

APPENDICES

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Appendix D: Surface Water
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Appendix A: Borehole Logs

- A1 – Paymaster Borehole Logs**
- A2 – Shave Gulch Borehole Logs**



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BORING NUMBER 09-PMBH-1

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PROJECT NUMBER 09208 DATE STARTED 9/16/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/16/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger & diamond bit coring DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling & HQ3 Coring SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,417; 1,248,327; 5,216.42 CORING METHOD HQ3 diamond bit
 TOP OF CASING N/A - no well installed DEPTH TO WATER N/A While Drilling N/A After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION unknown

REMARKS Samples collected 0-2ft, 2-3ft, 4-5ft, 6-6.3ft, 7-7.25ft, 9.1-11.3ft, 11.3-16.3ft, 16.3-21ft, 21-24.5ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					LIQUID LIMIT	PLASTIC LIMIT	SPT			
	0-23"	SC-SM	1	23"	0-3.5' Colluvium - Silty Clayey SAND, with gravel, trace cobbles, brown, dry, hard -- iron and manganese stained, color becomes yellowish brown, iron and manganese coated gravel, iron seam at 3'	27	21	75	8.17	-- Drilling depths not corrected for drill pad cut (<6") -- Specific Gravity 0'-2' = 2.906
	2-11"		2	11"			50/5"			
	11-16.3"	SC	3	5"	3.5'-7' Highly weathered Diorite, SAND and Lean CLAY, weathered bedrock, with iron and manganese stained gravel, dark yellowish brown	32	23	50/5"	10.49	
	16.3-17"		4	4"			50/4"			-- 7' started grinding rock
	17-20.5"		5	3"	7' - DIORITE, iron, manganese, and copper (?) coated fractures and joints (30° & 45° TCA), dark gray			50/3"		
	20.5-21.5"	box 1		21.5"	-- coring started at 9.1'. RQD = 31% 9.1'-16.3'					
	21.5-22.2"			55"	-- slightly magnetic @ ~10' and 12' -- 2" thick iron stained, highly fractured oxidized zones @ ~11.5', 12', 14', 14.25', 15', 16.3', 17', 18.3', 18.5', 19.5', 20', and 20.5'					-- 11' Some seams are clay lined. Alternating color changes of gray and dark yellowish brown observed in flush water from ~11.3' - 16.3'
	22.2-24.4"			53"	-- narrow fault zone at ~15' -- RQD = 16% 16.3'-24.4'					
	24.4-25"	box 2		18"	-- narrow fault zone at ~17' -- fault zone at ~19' to 22.2' -- trace magnetite, slightly magnetic @ ~19'					-- end of box 1 at 19.7', start of box 2
	25-24.4"	SC			22.2' - Clayey SAND, stiff, gray					
24.4-25"				End of Drilling at 24.4'					-- last foot of coring advanced fast and wash water color turned greenish gray. The sand and clay were washed from core barrel but some was recovered from bottom of bit.	



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PROJECT NUMBER 09208 DATE STARTED 9/16/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/16/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,240; 1,248,030; 5,248.35 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER 14.5' While Drilling; 16' After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION 9.3' 2:53pm 9/18/09

REMARKS Samples collected 0-0.75ft, 2-3.3ft, 4-5ft, 6-6.5ft, 8-8.25ft, 10-10.5ft, 12-12.5ft, 5-10ft, 14-14.5ft, 16-16.1ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION								
	0-5	SR/SC	1		0-5' Colluvium - Poorly sorted SAND with silty clay and gravel, trending to silty sand, trace cobbles, brown, dry	26	20	50/4"			4.58	-- Drill ing depths not corrected for drill pad cut (~1 1/2')	
			2					96/10"				-- Specific Gravity 0'-2' = 2.795	
			3					50/5"			12.84		
		5-8	SM	4		5'-9' Highly weathered Diorite bedrock - Silty SAND, with gravel, trace iron staining, manganese gravel, dark gray			50/5"				-- drillers observed cuttings have a strange odor from 6' to 10.5' (sample 8 is a grab sample of these cuttings from 5'-10')
				5		-- iron and manganese stained @ ~7'			50/3"			15.28	
		10		6	17"	-- lean clay layer, iron stained cuttings from ~9' to 11'			50/5"				
				7	4"				50/4"				
		15	ML	9		13.5'-15' Sandy SILT, with lean clay, iron stained lenses, mottled dark yellowish brown and dark gray, moist			50/5"			22.14	-- Auger grinding bedrock, harder drilling @ ~15'
			BR	10		15'-16.1' Weathered Diorite BEDROCK - dark yellowish brown and dark gray, wet			50/4"				
						End of drilling at 16.1'							



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PROJECT NUMBER 09208 DATE STARTED 9/14/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/14/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger & diamond bit coring DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon & HQ Core Samples SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,236; 1,248,674; 5,253.65 CORING METHOD HQ3 diamond bit
 TOP OF CASING N/A - no well installed DEPTH TO WATER DRY
 LOGGED BY Tom Smith GROUNDWATER ELEVATION UNKNOWN

REMARKS Samples collected 10-11.1ft, 11.1-15.3ft, 15.3-16.4ft, 16.4-20ft, 20-23ft, 23-25ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					REMARKS/TESTING
					LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	
					MATERIAL DESCRIPTION					
		ML			0-3' Colluvium - Sandy SILT, trace gravel and cobbles, brown, dry, hard drilling					Drilling depths not corrected for drill pad cut of ~2' Drilling very slow through cobbles / boulders. No split spoon sampling performed.
		SW			3' - 7.5' Highly Weathered Diorite - SAND and GRAVEL, gray, hard drilling -- drilling a little easier @ ~5.5' -- color becomes greenish brown @ ~7.5'					
	5									
	10	BR	box 1	10"	Fractured Diorite BEDROCK - iron, manganese, and copper stained fractures, rough and slightly undulating fracture faces, 10° - 20° TCA, dark gray -- began coring @ 10' -- RQD = 27% 10' - 16.4' -- slightly magnetic @ ~12'					box 1 from 10'-20'
	15			40"						
				5"	-- RQD = 16% 16.4' - 25'					
	20		box 2	31"						box 2 from 20'-25' EOD
				29"						
	25			16"	End of drilling at 25'					
	30									



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PROJECT NUMBER 09208 DATE STARTED 9/22/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/22/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger & diamond bit coring DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split spoon sampling & HQ core samples SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,029,930; 1,248,135; 5,329.83 CORING METHOD HQ3 diamond bit
 TOP OF CASING N/A - no well installed DEPTH TO WATER None While Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION N/A

REMARKS Samples collected 0-1.5ft, 2-2.8ft, 4-4.2ft, 6-6.6ft, 9.5-21ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING		
					LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)		MOISTURE (%)	
	0-3"	PT SM	1	17"	0-3" - DUFF - Peat, dark brown, dry			88/11"		Drilling depths not corrected for drill pad cut of ~ 6".	
	3"- 4'		2	9"	3"- 4' Highly Weathered Diorite - Silty SAND, with gravels, dark yellowish brown, dry -- trace gravel, dark grayish brown @ ~1.5'			50/4"	4.45		
	4'- 5'	GP	3	2"	4' - Diorite BEDROCK - with iron and manganese coating on gravels, color becomes gray @ ~6'			56/2"		6' - 8' - very hard drilling, small amounts of material recovered from split spoons, mostly chips and rock flour -- no recoverable sample 8'-9 $\frac{1}{2}$ ' -- started coring at 9 $\frac{1}{2}$ '	
	5'- 6'		4	2"				50/2"			
	6'- 10'		box 1			-- highly fractured and oxidized iron and manganese seam, dark yellowish brown from 11 $\frac{3}{4}$ ' - 12'					
	10'- 15'					-- copper veinlets, color becomes dark grayish green, iron and manganese coated fractures faces from 12' to 21' (EOD)					
	15'- 18.6'										
18.6'- 21'			6 box 2	60"						-- lost circulation from 18.75' - 21'	
21'			7	27"	End of drilling at 21'					-- box 2 18.6'-21' EOD	
21'- 25'											
25'- 30'											-- lost bit in hole, end of drilling @ ~ 21'



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PROJECT NUMBER 09208 DATE STARTED 9/21/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/12/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,029,899; 1,248,477; 5329.10 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER None While Drilling; None After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION N/A

REMARKS

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING		
					MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	SPT		DRY DENSITY (pcf)	MOISTURE (%)
	0-3"	PT ML	1	9"	0-3" - DUFF - Peat, dark brown, dry			50/5"		Drilling depths not corrected for drill pad cut of 2'. -- Drilling becomes very hard from 21' to 22"	
	3"-2.5"		2	5"	3"-2.5" - Colluvium - Sandy SILT, with gravel, with iron staining, brown, dry			50/5"			
	2.5' - 11'		3	3"	2.5' - 11' - Highly Weathered BEDROCK - fine grained Diorite, with iron staining, iron and manganese coated fractures, dark gray, dry			50/3"			
			4	3"				50/3"			
			5	5"				50/5"			
			6	3"				50/3"			
			7	23"		11' - Highly Weathered Diorite Bedrock - Sandy Lean CLAY, with iron staining, trace silt, iron and manganese stained fractures, dark gray and dark yellowish brown, moist -- with fine sand, gray and brown @ ~14' -- lean clay content increasing @ ~15'	44	20	50		19.7
			8	24"							
			9	16"		-- lean clay content decreasing @ ~17'	49	28	70/10"		29.8
			10	3"					50/3"		
			11	4"		-- color becomes dark gray and dark yellowish brown @ ~19' -- trace iron and manganese staining, slightly moist @ ~21' -- dry @ ~22'			50/4"		
			12	1.5"		End of drilling at 22'			50/1.5"		



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PROJECT NUMBER 09208 DATE STARTED 9/14/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/14/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Samples SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,115; 1,248,335; 5,277.68 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER None While Drilling; None After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION None 3:06pm 9/18/09

REMARKS Samples collected 0-2ft, 2-4ft, 4-6ft, 6-6.5ft, 9-10ft, 12-12.5ft, 14-15ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING		
					LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)		MOISTURE (%)	
	0-3'	ML	1	24"	0-3' Colluvium - Sandy SILT, with gravel, brown, dry			54		-- Drilling depths are not corrected for cut of drill pad (~4')	
	2-4'		2	24"				62	13.96	-- Specific Gravity 2'-4' = 3.074	
	4-6'	SW	3	24"	3'-15' Highly weathered Diorite Bedrock - SAND, trace gravel and silt, iron staining, and manganese veinlets, dark gray, wet			46			
	6-6.5'		4	24"	-- ~4" thick iron stained layer @ ~5 1/2' -- iron, manganese and Cu (?) coating on gravel from ~6' to 6 1/2'			60/5"			drilling a little stiffer from 6' - 6 1/2'
	6.5-9'		5	17"	-- iron and manganese seams from 9' to 10'			50/5"			
	9-10'		6	4"	-- with lean clayey gravel, iron and manganese seams, dark brown and dark gray from 12' to 12 1/2'			50/4"			
	10-12'		7	9"	-- with iron and manganese seams, trace gravel, dark gray and dark yellowish brown from 14 to 15'			50/3"			
	12-12.5'		8	1"	15-16.1' Bedrock - DIORITE, with iron staining, speckled dark gray and gray End of drilling 16.1'			50/1"			



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PROJECT NUMBER 09208 DATE STARTED 9/16/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/16/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,391; 1,247,889; 5,205.68 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER 9' While Drilling; None After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION None 2:49pm 9/18/09

REMARKS Samples collected 0-1ft, 2-2.25ft, 4-5.5ft, 6-8ft, 8-9.5ft, 10-10.25ft, 12-12.75ft, 14-14.5ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
	0-3'	ML	1	11"	0-3' Colluvium - Sandy Gravelly SILT, trace cobbles, brown, dry	23	19	50/5"	6.56		-- Drilling depths not corrected for drill pad cut (~1/2") -- Specific Gravity 0'-2' = 2.867
	3-5'		2	3"				50/3"			
	5-7'	SM	3	17"	3'-7' Highly Weathered Diorite Bedrock - Silty SAND, trace gravel, iron and manganese staining, dark gray and dark brown			84/11"	16.3		
	7-9'		4	24"				45			
	9-10'		5	17"	7'- Highly Weathered Diorite Bedrock - Silty SAND, with iron and manganese stained seams, mottled gray and dark yellowish brown, moist	42	37	87/5"	30.6		
	10-11'		6	3"	-- iron and manganese content increasing, color becomes dark yellowish brown @ ~9'			50/3"			
	11-12'		7	8"				50/2"	20.4		
	12-14.1'		8	1.5"	End of drilling 14.1'			50/1 1/2"			



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PROJECT NUMBER 09208 DATE STARTED 9/22/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/22/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,403; 1,248,701; 5,218.08 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER None While Drilling; None After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION None 9/24/09

REMARKS Samples collected 0-2ft, 2-3.5ft, 4-5ft, 6-7ft, 8-9ft, 10-10.5ft, 12-12.25ft, 14-14.1ft

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		PT	1	24"	0-3" - Duff, very dark brown, dry			61			Drilling depths not corrected for building drill pad (build-up of ~1')
		SM	2	17"	3"-5' - Colluvium - Sandy SILT, with gravel and cobbles, brown, dry			95/11"			
			3	10"		30	25	50/4"	10.6		
		SM	4	9"	5' - 8' - Highly Weathered Diorite Bedrock - Silty SAND, with iron staining, brown and yellowish brown, dry -- color becomes dark gray @ ~6'			50/3"			
		ML	5	10"	8'-16.5' - Weathered Diorite - Sandy SILT, with gravel, iron and manganese staining on seams, dark brown, slightly moist			50/4"	12.2		
			6	5"				50/5"			
			7	2"				50/2"	8.75		
			8	1"				50/1"			
					End of drilling 16.5'						



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PROJECT NUMBER 09208 DATE STARTED 9/17/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/17/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,592; 1,247,936; 5255.80 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER 4' While Drilling; 4.3' After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION standing water next to drill pad

REMARKS Boring located north of the Paymaster access road

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION								
		PT	1	24"	0-3' PEAT, very dark brown, hard, dry				32				Drilling depths not corrected for building drill pad (build-up of ~1/2') -- samples 5 (6'-6.5') and 6 (6.5'-7') are brass liner samples used while obtaining sample 4. Sample 5 permeability 7.0E-07 cm/s; Sample 6 permeability 5.4E-07 cm/s -- appears to be alluvium -- drilling becomes very hard from 21' to 24.5' EOD -- sample 14 was obtained from the end of the drill bit
			2	24"	-- becomes very stiff @ ~ 2'	35	25	23		22.8			
		ML	3	24"	3'-7.5' Very Sandy SILT, trending to silty sand, with iron staining, trace roots, dark brown, very stiff, wet -- trace gravel @ ~4'	35	25	28		19.3			
		SM	4	24"				28		18.8			
			5	6"						14.5			
		GW	6	6"									
			7	11"	7.5' - 9' Highly Weathered Diorite (?) - Sandy GRAVEL, with silt, iron and manganese staining, occasional silty sand in seams, very dense, dark brown and dark yellowish brown			50/5"					
		SM	8	9"	9'-10.5' Silty SAND, iron and manganese coated, very dense, very dark yellowish brown, wet, seams stained			96					
		SM	9	5"	10.5' - 19' Silty fine SAND, trace gravel, tight, oxidized, very dense, dark brown (glacial till?), wet			50/5"					
			10	9"	-- becomes fine very sandy lean clay, appears slightly overconsolidated @ ~12'			50/3"					
			11	3"	-- heavier manganese content, with manganese & iron seams @ ~13'			50/3"					
			12	4"	-- becomes gravelly @ ~15'			50/4"					
			13	1.5"	-- trace gravel @ ~17'			50/4"					
		SP			19'-21' Clean SAND, trace gravel, thin iron seams and manganese nodules, very dense, dark brown, wet			50/7.5"					
				21'- Weathered Bedrock - DIORITE, with iron seams and manganese and iron nodules, dark gray, wet									
			14	1"	End of drilling 24.5'								



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PROJECT NUMBER 09208 DATE STARTED 9/21/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/21/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,601; 1,248,689; 5179.94 CORING METHOD No coring for this boring
 TOP OF CASING N/A - no well installed DEPTH TO WATER 12' While Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION 7.33' 9/22/09

REMARKS Boring located north of the Paymaster access road

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION								
			1	24"	0-3" Topsoil - PEAT, dark brown, dry				25				Drilling depths not corrected for building drill pad (build-up of ~1 1/2') -- Brass liners used in split spoon sampler for all samples obtained from 6' to 26' Sample 4 permeability 1.8E-07 cm/s Permeability 8.9E-08 cm/s -- brass liners not used in samples 14 & 15 -- redrilled 28' to 29.5' due to sand inflow after removal of center drive bit -- Brass liners used from 28' to 29.5' -- Drilling becomes very hard from 28' to 29.5' EOD
			2	10"	3"-5' Colluvium - Sandy SILT, with organics, trace gravel, dark brown, very stiff, dry -- becomes very dense @ ~2'			50/4"					
			3	4"	-- becomes wet @ ~4'			50/4"					
		5	CL	4	11"	5' - 11' Highly Weathered Diorite - Lean CLAY, trace sand and gravel, very dense, brown	32	17	50/5"			17.0	
				5	24"	-- becomes dense @ ~8'			44				
		10		6	24"				42				
			SC	7	24"	11'- Clayey SAND, trace gravel, dense, dark brown, wet -- saturated at 12'			30				
		15		8	n.s.		33	18	41			16.1	
				9	17"	-- becomes very dense @ ~6'			84/11"				
		20		10	10"				50/4"				
				11	3"				50/3"				
		25		12	5"				50/5"				
				13	16"				99/10"				
				14	16"				91/10"				
				15	5"				50/5"				
		30		16	1"				50/1"				
					End of drilling 29.5'								



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BORING NUMBER 09-SGBH-1

PAGE 1 OF 2

PROJECT NUMBER 09208 DATE STARTED 9/17/2009
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10 DATE COMPLETED 9/18/2009
 LOCATION Lewis & Clark County, Montana DRILLER O'Keefe Drilling
 DRILLING METHOD hollow stem auger and core drill DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLING METHOD Split Spoon Sampling and Coring SAMPLER TYPE 3" diameter split spoon on downhole hammer
 NAD83 COORDINATES 1,030,973; 1,253,255; 5285,51 CORING METHOD HQ3 diamond bit
 TOP OF CASING N/A - no well installed DEPTH TO WATER None While Drilling; None After Drilling
 LOGGED BY Tom Smith GROUNDWATER ELEVATION N/A

REMARKS Drill site located on lower bench of Shave Gulch potential repository site.

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION								
		PT	1	11"	0-4" DUFF, dark brown, dry					25		10.2	Drilling depths not corrected for drill pad cut of ~1'
		ML			4"-2' Colluvium - Sandy SILT, with gravel and cobbles, brown, dry								
		SC	2	2"	-- trace gravel @ ~1'					50/2"			
			3	6"	2'-11' Highly Weathered Argillite - Clayey SAND, with roots and gravel, dark brown, dry					50/6"			
	5		4	3"						50/3"			
		SC	5	24"	-- trending to sand with trace lean clay and iron staining, moist @ ~7'	31	21	71				18.6	
	10		6	24"						78		14.52	
		ML	7	11"	11-25' Highly Weathered Argillite Bedrock - Sandy SILT, with trace gravel, brownish gray, dry					50/5"			
			8	9"	-- gravel is iron and manganese coated @ ~12'					50/3"		9.32	
	15		9	5"						50/5"			
			10	1"	-- color becomes brown @ ~17'					50/1"			
	20		11	2"						50/2"			
			12	3"	-- color becomes gray @ ~21'					50/3"			
	25	SM	13	5"						50/5"		10.3	
			14	4"	25'-29' Highly Weathered Argillite Bedrock - silty SAND, trace gravel, brownish gray, dry					50/4"			
			15	1"						50/1"			
	30	GW	16	4"	29'- Weathered Argillite Bedrock - SAND and GRAVEL, with iron staining, gray and yellowish brown, dry					50/4"			
			17	3"	-- iron staining content increasing, color becomes yellowish brown @ ~31'					50/3"			
			18	3"						50/3"			

end of drilling on 9/17/09 at 30', hole dry on 9/18/09



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BORING NUMBER 09-SGBH-2

PAGE 1 OF 2

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 DRILLING METHOD hollow stem auger
 SAMPLING METHOD Split Spoon Sampling
 NAD83 COORDINATES 1,031,316; 1,253,580; 5,377.95
 TOP OF CASING N/A - no well installed
 LOGGED BY Tom Smith

DATE STARTED 9/17/2009
 DATE COMPLETED 9/17/2009
 DRILLER O'Keefe Drilling
 DRILL RIG Rig 212 Ford F800 Diesel
 SAMPLER TYPE 3" diameter split spoon on downhole hammer
 CORING METHOD HQ3 diamond bit
 DEPTH TO WATER None While Drilling; None After Drilling
 GROUNDWATER ELEVATION N/A

REMARKS Drill site located up on steep slope of Shave Gulch potential repository site.

GRAPHIC LOG	DEPTH (FT)	U.S.C.S.	SAMPLE ID	RECOVERY	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	SPT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING	
												This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.
	0-4"	PT	1	15"	0-4" DUFF, dark brown, dry			77/9"		7.18	-- Drilling depths not corrected for drill pad cut of ~1'	
	4"-1.5'	CL-M			4"-1.5' Colluvium - Sandy SILT, with gravel and cobbles, brown, very dense, dry	22	17					
	1.5' - 11.5'	SM	2	17"	1.5' - 11.5' Highly Weathered Diorite Bedrock - GRAVEL, with silt infilling, gravel is coated with iron and manganese, dark brown, very dense, moist			97/11"		9.01	-- Specific Gravity 2'-4' = 2.868	
			3	24"					57			
		GM	4	5"	-- becomes sandy, trace gravel, dark gray, moist @ ~3.5'			50/5"		5.34		
			5	2"	-- becomes gravelly, dark brownish gray, moist @ ~5.5'			50/2"				
			6	24"					66		13.7	
		ML	7	5"	11.5'-17' Weathered Argillite Bedrock - Sandy Gravelly SILT, gravel coated with iron staining, trace lean clay, dark gray and brown			50/5"				
			8	4"					50/4"		10.3	
			9	4"					50/4"			
		10	3"	-- porphyry fragments, with iron staining, mottled gray and dark yellowish brown @ ~17.5'				50/3"				
								50/3"				
			box 1	46"	22'- Highly Fractured Bedrock - PORPHYRY, with iron and manganese fracture coating (coated fractures are dark yellowish brown and dark gray), fractures are mostly healed, trace sulfides (<3%) arsenopyrite, pyrrhotite, chalcocopyrite, and galena, gray						-- began coring at 22'; RQD = 30% -- porphyry appears bleached when compared to porphyry ore around the Mike Horse Mine.	
				26"	-- clay coated slip plane @ ~28'						--29' started losing and recovering water circulation; RQD = 56%	
				31"	-- color becomes greenish gray, sulfides <5%, undulating fracture faces, slightly rough @ ~29'							
			box 2	27"	-- fault zone @ ~33½'						-- RQD = 13% -- a sandy rubblized zone at 33.5' that may have washed out - no water circulation in 32'-36' interval	

Appendix B: Test Pit Logs

- B1 – Paymaster Test Pit Logs**
- B2 – Shave Gulch Test Pit Logs**
- B3 – Mike Horse Dam Toe Test Pit Logs**
- B4 – Mike Horse Road Test Pit Logs**



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TEST PIT NUMBER 09-PMTP-2

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,447

DATE STARTED 9/11/2009
 DATE COMPLETED 9/11/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,029,511; 1,248,197

REMARKS Bulk samples collected at 3', Bag samples collected at 1.5' and 3'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
MATERIAL DESCRIPTION									
			ML						
			SM						
			BR						
			BR						
		5							
		10							

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0-0.5' Duff - Sandy SILT, with organics, dark brown, dry
 0.5'-1' Colluvium - Silty SAND, with gravel and cobbles, brown, dry
 1'-3' Highly Weathered DIORITE, iron coated gravel and cobbles, dark reddish brown, dry
 3'-4' Weathered DIORITE, manganese coated gravel and cobbles, very dark brown, dry
 -- color becomes dark grayish brown @ ~4'
 Bottom of test pit 4'

Excavator hit refusal at 4'



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TEST PIT NUMBER 09-PMTP-4

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,397

DATE STARTED 9/11/2009
 DATE COMPLETED 9/11/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,029,576; 1,248,949

REMARKS Bulk samples collected at 2' and 4'; Bag samples collected at 4' and 8'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0	PT		0-6" DUFF, with organics, very dark brown, dry					
			GM		0.5'-3' Colluvium - Silty Sandy GRAVEL, trace cobbles and boulders, brown, dry					
		5	GM		-- becomes yellowish brown, moist @ ~2.5'					
			BR		3'-5' Highly Weathered Diorite - Silty Sandy GRAVEL, with cobbles, trace boulders, yellowish brown, iron staining, slightly moist					easily broken with rock hammer
		10	BR		5'-16' Weathered DIORITE - Cobbles, manganese staining, dark gray, moist					Bag samples @ 8' of Sandy Lean Clay layer
			BR		-- Iron staining increasing with banding @ ~7.5' - 8'					
		15	BR		-- Iron stained band @ ~9.5' - 10'					
			BR		-- Diorite has red staining @ ~12'					
		20			5'-16' Sandy Lean CLAY- with iron and manganese staining and very dark gray stringers, dark yellowish brown, moist					Max depth of excavator
					Bottom of test pit 16'					



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TEST PIT NUMBER 09-PMTP-7

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk/Grab samples
 GROUND ELEVATION 5,344

DATE STARTED 9/11/2009
 DATE COMPLETED 9/11/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,029,825; 1,248,593

REMARKS Bulk samples collected at 2'; Bag samples collected at 2' and 6'

GRAPHIC LOG LOOKING NORTH WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0-0.5'	PT		0-0.5' DUFF, with organics, very dark brown, dry					
		0.5' - 3'	SM		0.5' - 3' Colluvium - Silty SAND, brown, dry			106.3	8.1	
		3' - 21'	BR		3' - 21' Highly Weathered DIORITE - with iron, manganese and copper (?) staining/coating, with thin seams of moist lean clay, dark yellowish brown, between cobbles and boulders, dark brown, dry			89.5	25.3	Iron, copper and manganese staining on cobbles and boulders Thin layers of moist clay between cobbles and boulders
					Bottom of test pit 21'					max reach of excavator



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TEST PIT NUMBER 09-PMTP-10

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,195

DATE STARTED 9/11/2009
 DATE COMPLETED 9/11/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,030,508; 1,248,197

REMARKS Bulk samples collected at 1.5' - 2.5' and 3'-4'; Bag samples collected at 1.5' - 2.5' and 3'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION					
		0-0.5'	PT		0-0.5' DUFF, with organics, very dark brown, dry			96.9	10.0	
		0.5' - 1.5'			0.5' - 1.5' Colluvium - Silty SAND, with gravel, brown, dry					
		1.5' - 2.5'	BR		1.5' - 2.5' Weathered Diorite - Sandy GRAVEL, trace cobbles, manganese staining, trace iron staining, dark yellowish brown, dry			97.9	11.9	
		2.5'-6'			2.5'-6' DIORITE - Boulders, Cobbles, and Gravel, trace sand, dark gray, dry					
					Bottom of test pit 6'					Excavator hit refusal



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TEST PIT NUMBER 09-PMTP-11

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,224

DATE STARTED 9/14/2009
 DATE COMPLETED 9/14/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,030,221; 1,247,718

REMARKS Bulk samples collected at 2', 9'-10' and 14'; Bag samples collected at 2', 9'-10' and 12'-14'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. <td colspan="5"></td>									
MATERIAL DESCRIPTION <td colspan="5"></td>									
		0	PT						
		0.3	GM						
		2	BR						
		5							
		7							
		10	ML						
		15							
		16	BR						
		17							
		20							

0 - 0.3' DUFF, with organics, dark brown, dry

0.3' - 2' Colluvium - Silty Sandy GRAVEL, with cobbles, brown moist

2' - 10' Highly Weathered Diorite - Gravelly SAND, dark gray and dark yellowish brown, oxidized iron and manganese staining, wet (0.7-1.2 tons/sf pocket penetrometer)

-- oxidized seam of sandy lean clay, light gray and dark yellowish brown @ ~7'

10' - 16' SILT - trace lean clay, light gray mottled with dark yellowish brown, wet (2 tons/sf pocket penetrometer)

16'-17'-Weathered Diorite - Sandy GRAVEL and cobbles, dark gray, wet

Bottom of test pit 17'

Friable

Maximum depth of excavator



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TEST PIT NUMBER 09-SGTP-3

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,338

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,030,716; 1,253,552

REMARKS Bulk samples collected at 3' and 6'; Bag samples collected at 4', 6', 16' and 8'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
<p>This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>									
MATERIAL DESCRIPTION									
		0-0.8'	ML						
0-0.8' Duff and Topsoil - Sandy SILT, with organics, very dark brown, dry									
		0.8'-5.5'	ML				92.7	13.9	
0.8'-5.5' Colluvium - Highly Weathered Diorite - Sandy Gravelly SILT, with cobbles, light brown, moist, some dark bluish gray argillite float, dry									
		5.5'-7'	ML				91.1	20.6	
5.5'-7' Highly Weathered Diorite - Clayey SILT, with sand, gravel and cobbles, brownish gray, irons stained, soft, moist									
		7'-20'	BR						
7'-20' Highly Weathered Diorite - GRAVEL, dark brownish gray, soft, moist									
- color becomes dark gray @ ~10.5'									
- color becomes dark yellowish brown mottled with dark gray @ ~13'									
- iron staining content increasing to bottom of pit, manganese staining, copper seams, reddish brown @ ~15'									
Bottom of test pit 20'									Maximum depth of excavator



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TEST PIT NUMBER 09-SGTP-4

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,344

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,030,444; 1,253,754

REMARKS Located in line with Blackfoot Belle vein

GRAPHIC LOG LOOKING SOUTH		DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION					
		0	ML		0-0.3' Duff and Topsoil - Sandy SILT, with organics, dark brown, dry					Bulk samples collected at 2', 6' and 14' Bag samples collected at 2', 6' and 12'
		0.3	ML		0.3'-2' Colluvium - Cobbly Gravelly Sandy SILT, brown, dry					
		2	BR		2'-14' Weathered Diorite - Sandy Lean Clayey SILT, with gravel and cobbles, iron staining, dark yellowish brown, stiff, moist - cobbles are coated with manganese and trace copper veinlets - color becomes dark yellowish brown and gray @ ~8'					
		14			Bottom of test pit 14'					Max depth of excavator



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TEST PIT NUMBER 09-SGTP-5

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,277

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,030,345; 1,253,539

REMARKS Bulk samples collected at 2' and 9'; Bag samples collected at 2', 9' and 16'

GRAPHIC LOG LOOKING SOUTH		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0-3'	ML		0-0.3' Duff and Topsoil - Sandy SILT, with organics, dark brown, dry					
			ML		0.3'-3' Colluvium - Cobbly Gravelly Sandy SILT, brown, dry					
		3'-10'	BR		3'-10' Weathered Diorite - Sandy SILT, with gravels and cobbles, trace lean clay, iron staining, dark yellowish brown, moist					
			BR		10' - 17' Weathered Argillite - GRAVEL, with sandy silt, trace clay, iron staining, dark yellowish brown, stiff, moist					Weathered Argillite layer has a higher lean clay content than the weathered diorite
		Bottom of test pit 17'								Maximum depth of excavator

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TEST PIT NUMBER 09-SGTP-6

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,273

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,030,545; 1,253,368

REMARKS Bulk samples collected at 2' and 9'; Bag samples collected at 2', 9' and 16'

GRAPHIC LOG LOOKING SOUTH		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0-0.3'	ML		0-0.3' - Duff and Topsoil - Sandy SILT, with organics, dark brown, dry					
		0.3'-2'	ML		0.3'-2' Colluvium - Sandy SILT, with cobbles, brown, dry					
		2'-5'	BR		2'-5' Highly Weathered Diorite - Sandy Silty GRAVEL, with cobbles, trace lean clay, iron staining, trace manganese and copper staining, dark brown, moist					
		5'-16'	BR		5'-16' Weathered Argillite - GRAVEL with sandy lean clay, trace boulders and iron staining, medium stiff, dark brown, moist					
		16'			Bottom of test pit 16'					Maximum depth of excavator

This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

-- Wetter than 2'-5' layer



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TEST PIT NUMBER 09-SGTP-7

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk\Grab samples
 GROUND ELEVATION 5,296

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,030,864; 1,253,320

REMARKS Bulk samples collected at 2' and 12'; Bag samples collected at 2', 8' and 12'

GRAPHIC LOG LOOKING SOUTH		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0	ML		0-0.3' Duff and Topsoil - Sandy SILT - with organics, dark brown, dry					
		0.3	ML		0.3'-2' Colluvium - Sandy SILT, with gravel and cobbles, light brown, dry			96.6	7.2	
		2	ML		2'-8' Weathered Diorite - Sandy SILT, with cobbles, iron staining, manganese staining, yellowish brown, dry			97.4	14.7	
		8	SP		8'-9' Weathered Diorite - SAND, with cobbles, trace iron staining, and sandy lean clay, reddish brown, wet, appears to have porphyritic texture (unique layer)					
		9	BR		9' - 18' Highly Weathered Diorite - Sandy SILT, with cobbles, with lean clay, dark brown, iron and manganese staining, medium stiff, moist					other dark gray gravels are hard diorite
		18			Bottom of test pit 18'					



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TEST PIT NUMBER 09-SGTP-8

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Bulk/Grab samples
 GROUND ELEVATION 5,258

DATE STARTED 9/15/2009
 DATE COMPLETED 9/15/2009
 DEPTH TO WATER ~ 6'
 GROUNDWATER ELEVATION 5,252
 LOGGED BY Tom Smith and Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,031,379; 1,253,150

REMARKS Located near Shave Creek northwest of the access road.

GRAPHIC LOG LOOKING SOUTH		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0 5 10 15 20	PT SM		0-0.3' DUFF, dark brown, dry					Bulk samples collected at 6' and 9' Bag samples collected at 4', 7' and 9'
					0.3'-6' Alluvium - Silty SAND, with trace gravel and cobbles, dark reddish brown, damp					
					6'-9' Alluvium - Clayey Sandy GRAVEL, with cobbles, trace lean clay, yellowish brown, saturated					
					9' - 17' Sandy GRAVEL - with cobbles and boulders, trace silt and lean clay, saturated					
					<p>▼</p> <p>– making water @ ~14'</p>					
					Bottom of test pit 19'					Excavator hit refusal

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TEST PIT NUMBER 09-MHTP-1

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,484

DATE STARTED 9/8/2009
 DATE COMPLETED 9/8/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,839; 1,256,697

REMARKS Located at the west end of the test pit area on a bench

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0	SP		0-2.5' - Tailings - SAND, with gravel and cobbles, dark yellowish brown, dry					Bag samples collected at 9.5', 10' and 16' Estimated base of tailings and impacted soils, multiple layers of tailings and fill on bench Maximum depth of excavator
		2.5	ML		2.5'-4' Fill - Sandy SILT, with cobbles and gravel, dark brown gray, dry					
		4	SW		4'-5' Tailings - SAND, with gravel and cobbles, dark yellowish brown, dry					
		5			5'-9' Sandy Lean CLAY, with gravel, trace cobbles and boulders, dark grayish brown, dry					
		9	SW	1	9'-12' Tailings - SAND, with gravel and cobbles, dark yellowish brown, dry					
		10		2						
		12	CL		12' -16' Fill - Sandy Lean CLAY, with gravel, trace cobbles and boulders, dark grayish brown, damp					
		15								
		16	CL	3	16'-19' Alluvium? - Sandy Lean CLAY, with gravel, trace cobbles and boulders, dark grayish brown, wet					
		19			Bottom of pit 19'					



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TEST PIT NUMBER 09-MHTP-2

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,486

DATE STARTED 9/8/2009
 DATE COMPLETED 9/8/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,813; 1,256,785

REMARKS Bag samples collected at 4.5'-5', 6', 6.5', 7', 7.5' and 8'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0 5 10 15 20	SP SW SM	1	0-4' Tailings - SAND, with gravel and cobbles, acid generating, yellowish brown, dry					Estimated base of tailings and impacted soils
				2	4'-5' Fill - well graded SAND, with gravel, trace silt, dark brown, dry					
				3	5'-9' Silty SAND, with gravel, trace cobbles, dark brown, dry					
				4	-- sandy lean clay lens @ ~ 7'					
				5						
				6						
					Bottom of pit 9'					

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TEST PIT NUMBER 09-MHTP-5

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,461

DATE STARTED 9/9/2009
 DATE COMPLETED 9/9/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,905; 1,256,902

REMARKS Bag samples collected at 4.5' 5.5', 6.5', 7', 8' and 9'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0 5 10 15 20		SP	0-3.3' Tailings - SAND, with gravel, dark yellowish brown, dry					Natural topsoil layer? Estimated base of tailings and impacted soils
				CL	3.3'-5.5' Fill - Sandy Lean CLAY, with gravel, becomes fine sand at 5', flotation tailings lenses, brown, moist					
				GW	5.5'-5.8' FILL - oxidized tailings, dark yellowish brown					
				GM	5.8'-6.5' Topsoil - Lean CLAY, with gravel, sand, and roots, trace organics and glass, moist					
					6.5'-12.5' Colluvium - Sandy Silty GRAVEL, with cobbles, trace boulders, grayish brown to brown, moist					
					Bottom of pit 12.5'					



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TEST PIT NUMBER 09-MHTP-6

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,456

DATE STARTED 9/9/2009
 DATE COMPLETED 9/9/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,905; 1,256,971

REMARKS Bag samples collected a 5', 6', 6.5', 7.5' and 8.5'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
		0 5 10 15 20	SP		0-2.5' Tailings - SAND and GRAVEL, with lean clay and silt, dark yellowish brown, dry					
			SP		2.5'-5.25' Fill - Fine SAND, trace organics, dark brown, moist					
				1	5.25'-5.5' Oxidized Tailings - SAND, dark yellowish brown, moist					
			SW	2	5.5'-10.5' Fill? - Sandy SILT with gravel, dark brown, moist					
			ML	3						
	4									
	5									
					Bottom of pit 10.5'					Estimated base of tailings and impacted soils Excavator hit refusal



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TEST PIT NUMBER 09-MHTP-7

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,450

DATE STARTED 9/9/2009
 DATE COMPLETED 9/9/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,950; 1,256,992

REMARKS Bag samples collected a 6.5', 7.5', 8.5' and 9'

GRAPHIC LOG LOOKING WEST	DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING
				LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	
MATERIAL DESCRIPTION								
	0-6'	SM		0-6' Oxidized Tailings - Fine SAND with silt, gravel, and cobbles, dark yellowish brown, dry -- 4" diameter steel pipe @ ~ 2'				
	6-8'	BR	1	6'-8' Highly Weathered Shale - GRAVEL, with sand, trace cobbles, iron staining, dark brown, moist				Estimated base of tailings and impacted soils
	8-10'		2 3 4	8'-10' Highly Weathered Shale - SAND and GRAVEL, with silt, trace lean clay, dark brown, moist				
	Bottom of pit 10'							Excavator hit refusal



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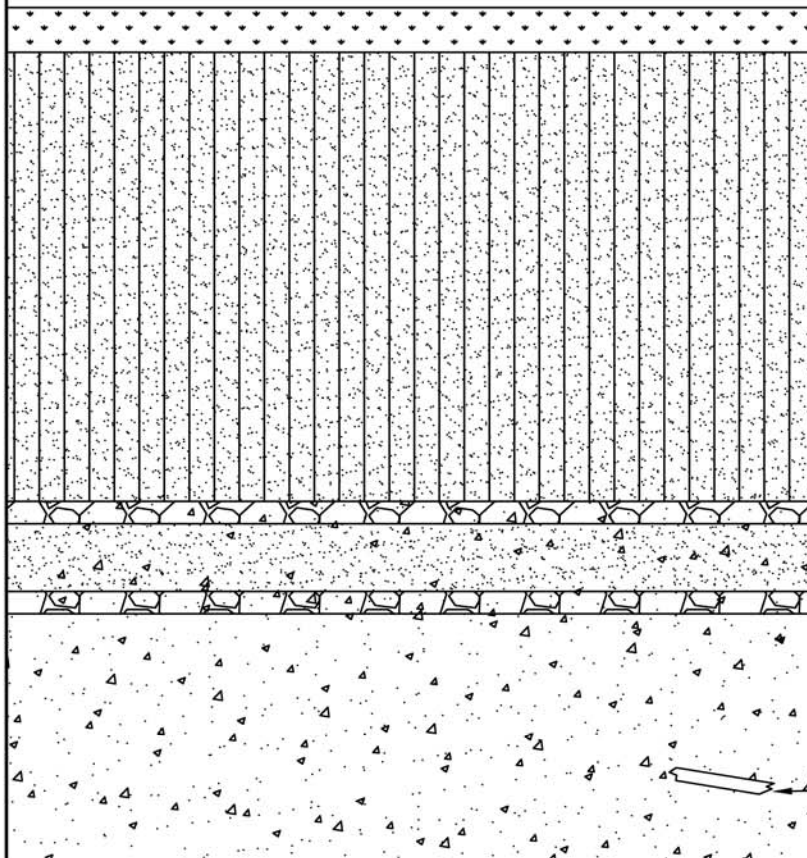
TEST PIT NUMBER 09-MHTP-9

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,436

DATE STARTED 9/9/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER 16'
 GROUNDWATER ELEVATION 5,420
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,025,976; 1,257,127

REMARKS Bag samples collected at 10' and 16'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION					
			PT		0-1' PEAT, dark brown and very dark brown, dry					This test pit is located on a bench created during the 1975 dam repair and is composed of fill and fine tailings. Tailings appear to have infiltrated the alluvium or was mixed during the dam repair activities. Pooling water in test pit prevented estimating base of tailings and impacted soils.
		5	ML		1'-11' Fill - Fine Sandy SILT, with gravel and boulders and pyrite flotation tailings in shale gravel, cobbles, and boulders, slightly oxidized in upper 2', yellowish brown, moist -- color becomes dark gray @ ~ 3'					
			GM		11'-11.5' Fill - Shale GRAVEL, with silt, trace sand, reddish brown, moist					Max depth of excavator
			GM		11.5'-13' Fill - Sandy GRAVEL with boulders, trace silt, grayish brown, wet					
		15	GM		13'-13.5' Fill - Shale GRAVEL, with silt, trace sand, red/brown, wet					
			GW		13.5'-19' Alluvium - Sandy GRAVEL, with boulders, roots, trace silt, very dark brown, wet -- tree debris @ ~ 17'					
		20			Bottom of pit 19'					



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TEST PIT NUMBER 09-MHTP-10

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD Grab samples
 GROUND ELEVATION 5,431

DATE STARTED 9/9/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER 17'
 GROUNDWATER ELEVATION 5,414
 LOGGED BY Tom Smith
 COORDINATES (NAD 83) (N, E) 1,026,035; 1,257,147

REMARKS Bag samples collected at 8' and 16'

GRAPHIC LOG LOOKING WEST		DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
					MATERIAL DESCRIPTION					
		0	PT		0-0.5' PEAT, dark brown and very dark brown, dry					<p>This test pit is located on a bench created during the 1975 dam repair and is composed of fill and fine tailings.</p> <p>Tailings appear to have infiltrated the alluvium or was mixed during the dam repair activities.</p> <p>Pooling water in test pit prevented estimating base of tailings and impacted soils.</p>
		5	ML		0.5'-9' Fill - Fine Sandy SILT, with pyrite flotation tailings in shale gravel, cobbles, boulders, and tails, brown, moist					
		10	GM		9'-10' Fill - Shale GRAVEL, with silt, trace sand, reddish brown, wet					
		15	GW		10'-19' Alluvium - Sandy GRAVEL, with boulders, flotation tailings, roots, trace silt, very dark brown, wet					
		17.5			▽ -- tree debris at ~ 17.5'					
		20			Bottom of pit 19'					Max depth of excavator



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TEST PIT NUMBER 09-MHRDTP-1

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,418
 REMARKS No samples taken

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,256,862; 1,026,686

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
	0	ML		0 - 2' Colluvium - Sandy SILT, with cobbles, trace gravel, light brown, dry					Bedrock is fractured and can be ripped or dug with large equipment Excavator limited by reach
	2	BR		2' - 4' BEDROCK - Diorite, dark brown, dry					
	5			Depth of test pit 4'					
	10								
	15								
	20								



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TEST PIT NUMBER 09-MHRDTP-2

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,393

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,256,633; 1,027,314

REMARKS No samples taken

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering, INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING
				LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	
MATERIAL DESCRIPTION								
			ML	0-1' Colluvium - Sandy SILT, with gravel and cobbles, light brown, dry				Bedrock is fractured and can be ripped or dug with large equipment Excavator limited by reach
			BR	1' - 5' BEDROCK - DIORITE, Sandy Cobbles with boulders, trace silt and lean clay, dark brown, dry				
	5			Depth of test pit 5'				
	10							
	15							
	20							



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TEST PIT NUMBER 09-MHRDTP-4

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,353

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,256,235; 1,027,923

REMARKS No samples taken

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING
				MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	
			BR	0' - 1' BEDROCK - Diorite, dark brown, dry				Exposed bedrock very hard
				Depth of test pit 1'				Excavator hit refusal
	5							
	10							
	15							
	20							



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TEST PIT NUMBER 09-MHRDTP-5

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,324
 REMARKS No samples taken

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,255,876; 1,028,151

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
				MATERIAL DESCRIPTION					
	0-2'	ML		0-2' Weathered Diorite - Sandy SILT, with cobbles, light brown, dry				Most of Colluvium is slough material from above bedrock is very hard Excavator hit refusal	
	2' - 4'	BR		2' - 4' BEDROCK - Fractured Diorite, dark brown, dry					
	Depth of test pit 4'								



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TEST PIT NUMBER 09-MHRDTP-6

PAGE 1 OF 1

PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,299

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,255,564; 1,028,369

REMARKS No samples taken

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				REMARKS/TESTING
				LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	
MATERIAL DESCRIPTION								
			ML	0-1' Colluvium - Sandy SILT, with cobbles, light brown, dry				Most of Colluvium is slough material from above
			BR	1' - 4' BEDROCK - Fractured Diorite, dark grayish brown, dry				Bedrock is very hard
				Depth of test pit 4'				Excavator hit refusal



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TEST PIT NUMBER 09-MHRDTP-7

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PROJECT NUMBER 09208
 PROJECT NAME UBMC SUMMER FIELD WORK TO 10
 LOCATION Lewis & Clark County, Montana
 EXCAVATION METHOD Backhoe
 SAMPLING METHOD No samples taken
 GROUND ELEVATION 5,296

DATE STARTED 9/16/2009
 DATE COMPLETED 9/16/2009
 DEPTH TO WATER NONE
 GROUNDWATER ELEVATION N/A
 LOGGED BY Jamie Mongoven
 COORDINATES (NAD 83) (N, E) 1,255,351; 1,028,512

REMARKS No samples taken

GRAPHIC LOG LOOKING NORTH	DEPTH (FT)	U.S.C.S.	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (pcf)	MOISTURE (%)	REMARKS/TESTING
	0 5 10 15 20	ML BR	0-1' 1'-4'	0-1' Weathered Diorite - Sandy SILT, with gravel and cobbles, light brown, dry 1' - 4' BEDROCK - Fractured Diorite, with manganese staining, dark brown, dry Depth of test pit 4'					Most of Colluvium is slough material from above Bedrock is very hard Excavator hit refusal

This log is part of a report by TerraGraphics Environmental Engineering INC. for the project and should be read with the report. The summary applies only at the location of the boring and at the time of the drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Appendix C: Photo Logs

- C1 – Mike Horse Dam Toe Photo Log**
- Mike Horse Road Photo Log**
- Paymaster Photo Log**
- Shave Gulch Photo Log**
- C2 – Hazards Photo Log**

Photo 1: 09-MHTP-1 Looking West into the test pit.



Photo 2: 09-MHTP-1 Looking East into the test pit. Gray layer is flotation tailings from the impoundment.



Photo 3: 09-MHTP-2 Looking West into the test pit. Note wood debris in the pit.

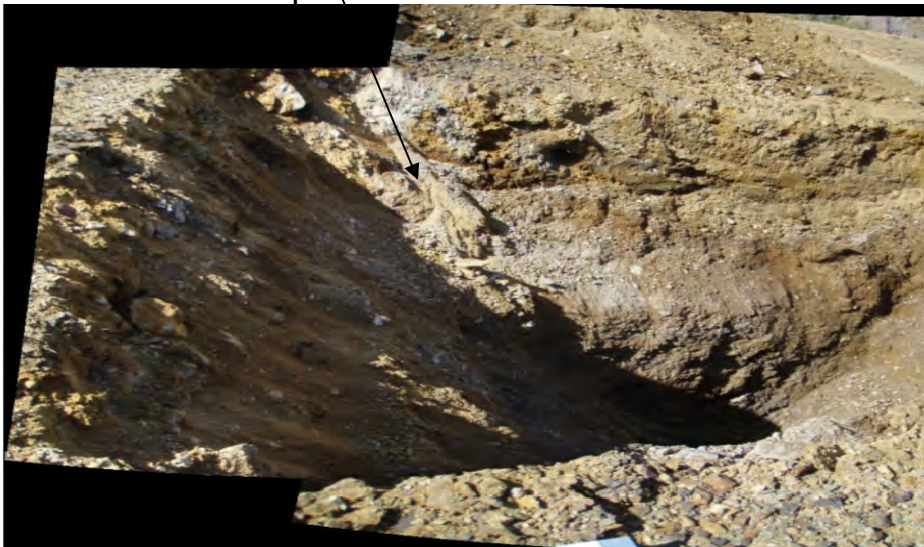


Photo 4: 09-MHTP-3 Looking West into the test pit. Gray layer is flotation tailings from the impoundment.

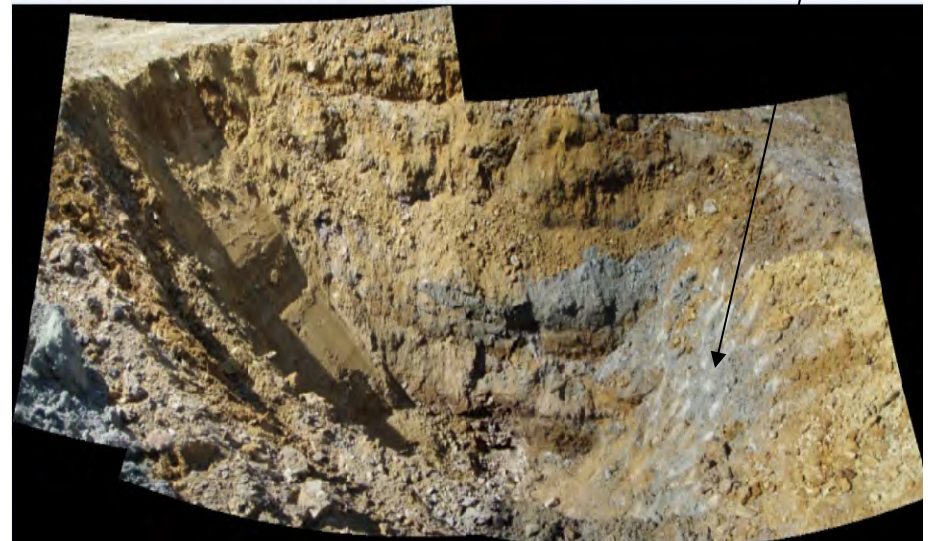


Photo 5: 09-MHTP-4 Looking West into the test pit.



Photo 6: 09-MHTP-5 Looking West



Photo 7: 09-MHTP-6 Looking West into the test pit.



Photo 8: 09-MHTP-7 Looking West into the test pit.



Photo 9: 09-MHTP-8 Looking West into the test pit.



Photo 10: 09-MHTP-9 Looking South into the test pit.



Photo 11: 09-MHTP-10, Excavated material and tree debris.



Photo 12: 09-MHTP-10 Looking East at the base of tailings and into the alluvium.



Tree debris

Photo 13: 09-MHTP-10 Looking South at the oxidizing and reducing zones.

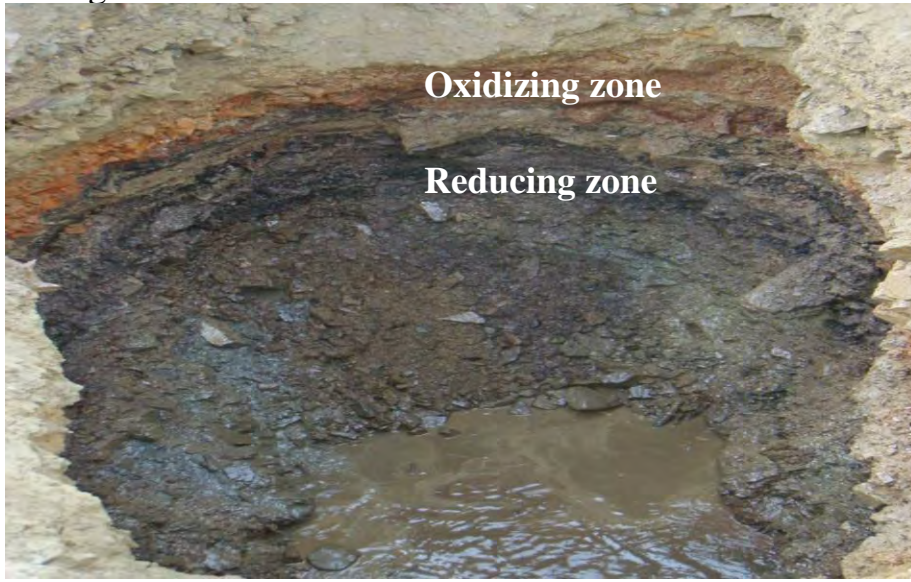


Photo 1: 09-MHRDTP-1 Looking West at pit.



Photo 2: 09-MHRDTP-1 Looking North at pit and pile.



Photo 3: 09-MHRDTP-2 Looking West in the pit.



Photo 4: 09-MHRDTP-2 Looking North at pit and pile.



Photo 5: 09-MHRDTP-3 Looking West at the pit.



Photo 6: 09-MHRDTP-3 Looking West at pit and pile.



Photo 7: 09-MHRDTP-4 Looking West at pit.



Photo 8: 09-MHRDTP-4 Looking North at pit and pile.



Photo 9: 09-MHRDTP-5 Looking West at the pit.



Photo 10: 09-MHRDTP-5 Looking North at pit and pile.



Photo 11: 09-MHRDTP-6 Looking North at the pit.



Photo 12: 09-MHRDTP-6 Looking North at pit and pile.



Photo 13: 09-MHRDTP-7 Looking West in the pit.



Photo 14: 09-MHRDTP-7 Looking West at pit and pile.



Photo 1: 09-PMTP-1 looking south at the pit.

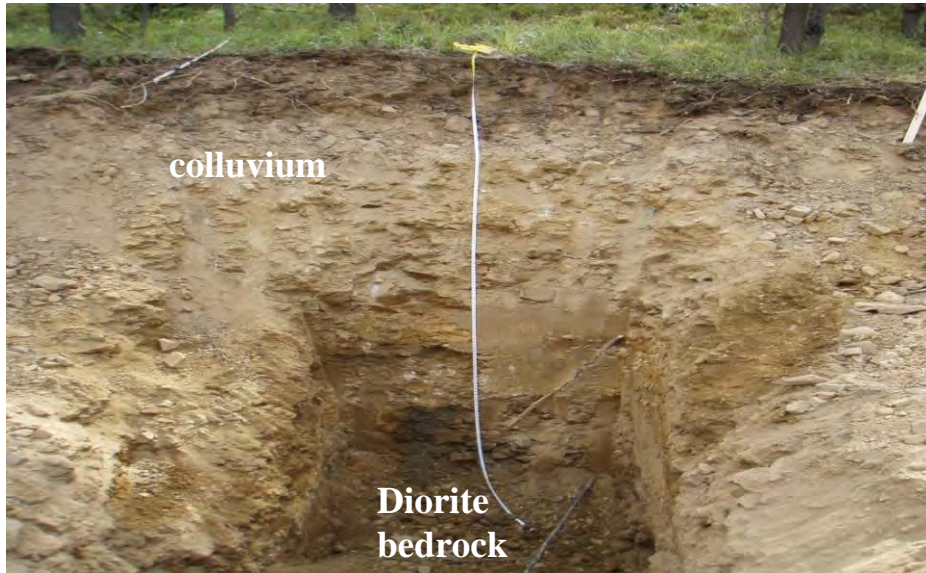


Photo 2: 09-PMTP-2 looking west into the pit.



Photo 3: 09-PMTP-3 looking east into the pit.

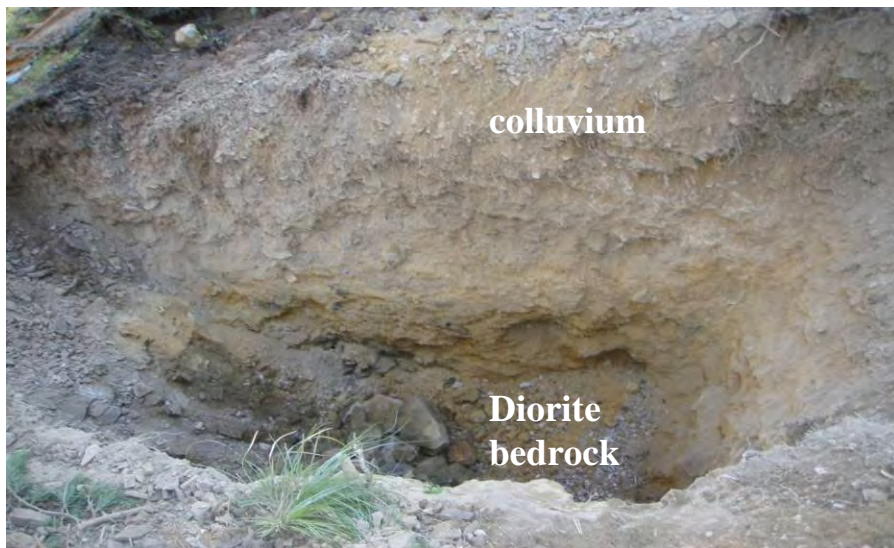


Photo 4: 09-PMTP-4 looking west. Dark yellowish brown lean clay layer rises up through the pit and turns downhill.

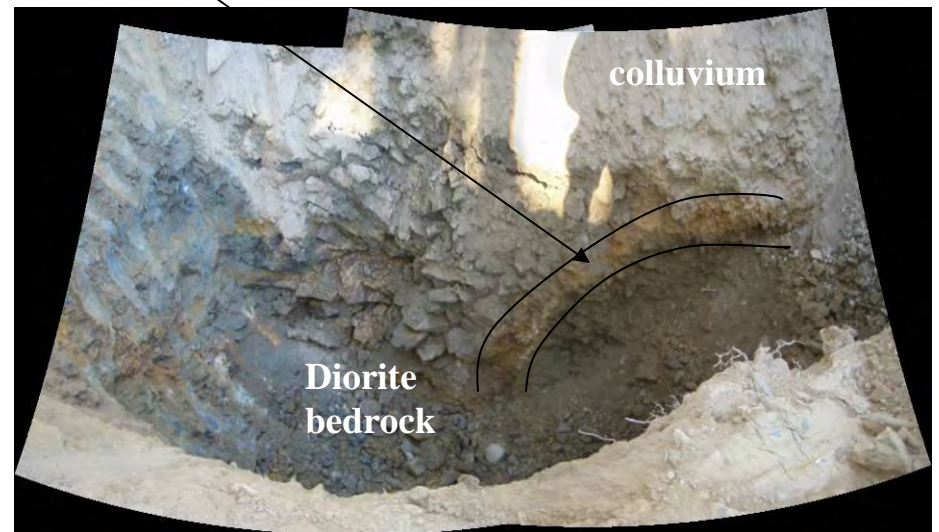


Photo 5: 09-PMTP-5 looking southerly. Pit is located above the existing ASARCO repository. Pyrite veinlets observed in diorite bedrock.

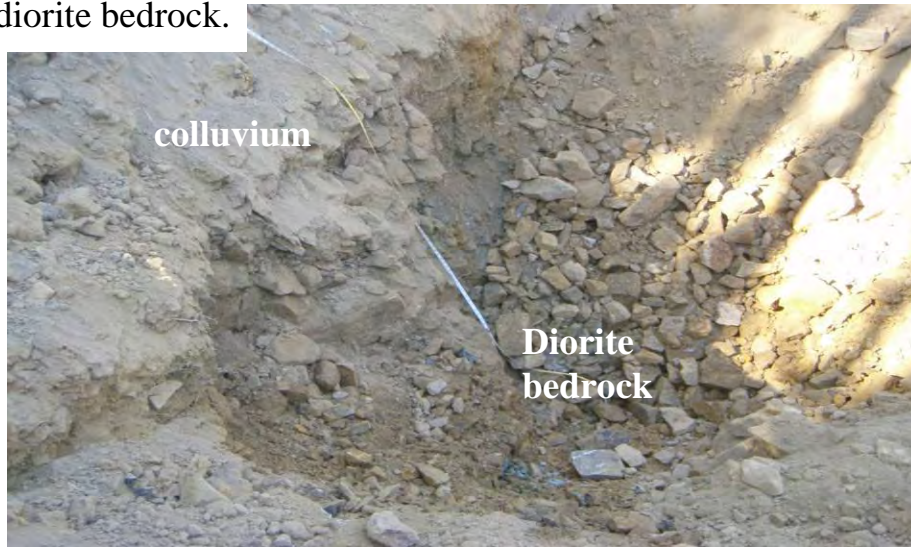


Photo 6: 09-PMTP-6 looking east into the pit.

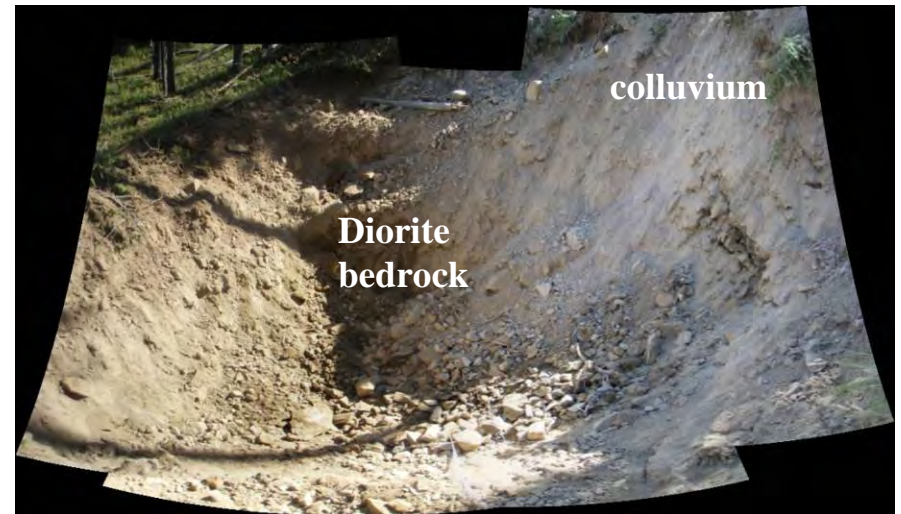


Photo 7: 09-PMTP-7 looking southerly. A vertical layer of oxidized lean clay rises up through the middle of the diorite bedrock.

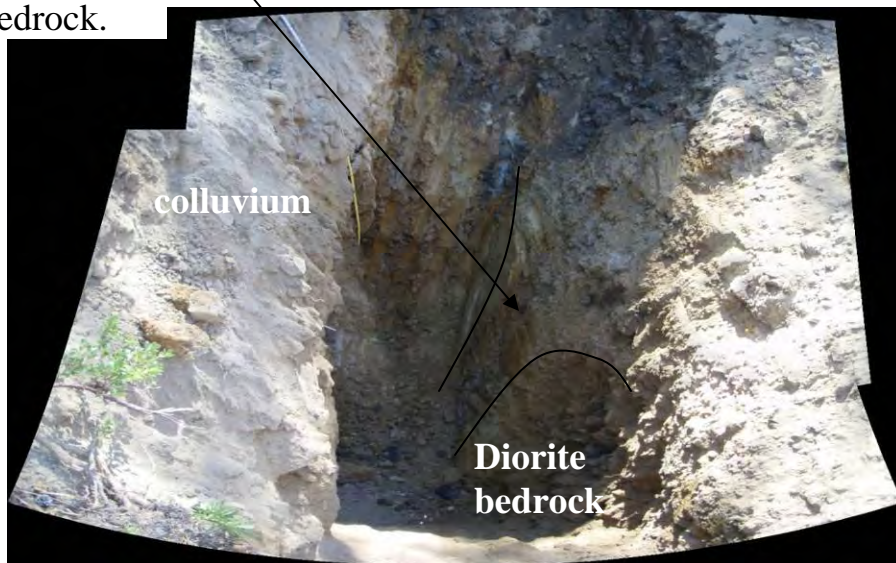
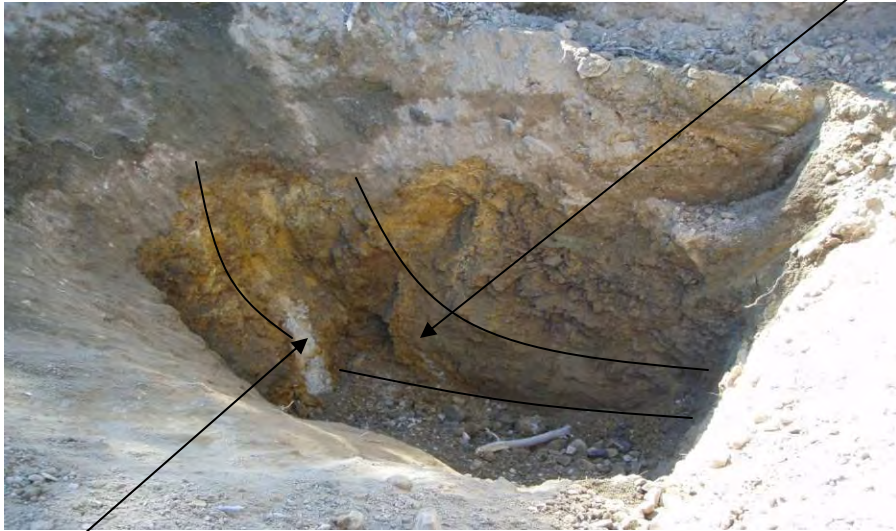


Photo 8: 09-PMTP-8 looking west. Pit located adjacent to diorite outcrop on west side of site.



Photo 9: 09-PMTP-9 looking west. Pit located to the NW of existing ASARCO repository. Sandy lean clay layer in pit.



Wedge of light gray sandy silt with little to no cohesion.

Note: no photo of 09-PMTP-10 appears to have been taken.

Photo 10: 09-PMTP-11 looking west down in to the pit.

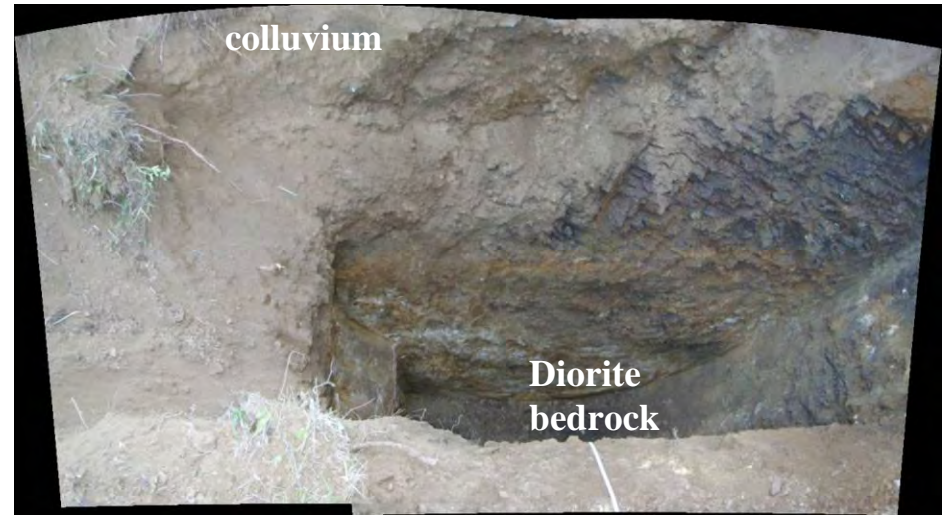


Photo 1: 09-SGTP-1 looking South. Highly weathered diorite and argillite layers in the test pit.



Photo 2: 09-SGTP-2 looking East. Highly weathered argillite layers in the test pit.



Photo 3: 09-SGTP-3 looking North. Highly weathered diorite in the test pit.



Photo 4: 09-SGTP-4 looking East. Weathered diorite in the test pit.



Photo 5: 09-SGTP-5 looking North. Weathered diorite and argillite in the test pit.



Photo 6: 09-SGTP-6 looking Southerly. Weathered diorite and argillite in the test pit.



Photo 7: 09-SGTP-7 looking Easterly. Reddish brown silty sand layer not observed elsewhere on site.

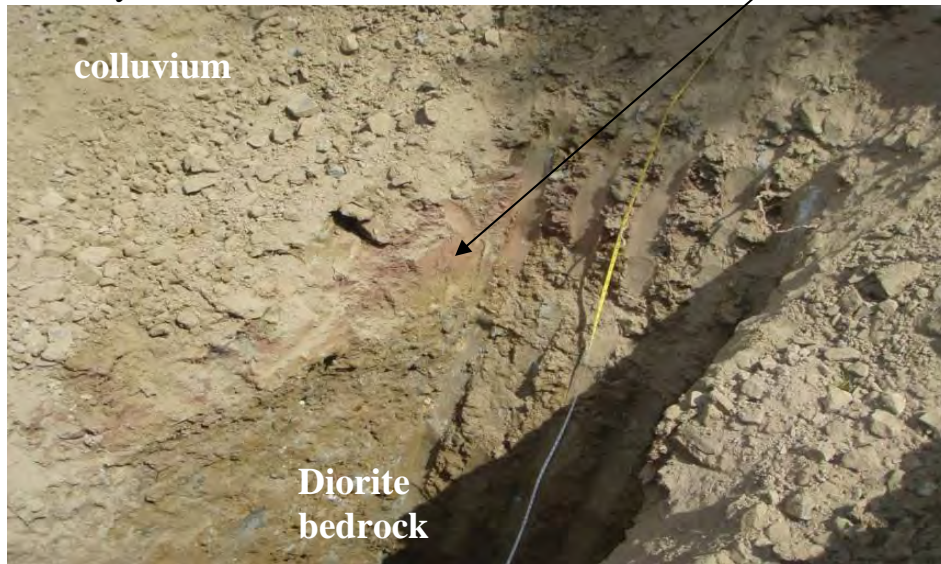


Photo 8: 09-SGTP-7 looking Easterly. Reddish brown silty sand layer.

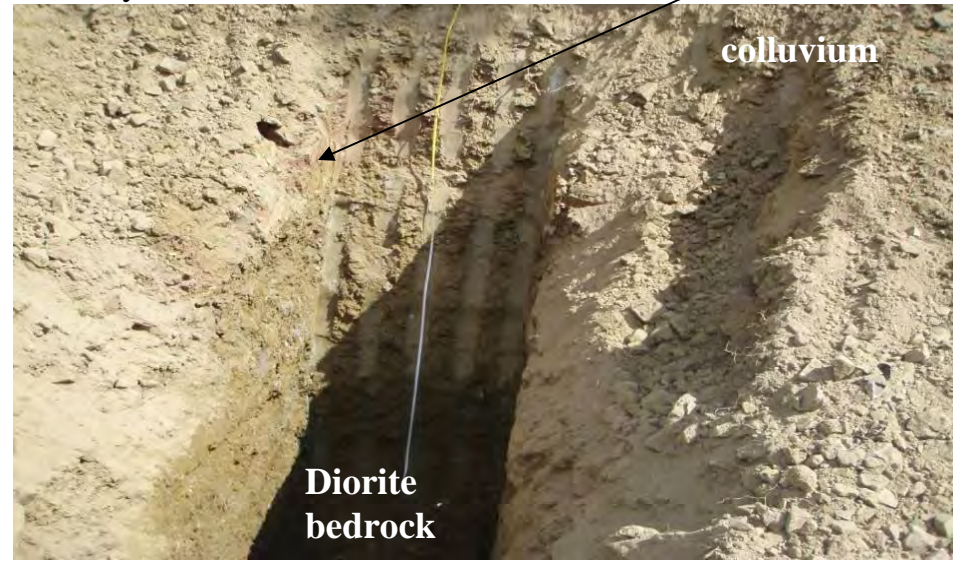


Photo 9: 09-SGTP-8 looking East. Alluvium layers in the test pit located below the Shave Gulch access road.



Photo 10: 09-SGTP-9 looking North. Highly weathered diorite in the test pit.



Photo 1: Waste/Tailings Pile below collapsed Mary P adit along Mike Horse Creek Road (looking SE).



Photo 2: Waste/Tailings Pile below collapsed Mary P adit along Mike Horse Creek Road (looking easterly).



Photo 3: 2 MWs across the road from Mary P piles (looking E).



Photo 4: possible historic building between the Paymaster and Mike Horse Creek Road (looking SW).



Photo 5: Hillside cut, ~ 30'-40', wide above old building in photo 4 (looking SW).



Photo 6: Trench, on left, along overgrown exploration road, above Paymaster

Road.
(looking NE)

trench



exploration
road

Photo 7: MWs at corner in Paymaster Road along Creek (looking SW).



Photo 8: Fine tails dumped below Paymaster road, Edith workings(?).

(looking S)



Photo 9: Detention pond below Paymaster Road (looking SE)
part of the
Edith
workings (?).



Photo 10: Debris pile on uphill side of Paymaster Road
(looking S).



Photo 11: MW PMP-3 on north edge of Paymaster Road
and by Paymaster Creek (looking N).



Photo 12: MWs (PMPZ-1 & 2) & inactive wetland cell on
south side of Paymaster Road below Paymaster workings
(looking SW).



Photo 13: Acid seep and tailings on north side of Paymaster Road (looking N).



Photo 14: Paymaster Creek (looking W).



Photo 15: MWs PMGW-118 and PMGW-119 on north side of Paymaster Road (looking W).



Photo 16: PMGW-117 along north side of Paymaster Road (looking W).



Photo 17: PMGW-116 on south side of Paymaster Road (looking W).



Photo 18: Dozed exploration pit or pond, 3'-4' deep (looking S).



Photo 19: 24" CMP on Mike Horse Creek Road with 54" RCP (looking N).



Photo 20: Overhead power crossing on Mike Horse Creek Rd. (looking N).



Photo 21: Collapsing building & debris on east side of Mike Horse Creek Road near Shave Creek (looking NE).



Photo 22: Collapsing building on east side of Mike Horse Creek Road near Shave Creek (looking NE).



Photo 23: Collapsing building on east side of Mike Horse Creek Road near Shave Creek (looking NE).



Photo 24: Power pole at intersection of Shave and Mike Horse Creek Road (looking NE).



Photo 25: Collapsing building in Shave Gulch area (looking NE).



Photo 26: Old cabin in Shave Gulch along old exploration workings (looking E).



Photo 27: Mike Horse Creek Road wetland, culvert, power and phone crossing (looking E).



Photo 28: Power junction box on east side of Mike Horse Creek Road (looking SE).



Photo 29: 12" CMP culvert in Mike Horse Creek Road between the wetlands & Shave Creek (looking W).



Photo 30: Shave Creek culverts in Mike Horse Creek Road 24" CMP and 54" RCP (looking SW).



Photo 31: Telephone pedestal on north side of Mike Horse Creek Road near Shave Creek (looking E).



Photo 32: Damaged 24" CMP under Mike Horse Creek Road near the water treatment plant (looking NE).



Photo 33: Pipeline repairs from Mike Horse adit to WTP on east side of Mike Horse Creek Road (looking S).



Photo 34: Seep in lower road to Mike Horse Mine and pipe work to WTP (looking NE).



Photo 35: Second seep in lower road below the Mike Horse Mine (looking NE).



Photo 36: Two junction boxes in lower road below the Mike Horse Mine (looking NE).



Photo 37: Retaining wall above Mike Horse town site & above Mike Horse Creek Road (looking SW).



Photo 38: Bottom of old Mike Horse Impoundment flume & 24" RCP inlet (looking S).

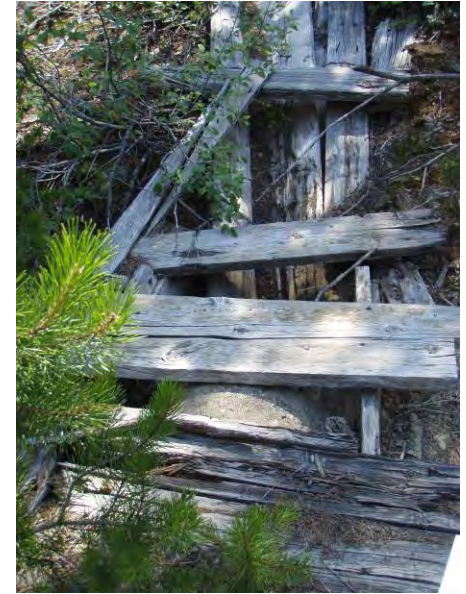


Photo 39: Old Mike Horse Impoundment diversion flume (looking S).



Photo 40: Anaconda Shaft and reclaimed collar, also area near 280' deep shaft with workings under Blackfoot River (looking N).



Photo 41: Panorama of Mike Horse Tailings Impoundment looking S from the dam.



Photo 42: Panorama of Mike Horse Tailings Impoundment looking E along the diversion ditch. Buried garbage dump from town reported, by G. Kovic, to be located along southern end of impoundment (to the right).



Photo 43: Shellie Haaland, of DEQ, standing over the estimated location of the abandoned septic tank system for the town of Mike Horse (looking N).



Photo 44: Subsidence of collapsed adit above the water treatment plant & underlying Mike Horse Creek Road (looking SW).



Photo 45: Mike Horse Creek Road pipeline & repair pit (looking E).



Photo 46: Same location as photo 45, pipe in the excavation (looking E).



Photo 47: Mike Horse Creek Road repair pit & foam insulated pipe cleanouts (looking E).



Photo 48: Mike Horse Creek Road repair pit & pipe repair (looking S).



Photo 49: Mike Horse Creek Road repair pit & foam insulated pipe cleanouts (looking E).



Photo 50: Mike Horse Creek Road repair pit & foam insulated pipe cleanouts (looking SW).



Photo 51: Mike Horse Creek Road repair pit & foam insulated pipe cleanouts (looking S).



Photo 52: Mike Horse Creek Road repair pit & foam insulated pipe cleanouts (looking S-SW).



Appendix D: Surface Water

- D1 – Analytical Reports for August 2009 and
November 2009 Sampling**
- D2 – Stream Discharge Calculations**

September 15, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC-Mike Horse
Pace Project No.: 10111520

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 01, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Washington Certification #: C754

Tennessee Certification #: 02818

Pennsylvania Certification #: 68-00563

Oregon Certification #: MN200001

North Dakota Certification #: R-036

North Carolina Certification #: 530

New York Certification #: 11647

New Jersey Certification #: MN-002

Montana Certification #: MT CERT0092

Minnesota Certification #: 027-053-137

Maine Certification #: 2007029

Louisiana Certification #: LA080009

Louisiana Certification #: 03086

Kansas Certification #: E-10167

Iowa Certification #: 368

Illinois Certification #: 200011

Florida/NELAP Certification #: E87605

Montana Certification IDs

602 South 25th Street Billings, MT 59101

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

EPA Region 8 Certification #: 8TMS-Q

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10111520001	BRSW-23	Water	08/28/09 14:15	09/01/09 09:45
10111520002	BRSW-3B	Water	08/28/09 16:01	09/01/09 09:45
10111520003	BRSW-38A	Water	08/28/09 19:00	09/01/09 09:45
10111520004	BRSW-38	Water	08/28/09 18:20	09/01/09 09:45
10111520005	BRSW-3A	Water	08/28/09 15:15	09/01/09 09:45
10111520006	BRSW-22A	Water	08/28/09 17:10	09/01/09 09:45
10111520007	BRSW-48	Water	08/28/09 13:02	09/01/09 09:45
10111520008	BRSW-22	Water	08/28/09 17:07	09/01/09 09:45
10111520009	BRSW-2	Water	08/28/09 11:51	09/01/09 09:45
10111520010	BRSW-1	Water	08/28/09 10:12	09/01/09 09:45

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10111520001	BRSW-23	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520002	BRSW-3B	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520003	BRSW-38A	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520004	BRSW-38	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520005	BRSW-3A	EPA 200.8	RJS	13	PASI-M

REPORT OF LABORATORY ANALYSIS

Page 4 of 51

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SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520006	BRSW-22A	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520007	BRSW-48	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520008	BRSW-22	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520009	BRSW-2	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT
10111520010	BRSW-1	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	CR1	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2310	CAC	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 2540C	ACH	1	PASI-M
		SM 2540D	KS1	1	PASI-MT
		SM 4500-H+B	CAC	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17089

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 673269)
- Manganese

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17089

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10111501001,10111520009

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 673273)
- Aluminum
- Manganese

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17087

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10111501001,10111520010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 673262)
 - Calcium, Dissolved
 - Magnesium, Dissolved
 - Potassium, Dissolved
 - Sodium, Dissolved
- MS (Lab ID: 673264)
 - Calcium, Dissolved
 - Magnesium, Dissolved
- MSD (Lab ID: 673263)
 - Calcium, Dissolved
 - Magnesium, Dissolved
 - Sodium, Dissolved

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: EPA 300.0

Description: 300.0 IC Anions

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Method: SM 2310
Description: 2310 Acidity
Client: Montana Dept. of Environmental Quality
Date: September 15, 2009

General Information:

10 samples were analyzed for SM 2310. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: SM 2510B

Description: 2510B Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for SM 2510B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: SM 2540D

Description: 2540D Total Suspended Solids

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/2696

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 673803)
- Total Suspended Solids

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- BRSW-1 (Lab ID: 10111520010)
- BRSW-2 (Lab ID: 10111520009)
- BRSW-22 (Lab ID: 10111520008)
- BRSW-22A (Lab ID: 10111520006)
- BRSW-23 (Lab ID: 10111520001)
- BRSW-38 (Lab ID: 10111520004)
- BRSW-38A (Lab ID: 10111520003)
- BRSW-3A (Lab ID: 10111520005)
- BRSW-3B (Lab ID: 10111520002)
- BRSW-48 (Lab ID: 10111520007)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: SM 2320B

Description: 2320B Alkalinity

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Method: SM 2540C

Description: 2540C Total Dissolved Solids

Client: Montana Dept. of Environmental Quality

Date: September 15, 2009

General Information:

10 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-23	Lab ID: 10111520001	Collected: 08/28/09 14:15	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/10/09 10:42	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:14	7440-38-2	
Cadmium	0.0011 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:14	7440-43-9	
Copper	0.0036 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:14	7440-50-8	
Iron	0.070 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:14	7439-89-6	
Lead	0.0029 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:14	7439-92-1	
Manganese	0.093 mg/L		0.0050	1	09/08/09 12:09	09/09/09 18:14	7439-96-5	Z2
Zinc	0.15 mg/L		0.010	1	09/08/09 12:09	09/09/09 18:14	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 14:52	7429-90-5	
Manganese, Dissolved	0.10 mg/L		0.0050	1	09/10/09 08:15	09/11/09 14:52	7439-96-5	
Copper, Dissolved	0.0026 mg/L		0.0010	1	09/10/09 08:15	09/11/09 14:52	7440-50-8	
Zinc, Dissolved	0.18 mg/L		0.010	1	09/10/09 08:15	09/11/09 14:52	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 14:52	7440-38-2	
Cadmium, Dissolved	0.0011 mg/L		0.000080	1	09/10/09 08:15	09/11/09 14:52	7440-43-9	
Lead, Dissolved	0.0015 mg/L		0.00050	1	09/10/09 08:15	09/11/09 14:52	7439-92-1	
Sodium, Dissolved	1.2 mg/L		1.0	1	09/10/09 08:15	09/11/09 14:52	7440-23-5	
Magnesium, Dissolved	14.8 mg/L		1.0	1	09/10/09 08:15	09/11/09 14:52	7439-95-4	
Calcium, Dissolved	25.2 mg/L		5.0	5	09/10/09 08:15	09/11/09 14:57	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 14:52	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 14:52	7439-89-6	
Total Hardness by 2340B, Dissolved	124 mg/L		5.0	5	09/10/09 08:15	09/11/09 14:57		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	255 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 07:25	16887-00-6	
Sulfate	29.6 mg/L		5.0	1		09/04/09 07:25	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.2 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	106 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	106 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-23	Lab ID: 10111520001	Collected: 08/28/09 14:15	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	149	mg/L	10.0	1		09/02/09 12:02		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-3B	Lab ID: 10111520002	Collected: 08/28/09 16:01	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/10/09 10:47	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:19	7440-38-2	
Cadmium	0.000097 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:19	7440-43-9	
Copper	0.0032 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:19	7440-50-8	
Iron	0.078 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:19	7439-89-6	
Lead	0.00080 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:19	7439-92-1	
Manganese	0.016 mg/L		0.0050	1	09/08/09 12:09	09/09/09 18:19	7439-96-5	Z2
Zinc	0.033 mg/L		0.010	1	09/08/09 12:09	09/09/09 18:19	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 15:01	7429-90-5	
Manganese, Dissolved	0.0071 mg/L		0.0050	1	09/10/09 08:15	09/11/09 15:01	7439-96-5	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/10/09 08:15	09/11/09 15:01	7440-50-8	
Zinc, Dissolved	0.039 mg/L		0.010	1	09/10/09 08:15	09/11/09 15:01	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 15:01	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/10/09 08:15	09/11/09 15:01	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/10/09 08:15	09/11/09 15:01	7439-92-1	
Sodium, Dissolved	1.4 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:01	7440-23-5	
Magnesium, Dissolved	17.1 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:01	7439-95-4	
Calcium, Dissolved	28.1 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:05	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:01	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 15:01	7439-89-6	
Total Hardness by 2340B, Dissolved	140 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:05		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	291 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	4.1 mg/L		2.1	1		09/02/09 11:30		D8
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 09:27	16887-00-6	
Sulfate	50.1 mg/L		5.0	1		09/04/09 09:27	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	104 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	104 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-3B								
Lab ID: 10111520002								
Collected: 08/28/09 16:01 Received: 09/01/09 09:45 Matrix: Water								
2540C Total Dissolved Solids								
Analytical Method: SM 2540C								
Total Dissolved Solids	25.0	mg/L	10.0	1		09/02/09 12:02		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-38A		Lab ID: 10111520003	Collected: 08/28/09 19:00	Received: 09/01/09 09:45	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030	mg/L	0.030	1	09/08/09 12:09	09/10/09 10:51	7429-90-5	
Arsenic	<0.0030	mg/L	0.0030	1	09/08/09 12:09	09/09/09 18:24	7440-38-2	
Cadmium	<0.000080	mg/L	0.000080	1	09/08/09 12:09	09/09/09 18:24	7440-43-9	
Copper	<0.0010	mg/L	0.0010	1	09/08/09 12:09	09/09/09 18:24	7440-50-8	
Iron	<0.050	mg/L	0.050	1	09/08/09 12:09	09/09/09 18:24	7439-89-6	
Lead	<0.00050	mg/L	0.00050	1	09/08/09 12:09	09/09/09 18:24	7439-92-1	
Manganese	<0.0050	mg/L	0.0050	1	09/08/09 12:09	09/09/09 18:24	7439-96-5	
Zinc	<0.010	mg/L	0.010	1	09/08/09 12:09	09/09/09 18:24	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030	mg/L	0.030	1	09/10/09 08:15	09/11/09 15:19	7429-90-5	
Manganese, Dissolved	<0.0050	mg/L	0.0050	1	09/10/09 08:15	09/11/09 15:19	7439-96-5	
Copper, Dissolved	<0.0010	mg/L	0.0010	1	09/10/09 08:15	09/11/09 15:19	7440-50-8	
Zinc, Dissolved	<0.010	mg/L	0.010	1	09/10/09 08:15	09/11/09 15:19	7440-66-6	
Arsenic, Dissolved	<0.0030	mg/L	0.0030	1	09/10/09 08:15	09/11/09 15:19	7440-38-2	
Cadmium, Dissolved	<0.000080	mg/L	0.000080	1	09/10/09 08:15	09/11/09 15:19	7440-43-9	
Lead, Dissolved	<0.00050	mg/L	0.00050	1	09/10/09 08:15	09/11/09 15:19	7439-92-1	
Sodium, Dissolved	<1.0	mg/L	1.0	1	09/10/09 08:15	09/11/09 15:19	7440-23-5	
Magnesium, Dissolved	<1.0	mg/L	1.0	1	09/10/09 08:15	09/11/09 15:19	7439-95-4	
Calcium, Dissolved	<1.0	mg/L	1.0	1	09/10/09 08:15	09/11/09 15:19	7440-70-2	
Potassium, Dissolved	<1.0	mg/L	1.0	1	09/10/09 08:15	09/11/09 15:19	7440-09-7	
Iron, Dissolved	<0.050	mg/L	0.050	1	09/10/09 08:15	09/11/09 15:19	7439-89-6	
Total Hardness by 2340B, Dissolved	<1.0	mg/L	1.0	1	09/10/09 08:15	09/11/09 15:19		
2310 Acidity		Analytical Method: SM 2310						
Acidity	6.5	mg/L	5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	<10.0	umhos/cm	10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0	mg/L	1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0	mg/L	1.0	1		09/03/09 20:38	16887-00-6	
Sulfate	<5.0	mg/L	5.0	1		09/03/09 20:38	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	6.3	Std. Units	0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	7.6	mg/L	5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0	mg/L	5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	7.6	mg/L	5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-38A	Lab ID: 10111520003	Collected: 08/28/09 19:00	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	<10.0	mg/L	10.0	1		09/02/09 12:03		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-38	Lab ID: 10111520004	Collected: 08/28/09 18:20	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 18:38	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:38	7440-38-2	
Cadmium	0.0041 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:38	7440-43-9	
Copper	0.0054 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:38	7440-50-8	
Iron	0.17 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:38	7439-89-6	
Lead	0.0090 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:38	7439-92-1	
Manganese	0.59 mg/L		0.025	5	09/08/09 12:09	09/10/09 10:56	7439-96-5	Z2
Zinc	0.76 mg/L		0.050	5	09/08/09 12:09	09/10/09 10:56	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 15:27	7429-90-5	
Manganese, Dissolved	0.54 mg/L		0.025	5	09/10/09 08:15	09/11/09 15:32	7439-96-5	
Copper, Dissolved	0.0039 mg/L		0.0010	1	09/10/09 08:15	09/11/09 15:27	7440-50-8	
Zinc, Dissolved	0.78 mg/L		0.050	5	09/10/09 08:15	09/11/09 15:32	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 15:27	7440-38-2	
Cadmium, Dissolved	0.0043 mg/L		0.000080	1	09/10/09 08:15	09/11/09 15:27	7440-43-9	
Lead, Dissolved	0.0018 mg/L		0.00050	1	09/10/09 08:15	09/11/09 15:27	7439-92-1	
Sodium, Dissolved	1.3 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:27	7440-23-5	
Magnesium, Dissolved	16.1 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:27	7439-95-4	
Calcium, Dissolved	27.8 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:32	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:27	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 15:27	7439-89-6	
Total Hardness by 2340B, Dissolved	136 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:32		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	274 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/03/09 21:08	16887-00-6	
Sulfate	54.1 mg/L		5.0	1		09/03/09 21:08	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.6 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	94.2 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	94.2 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-38								
Lab ID: 10111520004								
Collected: 08/28/09 18:20 Received: 09/01/09 09:45 Matrix: Water								
2540C Total Dissolved Solids								
Analytical Method: SM 2540C								
Total Dissolved Solids	169	mg/L	10.0	1		09/02/09 12:03		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-3A	Lab ID: 10111520005	Collected: 08/28/09 15:15	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 18:42	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:42	7440-38-2	
Cadmium	0.00027 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:42	7440-43-9	
Copper	0.0021 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:42	7440-50-8	
Iron	0.057 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:42	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:42	7439-92-1	
Manganese	0.033 mg/L		0.0050	1	09/08/09 12:09	09/09/09 18:42	7439-96-5	Z2
Zinc	0.074 mg/L		0.010	1	09/08/09 12:09	09/09/09 18:42	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 15:36	7429-90-5	
Manganese, Dissolved	0.033 mg/L		0.0050	1	09/10/09 08:15	09/11/09 15:36	7439-96-5	
Copper, Dissolved	0.0014 mg/L		0.0010	1	09/10/09 08:15	09/11/09 15:36	7440-50-8	
Zinc, Dissolved	0.10 mg/L		0.010	1	09/10/09 08:15	09/11/09 15:36	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 15:36	7440-38-2	
Cadmium, Dissolved	0.00029 mg/L		0.000080	1	09/10/09 08:15	09/11/09 15:36	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/10/09 08:15	09/11/09 15:36	7439-92-1	
Sodium, Dissolved	1.4 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:36	7440-23-5	
Magnesium, Dissolved	17.1 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:36	7439-95-4	
Calcium, Dissolved	29.6 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:40	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:36	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 15:36	7439-89-6	
Total Hardness by 2340B, Dissolved	144 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:40		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	289 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/03/09 22:40	16887-00-6	
Sulfate	53.7 mg/L		5.0	1		09/03/09 22:40	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.5 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	99.0 mg/L		10.0	2		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<10.0 mg/L		10.0	2		09/02/09 13:18		
Alkalinity, Total as CaCO3	99.0 mg/L		10.0	2		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-3A	Lab ID: 10111520005	Collected: 08/28/09 15:15	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	177	mg/L	10.0	1		09/02/09 12:04		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-22A	Lab ID: 10111520006	Collected: 08/28/09 17:10	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 18:47	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:47	7440-38-2	
Cadmium	0.0085 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:47	7440-43-9	
Copper	0.024 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:47	7440-50-8	
Iron	<0.050 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:47	7439-89-6	
Lead	0.0078 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:47	7439-92-1	
Manganese	0.098 mg/L		0.0050	1	09/08/09 12:09	09/09/09 18:47	7439-96-5	Z2
Zinc	1.3 mg/L		0.050	5	09/08/09 12:09	09/10/09 11:01	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 15:45	7429-90-5	
Manganese, Dissolved	0.095 mg/L		0.0050	1	09/10/09 08:15	09/11/09 15:45	7439-96-5	
Copper, Dissolved	0.022 mg/L		0.0010	1	09/10/09 08:15	09/11/09 15:45	7440-50-8	
Zinc, Dissolved	1.2 mg/L		0.050	5	09/10/09 08:15	09/11/09 15:49	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 15:45	7440-38-2	
Cadmium, Dissolved	0.0090 mg/L		0.000080	1	09/10/09 08:15	09/11/09 15:45	7440-43-9	
Lead, Dissolved	0.0072 mg/L		0.00050	1	09/10/09 08:15	09/11/09 15:45	7439-92-1	
Sodium, Dissolved	1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:45	7440-23-5	
Magnesium, Dissolved	15.4 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:45	7439-95-4	
Calcium, Dissolved	37.6 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:49	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:45	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 15:45	7439-89-6	
Total Hardness by 2340B, Dissolved	157 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:49		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	342 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/03/09 23:10	16887-00-6	
Sulfate	82.3 mg/L		5.0	1		09/03/09 23:10	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.0 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	91.4 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	91.4 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-22A	Lab ID: 10111520006	Collected: 08/28/09 17:10	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	205	mg/L	10.0	1		09/02/09 12:04		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-48	Lab ID: 10111520007	Collected: 08/28/09 13:02	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 18:52	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:52	7440-38-2	
Cadmium	0.0018 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:52	7440-43-9	
Copper	0.0049 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:52	7440-50-8	
Iron	0.25 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:52	7439-89-6	
Lead	0.0094 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:52	7439-92-1	
Manganese	0.62 mg/L		0.025	5	09/08/09 12:09	09/10/09 11:19	7439-96-5	Z2
Zinc	0.22 mg/L		0.010	1	09/08/09 12:09	09/09/09 18:52	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 15:54	7429-90-5	
Manganese, Dissolved	0.58 mg/L		0.025	5	09/10/09 08:15	09/11/09 15:58	7439-96-5	
Copper, Dissolved	0.0028 mg/L		0.0010	1	09/10/09 08:15	09/11/09 15:54	7440-50-8	
Zinc, Dissolved	0.26 mg/L		0.010	1	09/10/09 08:15	09/11/09 15:54	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 15:54	7440-38-2	
Cadmium, Dissolved	0.0018 mg/L		0.000080	1	09/10/09 08:15	09/11/09 15:54	7440-43-9	
Lead, Dissolved	0.0019 mg/L		0.00050	1	09/10/09 08:15	09/11/09 15:54	7439-92-1	
Sodium, Dissolved	1.2 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:54	7440-23-5	
Magnesium, Dissolved	15.3 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:54	7439-95-4	
Calcium, Dissolved	25.5 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:58	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 15:54	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 15:54	7439-89-6	
Total Hardness by 2340B, Dissolved	126 mg/L		5.0	5	09/10/09 08:15	09/11/09 15:58		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	265 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/03/09 23:41	16887-00-6	
Sulfate	37.4 mg/L		5.0	1		09/03/09 23:41	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.1 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	102 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	102 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-48								
Lab ID: 10111520007								
Collected: 08/28/09 13:02 Received: 09/01/09 09:45 Matrix: Water								
2540C Total Dissolved Solids								
Analytical Method: SM 2540C								
Total Dissolved Solids	151	mg/L	10.0	1		09/02/09 12:05		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-22	Lab ID: 10111520008	Collected: 08/28/09 17:07	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 18:56	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 18:56	7440-38-2	
Cadmium	0.0085 mg/L		0.000080	1	09/08/09 12:09	09/09/09 18:56	7440-43-9	
Copper	0.021 mg/L		0.0010	1	09/08/09 12:09	09/09/09 18:56	7440-50-8	
Iron	<0.050 mg/L		0.050	1	09/08/09 12:09	09/09/09 18:56	7439-89-6	
Lead	0.0064 mg/L		0.00050	1	09/08/09 12:09	09/09/09 18:56	7439-92-1	
Manganese	0.11 mg/L		0.0050	1	09/08/09 12:09	09/09/09 18:56	7439-96-5	Z2
Zinc	1.3 mg/L		0.050	5	09/08/09 12:09	09/10/09 11:24	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 16:11	7429-90-5	
Manganese, Dissolved	0.094 mg/L		0.0050	1	09/10/09 08:15	09/11/09 16:11	7439-96-5	
Copper, Dissolved	0.025 mg/L		0.0010	1	09/10/09 08:15	09/11/09 16:11	7440-50-8	
Zinc, Dissolved	1.2 mg/L		0.050	5	09/10/09 08:15	09/11/09 16:16	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 16:11	7440-38-2	
Cadmium, Dissolved	0.0090 mg/L		0.000080	1	09/10/09 08:15	09/11/09 16:11	7440-43-9	
Lead, Dissolved	0.0094 mg/L		0.00050	1	09/10/09 08:15	09/11/09 16:11	7439-92-1	
Sodium, Dissolved	1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:11	7440-23-5	
Magnesium, Dissolved	15.3 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:11	7439-95-4	
Calcium, Dissolved	37.2 mg/L		5.0	5	09/10/09 08:15	09/11/09 16:16	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:11	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 16:11	7439-89-6	
Total Hardness by 2340B, Dissolved	156 mg/L		5.0	5	09/10/09 08:15	09/11/09 16:16		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	328 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 00:11	16887-00-6	
Sulfate	82.2 mg/L		5.0	1		09/04/09 00:11	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.0 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	90.4 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	90.4 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-22		Lab ID: 10111520008	Collected: 08/28/09 17:07	Received: 09/01/09 09:45	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	211	mg/L	10.0	1		09/02/09 12:05		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-2		Lab ID: 10111520009	Collected: 08/28/09 11:51	Received: 09/01/09 09:45	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.083 mg/L		0.030	1	09/08/09 12:09	09/09/09 19:01	7429-90-5	M0
Arsenic	0.0075 mg/L		0.0030	1	09/08/09 12:09	09/09/09 19:01	7440-38-2	
Cadmium	0.00039 mg/L		0.000080	1	09/08/09 12:09	09/09/09 19:01	7440-43-9	
Copper	0.0098 mg/L		0.0010	1	09/08/09 12:09	09/09/09 19:01	7440-50-8	
Iron	1.5 mg/L		0.050	1	09/08/09 12:09	09/09/09 19:01	7439-89-6	
Lead	0.038 mg/L		0.00050	1	09/08/09 12:09	09/09/09 19:01	7439-92-1	
Manganese	0.69 mg/L		0.025	5	09/08/09 12:09	09/10/09 11:28	7439-96-5	M0,Z2
Zinc	0.084 mg/L		0.010	1	09/08/09 12:09	09/09/09 19:01	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 16:20	7429-90-5	
Manganese, Dissolved	0.40 mg/L		0.0050	1	09/10/09 08:15	09/11/09 16:20	7439-96-5	
Copper, Dissolved	0.0042 mg/L		0.0010	1	09/10/09 08:15	09/11/09 16:20	7440-50-8	
Zinc, Dissolved	<0.010 mg/L		0.010	1	09/10/09 08:15	09/11/09 16:20	7440-66-6	
Arsenic, Dissolved	0.0039 mg/L		0.0030	1	09/10/09 08:15	09/11/09 16:20	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/10/09 08:15	09/11/09 16:20	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/10/09 08:15	09/11/09 16:20	7439-92-1	
Sodium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:20	7440-23-5	
Magnesium, Dissolved	21.6 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:20	7439-95-4	
Calcium, Dissolved	45.6 mg/L		5.0	5	09/10/09 08:15	09/11/09 16:24	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:20	7440-09-7	
Iron, Dissolved	0.051 mg/L		0.050	1	09/10/09 08:15	09/11/09 16:20	7439-89-6	
Total Hardness by 2340B, Dissolved	203 mg/L		5.0	5	09/10/09 08:15	09/11/09 16:24		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	410 umhos/cm		10.0	1		09/03/09 16:00		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	18.0 mg/L		2.1	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 00:42	16887-00-6	
Sulfate	163 mg/L		5.0	1		09/04/09 00:42	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.8 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity,Bicarbonate (CaCO3)	56.2 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	56.2 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-2	Lab ID: 10111520009	Collected: 08/28/09 11:51	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	306	mg/L	10.0	1		09/02/09 12:05		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Sample: BRSW-1	Lab ID: 10111520010	Collected: 08/28/09 10:12	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/08/09 12:09	09/09/09 19:10	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/08/09 12:09	09/09/09 19:10	7440-38-2	
Cadmium	<0.000080 mg/L		0.000080	1	09/08/09 12:09	09/09/09 19:10	7440-43-9	
Copper	<0.0010 mg/L		0.0010	1	09/08/09 12:09	09/09/09 19:10	7440-50-8	
Iron	<0.050 mg/L		0.050	1	09/08/09 12:09	09/09/09 19:10	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	09/08/09 12:09	09/09/09 19:10	7439-92-1	
Manganese	<0.0050 mg/L		0.0050	1	09/08/09 12:09	09/09/09 19:10	7439-96-5	Z2
Zinc	<0.010 mg/L		0.010	1	09/08/09 12:09	09/09/09 19:10	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/10/09 08:15	09/11/09 16:29	7429-90-5	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/10/09 08:15	09/11/09 16:29	7439-96-5	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/10/09 08:15	09/11/09 16:29	7440-50-8	
Zinc, Dissolved	<0.010 mg/L		0.010	1	09/10/09 08:15	09/11/09 16:29	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/10/09 08:15	09/11/09 16:29	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/10/09 08:15	09/11/09 16:29	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/10/09 08:15	09/11/09 16:29	7439-92-1	
Sodium, Dissolved	1.2 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:29	7440-23-5	
Magnesium, Dissolved	13.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:29	7439-95-4	M1
Calcium, Dissolved	22.1 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:29	7440-70-2	M1
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:29	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/10/09 08:15	09/11/09 16:29	7439-89-6	
Total Hardness by 2340B, Dissolved	109 mg/L		1.0	1	09/10/09 08:15	09/11/09 16:29		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		09/04/09 20:52		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	210 umhos/cm		10.0	1		09/03/09 17:10		
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		09/02/09 11:30		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 01:12	16887-00-6	
Sulfate	6.1 mg/L		5.0	1		09/04/09 01:12	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.2 Std. Units		0.10	1		09/01/09 16:31		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	111 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/02/09 13:18		
Alkalinity, Total as CaCO3	111 mg/L		5.0	1		09/02/09 13:18		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

Sample: BRSW-1	Lab ID: 10111520010	Collected: 08/28/09 10:12	Received: 09/01/09 09:45	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	114	mg/L	10.0	1		09/02/09 12:06		

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

QC Batch: WET/17076

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 673753

Matrix: Water

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	09/02/09 11:57	

LABORATORY CONTROL SAMPLE: 673754

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	19.9	18.0	90	80-120	

SAMPLE DUPLICATE: 674060

Parameter	Units	10111402003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	849	846	0	20	

SAMPLE DUPLICATE: 674061

Parameter	Units	10111402004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	845	848	0	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse
Pace Project No.: 10111520

QC Batch: MPRP/17089 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 673269 Matrix: Water
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.030	0.030	09/10/09 10:19	
Arsenic	mg/L	<0.0030	0.0030	09/09/09 17:42	
Cadmium	mg/L	<0.000080	0.000080	09/09/09 17:42	
Copper	mg/L	<0.0010	0.0010	09/09/09 17:42	
Iron	mg/L	<0.050	0.050	09/09/09 17:42	
Lead	mg/L	<0.00050	0.00050	09/09/09 17:42	
Manganese	mg/L	<0.0050	0.0050	09/09/09 17:42	B
Zinc	mg/L	<0.010	0.010	09/09/09 17:42	

LABORATORY CONTROL SAMPLE: 673270

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.088	110	85-115	
Arsenic	mg/L	.08	0.073	92	85-115	
Cadmium	mg/L	.08	0.073	91	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.077	96	85-115	
Manganese	mg/L	.08	0.079	98	85-115	
Zinc	mg/L	.08	0.068	85	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 673271 673272

Parameter	Units	10111501001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Result	Spike Conc.	MSD Result						
Aluminum	mg/L	ND	.08	<0.15	.08	<0.15	107	117	70-130	9	20	
Arsenic	mg/L	ND	.08	0.078	.08	0.076	97	95	70-130	2	20	
Cadmium	mg/L	ND	.08	0.077	.08	0.074	96	93	70-130	3	20	
Copper	mg/L	1.2 ug/L	.08	0.080	.08	0.079	99	97	70-130	2	20	
Iron	mg/L	ND	1	1.2	1	1.1	114	110	70-130	3	20	
Lead	mg/L	ND	.08	0.080	.08	0.079	100	99	70-130	1	20	
Manganese	mg/L	0.56 ug/L	.08	0.085	.08	0.086	106	106	70-130	1	20	
Zinc	mg/L	ND	.08	0.071	.08	0.069	87	84	70-130	3	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

MATRIX SPIKE SAMPLE:		673273					
Parameter	Units	10111520009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.083	.08	0.23	187	70-130	M0
Arsenic	mg/L	0.0075	.08	0.083	95	70-130	
Cadmium	mg/L	0.00039	.08	0.077	96	70-130	
Copper	mg/L	0.0098	.08	0.087	97	70-130	
Iron	mg/L	1.5	1	2.7	127	70-130	
Lead	mg/L	0.038	.08	0.12	100	70-130	
Manganese	mg/L	0.69	.08	0.81	152	70-130	M0
Zinc	mg/L	0.084	.08	0.16	91	70-130	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

QC Batch: MT/2695 Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007,
10111520008, 10111520009, 10111520010

LABORATORY CONTROL SAMPLE: 673516

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	101	98-102	H6

SAMPLE DUPLICATE: 673517

Parameter	Units	10111520010 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.2	8.2	0	3	H6

SAMPLE DUPLICATE: 673518

Parameter	Units	10111500001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	3	H6

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

QC Batch: MT/2709

Analysis Method: SM 2310

QC Batch Method: SM 2310

Analysis Description: 2310 Acidity

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 674643

Matrix: Water

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acidity	mg/L	<5.0	5.0	09/04/09 20:52	

SAMPLE DUPLICATE: 674644

Parameter	Units	10111520005 Result	Dup Result	RPD	Max RPD	Qualifiers
Acidity	mg/L	<5.0	<5.0		20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

QC Batch: MT/2696

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 673801

Matrix: Water

Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<1.0	1.0	09/02/09 11:30	

LABORATORY CONTROL SAMPLE: 673802

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	25	27.0	108	71-129	

SAMPLE DUPLICATE: 673803

Parameter	Units	10111520002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	4.1	5.9	36	20	D8

SAMPLE DUPLICATE: 673804

Parameter	Units	10111520009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	18.0	18.0	0	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse
Pace Project No.: 10111520

QC Batch: MT/2711 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 675886 Matrix: Water
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/03/09 16:03	
Sulfate	mg/L	<5.0	5.0	09/03/09 16:03	

LABORATORY CONTROL SAMPLE: 674714

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	40	39.2	98	90-110	
Sulfate	mg/L	40	38.0	95	90-110	

MATRIX SPIKE SAMPLE: 674715

Parameter	Units	10111520001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<1.0	40	37.5	93	80-120	
Sulfate	mg/L	29.6	40	66.4	92	80-120	

MATRIX SPIKE SAMPLE: 674717

Parameter	Units	10111632001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<1.0	40	39.5	98	80-120	
Sulfate	mg/L	110	40	146	90	80-120	

MATRIX SPIKE SAMPLE: 675261

Parameter	Units	10111800001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	0.96J	40	41.4	101	80-120	
Sulfate	mg/L	6.0	40	45.0	98	80-120	

SAMPLE DUPLICATE: 674716

Parameter	Units	10111520002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	<1.0		20	
Sulfate	mg/L	50.1	50.4	1	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse

Pace Project No.: 10111520

SAMPLE DUPLICATE: 674718

Parameter	Units	10111632002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	1.1		20	
Sulfate	mg/L	<5.0	<5.0		20	

SAMPLE DUPLICATE: 675863

Parameter	Units	10111800002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	0.97J	<1.0		20	
Sulfate	mg/L	6.2	6.1	2	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse
Pace Project No.: 10111520

QC Batch: MPRP/17087 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 673260 Matrix: Water
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	<0.030	0.030	09/11/09 14:26	
Arsenic, Dissolved	mg/L	<0.0030	0.0030	09/11/09 14:26	
Cadmium, Dissolved	mg/L	<0.000080	0.000080	09/11/09 14:26	
Calcium, Dissolved	mg/L	<1.0	1.0	09/11/09 14:26	
Copper, Dissolved	mg/L	<0.0010	0.0010	09/11/09 14:26	
Iron, Dissolved	mg/L	<0.050	0.050	09/11/09 14:26	
Lead, Dissolved	mg/L	<0.00050	0.00050	09/11/09 14:26	
Magnesium, Dissolved	mg/L	<1.0	1.0	09/11/09 14:26	
Manganese, Dissolved	mg/L	<0.0050	0.0050	09/11/09 14:26	
Potassium, Dissolved	mg/L	<1.0	1.0	09/11/09 14:26	
Sodium, Dissolved	mg/L	<1.0	1.0	09/11/09 14:26	
Total Hardness by 2340B, Dissolved	mg/L	<1.0	1.0	09/11/09 14:26	
Zinc, Dissolved	mg/L	<0.010	0.010	09/11/09 14:26	

LABORATORY CONTROL SAMPLE: 673261

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	.08	0.080	99	85-115	
Arsenic, Dissolved	mg/L	.08	0.076	95	85-115	
Cadmium, Dissolved	mg/L	.08	0.076	95	85-115	
Calcium, Dissolved	mg/L	1	1.0	101	85-115	
Copper, Dissolved	mg/L	.08	0.078	98	85-115	
Iron, Dissolved	mg/L	1	1.0	102	85-115	
Lead, Dissolved	mg/L	.08	0.082	102	85-115	
Magnesium, Dissolved	mg/L	1	<1.0	99	85-115	
Manganese, Dissolved	mg/L	.08	0.078	97	85-115	
Potassium, Dissolved	mg/L	1	<1.0	91	85-115	
Sodium, Dissolved	mg/L	1	1.0	100	85-115	
Total Hardness by 2340B, Dissolved	mg/L		6.6			
Zinc, Dissolved	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 673262 673263

Parameter	Units	673262		673263		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		10111501001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Aluminum, Dissolved	mg/L	ND	.08	.08	<0.15	<0.15	102	100	70-130	2	20	
Arsenic, Dissolved	mg/L	ND	.08	.08	0.075	0.076	93	95	70-130	2	20	

Date: 09/15/2009 09:50 AM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: UBMC-Mike Horse
Pace Project No.: 10111520

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 673262												673263	
Parameter	Units	10111501001 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual	
			Spike Conc.	Spike Conc.									
Cadmium, Dissolved	mg/L	ND	.08	.08	0.073	0.075	92	94	70-130	2	20		
Calcium, Dissolved	mg/L	82800	1	1	80.3	82.4	-250	-35	70-130	3	20	M1	
		ug/L											
Copper, Dissolved	mg/L	0.85	.08	.08	0.074	0.075	92	92	70-130	0	20		
		ug/L											
Iron, Dissolved	mg/L	ND	1	1	0.96	0.98	95	98	70-130	2	20		
Lead, Dissolved	mg/L	ND	.08	.08	0.078	0.080	98	100	70-130	2	20		
Magnesium, Dissolved	mg/L	32200	1	1	32.2	32.8	-5	58	70-130	2	20	M1	
		ug/L											
Manganese, Dissolved	mg/L	ND	.08	.08	0.073	0.074	91	92	70-130	1	20		
Potassium, Dissolved	mg/L	3200	1	1	<5.0	<5.0	65	71	70-130	2	20	M1	
		ug/L											
Sodium, Dissolved	mg/L	9400	1	1	10	10	56	55	70-130	0	20	M1	
		ug/L											
Total Hardness by 2340B, Dissolved	mg/L	339000			333	341					2	20	
		ug/L											
Zinc, Dissolved	mg/L	ND	.08	.08	0.078	0.080	95	98	70-130	3	20		

MATRIX SPIKE SAMPLE: 673264		10111520010	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Aluminum, Dissolved	mg/L	<0.030	.08	<0.15	106	70-130	
Arsenic, Dissolved	mg/L	<0.0030	.08	0.076	94	70-130	
Cadmium, Dissolved	mg/L	<0.000080	.08	0.076	95	70-130	
Calcium, Dissolved	mg/L	22.1	1	21.5	-60	70-130	M1
Copper, Dissolved	mg/L	<0.0010	.08	0.077	95	70-130	
Iron, Dissolved	mg/L	<0.050	1	0.99	99	70-130	
Lead, Dissolved	mg/L	<0.00050	.08	0.081	102	70-130	
Magnesium, Dissolved	mg/L	13.0	1	13.5	42	70-130	M1
Manganese, Dissolved	mg/L	<0.0050	.08	0.079	94	70-130	
Potassium, Dissolved	mg/L	<1.0	1	<5.0	86	70-130	
Sodium, Dissolved	mg/L	1.2	1	<5.0	102	70-130	
Total Hardness by 2340B, Dissolved	mg/L	109		109			
Zinc, Dissolved	mg/L	<0.010	.08	0.084	100	70-130	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse
Pace Project No.: 10111520

QC Batch: WET/17073 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

METHOD BLANK: 673719 Matrix: Water
Associated Lab Samples: 10111520001, 10111520002, 10111520003, 10111520004, 10111520005, 10111520006, 10111520007, 10111520008, 10111520009, 10111520010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0	09/02/09 13:18	
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	09/02/09 13:18	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<5.0	5.0	09/02/09 13:18	

LABORATORY CONTROL SAMPLE & LCSD: 673720 673721

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.8	42.8	109	107	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 673722 673723

Parameter	Units	10111402001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	424	40	40	467	468	107	109	80-120	0	30	

MATRIX SPIKE SAMPLE: 673799

Parameter	Units	10111520005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	99.0	80	185	107	80-120	

QUALIFIERS

Project: UBMC-Mike Horse

Pace Project No.: 10111520

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

D8 The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

H6 Analysis initiated more than 15 minutes after sample collection.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Z2 Analyte present in the associated method blank above the detection limit.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10111520001	BRSW-23	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520002	BRSW-3B	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520003	BRSW-38A	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520004	BRSW-38	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520005	BRSW-3A	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520006	BRSW-22A	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520007	BRSW-48	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520008	BRSW-22	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520009	BRSW-2	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520010	BRSW-1	EPA 200.8	MPRP/17087	EPA 200.8	ICPM/7037
10111520001	BRSW-23	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520002	BRSW-3B	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520003	BRSW-38A	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520004	BRSW-38	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520005	BRSW-3A	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520006	BRSW-22A	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520007	BRSW-48	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520008	BRSW-22	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520009	BRSW-2	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520010	BRSW-1	EPA 200.8	MPRP/17089	EPA 200.8	ICPM/7022
10111520001	BRSW-23	SM 4500-H+B	MT/2695		
10111520002	BRSW-3B	SM 4500-H+B	MT/2695		
10111520003	BRSW-38A	SM 4500-H+B	MT/2695		
10111520004	BRSW-38	SM 4500-H+B	MT/2695		
10111520005	BRSW-3A	SM 4500-H+B	MT/2695		
10111520006	BRSW-22A	SM 4500-H+B	MT/2695		
10111520007	BRSW-48	SM 4500-H+B	MT/2695		
10111520008	BRSW-22	SM 4500-H+B	MT/2695		
10111520009	BRSW-2	SM 4500-H+B	MT/2695		
10111520010	BRSW-1	SM 4500-H+B	MT/2695		
10111520001	BRSW-23	SM 2320B	WET/17073		
10111520002	BRSW-3B	SM 2320B	WET/17073		
10111520003	BRSW-38A	SM 2320B	WET/17073		
10111520004	BRSW-38	SM 2320B	WET/17073		
10111520005	BRSW-3A	SM 2320B	WET/17073		
10111520006	BRSW-22A	SM 2320B	WET/17073		
10111520007	BRSW-48	SM 2320B	WET/17073		
10111520008	BRSW-22	SM 2320B	WET/17073		
10111520009	BRSW-2	SM 2320B	WET/17073		
10111520010	BRSW-1	SM 2320B	WET/17073		
10111520001	BRSW-23	SM 2540C	WET/17076		
10111520002	BRSW-3B	SM 2540C	WET/17076		
10111520003	BRSW-38A	SM 2540C	WET/17076		
10111520004	BRSW-38	SM 2540C	WET/17076		
10111520005	BRSW-3A	SM 2540C	WET/17076		
10111520006	BRSW-22A	SM 2540C	WET/17076		
10111520007	BRSW-48	SM 2540C	WET/17076		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse
Pace Project No.: 10111520

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10111520008	BRSW-22	SM 2540C	WET/17076		
10111520009	BRSW-2	SM 2540C	WET/17076		
10111520010	BRSW-1	SM 2540C	WET/17076		
10111520001	BRSW-23	SM 2540D	MT/2696		
10111520002	BRSW-3B	SM 2540D	MT/2696		
10111520003	BRSW-38A	SM 2540D	MT/2696		
10111520004	BRSW-38	SM 2540D	MT/2696		
10111520005	BRSW-3A	SM 2540D	MT/2696		
10111520006	BRSW-22A	SM 2540D	MT/2696		
10111520007	BRSW-48	SM 2540D	MT/2696		
10111520008	BRSW-22	SM 2540D	MT/2696		
10111520009	BRSW-2	SM 2540D	MT/2696		
10111520010	BRSW-1	SM 2540D	MT/2696		
10111520001	BRSW-23	SM 2310	MT/2709		
10111520002	BRSW-3B	SM 2310	MT/2709		
10111520003	BRSW-38A	SM 2310	MT/2709		
10111520004	BRSW-38	SM 2310	MT/2709		
10111520005	BRSW-3A	SM 2310	MT/2709		
10111520006	BRSW-22A	SM 2310	MT/2709		
10111520007	BRSW-48	SM 2310	MT/2709		
10111520008	BRSW-22	SM 2310	MT/2709		
10111520009	BRSW-2	SM 2310	MT/2709		
10111520010	BRSW-1	SM 2310	MT/2709		
10111520001	BRSW-23	EPA 300.0	MT/2711		
10111520002	BRSW-3B	EPA 300.0	MT/2711		
10111520003	BRSW-38A	EPA 300.0	MT/2711		
10111520004	BRSW-38	EPA 300.0	MT/2711		
10111520005	BRSW-3A	EPA 300.0	MT/2711		
10111520006	BRSW-22A	EPA 300.0	MT/2711		
10111520007	BRSW-48	EPA 300.0	MT/2711		
10111520008	BRSW-22	EPA 300.0	MT/2711		
10111520009	BRSW-2	EPA 300.0	MT/2711		
10111520010	BRSW-1	EPA 300.0	MT/2711		
10111520001	BRSW-23	SM 2510B	MT/2712		
10111520002	BRSW-3B	SM 2510B	MT/2712		
10111520003	BRSW-38A	SM 2510B	MT/2712		
10111520004	BRSW-38	SM 2510B	MT/2712		
10111520005	BRSW-3A	SM 2510B	MT/2712		
10111520006	BRSW-22A	SM 2510B	MT/2712		
10111520007	BRSW-48	SM 2510B	MT/2712		
10111520008	BRSW-22	SM 2510B	MT/2712		
10111520009	BRSW-2	SM 2510B	MT/2712		
10111520010	BRSW-1	SM 2510B	MT/2712		

December 09, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117717

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on November 24, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Washington Certification #: C754

Tennessee Certification #: 02818

Pennsylvania Certification #: 68-00563

Oregon Certification #: MN200001

North Dakota Certification #: R-036

North Carolina Certification #: 530

New York Certification #: 11647

New Jersey Certification #: MN-002

Montana Certification #: MT CERT0092

Minnesota Certification #: 027-053-137

Maine Certification #: 2007029

Louisiana Certification #: LA080009

Louisiana Certification #: 03086

Kansas Certification #: E-10167

Iowa Certification #: 368

Illinois Certification #: 200011

Florida/NELAP Certification #: E87605

Montana Certification IDs

602 South 25th Street Billings, MT 59101

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

EPA Region 8 Certification #: 8TMS-Q

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10117717001	BRSW-23-111909	Water	11/19/09 14:25	11/24/09 10:30
10117717002	BRSW-38-111909	Water	11/19/09 15:28	11/24/09 10:30
10117717003	BRSW-38A-112009	Water	11/20/09 14:39	11/24/09 10:30
10117717004	BRSW-48-11202009	Water	11/20/09 09:45	11/24/09 10:30
10117717005	BRSW-1-111909	Water	11/19/09 13:50	11/24/09 10:30
10117717006	BRSW-2-111909	Water	11/19/09 14:30	11/24/09 10:30
10117717007	BRSW-3A-112009	Water	11/20/09 11:40	11/24/09 10:30
10117717008	BRSW-3A-11202009	Water	11/20/09 11:38	11/24/09 10:30
10117717009	BRSW-3B-11909	Water	11/19/09 12:10	11/24/09 10:30

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10117717001	BRSW-23-111909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117717002	BRSW-38-111909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117717003	BRSW-38A-112009	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117717004	BRSW-48-11202009	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117717005	BRSW-1-111909	EPA 200.8	RJS	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117717006	BRSW-2-111909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117717007	BRSW-3A-112009	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117717008	BRSW-3A-11202009	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117717009	BRSW-3B-11909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2310	CAC	1	PASI-MT
		SM 2510B	MK1	1	PASI-MT
		SM 2540C	CAC	1	PASI-MT
		SM 2540D	CAC	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/18441

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10117717005,5032552001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 719186)
 - Calcium
 - Magnesium
- MS (Lab ID: 721975)
 - Calcium
 - Magnesium
 - Sodium
- MSD (Lab ID: 719187)
 - Calcium
 - Magnesium

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/18439

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10117682001,10117717005

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 719173)
 - Calcium, Dissolved
- MSD (Lab ID: 719174)
 - Calcium, Dissolved

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 2310

Description: 2310 Acidity

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 2310. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 2510B

Description: 2510B Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 2510B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 2540C

Description: 2540C Total Dissolved Solids

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MT/3337

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 719087)
- Total Dissolved Solids

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 2540D

Description: 2540D Total Suspended Solids

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: EPA 300.0

Description: 300.0 IC Anions

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- BRSW-1-111909 (Lab ID: 10117717005)
- BRSW-2-111909 (Lab ID: 10117717006)
- BRSW-23-111909 (Lab ID: 10117717001)
- BRSW-38-111909 (Lab ID: 10117717002)
- BRSW-38A-112009 (Lab ID: 10117717003)
- BRSW-3A-112009 (Lab ID: 10117717007)
- BRSW-3A-11202009 (Lab ID: 10117717008)
- BRSW-3B-11909 (Lab ID: 10117717009)
- BRSW-48-11202009 (Lab ID: 10117717004)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Method: SM 2320B

Description: 2320B Alkalinity

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

9 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-23-111909	Lab ID: 10117717001	Collected: 11/19/09 14:25	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 14:56	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 14:56	7440-38-2	
Cadmium	0.0020 mg/L		0.000080	1	12/03/09 16:56	12/07/09 14:56	7440-43-9	
Copper	0.0051 mg/L		0.0010	1	12/03/09 16:56	12/07/09 14:56	7440-50-8	
Iron	0.21 mg/L		0.050	1	12/03/09 16:56	12/07/09 14:56	7439-89-6	
Lead	0.0042 mg/L		0.00050	1	12/03/09 16:56	12/07/09 14:56	7439-92-1	
Manganese	0.35 mg/L		0.0050	1	12/03/09 16:56	12/07/09 14:56	7439-96-5	
Zinc	0.58 mg/L		0.050	5	12/03/09 16:56	12/08/09 11:15	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 01:37	7429-90-5	
Manganese, Dissolved	0.38 mg/L		0.0050	1	12/03/09 15:07	12/08/09 01:37	7439-96-5	
Copper, Dissolved	0.0034 mg/L		0.0010	1	12/03/09 15:07	12/08/09 01:37	7440-50-8	
Zinc, Dissolved	0.60 mg/L		0.050	5	12/03/09 15:07	12/09/09 09:20	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 01:37	7440-38-2	
Cadmium, Dissolved	0.0020 mg/L		0.000080	1	12/03/09 15:07	12/08/09 01:37	7440-43-9	
Lead, Dissolved	0.0010 mg/L		0.00050	1	12/03/09 15:07	12/08/09 01:37	7439-92-1	
Sodium, Dissolved	1.5 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:37	7440-23-5	
Magnesium, Dissolved	18.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:37	7439-95-4	
Calcium, Dissolved	30.0 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:20	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:37	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 01:37	7439-89-6	
Total Hardness by 2340B, Dissolved	149 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:20		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	291 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	173 mg/L		20.0	1		11/24/09 15:53		B+
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	0.98 mg/L		0.98	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/01/09 20:57	16887-00-6	
Sulfate	63.6 mg/L		5.0	1		12/01/09 20:57	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.9 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	106 mg/L		5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-23-111909		Lab ID: 10117717001		Collected: 11/19/09 14:25	Received: 11/24/09 10:30	Matrix: Water		
2320B Alkalinity								
		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	106	mg/L	5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-38-111909		Lab ID: 10117717002	Collected: 11/19/09 15:28	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.27 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:00	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:00	7440-38-2	
Cadmium	0.0093 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:00	7440-43-9	
Copper	0.034 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:00	7440-50-8	
Iron	0.67 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:00	7439-89-6	
Lead	0.020 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:00	7439-92-1	
Manganese	1.9 mg/L		0.025	5	12/03/09 16:56	12/07/09 15:04	7439-96-5	
Zinc	1.9 mg/L		0.050	5	12/03/09 16:56	12/07/09 15:04	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	0.13 mg/L		0.030	1	12/03/09 15:07	12/08/09 01:45	7429-90-5	
Manganese, Dissolved	2.3 mg/L		0.025	5	12/03/09 15:07	12/09/09 09:24	7439-96-5	
Copper, Dissolved	0.038 mg/L		0.0010	1	12/03/09 15:07	12/08/09 01:45	7440-50-8	
Zinc, Dissolved	2.3 mg/L		0.050	5	12/03/09 15:07	12/09/09 09:24	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 01:45	7440-38-2	
Cadmium, Dissolved	0.012 mg/L		0.000080	1	12/03/09 15:07	12/08/09 01:45	7440-43-9	
Lead, Dissolved	0.0013 mg/L		0.00050	1	12/03/09 15:07	12/08/09 01:45	7439-92-1	
Sodium, Dissolved	1.5 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:45	7440-23-5	
Magnesium, Dissolved	19.3 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:45	7439-95-4	
Calcium, Dissolved	34.8 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:24	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:45	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 01:45	7439-89-6	
Total Hardness by 2340B, Dissolved	166 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:24		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	326 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	258 mg/L		20.0	1		11/24/09 15:53		B-
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	9.1 mg/L		2.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/01/09 21:58	16887-00-6	
Sulfate	110 mg/L		5.0	1		12/01/09 21:58	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.5 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	75.4 mg/L		5.0	1		12/02/09 09:43		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-38-111909		Lab ID: 10117717002		Collected: 11/19/09 15:28	Received: 11/24/09 10:30	Matrix: Water		
2320B Alkalinity								
		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	75.4	mg/L	5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-38A-112009	Lab ID: 10117717003	Collected: 11/20/09 14:39	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:08	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:08	7440-38-2	
Cadmium	<0.000080 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:08	7440-43-9	
Copper	<0.0010 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:08	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:08	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:08	7439-92-1	
Manganese	<0.0050 mg/L		0.0050	1	12/03/09 16:56	12/07/09 15:08	7439-96-5	
Zinc	<0.010 mg/L		0.010	1	12/03/09 16:56	12/07/09 15:08	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 01:53	7429-90-5	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	12/03/09 15:07	12/08/09 01:53	7439-96-5	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/03/09 15:07	12/08/09 01:53	7440-50-8	
Zinc, Dissolved	<0.010 mg/L		0.010	1	12/03/09 15:07	12/08/09 01:53	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 01:53	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/03/09 15:07	12/08/09 01:53	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 01:53	7439-92-1	
Sodium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:53	7440-23-5	
Magnesium, Dissolved	<5.0 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:28	7439-95-4	
Calcium, Dissolved	<5.0 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:28	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 01:53	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 01:53	7439-89-6	
Total Hardness by 2340B, Dissolved	<5.0 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:28		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	<10.0 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	86.0 mg/L		20.0	1		11/24/09 15:53		B+
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	1.4 mg/L		0.97	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/01/09 22:29	16887-00-6	
Sulfate	<5.0 mg/L		5.0	1		12/01/09 22:29	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	6.3 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	<5.0 mg/L		5.0	1		12/02/09 09:43		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-38A-112009		Lab ID: 10117717003	Collected: 11/20/09 14:39	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	<5.0	mg/L	5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-48-11202009	Lab ID: 10117717004	Collected: 11/20/09 09:45	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:12	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:12	7440-38-2	
Cadmium	0.0050 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:12	7440-43-9	
Copper	0.0090 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:12	7440-50-8	
Iron	1.2 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:12	7439-89-6	
Lead	0.023 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:12	7439-92-1	
Manganese	2.2 mg/L		0.025	5	12/03/09 16:56	12/07/09 15:16	7439-96-5	
Zinc	1.1 mg/L		0.050	5	12/03/09 16:56	12/07/09 15:16	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 02:13	7429-90-5	
Manganese, Dissolved	2.2 mg/L		0.025	5	12/03/09 15:07	12/09/09 09:32	7439-96-5	
Copper, Dissolved	0.0022 mg/L		0.0010	1	12/03/09 15:07	12/08/09 02:13	7440-50-8	
Zinc, Dissolved	1.1 mg/L		0.050	5	12/03/09 15:07	12/09/09 09:32	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 02:13	7440-38-2	
Cadmium, Dissolved	0.0045 mg/L		0.000080	1	12/03/09 15:07	12/08/09 02:13	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:13	7439-92-1	
Sodium, Dissolved	1.3 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:13	7440-23-5	
Magnesium, Dissolved	19.2 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:13	7439-95-4	
Calcium, Dissolved	32.8 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:32	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:13	7440-09-7	
Iron, Dissolved	0.46 mg/L		0.050	1	12/03/09 15:07	12/08/09 02:13	7439-89-6	
Total Hardness by 2340B, Dissolved	161 mg/L		5.0	5	12/03/09 15:07	12/09/09 09:32		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	318 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	204 mg/L		20.0	1		11/24/09 15:53		B+
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	2.0 mg/L		2.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/01/09 22:59	16887-00-6	
Sulfate	88.5 mg/L		5.0	1		12/01/09 22:59	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.6 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	93.5 mg/L		10.0	2		12/03/09 14:18		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-48-11202009		Lab ID: 10117717004	Collected: 11/20/09 09:45	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<10.0	mg/L	10.0	2		12/03/09 14:18		
Alkalinity, Total as CaCO ₃	93.5	mg/L	10.0	2		12/03/09 14:18		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-1-111909	Lab ID: 10117717005	Collected: 11/19/09 13:50	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.0080 mg/L		0.0040	1	12/03/09 16:56	12/07/09 11:57	7429-90-5	
Arsenic	0.00077 mg/L		0.00050	1	12/03/09 16:56	12/07/09 11:57	7440-38-2	
Cadmium	<0.000080 mg/L		0.000080	1	12/03/09 16:56	12/07/09 11:57	7440-43-9	
Copper	<0.00050 mg/L		0.00050	1	12/03/09 16:56	12/07/09 11:57	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/03/09 16:56	12/07/09 11:57	7439-89-6	
Lead	0.00011 mg/L		0.00010	1	12/03/09 16:56	12/07/09 11:57	7439-92-1	
Manganese	0.0013 mg/L		0.00050	1	12/03/09 16:56	12/07/09 11:57	7439-96-5	
Zinc	0.014 mg/L		0.0050	1	12/03/09 16:56	12/07/09 11:57	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.0040 mg/L		0.0040	1	12/03/09 15:07	12/08/09 02:21	7429-90-5	
Manganese, Dissolved	0.0010 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:21	7439-96-5	
Copper, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:21	7440-50-8	
Zinc, Dissolved	0.015 mg/L		0.0050	1	12/03/09 15:07	12/08/09 02:21	7440-66-6	
Arsenic, Dissolved	0.00077 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:21	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/03/09 15:07	12/08/09 02:21	7440-43-9	
Lead, Dissolved	<0.00010 mg/L		0.00010	1	12/03/09 15:07	12/08/09 02:21	7439-92-1	
Sodium, Dissolved	1.2 mg/L		0.050	1	12/03/09 15:07	12/08/09 02:21	7440-23-5	
Magnesium, Dissolved	12.6 mg/L		0.0050	1	12/03/09 15:07	12/08/09 02:21	7439-95-4	
Calcium, Dissolved	20.6 mg/L		0.20	10	12/03/09 15:07	12/09/09 09:36	7440-70-2	M0
Potassium, Dissolved	0.33 mg/L		0.020	1	12/03/09 15:07	12/08/09 02:21	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 02:21	7439-89-6	
Total Hardness by 2340B, Dissolved	103 mg/L		0.71	10	12/03/09 15:07	12/09/09 09:36		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	186 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	196 mg/L		20.0	1		11/24/09 15:53		B+
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<0.98 mg/L		0.98	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/01/09 23:30	16887-00-6	
Sulfate	6.7 mg/L		5.0	1		12/01/09 23:30	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.2 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	99.9 mg/L		10.0	2		12/02/09 09:43		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-1-111909	Lab ID: 10117717005	Collected: 11/19/09 13:50	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<10.0	mg/L	10.0	2		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	99.9	mg/L	10.0	2		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-2-111909	Lab ID: 10117717006	Collected: 11/19/09 14:30	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.091 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:32	7429-90-5	
Arsenic	0.0033 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:32	7440-38-2	
Cadmium	0.060 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:32	7440-43-9	
Copper	0.026 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:32	7440-50-8	
Iron	0.64 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:32	7439-89-6	
Lead	0.029 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:32	7439-92-1	
Manganese	31.6 mg/L		0.50	100	12/03/09 16:56	12/07/09 15:36	7439-96-5	
Zinc	19.8 mg/L		1.0	100	12/03/09 16:56	12/07/09 15:36	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 02:38	7429-90-5	
Manganese, Dissolved	35.4 mg/L		1.2	250	12/03/09 15:07	12/09/09 10:01	7439-96-5	
Copper, Dissolved	0.019 mg/L		0.0010	1	12/03/09 15:07	12/08/09 02:38	7440-50-8	
Zinc, Dissolved	23.1 mg/L		2.5	250	12/03/09 15:07	12/09/09 10:01	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 02:38	7440-38-2	
Cadmium, Dissolved	0.055 mg/L		0.000080	1	12/03/09 15:07	12/08/09 02:38	7440-43-9	
Lead, Dissolved	0.0016 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:38	7439-92-1	
Sodium, Dissolved	2.4 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:38	7440-23-5	
Magnesium, Dissolved	175 mg/L		25.0	25	12/03/09 15:07	12/09/09 09:57	7439-95-4	
Calcium, Dissolved	411 mg/L		25.0	25	12/03/09 15:07	12/09/09 09:57	7440-70-2	
Potassium, Dissolved	4.7 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:38	7440-09-7	
Iron, Dissolved	0.12 mg/L		0.050	1	12/03/09 15:07	12/08/09 02:38	7439-89-6	
Total Hardness by 2340B, Dissolved	1750 mg/L		25.0	25	12/03/09 15:07	12/09/09 09:57		
2310 Acidity		Analytical Method: SM 2310						
Acidity	11.6 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	2620 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	2770 mg/L		20.0	1		11/24/09 15:53		B-
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	6.4 mg/L		2.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/02/09 00:31	16887-00-6	
Sulfate	2010 mg/L		50.0	10		12/02/09 10:41	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	6.6 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	46.3 mg/L		5.0	1		12/02/09 09:43		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-2-111909	Lab ID: 10117717006	Collected: 11/19/09 14:30	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	46.3	mg/L	5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-3A-112009	Lab ID: 10117717007	Collected: 11/20/09 11:40	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:41	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:41	7440-38-2	
Cadmium	0.00090 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:41	7440-43-9	
Copper	0.0011 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:41	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:41	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:41	7439-92-1	
Manganese	0.084 mg/L		0.0050	1	12/03/09 16:56	12/07/09 15:41	7439-96-5	
Zinc	0.49 mg/L		0.050	5	12/03/09 16:56	12/07/09 15:45	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 02:58	7429-90-5	
Manganese, Dissolved	0.053 mg/L		0.0050	1	12/03/09 15:07	12/08/09 02:58	7439-96-5	
Copper, Dissolved	0.0013 mg/L		0.0010	1	12/03/09 15:07	12/08/09 02:58	7440-50-8	
Zinc, Dissolved	0.53 mg/L		0.050	5	12/03/09 15:07	12/09/09 10:06	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 02:58	7440-38-2	
Cadmium, Dissolved	0.00086 mg/L		0.00040	5	12/03/09 15:07	12/09/09 10:06	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 02:58	7439-92-1	
Sodium, Dissolved	1.5 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:58	7440-23-5	
Magnesium, Dissolved	21.2 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:58	7439-95-4	
Calcium, Dissolved	34.6 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:06	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 02:58	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 02:58	7439-89-6	
Total Hardness by 2340B, Dissolved	173 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:06		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	322 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	293 mg/L		20.0	1		11/24/09 15:53		B-
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/02/09 02:02	16887-00-6	
Sulfate	87.3 mg/L		5.0	1		12/02/09 02:02	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	96.3 mg/L		5.0	1		12/03/09 14:18		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-3A-112009	Lab ID: 10117717007	Collected: 11/20/09 11:40	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/03/09 14:18		
Alkalinity, Total as CaCO ₃	96.3	mg/L	5.0	1		12/03/09 14:18		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-3A-11202009	Lab ID: 10117717008	Collected: 11/20/09 11:38	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:49	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:49	7440-38-2	
Cadmium	0.00081 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:49	7440-43-9	
Copper	0.0012 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:49	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:49	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:49	7439-92-1	
Manganese	0.051 mg/L		0.0050	1	12/03/09 16:56	12/07/09 15:49	7439-96-5	
Zinc	0.48 mg/L		0.050	5	12/03/09 16:56	12/07/09 15:53	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 03:06	7429-90-5	
Manganese, Dissolved	0.061 mg/L		0.0050	1	12/03/09 15:07	12/08/09 03:06	7439-96-5	
Copper, Dissolved	0.0013 mg/L		0.0010	1	12/03/09 15:07	12/08/09 03:06	7440-50-8	
Zinc, Dissolved	0.53 mg/L		0.050	5	12/03/09 15:07	12/09/09 10:10	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 03:06	7440-38-2	
Cadmium, Dissolved	0.00092 mg/L		0.00040	5	12/03/09 15:07	12/09/09 10:10	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 03:06	7439-92-1	
Sodium, Dissolved	1.5 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:06	7440-23-5	
Magnesium, Dissolved	20.7 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:06	7439-95-4	
Calcium, Dissolved	34.7 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:10	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:06	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 03:06	7439-89-6	
Total Hardness by 2340B, Dissolved	172 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:10		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	336 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	229 mg/L		20.0	1		11/24/09 15:53		B-
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/02/09 02:33	16887-00-6	
Sulfate	86.9 mg/L		5.0	1		12/02/09 02:33	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	97.2 mg/L		5.0	1		12/03/09 14:18		

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: BRSW-3A-11202009		Lab ID: 10117717008		Collected: 11/20/09 11:38	Received: 11/24/09 10:30	Matrix: Water		
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/03/09 14:18		
Alkalinity, Total as CaCO ₃	97.2	mg/L	5.0	1		12/03/09 14:18		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-3B-11909	Lab ID: 10117717009	Collected: 11/19/09 12:10	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/03/09 16:56	12/07/09 15:57	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/03/09 16:56	12/07/09 15:57	7440-38-2	
Cadmium	0.0016 mg/L		0.000080	1	12/03/09 16:56	12/07/09 15:57	7440-43-9	
Copper	0.0014 mg/L		0.0010	1	12/03/09 16:56	12/07/09 15:57	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/03/09 16:56	12/07/09 15:57	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/03/09 16:56	12/07/09 15:57	7439-92-1	
Manganese	0.33 mg/L		0.0050	1	12/03/09 16:56	12/07/09 15:57	7439-96-5	
Zinc	0.81 mg/L		0.050	5	12/03/09 16:56	12/07/09 16:01	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/03/09 15:07	12/08/09 03:14	7429-90-5	
Manganese, Dissolved	0.31 mg/L		0.0050	1	12/03/09 15:07	12/08/09 03:14	7439-96-5	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/03/09 15:07	12/08/09 03:14	7440-50-8	
Zinc, Dissolved	0.85 mg/L		0.050	5	12/03/09 15:07	12/09/09 10:14	7440-66-6	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/03/09 15:07	12/08/09 03:14	7440-38-2	
Cadmium, Dissolved	0.0017 mg/L		0.00040	5	12/03/09 15:07	12/09/09 10:14	7440-43-9	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/03/09 15:07	12/08/09 03:14	7439-92-1	
Sodium, Dissolved	1.4 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:14	7440-23-5	
Magnesium, Dissolved	20.4 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:14	7439-95-4	
Calcium, Dissolved	33.7 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:14	7440-70-2	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/03/09 15:07	12/08/09 03:14	7440-09-7	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/03/09 15:07	12/08/09 03:14	7439-89-6	
Total Hardness by 2340B, Dissolved	168 mg/L		5.0	5	12/03/09 15:07	12/09/09 10:14		
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		12/03/09 15:30		
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	324 umhos/cm		10.0	1		12/01/09 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C						
Total Dissolved Solids	308 mg/L		20.0	1		11/24/09 15:53		B-
2540D Total Suspended Solids		Analytical Method: SM 2540D						
Total Suspended Solids	<1.0 mg/L		1.0	1		11/24/09 15:53		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		12/02/09 03:03	16887-00-6	
Sulfate	85.9 mg/L		5.0	1		12/02/09 03:03	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.8 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	98.1 mg/L		5.0	1		12/02/09 09:43		

Date: 12/09/2009 03:34 PM

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Sample: BRSW-3B-11909		Lab ID: 10117717009	Collected: 11/19/09 12:10	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Carbonate (CaCO ₃)	<5.0	mg/L	5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO ₃	98.1	mg/L	5.0	1		12/02/09 09:43		

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117717

QC Batch: MPRP/18441 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

METHOD BLANK: 719184 Matrix: Water
Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.0040	0.0040	12/04/09 14:09	
Arsenic	mg/L	<0.00050	0.00050	12/04/09 14:09	
Cadmium	mg/L	<0.000080	0.000080	12/04/09 14:09	
Copper	mg/L	<0.00050	0.00050	12/04/09 14:09	
Iron	mg/L	<0.050	0.050	12/04/09 14:09	
Lead	mg/L	<0.00010	0.00010	12/04/09 14:09	
Manganese	mg/L	<0.00050	0.00050	12/04/09 14:09	
Zinc	mg/L	<0.0050	0.0050	12/04/09 14:09	

LABORATORY CONTROL SAMPLE: 719185

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	112	85-115	
Arsenic	mg/L	.08	0.082	102	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.090	112	85-115	
Manganese	mg/L	.08	0.082	102	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719186 719187

Parameter	Units	10117717005		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result						
Aluminum	mg/L	0.0080	.08	.08	0.11	0.10	122	120	70-130	2	20		
Arsenic	mg/L	0.00077	.08	.08	0.080	0.080	99	99	70-130	0	20		
Cadmium	mg/L	<0.000080	.08	.08	0.079	0.080	99	99	70-130	1	20		
Copper	mg/L	<0.00050	.08	.08	0.080	0.080	99	99	70-130	0	20		
Iron	mg/L	<0.050	1	1	1.0	1.0	100	102	70-130	2	20		
Lead	mg/L	0.00011	.08	.08	0.085	0.086	107	107	70-130	0	20		
Manganese	mg/L	0.0013	.08	.08	0.081	0.082	99	101	70-130	2	20		
Zinc	mg/L	0.014	.08	.08	0.093	0.093	99	98	70-130	0	20		

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

MATRIX SPIKE SAMPLE:		721975					
Parameter	Units	5032552001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	ND	.08	0.084	103	70-130	
Arsenic	mg/L	2.6 ug/L	.08	0.083	101	70-130	
Cadmium	mg/L	ND	.08	0.080	100	70-130	
Copper	mg/L	ND	.08	0.080	99	70-130	
Iron	mg/L	2160 ug/L	1	3.2	103	70-130	
Lead	mg/L	0.48 ug/L	.08	0.085	106	70-130	
Manganese	mg/L	508 ug/L	.08	0.57	81	70-130	
Zinc	mg/L	ND	.08	0.084	100	70-130	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: MPRP/18439 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

METHOD BLANK: 719170 Matrix: Water
 Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	<0.0040	0.0040	12/07/09 23:34	
Arsenic, Dissolved	mg/L	<0.00050	0.00050	12/07/09 23:34	
Cadmium, Dissolved	mg/L	<0.000080	0.000080	12/07/09 23:34	
Calcium, Dissolved	mg/L	<0.020	0.020	12/07/09 23:34	
Copper, Dissolved	mg/L	<0.00050	0.00050	12/07/09 23:34	
Iron, Dissolved	mg/L	<0.050	0.050	12/07/09 23:34	
Lead, Dissolved	mg/L	<0.00010	0.00010	12/07/09 23:34	
Magnesium, Dissolved	mg/L	<0.0050	0.0050	12/07/09 23:34	
Manganese, Dissolved	mg/L	<0.00050	0.00050	12/07/09 23:34	
Potassium, Dissolved	mg/L	<0.020	0.020	12/07/09 23:34	
Sodium, Dissolved	mg/L	<0.050	0.050	12/07/09 23:34	
Total Hardness by 2340B, Dissolved	mg/L	<0.071	0.071	12/07/09 23:34	
Zinc, Dissolved	mg/L	<0.0050	0.0050	12/07/09 23:34	

LABORATORY CONTROL SAMPLE: 719171

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	.08	0.083	104	85-115	
Arsenic, Dissolved	mg/L	.08	0.078	97	85-115	
Cadmium, Dissolved	mg/L	.08	0.083	103	85-115	
Calcium, Dissolved	mg/L	1	1.1	110	85-115	
Copper, Dissolved	mg/L	.08	0.080	100	85-115	
Iron, Dissolved	mg/L	1	1.0	104	85-115	
Lead, Dissolved	mg/L	.08	0.087	109	85-115	
Magnesium, Dissolved	mg/L	1	1.0	103	85-115	
Manganese, Dissolved	mg/L	.08	0.081	101	85-115	
Potassium, Dissolved	mg/L	1	0.98	98	85-115	
Sodium, Dissolved	mg/L	1	1.0	102	85-115	
Total Hardness by 2340B, Dissolved	mg/L		7.0			
Zinc, Dissolved	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE SAMPLE: 719172

Parameter	Units	10117682001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	0.0025J	.08	0.084	102	70-130	
Arsenic, Dissolved	mg/L	ND	.08	0.078	97	70-130	
Cadmium, Dissolved	mg/L	ND	.08	0.082	103	70-130	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

MATRIX SPIKE SAMPLE:		719172					
Parameter	Units	10117682001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	18.6J ug/L	1	1.1	112	70-130	
Copper, Dissolved	mg/L	ND	.08	0.080	100	70-130	
Iron, Dissolved	mg/L	ND	1	1.0	103	70-130	
Lead, Dissolved	mg/L	ND	.08	0.086	108	70-130	
Magnesium, Dissolved	mg/L	ND	1	0.99	99	70-130	
Manganese, Dissolved	mg/L	0.00033J	.08	0.081	101	70-130	
Potassium, Dissolved	mg/L	ND	1	0.94	94	70-130	
Sodium, Dissolved	mg/L	ND	1	1.1	105	70-130	
Total Hardness by 2340B, Dissolved	mg/L	55.5J ug/L		6.9			
Zinc, Dissolved	mg/L	ND	.08	0.082	101	70-130	

MATRIX SPIKE SAMPLE:		719173					
Parameter	Units	10117717005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	<0.0040	.08	0.081	98	70-130	
Arsenic, Dissolved	mg/L	0.00077	.08	0.078	96	70-130	
Cadmium, Dissolved	mg/L	<0.000080	.08	0.079	98	70-130	
Calcium, Dissolved	mg/L	20.6	1	20.7	14	70-130	M0
Copper, Dissolved	mg/L	<0.00050	.08	0.079	98	70-130	
Iron, Dissolved	mg/L	<0.050	1	0.98	97	70-130	
Lead, Dissolved	mg/L	<0.00010	.08	0.079	99	70-130	
Magnesium, Dissolved	mg/L	12.6	1	13.5	94	70-130	
Manganese, Dissolved	mg/L	0.0010	.08	0.077	95	70-130	
Potassium, Dissolved	mg/L	0.33	1	1.3	97	70-130	
Sodium, Dissolved	mg/L	1.2	1	2.3	102	70-130	
Total Hardness by 2340B, Dissolved	mg/L	103		107			
Zinc, Dissolved	mg/L	0.015	.08	0.090	94	70-130	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: MT/3373

Analysis Method: SM 2510B

QC Batch Method: SM 2510B

Analysis Description: 2510B Specific Conductance

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

METHOD BLANK: 720721

Matrix: Water

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Specific Conductance	umhos/cm	<10.0	10.0	12/01/09 11:12	

LABORATORY CONTROL SAMPLE: 720722

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance	umhos/cm	1000	971	97	90-110	

SAMPLE DUPLICATE: 720723

Parameter	Units	10117717001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	291	302	4	20	

SAMPLE DUPLICATE: 720724

Parameter	Units	10117719001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	489	490	0	20	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: MT/3336

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

METHOD BLANK: 719083

Matrix: Water

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<1.0	1.0	11/24/09 15:53	

LABORATORY CONTROL SAMPLE: 719084

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	25	25.4	101	71-129	

SAMPLE DUPLICATE: 719085

Parameter	Units	10117717002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	9.1	8.6	6	20	

SAMPLE DUPLICATE: 719086

Parameter	Units	10117651001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	3.4	2.7	22	20	R3

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: MT/3339

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

METHOD BLANK: 719094

Matrix: Water

Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717004, 10117717005, 10117717006, 10117717007, 10117717008, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	12/01/09 19:56	
Sulfate	mg/L	<5.0	5.0	12/01/09 19:56	

LABORATORY CONTROL SAMPLE: 719095

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	40	38.9	97	90-110	
Sulfate	mg/L	40	41.7	104	90-110	

MATRIX SPIKE SAMPLE: 719803

Parameter	Units	10117717005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<1.0	40	41.4	103	80-120	
Sulfate	mg/L	6.7	40	48.8	105	80-120	

SAMPLE DUPLICATE: 719804

Parameter	Units	10117717001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	<1.0		20	
Sulfate	mg/L	63.6	64.6	2	20	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: WET/17836 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717005, 10117717006, 10117717009

METHOD BLANK: 721419 Matrix: Water
 Associated Lab Samples: 10117717001, 10117717002, 10117717003, 10117717005, 10117717006, 10117717009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0	12/02/09 09:43	
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	12/02/09 09:43	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<5.0	5.0	12/02/09 09:43	

LABORATORY CONTROL SAMPLE & LCSD: 721420 721421

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.8	42.7	104	107	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721422 721423

Parameter	Units	10117717005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	99.9	80	80	183	182	104	102	80-120	1	30	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

QC Batch: WET/17839 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 10117717004, 10117717007, 10117717008

METHOD BLANK: 721819 Matrix: Water

Associated Lab Samples: 10117717004, 10117717007, 10117717008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0	12/03/09 14:15	
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	12/03/09 14:15	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<5.0	5.0	12/03/09 14:15	

LABORATORY CONTROL SAMPLE & LCSD: 721820 721821

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.1	43.1	108	108	80-120	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721822 721823

Parameter	Units	10117717004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	93.5	80	80	169	171	94	96	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721824 721825

Parameter	Units	10117815007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	70.6	40	40	112	111	103	101	80-120	1	30	

QUALIFIERS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

B+ Analyte was detected in the associated method blank as well as in the sample.

B- Analyte detected in method blank but was not detected in the associated samples.

H6 Analysis initiated more than 15 minutes after sample collection.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R3 RPD value was outside control limits due to uncertainty of values at or near the PRL.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10117717001	BRSW-23-111909	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717002	BRSW-38-111909	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717003	BRSW-38A-112009	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717004	BRSW-48-11202009	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717005	BRSW-1-111909	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717006	BRSW-2-111909	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717007	BRSW-3A-112009	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717008	BRSW-3A-11202009	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717009	BRSW-3B-11909	EPA 200.8	MPRP/18441	EPA 200.8	ICPM/7580
10117717001	BRSW-23-111909	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717002	BRSW-38-111909	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717003	BRSW-38A-112009	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717004	BRSW-48-11202009	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717005	BRSW-1-111909	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717006	BRSW-2-111909	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717007	BRSW-3A-112009	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717008	BRSW-3A-11202009	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717009	BRSW-3B-11909	EPA 200.8	MPRP/18439	EPA 200.8	ICPM/7587
10117717001	BRSW-23-111909	SM 2310	MT/3402		
10117717002	BRSW-38-111909	SM 2310	MT/3402		
10117717003	BRSW-38A-112009	SM 2310	MT/3402		
10117717004	BRSW-48-11202009	SM 2310	MT/3402		
10117717005	BRSW-1-111909	SM 2310	MT/3402		
10117717006	BRSW-2-111909	SM 2310	MT/3402		
10117717007	BRSW-3A-112009	SM 2310	MT/3402		
10117717008	BRSW-3A-11202009	SM 2310	MT/3402		
10117717009	BRSW-3B-11909	SM 2310	MT/3402		
10117717001	BRSW-23-111909	SM 2510B	MT/3373		
10117717002	BRSW-38-111909	SM 2510B	MT/3373		
10117717003	BRSW-38A-112009	SM 2510B	MT/3373		
10117717004	BRSW-48-11202009	SM 2510B	MT/3373		
10117717005	BRSW-1-111909	SM 2510B	MT/3373		
10117717006	BRSW-2-111909	SM 2510B	MT/3373		
10117717007	BRSW-3A-112009	SM 2510B	MT/3373		
10117717008	BRSW-3A-11202009	SM 2510B	MT/3373		
10117717009	BRSW-3B-11909	SM 2510B	MT/3373		
10117717001	BRSW-23-111909	SM 2540C	MT/3337		
10117717002	BRSW-38-111909	SM 2540C	MT/3337		
10117717003	BRSW-38A-112009	SM 2540C	MT/3337		
10117717004	BRSW-48-11202009	SM 2540C	MT/3337		
10117717005	BRSW-1-111909	SM 2540C	MT/3337		
10117717006	BRSW-2-111909	SM 2540C	MT/3337		
10117717007	BRSW-3A-112009	SM 2540C	MT/3337		
10117717008	BRSW-3A-11202009	SM 2540C	MT/3337		
10117717009	BRSW-3B-11909	SM 2540C	MT/3337		
10117717001	BRSW-23-111909	SM 2540D	MT/3336		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117717

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10117717002	BRSW-38-111909	SM 2540D	MT/3336		
10117717003	BRSW-38A-112009	SM 2540D	MT/3336		
10117717004	BRSW-48-11202009	SM 2540D	MT/3336		
10117717005	BRSW-1-111909	SM 2540D	MT/3336		
10117717006	BRSW-2-111909	SM 2540D	MT/3336		
10117717007	BRSW-3A-112009	SM 2540D	MT/3336		
10117717008	BRSW-3A-11202009	SM 2540D	MT/3336		
10117717009	BRSW-3B-11909	SM 2540D	MT/3336		
10117717001	BRSW-23-111909	EPA 300.0	MT/3339		
10117717002	BRSW-38-111909	EPA 300.0	MT/3339		
10117717003	BRSW-38A-112009	EPA 300.0	MT/3339		
10117717004	BRSW-48-11202009	EPA 300.0	MT/3339		
10117717005	BRSW-1-111909	EPA 300.0	MT/3339		
10117717006	BRSW-2-111909	EPA 300.0	MT/3339		
10117717007	BRSW-3A-112009	EPA 300.0	MT/3339		
10117717008	BRSW-3A-11202009	EPA 300.0	MT/3339		
10117717009	BRSW-3B-11909	EPA 300.0	MT/3339		
10117717001	BRSW-23-111909	SM 4500-H+B	MT/3334		
10117717002	BRSW-38-111909	SM 4500-H+B	MT/3334		
10117717003	BRSW-38A-112009	SM 4500-H+B	MT/3334		
10117717004	BRSW-48-11202009	SM 4500-H+B	MT/3334		
10117717005	BRSW-1-111909	SM 4500-H+B	MT/3334		
10117717006	BRSW-2-111909	SM 4500-H+B	MT/3334		
10117717007	BRSW-3A-112009	SM 4500-H+B	MT/3334		
10117717008	BRSW-3A-11202009	SM 4500-H+B	MT/3334		
10117717009	BRSW-3B-11909	SM 4500-H+B	MT/3334		
10117717001	BRSW-23-111909	SM 2320B	WET/17836		
10117717002	BRSW-38-111909	SM 2320B	WET/17836		
10117717003	BRSW-38A-112009	SM 2320B	WET/17836		
10117717004	BRSW-48-11202009	SM 2320B	WET/17839		
10117717005	BRSW-1-111909	SM 2320B	WET/17836		
10117717006	BRSW-2-111909	SM 2320B	WET/17836		
10117717007	BRSW-3A-112009	SM 2320B	WET/17839		
10117717008	BRSW-3A-11202009	SM 2320B	WET/17839		
10117717009	BRSW-3B-11909	SM 2320B	WET/17836		

**UBMC Summer Field Work - Surface Water Flow Measurements
TO #10**

MH Diversion Ditch BRSW-1

Flow Measurement Date: 8/28/2009 10:25

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
29	---	---	---
26	0.1	0.41	0.01
23	0.15	1.21	0.05
20	0.2	1.07	0.05
17	0.27	1.6	0.11
14	0.25	1.66	0.10
11	0.2	1.39	0.06
9	0.2	1.07	0.04
6	0.05	0	0.00

**Total Flow 0.42 cfs
190.02 gpm**

BRSW-2: water is stagnant in the impoundment and flow = 0.

BRSW-3B

Flow Measurement Date: 8/28/2009 16:29

Could hear water running but not visible.

3 channels found that were covered by grass and moss. Cleared grass and moss to measure flow.

Site is where alluvium is exposed below the Mike Horse Dam.

Can only measure 1 channel.

10" wide, depth 0.6', velocity 0.44 ft/sec

**Total Estimated Flow: 0.33 cfs in 3 channels
148.11 gpm**

BRSW-3A

Flow Measurement Date: 8/28/2009 15:28

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
12	---	---	---
14	0.1	0	0.00
21	0.2	0.14	0.01
26	0.45	0.2	0.03
30	0.45	0.25	0.03
33	0.45	0.22	0.02
36	0.4	0.15	0.02
39			0.00

**Total Flow 0.12 cfs
54.00 gpm**

meter was sinking into soft sediments
meter was sinking into soft sediments
meter was sinking into soft sediments
meter was sinking into soft sediments
meter was sinking into soft sediments, edge of vegetation
meter was sinking into soft sediments

comments: heavily vegetated, slimy bottom, low flow

BRSW-22

Flow Measurement Date: 8/28/2009 17:14

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
4	---	---	---
6	0.2		0.00
8	0.2	0.45	0.02
10	0.2	0.26	0.01
12	0.2	0.23	0.01
14	0.2	0.2	0.01
16	0.2	0.16	0.01
18	0.2	0.02	0.001
20	0.1	0.08	0.001
22	0.1	0.03	0.001
24	<0.1	---	---
26	<0.1	---	---

sloped rock, can't measure V

rock blocking flow

Total Flow **0.05** cfs
20.57 gpm

BRSW-23

Flow Measurement Date: 8/28/2009 14:27

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
7	---	---	---
9	0.15	0.35	0.02
14	0.2	0.17	0.01
19	0.2	0.11	0.01
24	0.2	0.14	0.01
29	0.3	0.83	0.10
34	0.4	1.26	0.21
39	0.3	1.36	0.17
44	0.3	0.59	0.07
49	0.25	0.34	0.04
54	0.2	0.08	0.007
59	0.1	0.02	0.001

sloped rock, can't measure V

Total Flow **0.65** cfs
292.10 gpm

BRSW-48

Flow Measurement Date: 8/28/2009 13:10

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
9	---	---	---
12	0.3	0.22	0.02
15	0.3	0.08	0.01
18	0.5	0.72	0.09
21	0.45	1.2	0.14
24	0.45	1.12	0.13
27	0.3	1.6	0.12
30	0.3	0.6	0.05
33	0.3	0.67	0.05
36	0.3	0.93	0.10
39	0.25	1.11	0.10
42	0.25	1.62	0.152
45	0.1	0.06	0.001

Total Flow **0.95** cfs
426.42 gpm

BRSW-38

Flow Measurement Date: 8/28/2009 18:26

Discharge Measurements

Tape (inches)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
12	---	---	---
17.5	0.15	0.13	0.01
23	0.35	0.05	0.01
28.5	0.4	0.31	0.06
34	0.3	0.35	0.05
39.5	0.4	0.6	0.11
45	0.3	1.59	0.22
50.5	0.2	1.78	0.16
56	0.2	1.48	0.14
61.5	0.2	1.26	0.12
67	0.15	0.74	0.03

Total Flow **0.89** cfs
399.60 gpm

**UBMC Summer Field Work - Surface Water Flow Measurements
TO #10**

MH Diversion Ditch BRSW-1

Flow Measurement Date: 11/19/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
52	---	---	---	---
49.7	0.5	0.04	0	0.00
45.1	0.75	0.06	0.49	0.01
40.5	1.25	0.10	0.73	0.06
35.9	2	0.17	0.88	0.11
31.3	3.1	0.26	0.91	0.18
26.7	1.25	0.10	0.3	0.02
22.1	1.75	0.15	0.44	0.02
17.5	2.25	0.19	0.67	0.05
12.9	2	0.17	0.18	0.01
8.3	1.75	0.15	0.03	0.00
Total Flow				0.47 cfs 212.42 gpm

BRSW-2: water is stagnant in the impoundment and flow = 0.

BRSW-3B

Flow Measurement Date: 11/20/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
---	---	---	---	---
11	0.5	0.04	0.5	0.01
Total Flow				0.01 cfs 4.286 gpm

BRSW-3A

Flow Measurement Date:

11/20/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
28	---	---	---	---
26.9	6.5	0.54	0.12	0.01
24.7	6	0.50	0.11	0.01
22.5	6	0.50	0.12	0.02
20.3	5.75	0.48	0.14	0.02
18.1	6	0.50	0.11	0.02
15.9	6.5	0.54	0.11	0.02
13.7	5	0.42	0.13	0.01
11.5	6	0.50	0.13	0.01
9.3	5	0.42	0.12	0.01
7.1	3	0.25	0.14	0.01

Total Flow **0.15 cfs**
68.32 gpm

BRSW-22

Flow Measurement Date:

11/20/2009

Site Frozen**Discharge Measurements**

Tape (inches)		Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
		---	---	---
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.000
				0.000
				0.000

			---	---

Total Flow **0.00 cfs**
0.00 gpm

BRSW-23

Flow Measurement Date:

11/19/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
50	---	---	---	---
48.1	1	0.08	0.03	0.00
44.3	1	0.08	0.38	0.01
40.5	2	0.17	0.53	0.06
34.7	0.5	0.04	1.05	0.03
32.9	0.5	0.04	1.01	0.02
29.1	2	0.17	1.25	0.13
25.3	1.9	0.16	1.37	0.07
21.5	2	0.17	0.76	0.04
17.7	1.5	0.13	0.37	0.01
13.9	1	0.08	0.75	0.05
Total Flow				0.42 cfs 188.02 gpm

BRSW-48

Flow Measurement Date:

11/20/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
37	---	---	---	---
35.4	0.25	0.02	0	0.00
32.2	0.5	0.04	0	0.00
29	1	0.08	0.52	0.02
25.8	1.25	0.10	0.66	0.04
22.6	1.75	0.15	1.73	0.13
19.4	2	0.17	1.1	0.10
16.2	2.25	0.19	1.62	0.08
13	3	0.25	1.23	0.08
9.8	1.5	0.13	1.1	0.04
6.6	1	0.08	0.59	0.02
Total Flow				0.51 cfs 229.74 gpm

BRSW-38

Flow Measurement Date:

11/19/2009

Discharge Measurements

Tape (inches)	Depth (in)	Depth (feet)	Velocity (ft/sec)	Discharge (cfs)
63	---	---	---	---
60.4	1	0.08	0.17	0.00
55.2	2.5	0.21	0.14	0.01
50	4	0.33	0.29	0.08
44.8	3.25	0.27	0.29	0.07
39.6	3.9	0.33	0.4	0.11
34.4	2.5	0.21	0.64	0.12
29.2	2	0.17	0.56	0.04
24	2.75	0.23	0.77	0.08
18.8	2.25	0.19	1.23	0.10
13.6	2	0.17	0.99	0.13

Total Flow **0.74** cfs
333.67 gpm

Appendix E: Groundwater

Analytical Reports for August 2009 and November 2009 Sampling

September 16, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: MDEQ Mike Horse Dam 09208
Pace Project No.: 10111632

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 02, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Washington Certification #: C754

Tennessee Certification #: 02818

Pennsylvania Certification #: 68-00563

Oregon Certification #: MN200001

North Dakota Certification #: R-036

North Carolina Certification #: 530

New York Certification #: 11647

New Jersey Certification #: MN-002

Montana Certification #: MT CERT0092

Minnesota Certification #: 027-053-137

Maine Certification #: 2007029

Louisiana Certification #: LA080009

Louisiana Certification #: 03086

Kansas Certification #: E-10167

Iowa Certification #: 368

Illinois Certification #: 200011

Florida/NELAP Certification #: E87605

Montana Certification IDs

602 South 25th Street Billings, MT 59101

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

EPA Region 8 Certification #: 8TMS-Q

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10111632001	TDMW-3DA	Water	08/31/09 17:50	09/02/09 10:05
10111632002	TDMW-3S	Water	08/31/09 17:06	09/02/09 10:05
10111632003	TDMW-4D	Water	08/31/09 19:56	09/02/09 10:05
10111632004	TDMW-5	Water	09/01/09 14:43	09/02/09 10:05
10111632005	TDMW-1	Water	08/31/09 11:50	09/02/09 10:05
10111632006	TDMW-2D	Water	08/31/09 14:07	09/02/09 10:05
10111632007	TDMW-2S	Water	08/31/09 14:57	09/02/09 10:05
10111632008	TDMW-3D	Water	08/31/09 17:48	09/02/09 10:05

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10111632001	TDMW-3DA	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632002	TDMW-3S	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632003	TDMW-4D	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632004	TDMW-5	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632005	TDMW-1	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632006	TDMW-2D	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632007	TDMW-2S	EPA 200.8	RJS	13	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
10111632008	TDMW-3D	EPA 200.8	RJS	13	PASI-M
		EPA 200.8	RJS	8	PASI-M
		EPA 300.0	MK1	2	PASI-MT
		SM 2320B	MJS	3	PASI-M
		SM 2510B	KS1	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17136

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10111672001,10111776001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 674906)
 - Aluminum
- MS (Lab ID: 674908)
 - Aluminum
 - Iron
 - Zinc
- MSD (Lab ID: 674907)
 - Aluminum

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17141

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10111632008,5029869001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 675292)
 - Calcium, Dissolved
 - Magnesium, Dissolved
 - Manganese, Dissolved
 - Sodium, Dissolved
- MS (Lab ID: 675294)
 - Calcium, Dissolved
- MSD (Lab ID: 675293)
 - Calcium, Dissolved
 - Magnesium, Dissolved
 - Manganese, Dissolved
 - Sodium, Dissolved

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: EPA 300.0

Description: 300.0 IC Anions

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: SM 2510B

Description: 2510B Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for SM 2510B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- TDMW-1 (Lab ID: 10111632005)
- TDMW-2D (Lab ID: 10111632006)
- TDMW-2S (Lab ID: 10111632007)
- TDMW-3D (Lab ID: 10111632008)
- TDMW-3DA (Lab ID: 10111632001)
- TDMW-3S (Lab ID: 10111632002)
- TDMW-4D (Lab ID: 10111632003)
- TDMW-5 (Lab ID: 10111632004)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Method: SM 2320B

Description: 2320B Alkalinity

Client: Montana Dept. of Environmental Quality

Date: September 16, 2009

General Information:

8 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/17118

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10111632001,10111668003

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 676261)
- Alkalinity, Total as CaCO₃

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-3DA		Lab ID: 10111632001	Collected: 08/31/09 17:50	Received: 09/02/09 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	4.8 mg/L		0.030	1	09/04/09 13:02	09/09/09 15:17	7429-90-5	
Arsenic	0.0059 mg/L		0.0030	1	09/04/09 13:02	09/09/09 15:17	7440-38-2	
Cadmium	0.00032 mg/L		0.000080	1	09/04/09 13:02	09/09/09 15:17	7440-43-9	
Copper	0.013 mg/L		0.0010	1	09/04/09 13:02	09/09/09 15:17	7440-50-8	
Iron	6.2 mg/L		0.050	1	09/04/09 13:02	09/09/09 15:17	7439-89-6	
Lead	0.026 mg/L		0.00050	1	09/04/09 13:02	09/09/09 15:17	7439-92-1	
Manganese	0.44 mg/L		0.0050	1	09/04/09 13:02	09/09/09 15:17	7439-96-5	
Zinc	0.079 mg/L		0.010	1	09/04/09 13:02	09/09/09 15:17	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/11/09 12:30	09/12/09 03:17	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/11/09 12:30	09/12/09 03:17	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/11/09 12:30	09/12/09 03:17	7440-43-9	
Calcium, Dissolved	38.6 mg/L		5.0	5	09/11/09 12:30	09/12/09 03:21	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/11/09 12:30	09/12/09 03:17	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/11/09 12:30	09/12/09 03:17	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/11/09 12:30	09/12/09 03:17	7439-92-1	
Magnesium, Dissolved	17.2 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:17	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/11/09 12:30	09/12/09 03:17	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:17	7440-09-7	
Sodium, Dissolved	2.1 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:17	7440-23-5	
Total Hardness by 2340B, Dissolved	167 mg/L		5.0	5	09/11/09 12:30	09/12/09 03:21		
Zinc, Dissolved	<0.010 mg/L		0.010	1	09/11/09 12:30	09/12/09 03:17	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	344 umhos/cm		10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 01:43	16887-00-6	
Sulfate	110 mg/L		5.0	1		09/04/09 01:43	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.5 Std. Units		0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	86.0 mg/L		10.0	2		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<10.0 mg/L		10.0	2		09/08/09 08:03		
Alkalinity, Total as CaCO3	86.0 mg/L		10.0	2		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-3S		Lab ID: 10111632002	Collected: 08/31/09 17:06	Received: 09/02/09 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030	mg/L	0.030	1	09/04/09 13:02	09/09/09 15:21	7429-90-5	
Arsenic	<0.0030	mg/L	0.0030	1	09/04/09 13:02	09/09/09 15:21	7440-38-2	
Cadmium	<0.000080	mg/L	0.000080	1	09/04/09 13:02	09/09/09 15:21	7440-43-9	
Copper	<0.0010	mg/L	0.0010	1	09/04/09 13:02	09/09/09 15:21	7440-50-8	
Iron	<0.050	mg/L	0.050	1	09/04/09 13:02	09/09/09 15:21	7439-89-6	
Lead	<0.00050	mg/L	0.00050	1	09/04/09 13:02	09/09/09 15:21	7439-92-1	
Manganese	<0.0050	mg/L	0.0050	1	09/04/09 13:02	09/09/09 15:21	7439-96-5	
Zinc	<0.010	mg/L	0.010	1	09/04/09 13:02	09/09/09 15:21	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030	mg/L	0.030	1	09/11/09 12:30	09/12/09 03:26	7429-90-5	
Arsenic, Dissolved	<0.0030	mg/L	0.0030	1	09/11/09 12:30	09/12/09 03:26	7440-38-2	
Cadmium, Dissolved	<0.000080	mg/L	0.000080	1	09/11/09 12:30	09/12/09 03:26	7440-43-9	
Calcium, Dissolved	<1.0	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:26	7440-70-2	
Copper, Dissolved	<0.0010	mg/L	0.0010	1	09/11/09 12:30	09/12/09 03:26	7440-50-8	
Iron, Dissolved	<0.050	mg/L	0.050	1	09/11/09 12:30	09/12/09 03:26	7439-89-6	
Lead, Dissolved	<0.00050	mg/L	0.00050	1	09/11/09 12:30	09/12/09 03:26	7439-92-1	
Magnesium, Dissolved	<1.0	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:26	7439-95-4	
Manganese, Dissolved	<0.0050	mg/L	0.0050	1	09/11/09 12:30	09/12/09 03:26	7439-96-5	
Potassium, Dissolved	<1.0	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:26	7440-09-7	
Sodium, Dissolved	2.5	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:26	7440-23-5	
Total Hardness by 2340B, Dissolved	1.3	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:26		
Zinc, Dissolved	<0.010	mg/L	0.010	1	09/11/09 12:30	09/12/09 03:26	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	16.5	umhos/cm	10.0	1		09/03/09 15:40		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0	mg/L	1.0	1		09/04/09 02:44	16887-00-6	
Sulfate	<5.0	mg/L	5.0	1		09/04/09 02:44	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.3	Std. Units	0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	5.6	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	5.6	mg/L	5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-4D	Lab ID: 10111632003	Collected: 08/31/09 19:56	Received: 09/02/09 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030	mg/L	0.030	1	09/04/09 13:02	09/09/09 15:34	7429-90-5	
Arsenic	<0.0030	mg/L	0.0030	1	09/04/09 13:02	09/09/09 15:34	7440-38-2	
Cadmium	<0.000080	mg/L	0.000080	1	09/04/09 13:02	09/09/09 15:34	7440-43-9	
Copper	<0.0010	mg/L	0.0010	1	09/04/09 13:02	09/09/09 15:34	7440-50-8	
Iron	<0.050	mg/L	0.050	1	09/04/09 13:02	09/09/09 15:34	7439-89-6	
Lead	<0.00050	mg/L	0.00050	1	09/04/09 13:02	09/09/09 15:34	7439-92-1	
Manganese	0.0071	mg/L	0.0050	1	09/04/09 13:02	09/09/09 15:34	7439-96-5	
Zinc	<0.010	mg/L	0.010	1	09/04/09 13:02	09/09/09 15:34	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030	mg/L	0.030	1	09/11/09 12:30	09/12/09 03:35	7429-90-5	
Arsenic, Dissolved	<0.0030	mg/L	0.0030	1	09/11/09 12:30	09/12/09 03:35	7440-38-2	
Cadmium, Dissolved	<0.000080	mg/L	0.000080	1	09/11/09 12:30	09/12/09 03:35	7440-43-9	
Calcium, Dissolved	21.1	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:35	7440-70-2	
Copper, Dissolved	<0.0010	mg/L	0.0010	1	09/11/09 12:30	09/12/09 03:35	7440-50-8	
Iron, Dissolved	<0.050	mg/L	0.050	1	09/11/09 12:30	09/12/09 03:35	7439-89-6	
Lead, Dissolved	<0.00050	mg/L	0.00050	1	09/11/09 12:30	09/12/09 03:35	7439-92-1	
Magnesium, Dissolved	12.3	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:35	7439-95-4	
Manganese, Dissolved	0.0070	mg/L	0.0050	1	09/11/09 12:30	09/12/09 03:35	7439-96-5	
Potassium, Dissolved	<1.0	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:35	7440-09-7	
Sodium, Dissolved	2.5	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:35	7440-23-5	
Total Hardness by 2340B, Dissolved	103	mg/L	1.0	1	09/11/09 12:30	09/12/09 03:35		
Zinc, Dissolved	<0.010	mg/L	0.010	1	09/11/09 12:30	09/12/09 03:35	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	204	umhos/cm	10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0	mg/L	1.0	1		09/04/09 04:46	16887-00-6	
Sulfate	19.9	mg/L	5.0	1		09/04/09 04:46	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.6	Std. Units	0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	87.0	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	87.0	mg/L	5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-5		Lab ID: 10111632004	Collected: 09/01/09 14:43	Received: 09/02/09 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.48 mg/L		0.030	1	09/04/09 13:02	09/09/09 15:39	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/04/09 13:02	09/09/09 15:39	7440-38-2	
Cadmium	0.00039 mg/L		0.000080	1	09/04/09 13:02	09/09/09 15:39	7440-43-9	
Copper	0.012 mg/L		0.0010	1	09/04/09 13:02	09/09/09 15:39	7440-50-8	
Iron	1.4 mg/L		0.050	1	09/04/09 13:02	09/09/09 15:39	7439-89-6	
Lead	0.014 mg/L		0.00050	1	09/04/09 13:02	09/09/09 15:39	7439-92-1	
Manganese	0.18 mg/L		0.0050	1	09/04/09 13:02	09/09/09 15:39	7439-96-5	
Zinc	0.055 mg/L		0.010	1	09/04/09 13:02	09/09/09 15:39	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/11/09 12:30	09/12/09 03:43	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/11/09 12:30	09/12/09 03:43	7440-38-2	
Cadmium, Dissolved	0.00013 mg/L		0.000080	1	09/11/09 12:30	09/12/09 03:43	7440-43-9	
Calcium, Dissolved	35.1 mg/L		5.0	5	09/11/09 12:30	09/12/09 03:48	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/11/09 12:30	09/12/09 03:43	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/11/09 12:30	09/12/09 03:43	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/11/09 12:30	09/12/09 03:43	7439-92-1	
Magnesium, Dissolved	15.4 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:43	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/11/09 12:30	09/12/09 03:43	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:43	7440-09-7	
Sodium, Dissolved	5.9 mg/L		1.0	1	09/11/09 12:30	09/12/09 03:43	7440-23-5	
Total Hardness by 2340B, Dissolved	151 mg/L		5.0	5	09/11/09 12:30	09/12/09 03:48		
Zinc, Dissolved	0.021 mg/L		0.010	1	09/11/09 12:30	09/12/09 03:43	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	306 umhos/cm		10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 05:16	16887-00-6	
Sulfate	53.0 mg/L		5.0	1		09/04/09 05:16	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.0 Std. Units		0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	115 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	115 mg/L		5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-1	Lab ID: 10111632005	Collected: 08/31/09 11:50	Received: 09/02/09 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	09/04/09 13:02	09/09/09 15:43	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/04/09 13:02	09/09/09 15:43	7440-38-2	
Cadmium	0.00050 mg/L		0.000080	1	09/04/09 13:02	09/09/09 15:43	7440-43-9	
Copper	<0.0010 mg/L		0.0010	1	09/04/09 13:02	09/09/09 15:43	7440-50-8	
Iron	<0.050 mg/L		0.050	1	09/04/09 13:02	09/09/09 15:43	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	09/04/09 13:02	09/09/09 15:43	7439-92-1	
Manganese	<0.0050 mg/L		0.0050	1	09/04/09 13:02	09/09/09 15:43	7439-96-5	
Zinc	0.18 mg/L		0.010	1	09/04/09 13:02	09/09/09 15:43	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/11/09 12:30	09/12/09 04:06	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/11/09 12:30	09/12/09 04:06	7440-38-2	
Cadmium, Dissolved	0.00048 mg/L		0.000080	1	09/11/09 12:30	09/12/09 04:06	7440-43-9	
Calcium, Dissolved	45.4 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:10	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/11/09 12:30	09/12/09 04:06	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/11/09 12:30	09/12/09 04:06	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/11/09 12:30	09/12/09 04:06	7439-92-1	
Magnesium, Dissolved	31.1 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:10	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/11/09 12:30	09/12/09 04:06	7439-96-5	
Potassium, Dissolved	1.1 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:06	7440-09-7	
Sodium, Dissolved	1.6 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:06	7440-23-5	
Total Hardness by 2340B, Dissolved	241 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:10		
Zinc, Dissolved	0.19 mg/L		0.010	1	09/11/09 12:30	09/12/09 04:06	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	470 umhos/cm		10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 05:47	16887-00-6	
Sulfate	160 mg/L		5.0	1		09/04/09 05:47	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.1 Std. Units		0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	88.8 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	88.8 mg/L		5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-2D	Lab ID: 10111632006	Collected: 08/31/09 14:07	Received: 09/02/09 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.35 mg/L		0.030	1	09/04/09 13:02	09/09/09 15:47	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	09/04/09 13:02	09/09/09 15:47	7440-38-2	
Cadmium	<0.000080 mg/L		0.000080	1	09/04/09 13:02	09/09/09 15:47	7440-43-9	
Copper	0.0024 mg/L		0.0010	1	09/04/09 13:02	09/09/09 15:47	7440-50-8	
Iron	0.29 mg/L		0.050	1	09/04/09 13:02	09/09/09 15:47	7439-89-6	
Lead	0.0016 mg/L		0.00050	1	09/04/09 13:02	09/09/09 15:47	7439-92-1	
Manganese	0.015 mg/L		0.0050	1	09/04/09 13:02	09/09/09 15:47	7439-96-5	
Zinc	<0.010 mg/L		0.010	1	09/04/09 13:02	09/09/09 15:47	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/11/09 12:30	09/12/09 04:14	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/11/09 12:30	09/12/09 04:14	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/11/09 12:30	09/12/09 04:14	7440-43-9	
Calcium, Dissolved	24.0 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:19	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/11/09 12:30	09/12/09 04:14	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/11/09 12:30	09/12/09 04:14	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/11/09 12:30	09/12/09 04:14	7439-92-1	
Magnesium, Dissolved	13.7 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:14	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/11/09 12:30	09/12/09 04:14	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:14	7440-09-7	
Sodium, Dissolved	1.3 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:14	7440-23-5	
Total Hardness by 2340B, Dissolved	116 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:19		
Zinc, Dissolved	<0.010 mg/L		0.010	1	09/11/09 12:30	09/12/09 04:14	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	228 umhos/cm		10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 06:18	16887-00-6	
Sulfate	24.2 mg/L		5.0	1		09/04/09 06:18	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	103 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	103 mg/L		5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-2S		Lab ID: 10111632007	Collected: 08/31/09 14:57	Received: 09/02/09 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030	mg/L	0.030	1	09/04/09 13:02	09/09/09 15:52	7429-90-5	
Arsenic	<0.0030	mg/L	0.0030	1	09/04/09 13:02	09/09/09 15:52	7440-38-2	
Cadmium	0.00046	mg/L	0.000080	1	09/04/09 13:02	09/09/09 15:52	7440-43-9	
Copper	<0.0010	mg/L	0.0010	1	09/04/09 13:02	09/09/09 15:52	7440-50-8	
Iron	0.092	mg/L	0.050	1	09/04/09 13:02	09/09/09 15:52	7439-89-6	
Lead	0.0014	mg/L	0.00050	1	09/04/09 13:02	09/09/09 15:52	7439-92-1	
Manganese	3.4	mg/L	0.12	25	09/04/09 13:02	09/11/09 16:46	7439-96-5	
Zinc	0.79	mg/L	0.050	5	09/04/09 13:02	09/11/09 16:42	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030	mg/L	0.030	1	09/11/09 12:30	09/12/09 04:23	7429-90-5	
Arsenic, Dissolved	<0.0030	mg/L	0.0030	1	09/11/09 12:30	09/12/09 04:23	7440-38-2	
Cadmium, Dissolved	0.00044	mg/L	0.000080	1	09/11/09 12:30	09/12/09 04:23	7440-43-9	
Calcium, Dissolved	49.3	mg/L	5.0	5	09/11/09 12:30	09/12/09 04:28	7440-70-2	
Copper, Dissolved	<0.0010	mg/L	0.0010	1	09/11/09 12:30	09/12/09 04:23	7440-50-8	
Iron, Dissolved	<0.050	mg/L	0.050	1	09/11/09 12:30	09/12/09 04:23	7439-89-6	
Lead, Dissolved	<0.00050	mg/L	0.00050	1	09/11/09 12:30	09/12/09 04:23	7439-92-1	
Magnesium, Dissolved	30.7	mg/L	5.0	5	09/11/09 12:30	09/12/09 04:28	7439-95-4	
Manganese, Dissolved	3.0	mg/L	0.12	25	09/11/09 12:30	09/15/09 10:39	7439-96-5	
Potassium, Dissolved	1.1	mg/L	1.0	1	09/11/09 12:30	09/12/09 04:23	7440-09-7	
Sodium, Dissolved	1.5	mg/L	1.0	1	09/11/09 12:30	09/12/09 04:23	7440-23-5	
Total Hardness by 2340B, Dissolved	250	mg/L	5.0	5	09/11/09 12:30	09/12/09 04:28		
Zinc, Dissolved	0.74	mg/L	0.050	5	09/11/09 12:30	09/12/09 04:28	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	497	umhos/cm	10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0	mg/L	1.0	1		09/04/09 06:48	16887-00-6	
Sulfate	157	mg/L	5.0	1		09/04/09 06:48	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.0	Std. Units	0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	103	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0	mg/L	5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	103	mg/L	5.0	1		09/08/09 08:03		

ANALYTICAL RESULTS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Sample: TDMW-3D		Lab ID: 10111632008	Collected: 08/31/09 17:48	Received: 09/02/09 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	5.1 mg/L		0.030	1	09/04/09 13:02	09/09/09 15:56	7429-90-5	
Arsenic	0.0062 mg/L		0.0030	1	09/04/09 13:02	09/09/09 15:56	7440-38-2	
Cadmium	0.00030 mg/L		0.000080	1	09/04/09 13:02	09/09/09 15:56	7440-43-9	
Copper	0.014 mg/L		0.0010	1	09/04/09 13:02	09/09/09 15:56	7440-50-8	
Iron	6.7 mg/L		0.050	1	09/04/09 13:02	09/09/09 15:56	7439-89-6	
Lead	0.026 mg/L		0.00050	1	09/04/09 13:02	09/09/09 15:56	7439-92-1	
Manganese	0.45 mg/L		0.0050	1	09/04/09 13:02	09/09/09 15:56	7439-96-5	
Zinc	0.080 mg/L		0.010	1	09/04/09 13:02	09/09/09 15:56	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	09/11/09 12:30	09/12/09 04:32	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	09/11/09 12:30	09/12/09 04:32	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	09/11/09 12:30	09/12/09 04:32	7440-43-9	
Calcium, Dissolved	39.5 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:41	7440-70-2	M1
Copper, Dissolved	<0.0010 mg/L		0.0010	1	09/11/09 12:30	09/12/09 04:32	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	09/11/09 12:30	09/12/09 04:32	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	09/11/09 12:30	09/12/09 04:32	7439-92-1	
Magnesium, Dissolved	17.2 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:32	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	09/11/09 12:30	09/12/09 04:32	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:32	7440-09-7	
Sodium, Dissolved	2.1 mg/L		1.0	1	09/11/09 12:30	09/12/09 04:32	7440-23-5	
Total Hardness by 2340B, Dissolved	169 mg/L		5.0	5	09/11/09 12:30	09/12/09 04:41		
Zinc, Dissolved	<0.010 mg/L		0.010	1	09/11/09 12:30	09/12/09 04:32	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	346 umhos/cm		10.0	1		09/03/09 17:10		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		09/04/09 07:19	16887-00-6	
Sulfate	107 mg/L		5.0	1		09/04/09 07:19	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.6 Std. Units		0.10	1		09/02/09 15:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	70.1 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		09/08/09 08:03		
Alkalinity, Total as CaCO3	70.1 mg/L		5.0	1		09/08/09 08:03		

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

QC Batch: MT/2700 Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

LABORATORY CONTROL SAMPLE: 674387

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	101	98-102	H6

SAMPLE DUPLICATE: 674388

Parameter	Units	10111632005 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.1	7.1	1	3	H6

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

QC Batch: WET/17118 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

METHOD BLANK: 676255 Matrix: Water
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0	09/08/09 08:03	
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	09/08/09 08:03	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<5.0	5.0	09/08/09 08:03	

LABORATORY CONTROL SAMPLE & LCSD: 676256 676257

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.0	43.0	108	108	80-120	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 676258 676259

Parameter	Units	10111632001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	86.0	80	80	152	150	82	80	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 676260 676261

Parameter	Units	10111668003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	82.3	80	80	178	180	119	122	80-120	1	30	M0

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

QC Batch: MPRP/17136 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

METHOD BLANK: 674904 Matrix: Water
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.030	0.030	09/09/09 14:50	
Arsenic	mg/L	<0.0030	0.0030	09/09/09 14:50	
Cadmium	mg/L	<0.000080	0.000080	09/09/09 14:50	
Copper	mg/L	<0.0010	0.0010	09/09/09 14:50	
Iron	mg/L	<0.050	0.050	09/09/09 14:50	
Lead	mg/L	<0.00050	0.00050	09/09/09 14:50	
Manganese	mg/L	<0.0050	0.0050	09/09/09 14:50	
Zinc	mg/L	<0.010	0.010	09/09/09 14:50	

LABORATORY CONTROL SAMPLE: 674905

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.082	103	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.085	106	85-115	
Manganese	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 674906 674907

Parameter	Units	10111776001		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	Max		Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result				RPD	RPD	
Aluminum	mg/L	660 ug/L	.08	.08	0.98	1.0	401	420	70-130	2	20	M1	
Arsenic	mg/L	0.66 ug/L	.08	.08	0.083	0.084	103	104	70-130	1	20		
Cadmium	mg/L	ND	.08	.08	0.080	0.080	100	100	70-130	1	20		
Copper	mg/L	2.8 ug/L	.08	.08	0.085	0.085	103	103	70-130	0	20		
Iron	mg/L	780 ug/L	1	1	1.9	1.9	114	113	70-130	1	20		
Lead	mg/L	0.38 ug/L	.08	.08	0.085	0.085	105	106	70-130	0	20		
Manganese	mg/L	47.6 ug/L	.08	.08	0.13	0.13	105	105	70-130	0	20		
Zinc	mg/L	6.1 ug/L	.08	.08	0.090	0.089	104	104	70-130	1	20		

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

MATRIX SPIKE SAMPLE:		674908					
Parameter	Units	10111672001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	3.6 ppm	.08	7.0	4309	70-130	M1
Arsenic	mg/L	1.8 ug/L	.08	0.079	97	70-130	
Cadmium	mg/L	1.9 ug/L	.08	0.081	99	70-130	
Copper	mg/L	9.7 ug/L	.08	0.092	103	70-130	
Iron	mg/L	2.8 ppm	1	4.3	145	70-130	M1
Lead	mg/L	24.3 ug/L	.08	0.11	108	70-130	
Manganese	mg/L	0.17 ppm	.08	0.25	104	70-130	
Zinc	mg/L	369 ug/L	.08	0.42	66	70-130	M1

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Project No.: 10111632

QC Batch: MPRP/17141 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

METHOD BLANK: 675290 Matrix: Water
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	<0.030	0.030	09/12/09 02:15	
Arsenic, Dissolved	mg/L	<0.0030	0.0030	09/12/09 02:15	
Cadmium, Dissolved	mg/L	<0.000080	0.000080	09/12/09 02:15	
Calcium, Dissolved	mg/L	<1.0	1.0	09/12/09 02:15	
Copper, Dissolved	mg/L	<0.0010	0.0010	09/12/09 02:15	
Iron, Dissolved	mg/L	<0.050	0.050	09/12/09 02:15	
Lead, Dissolved	mg/L	<0.00050	0.00050	09/12/09 02:15	
Magnesium, Dissolved	mg/L	<1.0	1.0	09/12/09 02:15	
Manganese, Dissolved	mg/L	<0.0050	0.0050	09/12/09 02:15	
Potassium, Dissolved	mg/L	<1.0	1.0	09/12/09 02:15	
Sodium, Dissolved	mg/L	<1.0	1.0	09/12/09 02:15	
Total Hardness by 2340B, Dissolved	mg/L	<1.0	1.0	09/12/09 02:15	
Zinc, Dissolved	mg/L	<0.010	0.010	09/12/09 02:15	

LABORATORY CONTROL SAMPLE: 675291

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	.08	0.080	100	85-115	
Arsenic, Dissolved	mg/L	.08	0.078	97	85-115	
Cadmium, Dissolved	mg/L	.08	0.077	96	85-115	
Calcium, Dissolved	mg/L	1	1.0	104	85-115	
Copper, Dissolved	mg/L	.08	0.080	99	85-115	
Iron, Dissolved	mg/L	1	1.0	101	85-115	
Lead, Dissolved	mg/L	.08	0.076	95	85-115	
Magnesium, Dissolved	mg/L	1	1.0	101	85-115	
Manganese, Dissolved	mg/L	.08	0.079	99	85-115	
Potassium, Dissolved	mg/L	1	<1.0	97	85-115	
Sodium, Dissolved	mg/L	1	1.0	103	85-115	
Total Hardness by 2340B, Dissolved	mg/L		6.8			
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 675292 675293

Parameter	Units	5029869001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec				
Aluminum, Dissolved	mg/L	ND	.08	.08	.08	<0.15	<0.15	101	91	70-130	10	20	
Arsenic, Dissolved	mg/L	2.4 ug/L	.08	.08	.08	0.081	0.082	99	100	70-130	1	20	

Date: 09/16/2009 11:48 AM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 675292												675293	
Parameter	Units	5029869001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Cadmium, Dissolved	mg/L	ND	.08	.08	0.076	0.073	95	91	70-130	4	20		
Calcium, Dissolved	mg/L	131000 ug/L	1	1	125	123	-542	-742	70-130	2	20 M1		
Copper, Dissolved	mg/L	ND	.08	.08	0.077	0.073	96	91	70-130	5	20		
Iron, Dissolved	mg/L	5650 ug/L	1	1	6.5	6.4	83	71	70-130	2	20		
Lead, Dissolved	mg/L	ND	.08	.08	0.074	0.072	92	90	70-130	2	20		
Magnesium, Dissolved	mg/L	28600 ug/L	1	1	28.9	28.6	28	6	70-130	1	20 M1		
Manganese, Dissolved	mg/L	1170 ug/L	.08	.08	1.2	1.2	50	32	70-130	1	20 M1		
Potassium, Dissolved	mg/L	2700 ug/L	1	1	<5.0	<5.0	79	77	70-130	1	20		
Sodium, Dissolved	mg/L	18600 ug/L	1	1	18.8	18.8	13	14	70-130	0	20 M1		
Total Hardness by 2340B, Dissolved	mg/L	444000 ug/L			432	426				1	20		
Zinc, Dissolved	mg/L	ND	.08	.08	0.082	0.079	100	98	70-130	3	20		

MATRIX SPIKE SAMPLE: 675294		10111632008	Spike	MS	MS	% Rec	Qualifiers
Parameter	Units	Result	Conc.	Result	% Rec	Limits	
Aluminum, Dissolved	mg/L	<0.030	.08	<0.15	100	70-130	
Arsenic, Dissolved	mg/L	<0.0030	.08	0.077	96	70-130	
Cadmium, Dissolved	mg/L	<0.000080	.08	0.076	95	70-130	
Calcium, Dissolved	mg/L	39.5	1	38.2	-132	70-130 M1	
Copper, Dissolved	mg/L	<0.0010	.08	0.077	96	70-130	
Iron, Dissolved	mg/L	<0.050	1	0.99	98	70-130	
Lead, Dissolved	mg/L	<0.00050	.08	0.072	90	70-130	
Magnesium, Dissolved	mg/L	17.2	1	18.0	80	70-130	
Manganese, Dissolved	mg/L	<0.0050	.08	0.076	94	70-130	
Potassium, Dissolved	mg/L	<1.0	1	<5.0	97	70-130	
Sodium, Dissolved	mg/L	2.1	1	<5.0	101	70-130	
Total Hardness by 2340B, Dissolved	mg/L	169		169			
Zinc, Dissolved	mg/L	<0.010	.08	0.086	105	70-130	

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

QC Batch: MT/2712

Analysis Method: SM 2510B

QC Batch Method: SM 2510B

Analysis Description: 2510B Specific Conductance

Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

METHOD BLANK: 674838

Matrix: Water

Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Specific Conductance	umhos/cm	<10.0	10.0	09/03/09 16:00	

LABORATORY CONTROL SAMPLE: 674839

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance	umhos/cm	1000	984	98	90-110	

SAMPLE DUPLICATE: 674841

Parameter	Units	10111520010 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	210	207	1	20	

SAMPLE DUPLICATE: 675464

Parameter	Units	10111520001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	255	247	3	20	

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

QC Batch: MT/2711 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

METHOD BLANK: 675886 Matrix: Water
 Associated Lab Samples: 10111632001, 10111632002, 10111632003, 10111632004, 10111632005, 10111632006, 10111632007, 10111632008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/03/09 16:03	
Sulfate	mg/L	<5.0	5.0	09/03/09 16:03	

LABORATORY CONTROL SAMPLE: 674714

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	40	39.2	98	90-110	
Sulfate	mg/L	40	38.0	95	90-110	

MATRIX SPIKE SAMPLE: 674715

Parameter	Units	10111520001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<1.0	40	37.5	93	80-120	
Sulfate	mg/L	29.6	40	66.4	92	80-120	

MATRIX SPIKE SAMPLE: 674717

Parameter	Units	10111632001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<1.0	40	39.5	98	80-120	
Sulfate	mg/L	110	40	146	90	80-120	

MATRIX SPIKE SAMPLE: 675261

Parameter	Units	10111800001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	0.96J	40	41.4	101	80-120	
Sulfate	mg/L	6.0	40	45.0	98	80-120	

SAMPLE DUPLICATE: 674716

Parameter	Units	10111520002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	<1.0		20	
Sulfate	mg/L	50.1	50.4	1	20	

QUALITY CONTROL DATA

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

SAMPLE DUPLICATE: 674718

Parameter	Units	10111632002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	1.1		20	
Sulfate	mg/L	<5.0	<5.0		20	

SAMPLE DUPLICATE: 675863

Parameter	Units	10111800002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	0.97J	<1.0		20	
Sulfate	mg/L	6.2	6.1	2	20	

QUALIFIERS

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

H6 Analysis initiated more than 15 minutes after sample collection.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10111632001	TDMW-3DA	SM 4500-H+B	MT/2700		
10111632002	TDMW-3S	SM 4500-H+B	MT/2700		
10111632003	TDMW-4D	SM 4500-H+B	MT/2700		
10111632004	TDMW-5	SM 4500-H+B	MT/2700		
10111632005	TDMW-1	SM 4500-H+B	MT/2700		
10111632006	TDMW-2D	SM 4500-H+B	MT/2700		
10111632007	TDMW-2S	SM 4500-H+B	MT/2700		
10111632008	TDMW-3D	SM 4500-H+B	MT/2700		
10111632001	TDMW-3DA	EPA 300.0	MT/2711		
10111632002	TDMW-3S	EPA 300.0	MT/2711		
10111632003	TDMW-4D	EPA 300.0	MT/2711		
10111632004	TDMW-5	EPA 300.0	MT/2711		
10111632005	TDMW-1	EPA 300.0	MT/2711		
10111632006	TDMW-2D	EPA 300.0	MT/2711		
10111632007	TDMW-2S	EPA 300.0	MT/2711		
10111632008	TDMW-3D	EPA 300.0	MT/2711		
10111632001	TDMW-3DA	SM 2510B	MT/2712		
10111632002	TDMW-3S	SM 2510B	MT/2712		
10111632003	TDMW-4D	SM 2510B	MT/2712		
10111632004	TDMW-5	SM 2510B	MT/2712		
10111632005	TDMW-1	SM 2510B	MT/2712		
10111632006	TDMW-2D	SM 2510B	MT/2712		
10111632007	TDMW-2S	SM 2510B	MT/2712		
10111632008	TDMW-3D	SM 2510B	MT/2712		
10111632001	TDMW-3DA	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632002	TDMW-3S	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632003	TDMW-4D	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632004	TDMW-5	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632005	TDMW-1	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632006	TDMW-2D	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632007	TDMW-2S	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632008	TDMW-3D	EPA 200.8	MPRP/17136	EPA 200.8	ICPM/7016
10111632001	TDMW-3DA	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632002	TDMW-3S	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632003	TDMW-4D	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632004	TDMW-5	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632005	TDMW-1	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632006	TDMW-2D	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632007	TDMW-2S	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632008	TDMW-3D	EPA 200.8	MPRP/17141	EPA 200.8	ICPM/7044
10111632001	TDMW-3DA	SM 2320B	WET/17118		
10111632002	TDMW-3S	SM 2320B	WET/17118		
10111632003	TDMW-4D	SM 2320B	WET/17118		
10111632004	TDMW-5	SM 2320B	WET/17118		
10111632005	TDMW-1	SM 2320B	WET/17118		
10111632006	TDMW-2D	SM 2320B	WET/17118		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MDEQ Mike Horse Dam 09208

Pace Project No.: 10111632

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10111632007	TDMW-2S	SM 2320B	WET/17118		
10111632008	TDMW-3D	SM 2320B	WET/17118		

December 09, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117719

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on November 24, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Washington Certification #: C754

Tennessee Certification #: 02818

Pennsylvania Certification #: 68-00563

Oregon Certification #: MN200001

North Dakota Certification #: R-036

North Carolina Certification #: 530

New York Certification #: 11647

New Jersey Certification #: MN-002

Montana Certification #: MT CERT0092

Minnesota Certification #: 027-053-137

Maine Certification #: 2007029

Louisiana Certification #: LA080009

Louisiana Certification #: 03086

Kansas Certification #: E-10167

Iowa Certification #: 368

Illinois Certification #: 200011

Florida/NELAP Certification #: E87605

Montana Certification IDs

602 South 25th Street Billings, MT 59101

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

EPA Region 8 Certification #: 8TMS-Q

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10117719001	TDMW-1-111809	Water	11/18/09 14:50	11/24/09 10:30
10117719002	TDMW-1S-111809	Water	11/18/09 14:54	11/24/09 10:30
10117719003	TDMW-2D-111809	Water	11/18/09 12:57	11/24/09 10:30
10117719004	TDMW-2S-111809	Water	11/18/09 13:40	11/24/09 10:30
10117719005	TDMW-3D-111809	Water	11/18/09 17:31	11/24/09 10:30
10117719006	TDMW-4D-111909	Water	11/19/09 11:55	11/24/09 10:30
10117719007	TDMW-5-111909	Water	11/19/09 10:29	11/24/09 10:30
10117719008	TDMW-5-555-111909	Water	11/19/09 10:31	11/24/09 10:30

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10117719001	TDMW-1-111809	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117719002	TDMW-1S-111809	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117719003	TDMW-2D-111809	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117719004	TDMW-2S-111809	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117719005	TDMW-3D-111809	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	KEO	3	PASI-M
10117719006	TDMW-4D-111909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117719007	TDMW-5-111909	EPA 200.8	RJS	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M
10117719008	TDMW-5-555-111909	EPA 200.8	RJS	8	PASI-M
		EPA 200.8	RJS	13	PASI-M
		SM 2510B	MK1	1	PASI-MT
		EPA 300.0	MK1	2	PASI-MT
		SM 4500-H+B	MK1	1	PASI-MT
		SM 2320B	MJS	3	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

8 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/18490

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10117719005,10117786007

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 721025)
 - Aluminum
 - Barium
 - Iron
 - Manganese
- MS (Lab ID: 721027)
 - Aluminum
- MSD (Lab ID: 721026)
 - Aluminum
 - Barium
 - Iron

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117719

Method: EPA 200.8
Description: 200.8 MET ICPMS
Client: Montana Dept. of Environmental Quality
Date: December 09, 2009

Additional Comments:

REPORT OF LABORATORY ANALYSIS

Page 7 of 33

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PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117719

Method: EPA 200.8
Description: 200.8 MET ICPMS, Dissolved
Client: Montana Dept. of Environmental Quality
Date: December 09, 2009

General Information:

8 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/18489

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10117719005,10117786007

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 721020)
 - Calcium, Dissolved
 - Magnesium, Dissolved
- MS (Lab ID: 721022)
 - Calcium, Dissolved
 - Magnesium, Dissolved
 - Silica, Dissolved
 - Silicon, Dissolved
- MSD (Lab ID: 721021)
 - Calcium, Dissolved
 - Magnesium, Dissolved

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: SM 2510B

Description: 2510B Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

8 samples were analyzed for SM 2510B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: EPA 300.0

Description: 300.0 IC Anions

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

8 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

8 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- TDMW-1-111809 (Lab ID: 10117719001)
- TDMW-1S-111809 (Lab ID: 10117719002)
- TDMW-2D-111809 (Lab ID: 10117719003)
- TDMW-2S-111809 (Lab ID: 10117719004)
- TDMW-3D-111809 (Lab ID: 10117719005)
- TDMW-4D-111909 (Lab ID: 10117719006)
- TDMW-5-111909 (Lab ID: 10117719007)
- TDMW-5-555-111909 (Lab ID: 10117719008)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Method: SM 2320B

Description: 2320B Alkalinity

Client: Montana Dept. of Environmental Quality

Date: December 09, 2009

General Information:

8 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-1-111809	Lab ID: 10117719001	Collected: 11/18/09 14:50	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/04/09 17:12	12/09/09 03:45	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/04/09 17:12	12/09/09 03:45	7440-38-2	
Cadmium	0.00055 mg/L		0.000080	1	12/04/09 17:12	12/09/09 03:45	7440-43-9	
Copper	<0.0010 mg/L		0.0010	1	12/04/09 17:12	12/09/09 03:45	7440-50-8	
Iron	<0.050 mg/L		0.050	1	12/04/09 17:12	12/09/09 03:45	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/04/09 17:12	12/09/09 03:45	7439-92-1	
Manganese	<0.0050 mg/L		0.0050	1	12/04/09 17:12	12/09/09 03:45	7439-96-5	
Zinc	0.23 mg/L		0.010	1	12/04/09 17:12	12/09/09 03:45	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/08/09 23:51	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/08/09 23:51	7440-38-2	
Cadmium, Dissolved	0.00052 mg/L		0.000080	1	12/07/09 11:46	12/08/09 23:51	7440-43-9	
Calcium, Dissolved	52.1 mg/L		5.0	5	12/07/09 11:46	12/08/09 23:55	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/07/09 11:46	12/08/09 23:51	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/08/09 23:51	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/08/09 23:51	7439-92-1	
Magnesium, Dissolved	31.6 mg/L		5.0	5	12/07/09 11:46	12/08/09 23:55	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	12/07/09 11:46	12/08/09 23:51	7439-96-5	
Potassium, Dissolved	1.1 mg/L		1.0	1	12/07/09 11:46	12/08/09 23:51	7440-09-7	
Sodium, Dissolved	1.6 mg/L		1.0	1	12/07/09 11:46	12/08/09 23:51	7440-23-5	
Total Hardness by 2340B, Dissolved	260 mg/L		5.0	5	12/07/09 11:46	12/08/09 23:55		
Zinc, Dissolved	0.23 mg/L		0.010	1	12/07/09 11:46	12/08/09 23:51	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	489 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		11/25/09 22:18	16887-00-6	
Sulfate	178 mg/L		5.0	1		11/25/09 22:18	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.0 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	101 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Total as CaCO3	101 mg/L		5.0	1		11/25/09 08:22		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-1S-111809		Lab ID: 10117719002	Collected: 11/18/09 14:54	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030	mg/L	0.030	1	12/04/09 17:12	12/09/09 03:49	7429-90-5	
Arsenic	<0.0030	mg/L	0.0030	1	12/04/09 17:12	12/09/09 03:49	7440-38-2	
Cadmium	<0.000080	mg/L	0.000080	1	12/04/09 17:12	12/09/09 03:49	7440-43-9	
Copper	<0.0010	mg/L	0.0010	1	12/04/09 17:12	12/09/09 03:49	7440-50-8	
Iron	<0.050	mg/L	0.050	1	12/04/09 17:12	12/09/09 03:49	7439-89-6	
Lead	<0.00050	mg/L	0.00050	1	12/04/09 17:12	12/09/09 03:49	7439-92-1	
Manganese	<0.0050	mg/L	0.0050	1	12/04/09 17:12	12/09/09 03:49	7439-96-5	
Zinc	<0.010	mg/L	0.010	1	12/04/09 17:12	12/09/09 03:49	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030	mg/L	0.030	1	12/07/09 11:46	12/09/09 13:16	7429-90-5	
Arsenic, Dissolved	<0.0030	mg/L	0.0030	1	12/07/09 11:46	12/09/09 13:16	7440-38-2	
Cadmium, Dissolved	<0.000080	mg/L	0.000080	1	12/07/09 11:46	12/09/09 13:16	7440-43-9	
Calcium, Dissolved	<1.0	mg/L	1.0	1	12/07/09 11:46	12/09/09 13:16	7440-70-2	
Copper, Dissolved	<0.0010	mg/L	0.0010	1	12/07/09 11:46	12/09/09 13:16	7440-50-8	
Iron, Dissolved	<0.050	mg/L	0.050	1	12/07/09 11:46	12/09/09 13:16	7439-89-6	
Lead, Dissolved	<0.00050	mg/L	0.00050	1	12/07/09 11:46	12/09/09 13:16	7439-92-1	
Magnesium, Dissolved	<1.0	mg/L	1.0	1	12/07/09 11:46	12/09/09 13:16	7439-95-4	
Manganese, Dissolved	<0.0050	mg/L	0.0050	1	12/07/09 11:46	12/09/09 13:16	7439-96-5	
Potassium, Dissolved	<1.0	mg/L	1.0	1	12/07/09 11:46	12/09/09 13:16	7440-09-7	
Sodium, Dissolved	<1.0	mg/L	1.0	1	12/07/09 11:46	12/09/09 13:16	7440-23-5	
Total Hardness by 2340B, Dissolved	<1.0	mg/L	1.0	1	12/07/09 11:46	12/09/09 13:16		
Zinc, Dissolved	<0.010	mg/L	0.010	1	12/07/09 11:46	12/09/09 13:16	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	<10.0	umhos/cm	10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0	mg/L	1.0	1		11/25/09 23:19	16887-00-6	
Sulfate	<5.0	mg/L	5.0	1		11/25/09 23:19	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	6.4	Std. Units	0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	7.3	mg/L	5.0	1		11/25/09 08:22		
Alkalinity, Carbonate (CaCO3)	<5.0	mg/L	5.0	1		11/25/09 08:22		
Alkalinity, Total as CaCO3	7.3	mg/L	5.0	1		11/25/09 08:22		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-2D-111809	Lab ID: 10117719003	Collected: 11/18/09 12:57	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	0.86 mg/L		0.030	1	12/04/09 17:12	12/09/09 03:53	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/04/09 17:12	12/09/09 03:53	7440-38-2	
Cadmium	<0.000080 mg/L		0.000080	1	12/04/09 17:12	12/09/09 03:53	7440-43-9	
Copper	0.0039 mg/L		0.0010	1	12/04/09 17:12	12/09/09 03:53	7440-50-8	
Iron	0.70 mg/L		0.050	1	12/04/09 17:12	12/09/09 03:53	7439-89-6	
Lead	0.0020 mg/L		0.00050	1	12/04/09 17:12	12/09/09 03:53	7439-92-1	
Manganese	0.022 mg/L		0.0050	1	12/04/09 17:12	12/09/09 03:53	7439-96-5	
Zinc	0.011 mg/L		0.010	1	12/04/09 17:12	12/09/09 03:53	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/09/09 00:07	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/09/09 00:07	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/07/09 11:46	12/09/09 00:07	7440-43-9	
Calcium, Dissolved	26.6 mg/L		5.0	5	12/07/09 11:46	12/09/09 00:12	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/07/09 11:46	12/09/09 00:07	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/09/09 00:07	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:07	7439-92-1	
Magnesium, Dissolved	13.6 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:07	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	12/07/09 11:46	12/09/09 00:07	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:07	7440-09-7	
Sodium, Dissolved	1.3 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:07	7440-23-5	
Total Hardness by 2340B, Dissolved	123 mg/L		5.0	5	12/07/09 11:46	12/09/09 00:12		
Zinc, Dissolved	<0.010 mg/L		0.010	1	12/07/09 11:46	12/09/09 00:07	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	223 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		11/25/09 23:49	16887-00-6	
Sulfate	28.2 mg/L		5.0	1		11/25/09 23:49	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.5 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	102 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Total as CaCO3	102 mg/L		5.0	1		11/25/09 08:22		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-2S-111809	Lab ID: 10117719004	Collected: 11/18/09 13:40	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	<0.030 mg/L		0.030	1	12/04/09 17:12	12/09/09 14:09	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/04/09 17:12	12/09/09 03:57	7440-38-2	
Cadmium	0.00077 mg/L		0.000080	1	12/04/09 17:12	12/09/09 03:57	7440-43-9	
Copper	<0.0010 mg/L		0.0010	1	12/04/09 17:12	12/09/09 03:57	7440-50-8	
Iron	0.13 mg/L		0.050	1	12/04/09 17:12	12/09/09 03:57	7439-89-6	
Lead	<0.00050 mg/L		0.00050	1	12/04/09 17:12	12/09/09 03:57	7439-92-1	
Manganese	8.9 mg/L		0.25	50	12/04/09 17:12	12/09/09 14:13	7439-96-5	
Zinc	1.9 mg/L		0.50	50	12/04/09 17:12	12/09/09 14:13	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/09/09 00:16	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/09/09 00:16	7440-38-2	
Cadmium, Dissolved	0.00072 mg/L		0.000080	1	12/07/09 11:46	12/09/09 00:16	7440-43-9	
Calcium, Dissolved	72.8 mg/L		5.0	5	12/07/09 11:46	12/09/09 00:20	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/07/09 11:46	12/09/09 00:16	7440-50-8	
Iron, Dissolved	0.089 mg/L		0.050	1	12/07/09 11:46	12/09/09 00:16	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:16	7439-92-1	
Magnesium, Dissolved	41.1 mg/L		5.0	5	12/07/09 11:46	12/09/09 00:20	7439-95-4	
Manganese, Dissolved	7.0 mg/L		0.25	50	12/07/09 11:46	12/09/09 13:20	7439-96-5	
Potassium, Dissolved	1.1 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:16	7440-09-7	
Sodium, Dissolved	1.5 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:16	7440-23-5	
Total Hardness by 2340B, Dissolved	351 mg/L		5.0	5	12/07/09 11:46	12/09/09 00:20		
Zinc, Dissolved	1.6 mg/L		0.050	5	12/07/09 11:46	12/09/09 00:20	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	560 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		11/26/09 00:20	16887-00-6	
Sulfate	232 mg/L		5.0	1		11/26/09 00:20	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.1 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	105 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		11/25/09 08:22		
Alkalinity, Total as CaCO3	105 mg/L		5.0	1		11/25/09 08:22		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-3D-111809		Lab ID: 10117719005	Collected: 11/18/09 17:31	Received: 11/24/09 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	6.3 mg/L		0.0040	1	12/04/09 17:12	12/09/09 04:01	7429-90-5	MO
Arsenic	0.0089 mg/L		0.00050	1	12/04/09 17:12	12/09/09 04:01	7440-38-2	
Cadmium	0.00059 mg/L		0.000080	1	12/04/09 17:12	12/09/09 04:01	7440-43-9	
Copper	0.018 mg/L		0.00050	1	12/04/09 17:12	12/09/09 04:01	7440-50-8	
Iron	11.2 mg/L		0.050	1	12/04/09 17:12	12/09/09 04:01	7439-89-6	MO
Lead	0.039 mg/L		0.00010	1	12/04/09 17:12	12/09/09 04:01	7439-92-1	
Manganese	0.81 mg/L		0.0025	5	12/04/09 17:12	12/09/09 04:13	7439-96-5	MO
Zinc	0.13 mg/L		0.0050	1	12/04/09 17:12	12/09/09 04:01	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	0.027 mg/L		0.0040	1	12/07/09 11:46	12/09/09 00:36	7429-90-5	
Arsenic, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:36	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/07/09 11:46	12/09/09 00:36	7440-43-9	
Calcium, Dissolved	73.2 mg/L		0.10	5	12/07/09 11:46	12/09/09 00:48	7440-70-2	MO
Copper, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:36	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/09/09 00:36	7439-89-6	
Lead, Dissolved	<0.00010 mg/L		0.00010	1	12/07/09 11:46	12/09/09 00:36	7439-92-1	
Magnesium, Dissolved	29.1 mg/L		0.025	5	12/07/09 11:46	12/09/09 00:48	7439-95-4	MO
Manganese, Dissolved	0.0041 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:36	7439-96-5	
Potassium, Dissolved	0.68 mg/L		0.020	1	12/07/09 11:46	12/09/09 00:36	7440-09-7	
Sodium, Dissolved	2.1 mg/L		0.050	1	12/07/09 11:46	12/09/09 00:36	7440-23-5	
Total Hardness by 2340B, Dissolved	303 mg/L		0.36	5	12/07/09 11:46	12/09/09 00:48		
Zinc, Dissolved	0.0052 mg/L		0.0050	1	12/07/09 11:46	12/09/09 00:36	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	564 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<2.0 mg/L		2.0	2		11/26/09 00:50	16887-00-6	
Sulfate	263 mg/L		10.0	2		11/26/09 00:50	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.7 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	64.2 mg/L		10.0	2		11/25/09 08:22		
Alkalinity, Carbonate (CaCO3)	<10.0 mg/L		10.0	2		11/25/09 08:22		
Alkalinity, Total as CaCO3	64.2 mg/L		10.0	2		11/25/09 08:22		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-4D-111909	Lab ID: 10117719006	Collected: 11/19/09 11:55	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	3.8 mg/L		0.030	1	12/04/09 17:12	12/09/09 04:29	7429-90-5	
Arsenic	0.010 mg/L		0.0030	1	12/04/09 17:12	12/09/09 04:29	7440-38-2	
Cadmium	0.00023 mg/L		0.000080	1	12/04/09 17:12	12/09/09 04:29	7440-43-9	
Copper	0.11 mg/L		0.0010	1	12/04/09 17:12	12/09/09 04:29	7440-50-8	
Iron	5.3 mg/L		0.050	1	12/04/09 17:12	12/09/09 04:29	7439-89-6	
Lead	0.023 mg/L		0.00050	1	12/04/09 17:12	12/09/09 04:29	7439-92-1	
Manganese	0.22 mg/L		0.0050	1	12/04/09 17:12	12/09/09 04:29	7439-96-5	
Zinc	0.058 mg/L		0.010	1	12/04/09 17:12	12/09/09 04:29	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/09/09 00:52	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/09/09 00:52	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/07/09 11:46	12/09/09 00:52	7440-43-9	
Calcium, Dissolved	22.3 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:52	7440-70-2	
Copper, Dissolved	0.0014 mg/L		0.0010	1	12/07/09 11:46	12/09/09 00:52	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/09/09 00:52	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 00:52	7439-92-1	
Magnesium, Dissolved	11.9 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:52	7439-95-4	
Manganese, Dissolved	0.012 mg/L		0.0050	1	12/07/09 11:46	12/09/09 00:52	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:52	7440-09-7	
Sodium, Dissolved	2.6 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:52	7440-23-5	
Total Hardness by 2340B, Dissolved	105 mg/L		1.0	1	12/07/09 11:46	12/09/09 00:52		
Zinc, Dissolved	<0.010 mg/L		0.010	1	12/07/09 11:46	12/09/09 00:52	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	194 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		11/26/09 01:51	16887-00-6	
Sulfate	21.3 mg/L		5.0	1		11/26/09 01:51	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.7 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	114 mg/L		10.0	2		12/02/09 09:43		
Alkalinity, Carbonate (CaCO3)	<10.0 mg/L		10.0	2		12/02/09 09:43		
Alkalinity, Total as CaCO3	114 mg/L		10.0	2		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample: TDMW-5-111909	Lab ID: 10117719007	Collected: 11/19/09 10:29	Received: 11/24/09 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum	2.1 mg/L		0.030	1	12/04/09 17:12	12/09/09 04:33	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/04/09 17:12	12/09/09 04:33	7440-38-2	
Cadmium	0.00042 mg/L		0.000080	1	12/04/09 17:12	12/09/09 04:33	7440-43-9	
Copper	0.040 mg/L		0.0010	1	12/04/09 17:12	12/09/09 04:33	7440-50-8	
Iron	5.9 mg/L		0.050	1	12/04/09 17:12	12/09/09 04:33	7439-89-6	
Lead	0.015 mg/L		0.00050	1	12/04/09 17:12	12/09/09 04:33	7439-92-1	
Manganese	0.33 mg/L		0.0050	1	12/04/09 17:12	12/09/09 04:33	7439-96-5	
Zinc	0.069 mg/L		0.010	1	12/04/09 17:12	12/09/09 04:33	7440-66-6	
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/09/09 13:36	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/09/09 01:01	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/07/09 11:46	12/09/09 01:01	7440-43-9	
Calcium, Dissolved	27.8 mg/L		5.0	5	12/07/09 11:46	12/09/09 01:05	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/07/09 11:46	12/09/09 01:01	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/09/09 01:01	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 01:01	7439-92-1	
Magnesium, Dissolved	13.5 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:01	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	12/07/09 11:46	12/09/09 01:01	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:01	7440-09-7	
Sodium, Dissolved	2.9 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:01	7440-23-5	
Total Hardness by 2340B, Dissolved	125 mg/L		5.0	5	12/07/09 11:46	12/09/09 01:05		
Zinc, Dissolved	0.012 mg/L		0.010	1	12/07/09 11:46	12/09/09 01:01	7440-66-6	
2510B Specific Conductance		Analytical Method: SM 2510B						
Specific Conductance	250 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions		Analytical Method: EPA 300.0						
Chloride	<1.0 mg/L		1.0	1		11/26/09 03:23	16887-00-6	
Sulfate	48.0 mg/L		5.0	1		11/26/09 03:23	14808-79-8	
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.3 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Bicarbonate (CaCO3)	94.4 mg/L		5.0	1		12/02/09 09:43		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO3	94.4 mg/L		5.0	1		12/02/09 09:43		

ANALYTICAL RESULTS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Sample:	Lab ID:	Collected:	Received:	Matrix:				
TDMW-5-555-111909	10117719008	11/19/09 10:31	11/24/09 10:30	Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	1.9 mg/L		0.030	1	12/04/09 17:12	12/09/09 04:38	7429-90-5	
Arsenic	<0.0030 mg/L		0.0030	1	12/04/09 17:12	12/09/09 04:38	7440-38-2	
Cadmium	0.00034 mg/L		0.000080	1	12/04/09 17:12	12/09/09 04:38	7440-43-9	
Copper	0.025 mg/L		0.0010	1	12/04/09 17:12	12/09/09 04:38	7440-50-8	
Iron	5.1 mg/L		0.050	1	12/04/09 17:12	12/09/09 04:38	7439-89-6	
Lead	0.012 mg/L		0.00050	1	12/04/09 17:12	12/09/09 04:38	7439-92-1	
Manganese	0.26 mg/L		0.0050	1	12/04/09 17:12	12/09/09 04:38	7439-96-5	
Zinc	0.058 mg/L		0.010	1	12/04/09 17:12	12/09/09 04:38	7440-66-6	
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	<0.030 mg/L		0.030	1	12/07/09 11:46	12/09/09 13:41	7429-90-5	
Arsenic, Dissolved	<0.0030 mg/L		0.0030	1	12/07/09 11:46	12/09/09 01:09	7440-38-2	
Cadmium, Dissolved	<0.000080 mg/L		0.000080	1	12/07/09 11:46	12/09/09 01:09	7440-43-9	
Calcium, Dissolved	28.6 mg/L		5.0	5	12/07/09 11:46	12/09/09 01:13	7440-70-2	
Copper, Dissolved	<0.0010 mg/L		0.0010	1	12/07/09 11:46	12/09/09 01:09	7440-50-8	
Iron, Dissolved	<0.050 mg/L		0.050	1	12/07/09 11:46	12/09/09 01:09	7439-89-6	
Lead, Dissolved	<0.00050 mg/L		0.00050	1	12/07/09 11:46	12/09/09 01:09	7439-92-1	
Magnesium, Dissolved	13.6 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:09	7439-95-4	
Manganese, Dissolved	<0.0050 mg/L		0.0050	1	12/07/09 11:46	12/09/09 01:09	7439-96-5	
Potassium, Dissolved	<1.0 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:09	7440-09-7	
Sodium, Dissolved	3.0 mg/L		1.0	1	12/07/09 11:46	12/09/09 01:09	7440-23-5	
Total Hardness by 2340B, Dissolved	127 mg/L		5.0	5	12/07/09 11:46	12/09/09 01:13		
Zinc, Dissolved	0.014 mg/L		0.010	1	12/07/09 11:46	12/09/09 01:09	7440-66-6	
2510B Specific Conductance								
Analytical Method: SM 2510B								
Specific Conductance	258 umhos/cm		10.0	1		12/01/09 11:12		
300.0 IC Anions								
Analytical Method: EPA 300.0								
Chloride	<1.0 mg/L		1.0	1		11/26/09 03:53	16887-00-6	
Sulfate	48.1 mg/L		5.0	1		11/26/09 03:53	14808-79-8	
4500H+ pH, Electrometric								
Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	8.2 Std. Units		0.10	1		11/24/09 17:30		H6
2320B Alkalinity								
Analytical Method: SM 2320B								
Alkalinity, Bicarbonate (CaCO3)	99.0 mg/L		5.0	1		12/02/09 09:43		
Alkalinity, Carbonate (CaCO3)	<5.0 mg/L		5.0	1		12/02/09 09:43		
Alkalinity, Total as CaCO3	99.0 mg/L		5.0	1		12/02/09 09:43		

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex
Pace Project No.: 10117719

QC Batch: MPRP/18490 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

METHOD BLANK: 721023 Matrix: Water
Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.0040	0.0040	12/09/09 03:36	
Arsenic	mg/L	<0.00050	0.00050	12/09/09 03:36	
Cadmium	mg/L	<0.000080	0.000080	12/09/09 03:36	
Copper	mg/L	<0.00050	0.00050	12/09/09 03:36	
Iron	mg/L	<0.050	0.050	12/09/09 03:36	
Lead	mg/L	<0.00010	0.00010	12/09/09 03:36	
Manganese	mg/L	<0.00050	0.00050	12/09/09 03:36	
Zinc	mg/L	<0.0050	0.0050	12/09/09 03:36	

LABORATORY CONTROL SAMPLE: 721024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	112	85-115	
Arsenic	mg/L	.08	0.084	105	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Copper	mg/L	.08	0.090	113	85-115	
Iron	mg/L	1	1.1	109	85-115	
Lead	mg/L	.08	0.086	107	85-115	
Manganese	mg/L	.08	0.088	110	85-115	
Zinc	mg/L	.08	0.089	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721025 721026

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		Spike Conc.	Result	Spike Conc.	Result							
Aluminum	mg/L	6.3	.08	.08	9.8	9.7	4448	4229	70-130	2	20	M0
Arsenic	mg/L	0.0089	.08	.08	0.089	0.086	100	96	70-130	4	20	
Cadmium	mg/L	0.00059	.08	.08	0.079	0.076	99	95	70-130	4	20	
Copper	mg/L	0.018	.08	.08	0.11	0.10	111	105	70-130	5	20	
Iron	mg/L	11.2	1	1	13.5	13.2	233	197	70-130	3	20	M0
Lead	mg/L	0.039	.08	.08	0.12	0.12	103	98	70-130	4	20	
Manganese	mg/L	0.81	.08	.08	0.95	0.91	165	125	70-130	3	20	M0
Zinc	mg/L	0.13	.08	.08	0.23	0.22	121	112	70-130	3	20	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

MATRIX SPIKE SAMPLE:		721027					
Parameter	Units	10117786007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L		.08	0.25	158	70-130	M0
Arsenic	mg/L		.08	0.090	101	70-130	
Cadmium	mg/L		.08	0.079	99	70-130	
Copper	mg/L		.08	0.11	108	70-130	
Iron	mg/L		1	1.4	104	70-130	
Lead	mg/L		.08	0.078	97	70-130	
Manganese	mg/L		.08	0.10	104	70-130	
Zinc	mg/L		.08	0.088	106	70-130	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: MPRP/18489 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

METHOD BLANK: 721018 Matrix: Water

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	<0.0040	0.0040	12/08/09 23:39	
Arsenic, Dissolved	mg/L	<0.00050	0.00050	12/08/09 23:39	
Cadmium, Dissolved	mg/L	<0.000080	0.000080	12/08/09 23:39	
Calcium, Dissolved	mg/L	<0.020	0.020	12/08/09 23:39	
Copper, Dissolved	mg/L	<0.00050	0.00050	12/08/09 23:39	
Iron, Dissolved	mg/L	<0.050	0.050	12/08/09 23:39	
Lead, Dissolved	mg/L	<0.00010	0.00010	12/08/09 23:39	
Magnesium, Dissolved	mg/L	<0.0050	0.0050	12/08/09 23:39	
Manganese, Dissolved	mg/L	<0.00050	0.00050	12/09/09 13:08	
Potassium, Dissolved	mg/L	<0.020	0.020	12/08/09 23:39	
Sodium, Dissolved	mg/L	<0.050	0.050	12/08/09 23:39	
Total Hardness by 2340B, Dissolved	mg/L	<0.071	0.071	12/08/09 23:39	
Zinc, Dissolved	mg/L	<0.0050	0.0050	12/08/09 23:39	

LABORATORY CONTROL SAMPLE: 721019

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	.08	0.085	107	85-115	
Arsenic, Dissolved	mg/L	.08	0.080	99	85-115	
Cadmium, Dissolved	mg/L	.08	0.077	96	85-115	
Calcium, Dissolved	mg/L	1	0.94	94	85-115	
Copper, Dissolved	mg/L	.08	0.084	105	85-115	
Iron, Dissolved	mg/L	1	1.0	100	85-115	
Lead, Dissolved	mg/L	.08	0.077	96	85-115	
Magnesium, Dissolved	mg/L	1	1.0	101	85-115	
Manganese, Dissolved	mg/L	.08	0.081	101	85-115	
Potassium, Dissolved	mg/L	1	0.99	99	85-115	
Sodium, Dissolved	mg/L	1	1.0	101	85-115	
Total Hardness by 2340B, Dissolved	mg/L		6.5			
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721020 721021

Parameter	Units	10117719005		MSD		MSD		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Aluminum, Dissolved	mg/L	0.027	.08	.08	0.12	0.10	111	96	70-130	11	20		

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Project No.: 10117719

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721020												721021	
Parameter	Units	10117719005 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual	
			Spike Conc.	Spike Conc.									
Arsenic, Dissolved	mg/L	<0.0005 0	.08	.08	0.079	0.075	99	93	70-130	6	20		
Cadmium, Dissolved	mg/L	<0.0000 80	.08	.08	0.078	0.073	97	91	70-130	6	20		
Calcium, Dissolved	mg/L	73.2	1	1	78.4	72.1	530	-105	70-130	8	20	M0	
Copper, Dissolved	mg/L	<0.0005 0	.08	.08	0.084	0.079	104	98	70-130	6	20		
Iron, Dissolved	mg/L	<0.050	1	1	1.0	0.95	99	94	70-130	5	20		
Lead, Dissolved	mg/L	<0.0001 0	.08	.08	0.078	0.074	97	92	70-130	6	20		
Magnesium, Dissolved	mg/L	29.1	1	1	31.7	29.5	260	38	70-130	7	20	M0	
Manganese, Dissolved	mg/L	0.0041	.08	.08	0.085	0.080	101	95	70-130	6	20		
Potassium, Dissolved	mg/L	0.68	1	1	1.7	1.6	103	92	70-130	6	20		
Sodium, Dissolved	mg/L	2.1	1	1	3.3	3.0	118	92	70-130	8	20		
Total Hardness by 2340B, Dissolved	mg/L	303			327	302				8	20		
Zinc, Dissolved	mg/L	0.0052	.08	.08	0.086	0.080	102	93	70-130	8	20		

MATRIX SPIKE SAMPLE: 721022		10117786007	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Aluminum, Dissolved	mg/L	0.0065	.08	0.095	111	70-130	
Arsenic, Dissolved	mg/L	0.0041	.08	0.084	100	70-130	
Cadmium, Dissolved	mg/L	<0.000040	.08	0.079	99	70-130	
Calcium, Dissolved	mg/L	38.0	1	41.7	368	70-130	M0
Copper, Dissolved	mg/L	0.0059	.08	0.090	106	70-130	
Iron, Dissolved	mg/L	<0.025	1	1.0	102	70-130	
Lead, Dissolved	mg/L	<0.000050	.08	0.080	100	70-130	
Magnesium, Dissolved	mg/L	21.6	1	24.8	324	70-130	M0
Manganese, Dissolved	mg/L	0.0048	.08	0.088	104	70-130	
Potassium, Dissolved	mg/L	2.7	1	3.9	120	70-130	
Sodium, Dissolved	mg/L	2.8	1	4.1	127	70-130	
Total Hardness by 2340B, Dissolved	mg/L	184		206			
Zinc, Dissolved	mg/L	0.0033J	.08	0.085	102	70-130	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: MT/3373

Analysis Method: SM 2510B

QC Batch Method: SM 2510B

Analysis Description: 2510B Specific Conductance

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

METHOD BLANK: 720721

Matrix: Water

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Specific Conductance	umhos/cm	<10.0	10.0	12/01/09 11:12	

LABORATORY CONTROL SAMPLE: 720722

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance	umhos/cm	1000	971	97	90-110	

SAMPLE DUPLICATE: 720723

Parameter	Units	10117717001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	291	302	4	20	

SAMPLE DUPLICATE: 720724

Parameter	Units	10117719001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	489	490	0	20	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: MT/3346 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

METHOD BLANK: 719713 Matrix: Water
 Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	11/25/09 14:46	
Sulfate	mg/L	<5.0	5.0	11/25/09 14:46	

LABORATORY CONTROL SAMPLE: 719714

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	40	41.9	105	90-110	
Sulfate	mg/L	40	42.6	106	90-110	

MATRIX SPIKE SAMPLE: 719717

Parameter	Units	10117786001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	0.90J	40	42.0	103	80-120	
Sulfate	mg/L	16.1	40	57.5	103	80-120	

MATRIX SPIKE SAMPLE: 719786

Parameter	Units	10117719005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<2.0	80	84.3	104	80-120	
Sulfate	mg/L	263	80	338	94	80-120	

SAMPLE DUPLICATE: 719718

Parameter	Units	10117786002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	0.67J	<1.0		20	
Sulfate	mg/L	4.7J	<5.0		20	

SAMPLE DUPLICATE: 719785

Parameter	Units	10117719001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	<1.0	<1.0		20	
Sulfate	mg/L	178	177	0	20	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: MT/3334 Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005, 10117719006, 10117719007, 10117719008

LABORATORY CONTROL SAMPLE: 719077

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.1	102	98-102	H6

SAMPLE DUPLICATE: 719078

Parameter	Units	10117719005 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.7	7.7	0	3	H6

SAMPLE DUPLICATE: 719079

Parameter	Units	10117717005 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.2	8.2	0	3	H6

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: WET/17798

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005

METHOD BLANK: 719455

Matrix: Water

Associated Lab Samples: 10117719001, 10117719002, 10117719003, 10117719004, 10117719005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0	11/25/09 08:22	
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	11/25/09 08:22	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<5.0	5.0	11/25/09 08:22	

LABORATORY CONTROL SAMPLE & LCSD: 719456

719457

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.1	43.1	108	108	80-120	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719458

719459

Parameter	Units	10117719005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	64.2	80	80	145	147	101	103	80-120	1	30	

QUALITY CONTROL DATA

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

QC Batch: WET/17836

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 10117719006, 10117719007, 10117719008

METHOD BLANK: 721419

Matrix: Water

Associated Lab Samples: 10117719006, 10117719007, 10117719008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO ₃)	mg/L	<5.0	5.0	12/02/09 09:43	
Alkalinity, Total as CaCO ₃	mg/L	<5.0	5.0	12/02/09 09:43	
Alkalinity,Bicarbonate (CaCO ₃)	mg/L	<5.0	5.0	12/02/09 09:43	

LABORATORY CONTROL SAMPLE & LCSD: 721420

721421

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	40	41.8	42.7	104	107	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721422

721423

Parameter	Units	10117717005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO ₃	mg/L	99.9	80	80	183	182	104	102	80-120	1	30	

QUALIFIERS

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

H6 Analysis initiated more than 15 minutes after sample collection.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10117719001	TDMW-1-111809	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719002	TDMW-1S-111809	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719003	TDMW-2D-111809	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719004	TDMW-2S-111809	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719005	TDMW-3D-111809	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719006	TDMW-4D-111909	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719007	TDMW-5-111909	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719008	TDMW-5-555-111909	EPA 200.8	MPRP/18490	EPA 200.8	ICPM/7594
10117719001	TDMW-1-111809	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719002	TDMW-1S-111809	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719003	TDMW-2D-111809	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719004	TDMW-2S-111809	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719005	TDMW-3D-111809	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719006	TDMW-4D-111909	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719007	TDMW-5-111909	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719008	TDMW-5-555-111909	EPA 200.8	MPRP/18489	EPA 200.8	ICPM/7593
10117719001	TDMW-1-111809	SM 2510B	MT/3373		
10117719002	TDMW-1S-111809	SM 2510B	MT/3373		
10117719003	TDMW-2D-111809	SM 2510B	MT/3373		
10117719004	TDMW-2S-111809	SM 2510B	MT/3373		
10117719005	TDMW-3D-111809	SM 2510B	MT/3373		
10117719006	TDMW-4D-111909	SM 2510B	MT/3373		
10117719007	TDMW-5-111909	SM 2510B	MT/3373		
10117719008	TDMW-5-555-111909	SM 2510B	MT/3373		
10117719001	TDMW-1-111809	EPA 300.0	MT/3346		
10117719002	TDMW-1S-111809	EPA 300.0	MT/3346		
10117719003	TDMW-2D-111809	EPA 300.0	MT/3346		
10117719004	TDMW-2S-111809	EPA 300.0	MT/3346		
10117719005	TDMW-3D-111809	EPA 300.0	MT/3346		
10117719006	TDMW-4D-111909	EPA 300.0	MT/3346		
10117719007	TDMW-5-111909	EPA 300.0	MT/3346		
10117719008	TDMW-5-555-111909	EPA 300.0	MT/3346		
10117719001	TDMW-1-111809	SM 4500-H+B	MT/3334		
10117719002	TDMW-1S-111809	SM 4500-H+B	MT/3334		
10117719003	TDMW-2D-111809	SM 4500-H+B	MT/3334		
10117719004	TDMW-2S-111809	SM 4500-H+B	MT/3334		
10117719005	TDMW-3D-111809	SM 4500-H+B	MT/3334		
10117719006	TDMW-4D-111909	SM 4500-H+B	MT/3334		
10117719007	TDMW-5-111909	SM 4500-H+B	MT/3334		
10117719008	TDMW-5-555-111909	SM 4500-H+B	MT/3334		
10117719001	TDMW-1-111809	SM 2320B	WET/17798		
10117719002	TDMW-1S-111809	SM 2320B	WET/17798		
10117719003	TDMW-2D-111809	SM 2320B	WET/17798		
10117719004	TDMW-2S-111809	SM 2320B	WET/17798		
10117719005	TDMW-3D-111809	SM 2320B	WET/17798		
10117719006	TDMW-4D-111909	SM 2320B	WET/17836		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Upper Blackfoot Mining Complex

Pace Project No.: 10117719

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10117719007	TDMW-5-111909	SM 2320B	WET/17836		
10117719008	TDMW-5-555-111909	SM 2320B	WET/17836		

Appendix F: Soils/Tailings

**F1 – pHase Geochemistry Memo on Paymaster and
Shave Gulch Geochemistry**

F2 – Analytical Reports

F3 – Geotechnical Laboratory Testing Report

F4 – nuclear Field Density Report

1866 Bowser Ave, North Vancouver, British Columbia V7P 2Y7 T 604 764-0854

To: Tom Smith (TerraGraphics Environmental Engineering, Inc.)
Cc: Don Sutton (Spectrum Engineering)
From: Shannon Shaw (pHase Geochemistry Inc.)
Date: November 30, 2009
Re: Geochemical results for Paymaster, Mike Horse & Shave Gulch samples.

Tom,

As requested, I've reviewed data you provided from test pit samples collected at the Paymaster, Mike Horse and Shave Gulch sites. This memo provides an overview of those results.

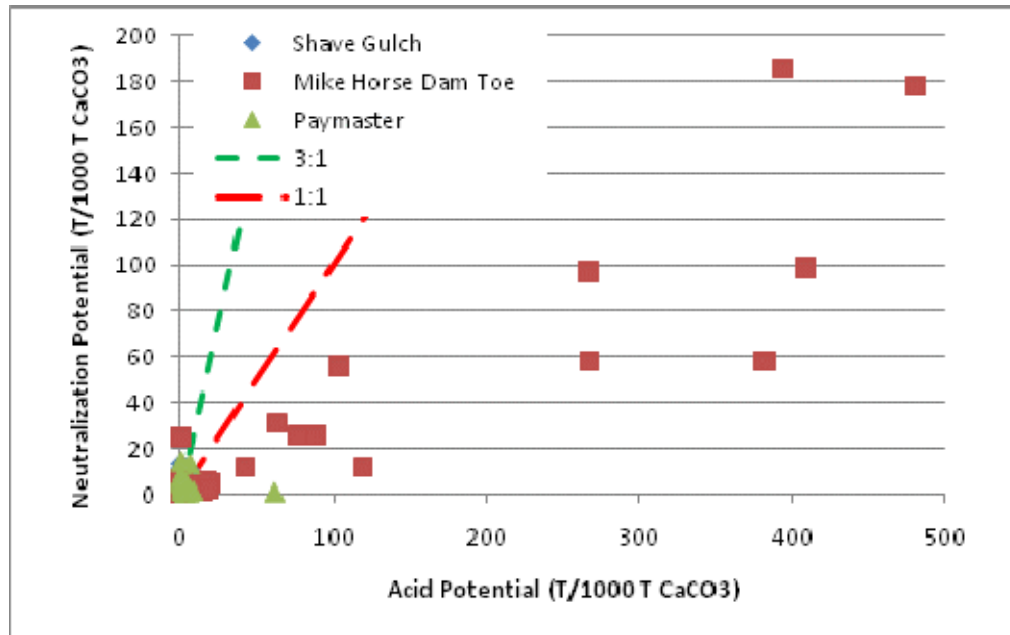
Analyses included paste pH and conductivity (EC) via ASA 103.2 and 103.3 procedures, acid base accounting (ABA, modified Sobek 7 procedure) tests, selected metal analysis (EPA 6020 methodology), moisture content, organic carbon (EPA 9060 modified procedure) and leach extraction analyses via the synthetic precipitation leach procedure (EPA 6010 methodology). Data is provided electronically in file "[paceport_compilation.Nov_09_09.scs.xls](#)". Included in the file are results for 20 samples from Shave Gulch, 28 from Mike Horse and 21 samples from the Paymaster area.

Samples collected from Mike Horse were comprised of tailings collected near the base of the tailings/soil interface (T. Smith, email communications Nov 6, 2009). Results show these samples to vary with respect to pH from acidic (pH 3.7) to neutral (7.4), with moderate to high conductivity values, ranging from 0.88 to 14.3 mmhos/cm (or 880 to 14,300 μ S/cm). Values of sulfur are variable (from 0.07 to 16.6 %) with an average of \sim 3.7% suggesting that the samples include a mixture of soil and tailings. Values of neutralization potential varied from negligible (<0.5 kg CaCO₃/t) to significant (186 kg CaCO₃/t). A relationship between sulfur and neutralization potential appears to exist whereby samples with higher sulfur



Memorandum

values (and therefore acid potential) typically also have higher neutralization potential values as shown in the figure below.



Acid Potential versus Neutralization Potential.

Typically, guidelines for the prediction of acid rock drainage potential suggest that if a sample has a neutralization potential to acid potential ratio (NP/AP) below 1 it is considered potentially acid generating (PAG). If the ratio is between 1 and 3 it is considered uncertain with respect to acid potential and if it is above 3 it is considered non-PAG. Based on these guidelines, nearly all the Mike Horse samples would be considered PAG.

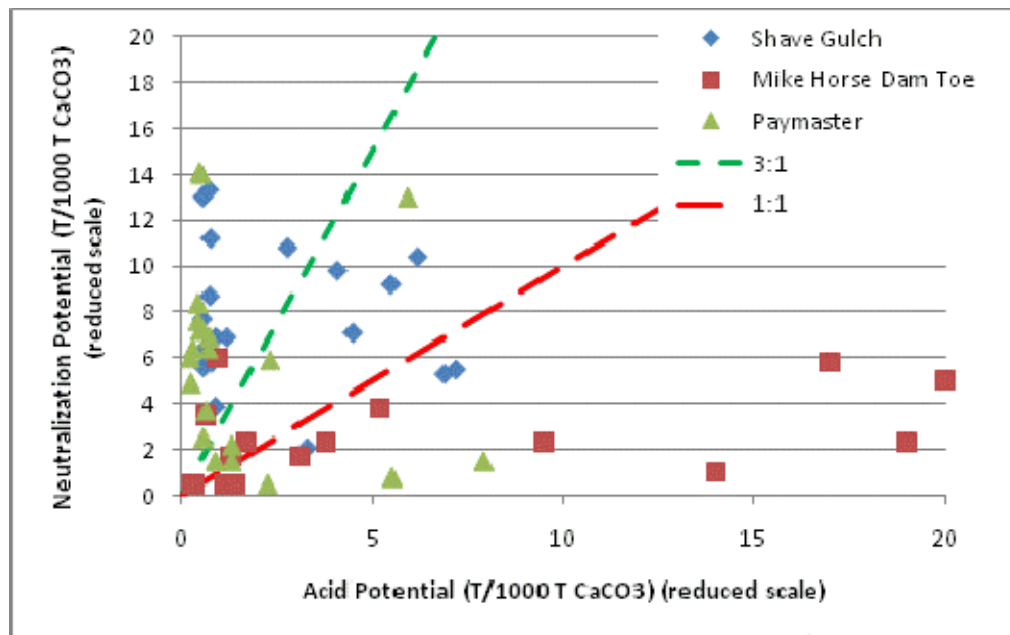
Solids metal analyses for the Mike Horse samples for Al, As, Cd, Cu, Fe, Pb, Mn and Zn also show a range of values. Some samples showing exceedances as compared to the human health standards with respect to As, Fe, Pb and Mn. SPLP tests, which can indicate the mobility or solubility of metals in the materials indicate that As, Cd, Fe, Pb, Mn and Zn may be present in these samples in a soluble form and that in contact with water may become mobile.

Samples collected from test pits in the Shave Gulch area were comprised of in-situ material collected from depths ranging from ~ 2 to 12 feet from surface. Results show these samples are all neutral with respect to pH (values between ~ 6.6 and 7.4), with low conductivity values, ranging from 0.06 to 0.31 mmhos/cm (or 60 to 310 μ S/cm). Values of sulfur are



Memorandum

variable, but low (from <0.04 to 0.38%). Neutralization potential values were also low (<15 kg/CaCO₃/t). The figure below is the same plot of neutralization potential versus acid potential as shown on the previous page, but with reduced scales on both axes to better assess those samples that cluster near the axes.



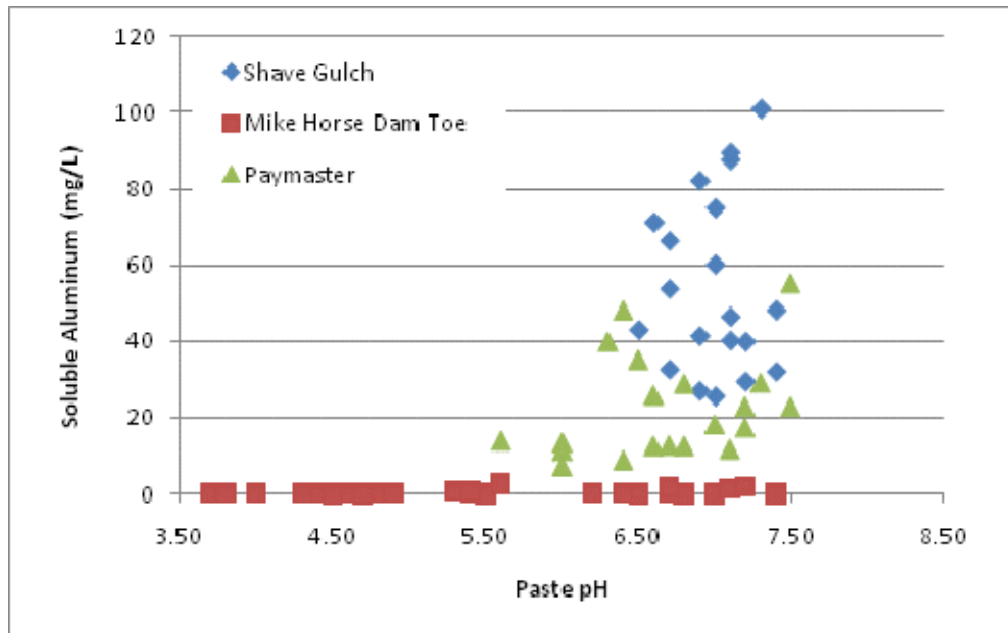
Acid Potential versus Neutralization Potential (reduced axes).

Using the guidelines as discussed above, the samples collected from Shave Gulch show predominantly non-PAG characteristics, with a few likely considered uncertain with respect to ARD.

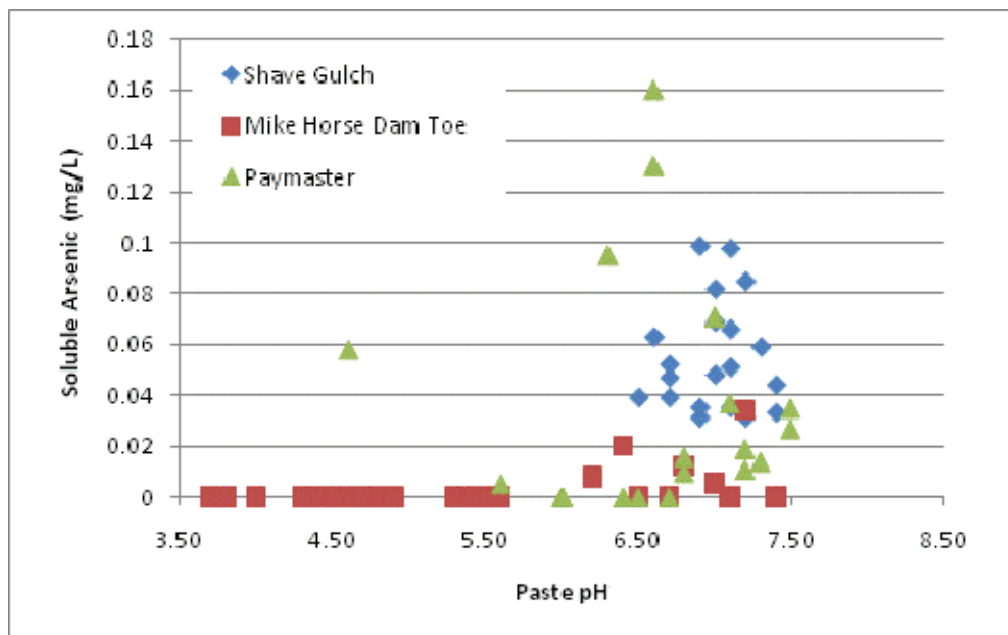
Solids metal analyses on the Shave Gulch samples for Al, As, Cd, Cu, Fe, Pb, Mn and Zn also show a range of values. Some samples show exceedances as compared to the human health standards with respect to Fe, with a few also showing elevated As and Pb. SPLP tests, again used as an indication of what might be soluble, surprisingly show consistently soluble levels of As, Cd, Fe, Pb, and Mn. Moreover, concentrations of particular parameters (e.g. Al, As, Cu, Fe) in the SPLP test for these samples were significantly higher than those from the Mike Horse samples as shown in the series of figures below. Other parameters (most notably Mn and Zn) were higher in the Mike Horse tailings than the Shave Gulch samples.



Memorandum



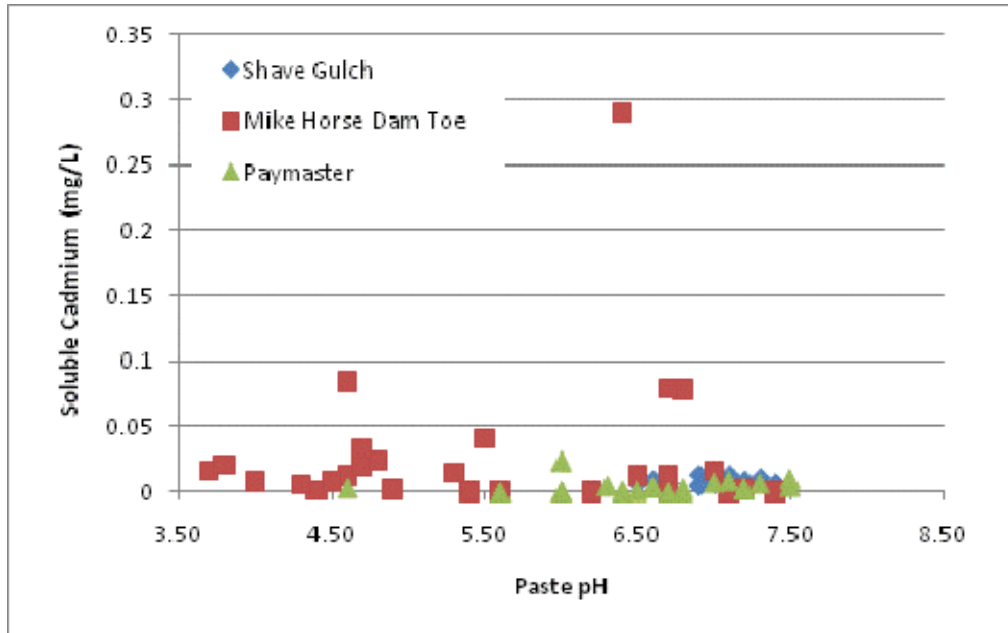
SPLP Concentrations of Al versus paste pH.



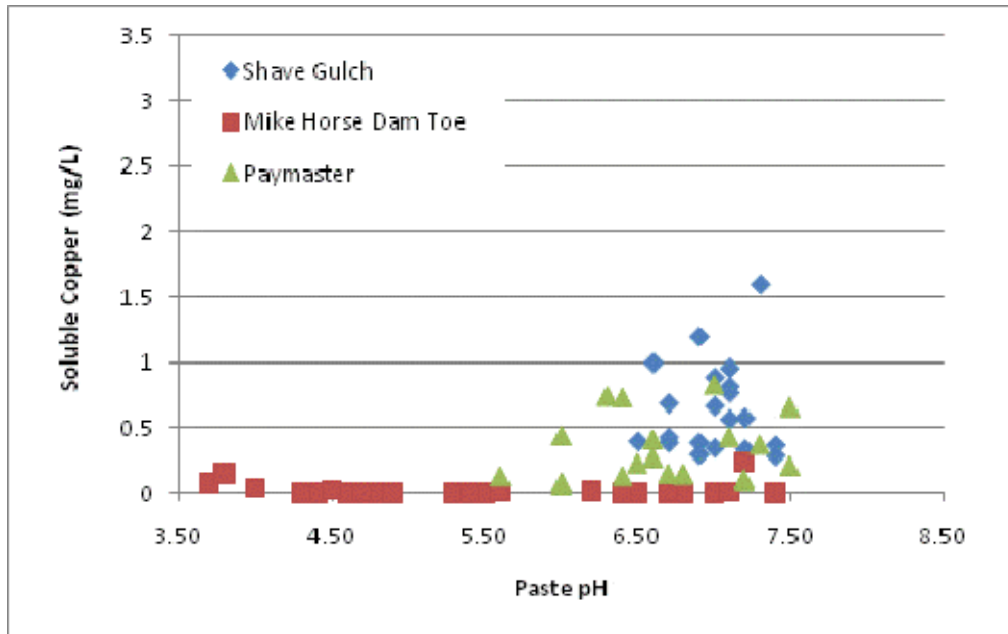
SPLP Concentrations of As versus paste pH.



Memorandum



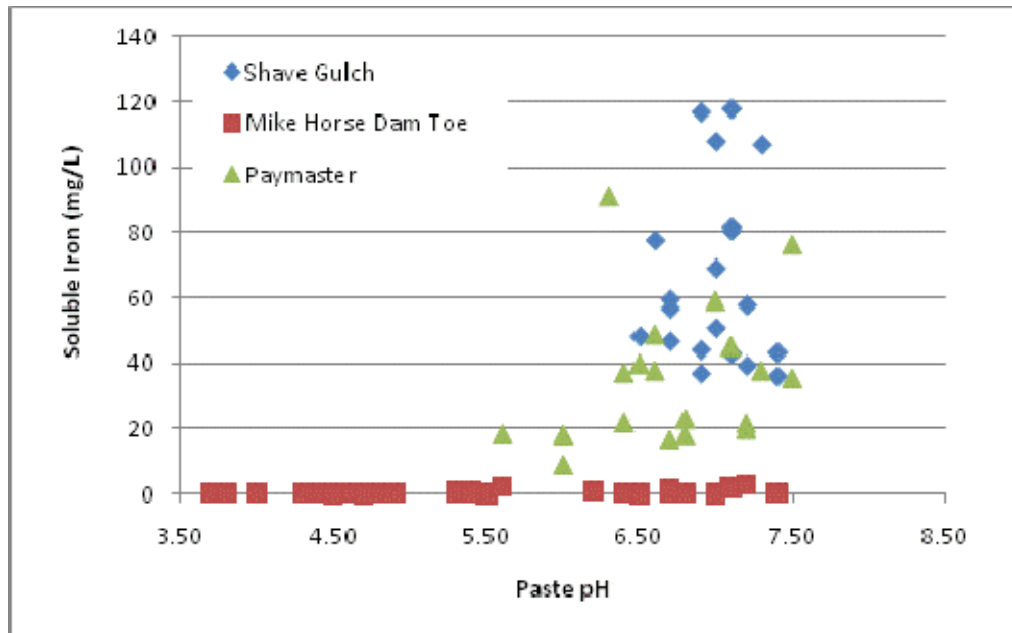
SPLP Concentrations of Cd versus paste pH.



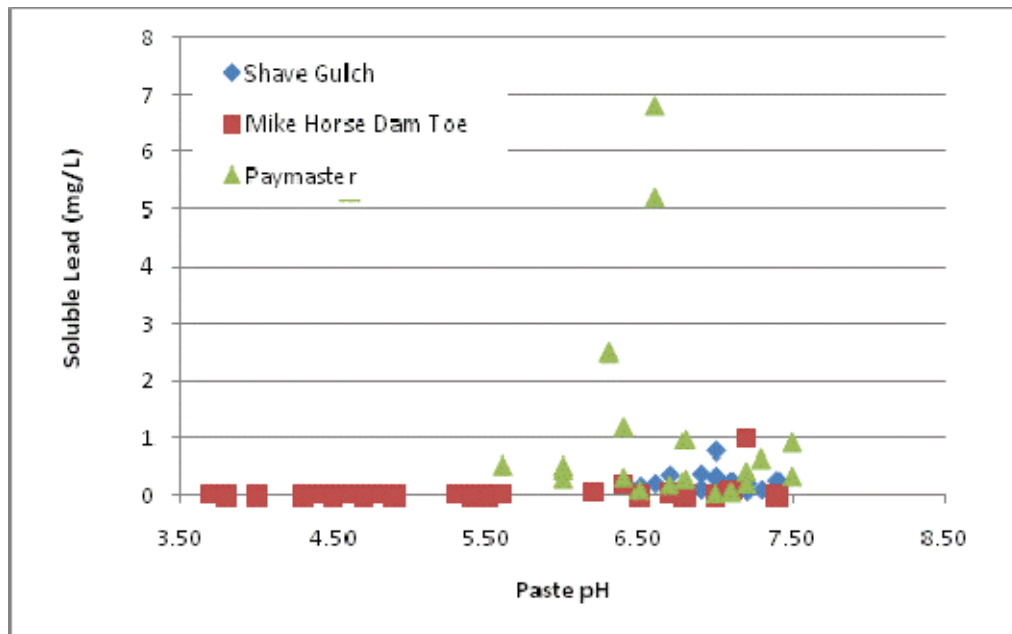
SPLP Concentrations of Cu versus paste pH.



Memorandum



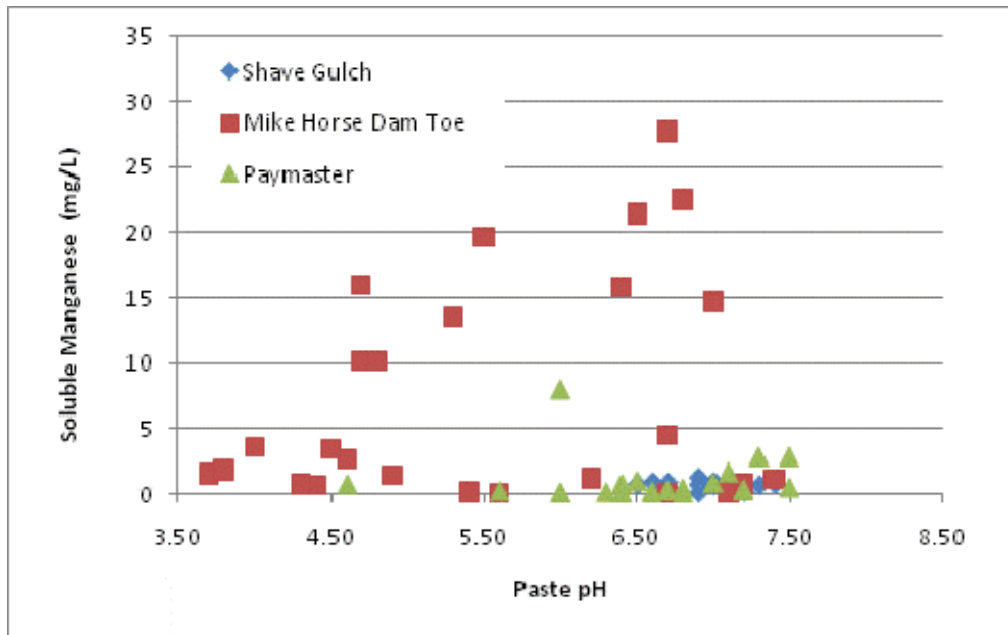
SPLP Concentrations of Fe versus paste pH.



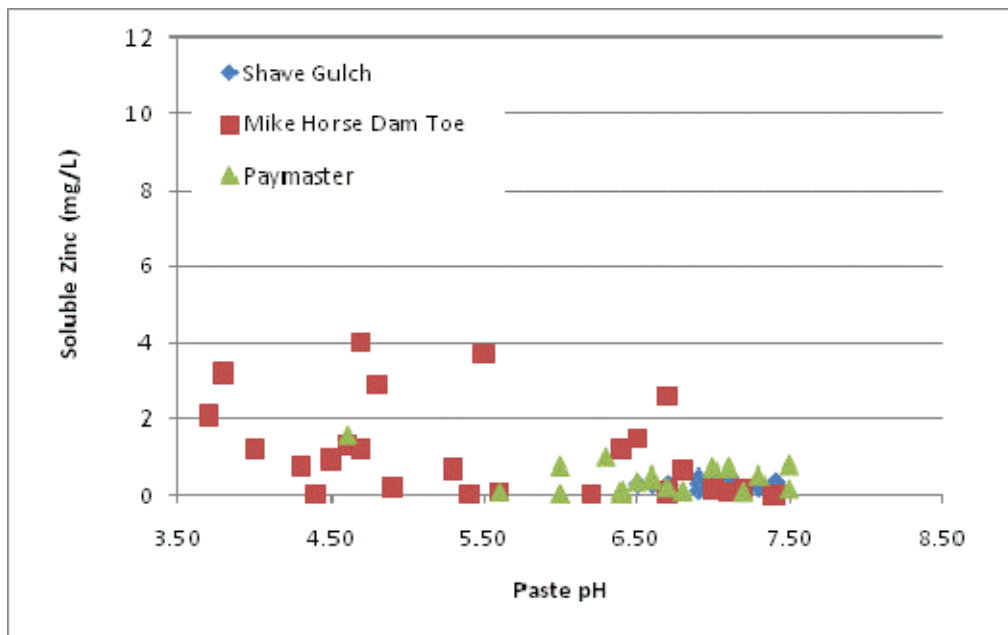
SPLP Concentrations of Pb versus paste pH.



Memorandum



SPLP Concentrations of Mn versus paste pH.



SPLP Concentrations of Zn versus paste pH.

Results of samples from Paymaster were not dissimilar from those collected in Shave Gulch. Near neutral pH values were seen, averaging 6.6, though two samples had weakly acidic pH



Memorandum

values. Conductivity values were low (from 0.06 to 0.65 mmhos/cm). Sulfur values varied from negligible to 2.2%, though most were <0.33% and neutralization potentials were very low (<15 kg CaCO₃/t). Most samples would classify as non-PAG, though a range of characteristics is seen (see previous Figure). Metals contents indicated elevated amounts of Fe and Pb with occasionally elevated As, Cd and Mn. SPLP concentrations, as was seen with Shave Gulch, were surprisingly high for particular parameters, notably As, Fe, Pb and occasionally Cd.

These results support the earlier classifications of the Mike Horse tailings as PAG with potential metal leaching (particularly for Mn, Zn etc). The samples from Shave Gulch and Paymaster indicate that the areas are largely non-PAG, but that there are regionally elevated metals in both areas (e.g. As, Cu, Fe, Pb). Samples from these two areas show somewhat surprisingly high SPLP concentrations. This may be related to weathering products and transported constituents, or organically held metals within the near surface zone (e.g. Fe-oxyhydroxides, Mn-oxides etc). Based on these results, it may be prudent to minimize water contact, or 'flushing' of these materials should they be used for construction purposes.

If you have any questions please feel free to contact me. We look forward to continuing to work with you on this exciting project.

Best Regards,
pHase Geochemistry Inc.

Shannon Shaw, M.Sc., P.Geo
Sr. Geochemist

November 10, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC-Mike Horse 09208 REVISED
Pace Project No.: 10112793

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 18, 2009. The results relate only to the samples included in this report.

The total inorganic carbon concentrations are presented in the EPA 9060 project narrative section.

REVISION - The qualifiers associated with the Mean Total Organic Carbon have been corrected on 09-PMTP-5 5'(10112793014) and 09-MHTP-03 8 1/2'(10112793016).

REVISION 2 - The saturated paste lab control sample recovery has been corrected. RPD limits were added to the sulfur QC data. Qualifiers were added to the pH QC data.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

Page 1 of 92

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CERTIFICATIONS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414
Wisconsin Certification #: 999407970
Alaska Certification #: UST-078
Arizona Certification #: AZ-0014
California Certification #: 01155CA
Florida/NELAP Certification #: E87605
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009

Maine Certification #: 2007029
Minnesota Certification #: 027-053-137
Montana Certification #: MT CERT0092
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Oregon Certification #: MN200001
Washington Certification #: C754
Tennessee Certification #: 02818
Pennsylvania Certification #: 68-00563

Montana Certification IDs

Montana Certification #: MT CERT0040
Idaho Certification #: MT00012

EPA Region 8 Certification #: 8TMS-Q
602 South 25th Street Billings, MT 59101

Green Bay Certification IDs

North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
1241 Bellevue Street Green Bay, WI 54302
Florida/NELAP Certification #: E87948

Illinois Certification #: 200050
Kentucky Certification #: 82
New York Certification #: 11888
New York Certification #: 11887
California Certification #: 09268CA
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10112793001	09-MHTP-7 9'	Solid	09/09/09 00:00	09/18/09 10:30
10112793002	09-MHTP-8 8 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793003	09-MHTP-8 9 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793004	09-MHTP-8 10'	Solid	09/09/09 00:00	09/18/09 10:30
10112793005	09-MHTP-9 10'	Solid	09/16/09 00:00	09/18/09 10:30
10112793006	09-MHTP-9 16'	Solid	09/16/09 00:00	09/18/09 10:30
10112793007	09-MHTP-10 8'	Solid	09/16/09 00:00	09/18/09 10:30
10112793008	09-MHTP-10 16'	Solid	09/16/09 00:00	09/18/09 10:30
10112793009	09-PMTP-1 8'	Solid	09/10/09 00:00	09/18/09 10:30
10112793010	09-PMTP-1 9'	Solid	09/10/09 00:00	09/18/09 10:30
10112793011	09-PMTP-4 8-9'	Solid	09/11/09 00:00	09/18/09 10:30
10112793012	09-PMTP-4 4'	Solid	09/11/09 00:00	09/18/09 10:30
10112793013	09-PMTP-5 9-10'	Solid	09/11/09 00:00	09/18/09 10:30
10112793014	09-PMTP-5 5'	Solid	09/11/09 00:00	09/18/09 10:30
10112793015	09-MHTP-03 8'	Solid	09/09/09 00:00	09/18/09 10:30
10112793016	09-MHTP-03 8 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793017	09-MHTP-4 7 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793018	09-MHTP-4A 7 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793019	09-MHTP-4 8 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112793020	09-MHTP-4 9'	Solid	09/09/09 00:00	09/18/09 10:30

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10112793001	09-MHTP-7 9'	% Moisture	JDL	1	PASI-M		
		ASA 10-3.3	KAS	1	PASI-MT		
		ASA 103.2	CAC	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	RJS	8	PASI-M		
		EPA 9060 Modified	DJR	3	PASI-G		
		LECO	CAC	1	PASI-MT		
		Modified Sobek 7	CAC, EJS	10	PASI-MT		
		10112793002	09-MHTP-8 8 1/2'	% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
ASA 103.2	CAC			1	PASI-MT		
EPA 6010	IP			8	PASI-M		
EPA 6020	RJS			8	PASI-M		
EPA 9060 Modified	DJR			3	PASI-G		
LECO	CAC			1	PASI-MT		
Modified Sobek 7	CAC, EJS			10	PASI-MT		
10112793003	09-MHTP-8 9 1/2'			% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	RJS	8	PASI-M		
		EPA 9060 Modified	DJR	3	PASI-G		
		LECO	CAC	1	PASI-MT		
		Modified Sobek 7	CAC, EJS	10	PASI-MT		
		10112793004	09-MHTP-8 10'	% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
ASA 103.2	CAC			1	PASI-MT		
EPA 6010	IP			8	PASI-M		
EPA 6020	RJS			8	PASI-M		
EPA 9060 Modified	DJR			3	PASI-G		
LECO	CAC			1	PASI-MT		
Modified Sobek 7	CAC, EJS			10	PASI-MT		
10112793005	09-MHTP-9 10'			% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	RJS	8	PASI-M		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10112793006	09-MHTP-9 16'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
10112793007	09-MHTP-10 8'	EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
10112793008	09-MHTP-10 16'	EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
10112793009	09-PMTP-1 8'	ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
10112793010	09-PMTP-1 9'	ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112793011	09-PMTP-4 8-9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112793012	09-PMTP-4 4'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112793013	09-PMTP-5 9-10'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112793014	09-PMTP-5 5'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10112793015	09-MHTP-03 8'	Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
10112793016	09-MHTP-03 8 1/2'	Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
10112793017	09-MHTP-4 7 1/2'	Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
10112793018	09-MHTP-4A 7 1/2'	Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
10112793019	09-MHTP-4 8 1/2'	Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112793020	09-MHTP-4 9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED
Pace Project No.: 10112793

Method: EPA 6020
Description: 6020 MET ICPMS
Client: Montana Dept. of Environmental Quality
Date: November 10, 2009

General Information:

20 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

QC Batch: MPRP/17342

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- LCS (Lab ID: 682644)
 - Aluminum
- MS (Lab ID: 682645)
 - Aluminum
- MSD (Lab ID: 682646)
 - Aluminum

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17340

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112793001,10112793011

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- MS (Lab ID: 682635)
 - Aluminum
 - Iron
 - Manganese

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

QC Batch: MPRP/17340

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112793001,10112793011

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- Zinc
- MS (Lab ID: 682637)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc
- MSD (Lab ID: 682636)
 - Aluminum
 - Copper
 - Iron
 - Manganese
 - Zinc

QC Batch: MPRP/17342

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112793020

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 682645)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc
- MSD (Lab ID: 682646)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 682646)
 - Copper
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17340

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- 09-MHTP-4 8 1/2' (Lab ID: 10112793019)
 - Zinc
- 09-PMTP-4 8-9' (Lab ID: 10112793011)
 - Copper
 - Iron
 - Lead
- MS (Lab ID: 682635)
 - Manganese
 - Aluminum
 - Copper
 - Iron
 - Lead
- MSD (Lab ID: 682636)
 - Iron
 - Manganese

QC Batch: MPRP/17342

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 682645)
 - Aluminum
 - Iron
 - Manganese
 - Zinc
- MSD (Lab ID: 682646)
 - Aluminum
 - Iron
 - Manganese

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: % Moisture

Description: Dry Weight

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/2905

R1: RPD value was outside control limits.

- DUP (Lab ID: 689691)
- Sp. Conductance Saturated Paste

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: ASA 103.2

Description: ASA 103.2 pH

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for ASA 103.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/2865

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 685713)
 - pH, Saturated Paste
- DUP (Lab ID: 685714)
 - pH, Saturated Paste

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: LECO

Description: Sulfur analysis Montana

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for LECO. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

20 samples were analyzed for EPA 9060 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/4769

11M: Total Carbon result of

26600 mg/Kg,

MDL 1217 mg/Kg,

RDL 4348 mg/Kg.

- 09-MHTP-10 16' (Lab ID: 10112793008)

- Mean Total Organic Carbon

14M: Total Carbon result of

4080 mg/Kg,

MDL 277 mg/Kg,

RDL 990 mg/Kg.

- 09-MHTP-9 10' (Lab ID: 10112793005)

- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4769

15M: Total Carbon result of

416 mg/Kg,

MDL 70 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-7 9' (Lab ID: 10112793001)
- Mean Total Organic Carbon

1M: Total Carbon result of

1220 mg/Kg,

MDL 70.7 mg/Kg,

RDL 253 mg/Kg.

- 09-MHTP-8 9 1/2' (Lab ID: 10112793003)
- Mean Total Organic Carbon

20M: Total Carbon result of

742 mg/Kg,

MDL 70.4 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-1 9' (Lab ID: 10112793010)
- Mean Total Organic Carbon

21M: Total Inorganic Carbon result of

10400 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-10 8' (Lab ID: 10112793007)
- Mean Total Organic Carbon

24M: Total Inorganic Carbon result of

2590 mg/Kg,

MDL 277 mg/Kg,

RDL 990 mg/Kg.

- 09-MHTP-9 10' (Lab ID: 10112793005)
- Mean Total Organic Carbon

27M: Total Inorganic Carbon result of

564 mg/Kg,

MDL 70.2 mg/Kg,

RDL 251 mg/Kg.

- 09-MHTP-8 10' (Lab ID: 10112793004)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4769

2M: Total Carbon result of

1240 mg/Kg,

MDL 70.2 mg/Kg,

RDL 251 mg/Kg.

- 09-MHTP-8 10' (Lab ID: 10112793004)
- Mean Total Organic Carbon

30M: Total Inorganic Carbon result of

877 mg/Kg,

MDL 70.6 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-8 8 1/2' (Lab ID: 10112793002)
- Mean Total Organic Carbon

33M: Total Inorganic Carbon result of

<251 mg/Kg,

MDL 70.4 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-1 9' (Lab ID: 10112793010)
- Mean Total Organic Carbon

34M: Total Inorganic Carbon result of

<253 mg/Kg,

MDL 70.7 mg/Kg,

RDL 253 mg/Kg.

- 09-MHTP-8 9 1/2' (Lab ID: 10112793003)
- Mean Total Organic Carbon

35M: Total Inorganic Carbon result of

<3920 mg/Kg,

MDL 1098 mg/Kg,

RDL 3920 mg/Kg.

- 09-MHTP-9 16' (Lab ID: 10112793006)
- Mean Total Organic Carbon

36M: Total Inorganic Carbon result of

<4348 mg/Kg,

MDL 1217 mg/Kg,

RDL 4348 mg/Kg.

- 09-MHTP-10 16' (Lab ID: 10112793008)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4769

38M: Total Inorganic Carbon result of

<493 mg/Kg,

MDL 138 mg/Kg,

RDL 493 mg/Kg.

- 09-MHTP-7 9' (Lab ID: 10112793001)
- Mean Total Organic Carbon

3M: Total Carbon result of

12400 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-10 8' (Lab ID: 10112793007)
- Mean Total Organic Carbon

40M: Total Inorganic Carbon result of

<498 mg/Kg,

MDL 139 mg/Kg,

RDL 498 mg/Kg.

- 09-PMTP-1 8' (Lab ID: 10112793009)
- Mean Total Organic Carbon

6M: Total Carbon result of

1530 mg/Kg,

MDL 70.6 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-8 8 1/2' (Lab ID: 10112793002)
- Mean Total Organic Carbon

7M: Total Carbon result of

1680 mg/Kg,

MDL 139 mg/Kg,

RDL 498 mg/Kg.

- 09-PMTP-1 8' (Lab ID: 10112793009)
- Mean Total Organic Carbon

9M: Total Carbon result of

22200 mg/Kg,

MDL 1098 mg/Kg,

RDL 3920 mg/Kg.

- 09-MHTP-9 16' (Lab ID: 10112793006)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4771

10M: Total Carbon result of

2560 mg/Kg,

MDL 141 mg/Kg,

RDL 503 mg/Kg.

- 09-PMTP-4 4' (Lab ID: 10112793012)
- Mean Total Organic Carbon

12M: Total Carbon result of

2750 mg/Kg,

MDL 138 mg/Kg,

RDL 494 mg/Kg.

- 09-PMTP-5 9-10' (Lab ID: 10112793013)
- Mean Total Organic Carbon

13M: Total Carbon result of

3190 mg/Kg,

MDL 138 mg/Kg,

RDL 491 mg/Kg.

- 09-PMTP-5 5' (Lab ID: 10112793014)
- Mean Total Organic Carbon

16M: Total Carbon result of

46300 mg/Kg,

MDL 5090 mg/Kg,

RDL 18200 mg/Kg.

- 09-MHTP-4 8 1/2' (Lab ID: 10112793019)
- Mean Total Organic Carbon

17M: Total Carbon result of

5750 mg/Kg,

MDL 295 mg/Kg,

RDL 1050 mg/Kg.

- 09-MHTP-4 9' (Lab ID: 10112793020)
- Mean Total Organic Carbon

18M: Total Carbon result of

5940 mg/Kg,

MDL 505 mg/Kg,

RDL 1800 mg/Kg.

- 09-MHTP-03 8 1/2' (Lab ID: 10112793016)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4771

19M: Total Carbon result of

6520 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-03 8' (Lab ID: 10112793015)
- Mean Total Organic Carbon

22M: Total Inorganic Carbon result of

13180 mg/Kg,

MDL 554 mg/Kg,

RDL 1980 mg/Kg.

- 09-MHTP-4 7 1/2' (Lab ID: 10112793017)
- Mean Total Organic Carbon

23M: Total Inorganic Carbon result of

15240 mg/Kg,

MDL 1300 mg/Kg,

RDL 4650 mg/Kg.

- 09-MHTP-4A 7 1/2' (Lab ID: 10112793018)
- Mean Total Organic Carbon

25M: Total Inorganic Carbon result of

43380 mg/Kg,

MDL 5090 mg/Kg,

RDL 18200 mg/Kg.

- 09-MHTP-4 8 1/2' (Lab ID: 10112793019)
- Mean Total Organic Carbon

26M: Total Inorganic Carbon result of

4440 mg/Kg,

MDL 295 mg/Kg,

RDL 1050 mg/Kg.

- 09-MHTP-4 9' (Lab ID: 10112793020)
- Mean Total Organic Carbon

28M: Total Inorganic Carbon result of

590 mg/Kg,

MDL 138 mg/Kg,

RDL 491 mg/Kg.

- 09-PMTP-5 5' (Lab ID: 10112793014)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4771

29M: Total Inorganic Carbon result of

770 mg/Kg,

MDL 141 mg/Kg,

RDL 503 mg/Kg.

- 09-PMTP-4 4' (Lab ID: 10112793012)
- Mean Total Organic Carbon

31M: Total Inorganic Carbon result of

<1800 mg/Kg,

MDL 505 mg/Kg,

RDL 1800 mg/Kg.

- 09-MHTP-03 8 1/2' (Lab ID: 10112793016)
- Mean Total Organic Carbon

32M: Total Inorganic Carbon result of

<2000 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-03 8' (Lab ID: 10112793015)
- Mean Total Organic Carbon

37M: Total Inorganic Carbon result of

<487 mg/Kg,

MDL 136 mg/Kg,

RDL 487 mg/Kg.

- 09-PMTP-4 8-9' (Lab ID: 10112793011)
- Mean Total Organic Carbon

39M: Total Inorganic Carbon result of

<494 mg/Kg,

MDL 138 mg/Kg,

RDL 494 mg/Kg.

- 09-PMTP-5 9-10' (Lab ID: 10112793013)
- Mean Total Organic Carbon

4M: Total Carbon result of

1290 mg/Kg,

MDL 136 mg/Kg,

RDL 487 mg/Kg.

- 09-PMTP-4 8-9' (Lab ID: 10112793011)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4771

5M: Total Carbon result of

14600 mg/Kg,

MDL 554 mg/Kg,

RDL 1980 mg/Kg.

- 09-MHTP-4 7 1/2' (Lab ID: 10112793017)
- Mean Total Organic Carbon

8M: Total Carbon result of

17000 mg/Kg,

MDL 1300 mg/Kg,

RDL 4650 mg/Kg.

- 09-MHTP-4A 7 1/2' (Lab ID: 10112793018)
- Mean Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-7 9' Lab ID: 10112793001 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.14	mg/L	0.10	0.10	1	09/29/09 17:25	09/30/09 13:05	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:05	7440-38-2	
Cadmium	0.0013	mg/L	0.00050	0.00050	1	09/29/09 17:25	09/30/09 13:05	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:05	7440-50-8	
Iron	0.061	mg/L	0.025	0.025	1	09/29/09 17:25	09/30/09 13:05	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	09/30/09 13:05	7439-92-1	
Manganese	1.4	mg/L	0.0025	0.0025	1	09/29/09 17:25	09/30/09 13:05	7439-96-5	
Zinc	0.20	mg/L	0.010	0.010	1	09/29/09 17:25	09/30/09 13:05	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9670	mg/kg	3.4	1.7	20	09/27/09 14:42	09/29/09 22:22	7429-90-5	P6
Arsenic	13.1	mg/kg	0.43	0.21	20	09/27/09 14:42	09/29/09 22:22	7440-38-2	
Cadmium	0.91	mg/kg	0.086	0.043	20	09/27/09 14:42	09/29/09 22:22	7440-43-9	
Copper	42.1	mg/kg	0.43	0.21	20	09/27/09 14:42	09/29/09 22:22	7440-50-8	P6
Iron	18200	mg/kg	42.8	21.4	20	09/27/09 14:42	09/29/09 22:22	7439-89-6	P6
Lead	30.8	mg/kg	0.086	0.043	20	09/27/09 14:42	09/29/09 22:22	7439-92-1	
Manganese	1370	mg/kg	2.1	1.1	100	09/27/09 14:42	09/29/09 22:35	7439-96-5	P6
Zinc	192	mg/kg	4.3	2.1	20	09/27/09 14:42	09/29/09 22:22	7440-66-6	P6
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.3	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.9	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	0.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.021J	% (w/w)	0.050		1		10/01/09 14:59		
Sulfur, HNO3 Extractable	0.028J	% (w/w)	0.050		1		10/01/09 14:59		
Sulfur, Hot Water Extractable	0.058	% (w/w)	0.050		1		10/01/09 14:59		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 14:59		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-0.87	tons/1000	0.0		1		10/02/09 10:46		
Acid Potential	1.4	tons/1000	0.50		1		10/02/09 10:46		
Lime Requirement	6.6	tons/1000	0.0		1		10/02/09 10:46		
SMP Lime Requirement	3.9	tons/1000	0.0		1		10/02/09 10:46		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-7 9' **Lab ID: 10112793001** Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	2.4	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.11	% (w/w)	0.050	0.037	1		09/29/09 12:51		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1260	mg/kg	490	137	1		09/29/09 13:35	7440-44-0	
Total Organic Carbon	1380	mg/kg	495	139	1		09/29/09 13:45	7440-44-0	
Mean Total Organic Carbon	1320	mg/kg	493	138	1		09/29/09 13:45	7440-44-0	15M, 38M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Sample Project No.: 10112793

Sample: 09-MHTP-8 8 1/2' Lab ID: 10112793002 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.45	mg/L	0.10	0.10	1	09/29/09 17:25	09/30/09 13:18	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:18	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	09/30/09 13:18	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:18	7440-50-8	
Iron	0.30	mg/L	0.025	0.025	1	09/29/09 17:25	09/30/09 13:18	7439-89-6	
Lead	0.0018	mg/L	0.0015	0.0015	1	09/29/09 17:25	09/30/09 13:18	7439-92-1	
Manganese	0.26	mg/L	0.0025	0.0025	1	09/29/09 17:25	09/30/09 13:18	7439-96-5	
Zinc	0.017	mg/L	0.010	0.010	1	09/29/09 17:25	09/30/09 13:18	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	12500	mg/kg	35.0	17.5	200	09/27/09 14:42	10/01/09 03:43	7429-90-5	
Arsenic	29.0	mg/kg	4.4	2.2	200	09/27/09 14:42	10/01/09 03:43	7440-38-2	
Cadmium	2.3	mg/kg	0.88	0.44	200	09/27/09 14:42	10/01/09 03:43	7440-43-9	
Copper	102	mg/kg	4.4	2.2	200	09/27/09 14:42	10/01/09 03:43	7440-50-8	
Iron	24800	mg/kg	438	219	200	09/27/09 14:42	10/01/09 03:43	7439-89-6	
Lead	446	mg/kg	0.88	0.44	200	09/27/09 14:42	10/01/09 03:43	7439-92-1	
Manganese	6930	mg/kg	21.9	10.9	1000	09/27/09 14:42	10/01/09 03:48	7439-96-5	
Zinc	567	mg/kg	43.8	21.9	200	09/27/09 14:42	10/01/09 03:43	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.1	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.4	Std. Units	0.10	0.050	1		09/28/09 17:01		D6
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.3	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.033J	% (w/w)	0.050		1		10/01/09 15:06		
Sulfur, HNO3 Extractable	0.024J	% (w/w)	0.050		1		10/01/09 15:06		
Sulfur, Hot Water Extractable	0.034J	% (w/w)	0.050		1		10/01/09 15:06		
Sulfur, Residual	0.0049J	% (w/w)	0.050		1		10/01/09 15:06		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	0.62	tons/1000	0.0		1		10/02/09 10:49		
Acid Potential	1.7	tons/1000	0.50		1		10/02/09 10:49		
Lime Requirement	6.0	tons/1000	0.0		1		10/02/09 10:49		
SMP Lime Requirement	3.1	tons/1000	0.0		1		10/02/09 10:49		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-8 8 1/2' **Lab ID:** 10112793002 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	1.6	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.096	% (w/w)	0.050	0.037	1		09/29/09 13:04		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	512	mg/kg	251	70.2	1		09/29/09 14:17	7440-44-0	
Total Organic Carbon	794	mg/kg	250	70.0	1		09/29/09 14:24	7440-44-0	
Mean Total Organic Carbon	653	mg/kg	250	70.1	1		09/29/09 14:24	7440-44-0	30M,6M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Project No.: 10112793

Sample: 09-MHTP-8 9 1/2' Lab ID: 10112793003 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.89	mg/L	0.10	0.10	1	09/29/09 17:25	09/30/09 13:24	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:24	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	09/30/09 13:24	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:24	7440-50-8	
Iron	0.63	mg/L	0.025	0.025	1	09/29/09 17:25	09/30/09 13:24	7439-89-6	
Lead	0.0045	mg/L	0.0015	0.0015	1	09/29/09 17:25	09/30/09 13:24	7439-92-1	
Manganese	0.11	mg/L	0.0025	0.0025	1	09/29/09 17:25	09/30/09 13:24	7439-96-5	
Zinc	0.021	mg/L	0.010	0.010	1	09/29/09 17:25	09/30/09 13:24	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	20900	mg/kg	33.1	16.5	200	09/27/09 14:42	10/01/09 03:52	7429-90-5	
Arsenic	29.5	mg/kg	4.1	2.1	200	09/27/09 14:42	10/01/09 03:52	7440-38-2	
Cadmium	2.7	mg/kg	0.83	0.41	200	09/27/09 14:42	10/01/09 03:52	7440-43-9	
Copper	134	mg/kg	4.1	2.1	200	09/27/09 14:42	10/01/09 03:52	7440-50-8	
Iron	38300	mg/kg	413	207	200	09/27/09 14:42	10/01/09 03:52	7439-89-6	
Lead	385	mg/kg	0.83	0.41	200	09/27/09 14:42	10/01/09 03:52	7439-92-1	
Manganese	2780	mg/kg	4.1	2.1	200	09/27/09 14:42	10/01/09 03:52	7439-96-5	
Zinc	549	mg/kg	41.3	20.7	200	09/27/09 14:42	10/01/09 03:52	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.4	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	3.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.015J	% (w/w)	0.050		1		10/01/09 15:08		
Sulfur, HNO3 Extractable	0.0081J	% (w/w)	0.050		1		10/01/09 15:08		
Sulfur, Hot Water Extractable	0.048J	% (w/w)	0.050		1		10/01/09 15:08		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:08		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	2.9	tons/1000	0.0		1		10/02/09 10:51		
Acid Potential	0.63	tons/1000	0.50		1		10/02/09 10:51		
Lime Requirement	2.0	tons/1000	0.0		1		10/02/09 10:51		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/02/09 10:51		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-8 9 1/2' **Lab ID:** 10112793003 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	2.2	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.072	% (w/w)	0.050	0.037	1		09/29/09 13:22		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	955	mg/kg	251	70.4	1		09/29/09 14:33	7440-44-0	
Total Organic Carbon	1550	mg/kg	250	70.0	1		09/29/09 14:39	7440-44-0	
Mean Total Organic Carbon	1250	mg/kg	251	70.2	1		09/29/09 14:39	7440-44-0	1M,34M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Sample Project No.: 10112793

Sample: 09-MHTP-8 10' **Lab ID:** 10112793004 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	2.6	mg/L	0.10	0.10	1	09/29/09 17:25	09/30/09 13:29	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:29	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	09/30/09 13:29	7440-43-9	
Copper	0.0081	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:29	7440-50-8	
Iron	2.0	mg/L	0.025	0.025	1	09/29/09 17:25	09/30/09 13:29	7439-89-6	
Lead	0.021	mg/L	0.0015	0.0015	1	09/29/09 17:25	09/30/09 13:29	7439-92-1	
Manganese	0.078	mg/L	0.0025	0.0025	1	09/29/09 17:25	09/30/09 13:29	7439-96-5	
Zinc	0.058	mg/L	0.010	0.010	1	09/29/09 17:25	09/30/09 13:29	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	12100	mg/kg	39.4	19.7	200	09/27/09 14:42	10/01/09 03:56	7429-90-5	
Arsenic	25.1	mg/kg	4.9	2.5	200	09/27/09 14:42	10/01/09 03:56	7440-38-2	
Cadmium	1.3	mg/kg	0.98	0.49	200	09/27/09 14:42	10/01/09 03:56	7440-43-9	
Copper	85.5	mg/kg	4.9	2.5	200	09/27/09 14:42	10/01/09 03:56	7440-50-8	
Iron	21800	mg/kg	492	246	200	09/27/09 14:42	10/01/09 03:56	7439-89-6	
Lead	290	mg/kg	0.98	0.49	200	09/27/09 14:42	10/01/09 03:56	7439-92-1	
Manganese	1620	mg/kg	4.9	2.5	200	09/27/09 14:42	10/01/09 03:56	7439-96-5	
Zinc	369	mg/kg	49.2	24.6	200	09/27/09 14:42	10/01/09 03:56	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.9	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.6	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.015J	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, HNO3 Extractable	0.018J	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, Hot Water Extractable	0.071	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, Residual	0.00090J	% (w/w)	0.050		1		10/01/09 15:09		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.1	tons/1000	0.0		1		10/02/09 10:51		
Acid Potential	0.93	tons/1000	0.50		1		10/02/09 10:51		
Lime Requirement	1.5	tons/1000	0.0		1		10/02/09 10:51		
SMP Lime Requirement	0.3	tons/1000	0.0		1		10/02/09 10:51		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-8 10' **Lab ID:** 10112793004 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	2.3	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.10	% (w/w)	0.050	0.037	1		09/29/09 16:21		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	772	mg/kg	250	70.0	1		09/29/09 14:44	7440-44-0	
Total Organic Carbon	576	mg/kg	250	70.0	1		09/29/09 14:53	7440-44-0	
Mean Total Organic Carbon	674	mg/kg	250	70.0	1		09/29/09 14:53	7440-44-0	27M,2M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-9 10' Lab ID: 10112793005 Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	1.7	mg/L	0.10	0.10	1	09/29/09 17:25	09/30/09 13:35	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:35	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	09/30/09 13:35	7440-43-9	
Copper	0.0075	mg/L	0.0050	0.0050	1	09/29/09 17:25	09/30/09 13:35	7440-50-8	
Iron	1.6	mg/L	0.025	0.025	1	09/29/09 17:25	09/30/09 13:35	7439-89-6	
Lead	0.024	mg/L	0.0015	0.0015	1	09/29/09 17:25	09/30/09 13:35	7439-92-1	
Manganese	0.087	mg/L	0.0025	0.0025	1	09/29/09 17:25	09/30/09 13:35	7439-96-5	
Zinc	0.042	mg/L	0.010	0.010	1	09/29/09 17:25	09/30/09 13:35	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	6490	mg/kg	31.5	15.7	200	09/27/09 14:42	10/01/09 04:01	7429-90-5	
Arsenic	141	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:01	7440-38-2	
Cadmium	9.9	mg/kg	0.79	0.39	200	09/27/09 14:42	10/01/09 04:01	7440-43-9	
Copper	343	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:01	7440-50-8	
Iron	65400	mg/kg	394	197	200	09/27/09 14:42	10/01/09 04:01	7439-89-6	
Lead	771	mg/kg	0.79	0.39	200	09/27/09 14:42	10/01/09 04:01	7439-92-1	
Manganese	2990	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:01	7439-96-5	
Zinc	1810	mg/kg	39.4	19.7	200	09/27/09 14:42	10/01/09 04:01	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	12	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.042J	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, HNO3 Extractable	3.7	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, Hot Water Extractable	0.18	% (w/w)	0.050		1		10/01/09 15:09		
Sulfur, Residual	0.11	% (w/w)	0.050		1		10/01/09 15:09		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-108	tons/1000	0.0		1		10/02/09 10:52		
Acid Potential	120	tons/1000	0.50		1		10/02/09 10:52		
Lime Requirement	150	tons/1000	0.0		1		10/02/09 10:52		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 10:52		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-9 10' **Lab ID: 10112793005** Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	1.3	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	4.0	% (w/w)	0.050	0.037	1		09/30/09 08:10		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1700	mg/kg	498	139	1		09/29/09 14:59	7440-44-0	
Total Organic Carbon	1280	mg/kg	498	139	1		09/29/09 15:06	7440-44-0	
Mean Total Organic Carbon	1490	mg/kg	498	139	1		09/29/09 15:06	7440-44-0	14M, 24M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-9 16' Lab ID: 10112793006 Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.19	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:08	7429-90-5	
Arsenic	0.0077	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:08	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:08	7440-43-9	
Copper	0.012	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:08	7440-50-8	
Iron	1.0	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:08	7439-89-6	
Lead	0.054	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:08	7439-92-1	
Manganese	1.2	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:08	7439-96-5	
Zinc	0.037	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:08	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	4470	mg/kg	48.6	24.3	200	09/27/09 14:42	10/01/09 04:05	7429-90-5	
Arsenic	458	mg/kg	6.1	3.0	200	09/27/09 14:42	10/01/09 04:05	7440-38-2	
Cadmium	31.8	mg/kg	1.2	0.61	200	09/27/09 14:42	10/01/09 04:05	7440-43-9	
Copper	1330	mg/kg	6.1	3.0	200	09/27/09 14:42	10/01/09 04:05	7440-50-8	
Iron	165000	mg/kg	607	304	200	09/27/09 14:42	10/01/09 04:05	7439-89-6	
Lead	3040	mg/kg	1.2	0.61	200	09/27/09 14:42	10/01/09 04:05	7439-92-1	
Manganese	5890	mg/kg	30.4	15.2	1000	09/27/09 14:42	10/01/09 04:09	7439-96-5	
Zinc	4260	mg/kg	60.7	30.4	200	09/27/09 14:42	10/01/09 04:05	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	33.6	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.2	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	58	tons/1000	0.50		1		10/02/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.86	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, HNO3 Extractable	11.4	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, Hot Water Extractable	0.17	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, Residual	0.15	% (w/w)	0.050		1		10/01/09 15:10		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-324	tons/1000	0.0		1		10/02/09 10:52		
Acid Potential	382	tons/1000	0.50		1		10/02/09 10:52		
Lime Requirement	478	tons/1000	0.0		1		10/02/09 10:52		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 10:52		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-9 16' **Lab ID:** 10112793006 Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	1.5	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	12.6	% (w/w)	0.050	0.037	1		09/30/09 08:48		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	26300	mg/kg	3330	933	1		09/29/09 15:19	7440-44-0	
Total Organic Carbon	18500	mg/kg	3570	1000	1		09/29/09 15:25	7440-44-0	
Mean Total Organic Carbon	22500	mg/kg	3450	966	1		09/29/09 15:25	7440-44-0	35M,9M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-10 8' **Lab ID:** 10112793007 Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	1.3	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:14	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:14	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:14	7440-43-9	
Copper	0.0094	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:14	7440-50-8	
Iron	1.8	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:14	7439-89-6	
Lead	0.078	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:14	7439-92-1	
Manganese	0.13	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:14	7439-96-5	
Zinc	0.071	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:14	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	4590	mg/kg	31.5	15.8	200	09/27/09 14:42	10/01/09 04:14	7429-90-5	
Arsenic	196	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:14	7440-38-2	
Cadmium	9.4	mg/kg	0.79	0.39	200	09/27/09 14:42	10/01/09 04:14	7440-43-9	
Copper	346	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:14	7440-50-8	
Iron	58100	mg/kg	394	197	200	09/27/09 14:42	10/01/09 04:14	7439-89-6	
Lead	1040	mg/kg	0.79	0.39	200	09/27/09 14:42	10/01/09 04:14	7439-92-1	
Manganese	2080	mg/kg	3.9	2.0	200	09/27/09 14:42	10/01/09 04:14	7439-96-5	
Zinc	2100	mg/kg	39.4	19.7	200	09/27/09 14:42	10/01/09 04:14	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.3	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	58	tons/1000	0.50		1		10/02/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.59	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, HNO3 Extractable	7.9	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, Hot Water Extractable	0.12	% (w/w)	0.050		1		10/01/09 15:10		
Sulfur, Residual	0.20	% (w/w)	0.050		1		10/01/09 15:10		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-210	tons/1000	0.0		1		10/02/09 10:53		
Acid Potential	268	tons/1000	0.50		1		10/02/09 10:53		
Lime Requirement	335	tons/1000	0.0		1		10/02/09 10:53		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 10:53		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-10 8' **Lab ID: 10112793007** Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	1.8	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	8.8	% (w/w)	0.050	0.037	1		09/30/09 10:29		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1620	mg/kg	498	139	1		09/29/09 15:51	7440-44-0	
Total Organic Carbon	2330	mg/kg	488	137	1		09/29/09 15:59	7440-44-0	
Mean Total Organic Carbon	1980	mg/kg	493	138	1		09/29/09 15:59	7440-44-0	21M,3M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-10 16' **Lab ID:** 10112793008 Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	1.7	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:20	7429-90-5	
Arsenic	0.034	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:20	7440-38-2	
Cadmium	0.0013	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:20	7440-43-9	
Copper	0.24	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:20	7440-50-8	
Iron	2.8	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:20	7439-89-6	
Lead	1.0	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:20	7439-92-1	
Manganese	0.77	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:20	7439-96-5	
Zinc	0.19	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:20	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	34400	mg/kg	49.5	24.7	200	09/27/09 14:42	10/02/09 06:37	7429-90-5	
Arsenic	3640	mg/kg	6.2	3.1	200	09/27/09 14:42	10/02/09 06:37	7440-38-2	
Cadmium	42.0	mg/kg	1.2	0.62	200	09/27/09 14:42	10/02/09 06:37	7440-43-9	
Copper	2800	mg/kg	6.2	3.1	200	09/27/09 14:42	10/01/09 04:27	7440-50-8	
Iron	108000	mg/kg	619	309	200	09/27/09 14:42	10/01/09 04:27	7439-89-6	
Lead	32700	mg/kg	12.4	6.2	2000	09/27/09 14:42	10/01/09 04:31	7439-92-1	
Manganese	2440	mg/kg	6.2	3.1	200	09/27/09 14:42	10/01/09 04:27	7439-96-5	
Zinc	3480	mg/kg	61.9	30.9	200	09/27/09 14:42	10/01/09 04:27	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	31.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.2	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	26	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.19	% (w/w)	0.050		1		10/01/09 15:11		
Sulfur, HNO3 Extractable	2.6	% (w/w)	0.050		1		10/01/09 15:11		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 15:11		
Sulfur, Residual	0.11	% (w/w)	0.050		1		10/01/09 15:11		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-63	tons/1000	0.0		1		10/02/09 10:53		
Acid Potential	89	tons/1000	0.50		1		10/02/09 10:53		
Lime Requirement	111	tons/1000	0.0		1		10/02/09 10:53		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 10:53		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-10 16' **Lab ID: 10112793008** Collected: 09/16/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.88	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	2.8	% (w/w)	0.050	0.037	1		09/30/09 10:46		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	31600	mg/kg	4000	1120	1		09/29/09 16:09	7440-44-0	
Total Organic Carbon	30100	mg/kg	4170	1170	1		09/29/09 16:32	7440-44-0	
Mean Total Organic Carbon	30900	mg/kg	4080	1140	1		09/29/09 16:32	7440-44-0	11M, 36M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Sample Project No.: 10112793

Sample: 09-PMTP-1 8' Lab ID: 10112793009 Collected: 09/10/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	12.6	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:26	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:26	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:26	7440-43-9	
Copper	0.15	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:26	7440-50-8	
Iron	16.2	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:26	7439-89-6	
Lead	0.18	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:26	7439-92-1	
Manganese	0.19	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:26	7439-96-5	
Zinc	0.20	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:26	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	39700	mg/kg	41.1	20.6	200	09/27/09 14:42	10/02/09 06:46	7429-90-5	
Arsenic	26.2	mg/kg	5.1	2.6	200	09/27/09 14:42	10/02/09 06:46	7440-38-2	
Cadmium	2.8	mg/kg	1.0	0.51	200	09/27/09 14:42	10/02/09 06:46	7440-43-9	
Copper	1030	mg/kg	5.1	2.6	200	09/27/09 14:42	10/02/09 06:46	7440-50-8	
Iron	106000	mg/kg	514	257	200	09/27/09 14:42	10/02/09 06:46	7439-89-6	
Lead	938	mg/kg	1.0	0.51	200	09/27/09 14:42	10/02/09 06:46	7439-92-1	
Manganese	888	mg/kg	5.1	2.6	200	09/27/09 14:42	10/02/09 06:46	7439-96-5	
Zinc	855	mg/kg	51.4	25.7	200	09/27/09 14:42	10/02/09 06:46	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	17.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.4	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.016J	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, HNO3 Extractable	0.0083J	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, Hot Water Extractable	0.0072J	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, Residual	0.0014J	% (w/w)	0.050		1		10/01/09 15:12		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.7	tons/1000	0.0		1		10/02/09 10:56		
Acid Potential	0.68	tons/1000	0.50		1		10/02/09 10:56		
Lime Requirement	1.2	tons/1000	0.0		1		10/02/09 10:56		
SMP Lime Requirement	0.3	tons/1000	0.0		1		10/02/09 10:56		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-1 8' **Lab ID:** 10112793009 Collected: 09/10/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.18	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		09/30/09 11:03		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1170	mg/kg	500	140	1		09/29/09 16:46	7440-44-0	
Total Organic Carbon	1810	mg/kg	493	138	1		09/29/09 16:59	7440-44-0	
Mean Total Organic Carbon	1490	mg/kg	496	139	1		09/29/09 16:59	7440-44-0	40M,7M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-PMTP-1 9' **Lab ID:** 10112793010 Collected: 09/10/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	25.8	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:32	7429-90-5	
Arsenic	0.13	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:32	7440-38-2	
Cadmium	0.0030	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:32	7440-43-9	
Copper	0.27	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:32	7440-50-8	
Iron	37.5	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:32	7439-89-6	
Lead	5.2	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:32	7439-92-1	
Manganese	0.13	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:32	7439-96-5	
Zinc	0.42	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:32	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	7530	mg/kg	3.7	1.8	20	09/27/09 14:42	10/01/09 04:40	7429-90-5	
Arsenic	59.9	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 04:40	7440-38-2	
Cadmium	0.59	mg/kg	0.091	0.046	20	09/27/09 14:42	10/01/09 04:40	7440-43-9	
Copper	184	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 04:40	7440-50-8	
Iron	33700	mg/kg	45.7	22.8	20	09/27/09 14:42	10/01/09 04:40	7439-89-6	
Lead	2790	mg/kg	0.091	0.046	20	09/27/09 14:42	10/01/09 04:40	7439-92-1	
Manganese	110	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 04:40	7439-96-5	
Zinc	184	mg/kg	4.6	2.3	20	09/27/09 14:42	10/01/09 04:40	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.7	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.6	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	13	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.14	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, HNO3 Extractable	0.080	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, Hot Water Extractable	0.11	% (w/w)	0.050		1		10/01/09 15:12		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:12		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.8	tons/1000	0.0		1		10/02/09 10:56		
Acid Potential	5.9	tons/1000	0.50		1		10/02/09 10:56		
Lime Requirement	7.3	tons/1000	0.0		1		10/02/09 10:56		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 10:56		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.2	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-1 9' **Lab ID:** 10112793010 Collected: 09/10/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.31	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.33	% (w/w)	0.050	0.037	1		09/30/09 11:14		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	999	mg/kg	252	70.5	1		09/29/09 17:07	7440-44-0	
Total Organic Carbon	431	mg/kg	251	70.2	1		09/29/09 17:18	7440-44-0	
Mean Total Organic Carbon	714	mg/kg	251	70.4	1		09/29/09 17:18	7440-44-0	20M, 33M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-PMTP-4 8-9' **Lab ID:** 10112793011 **Collected:** 09/11/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	12.5	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:39	7429-90-5	
Arsenic	0.010	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:39	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:39	7440-43-9	
Copper	0.14	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:39	7440-50-8	
Iron	17.5	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:39	7439-89-6	
Lead	0.97	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:39	7439-92-1	
Manganese	0.028	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:39	7439-96-5	
Zinc	0.12	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:39	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	19200	mg/kg	3.6	1.8	20	09/27/09 14:42	10/01/09 04:49	7429-90-5	P6
Arsenic	66.6	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 04:49	7440-38-2	P6
Cadmium	0.23	mg/kg	0.091	0.046	20	09/27/09 14:42	10/01/09 04:49	7440-43-9	
Copper	948	mg/kg	0.91	0.46	40	09/27/09 14:42	10/02/09 07:03	7440-50-8	E,P6
Iron	106000	mg/kg	91.1	45.5	40	09/27/09 14:42	10/02/09 07:03	7439-89-6	E,P6
Lead	8100	mg/kg	0.18	0.091	40	09/27/09 14:42	10/02/09 07:03	7439-92-1	E,P6
Manganese	90.4	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 04:49	7439-96-5	P6
Zinc	85.1	mg/kg	4.6	2.3	20	09/27/09 14:42	10/01/09 04:49	7440-66-6	P6
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	17.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.8	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.016J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, HNO3 Extractable	0.029J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, Hot Water Extractable	0.028J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:13		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	0.23	tons/1000	0.0		1		10/02/09 10:57		
Acid Potential	1.3	tons/1000	0.50		1		10/02/09 10:57		
Lime Requirement	2.0	tons/1000	0.0		1		10/02/09 10:57		
SMP Lime Requirement	0.3	tons/1000	0.0		1		10/02/09 10:57		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-4 8-9' **Lab ID:** 10112793011 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.20	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.073	% (w/w)	0.050	0.037	1		09/30/09 11:25		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1260	mg/kg	488	137	1		09/30/09 08:51	7440-44-0	
Total Organic Carbon	1280	mg/kg	483	135	1		09/30/09 08:55	7440-44-0	
Mean Total Organic Carbon	1270	mg/kg	485	136	1		09/30/09 08:55	7440-44-0	37M,4M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-PMTP-4 4' **Lab ID:** 10112793012 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	8.7	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:45	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:45	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:45	7440-43-9	
Copper	0.13	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:45	7440-50-8	
Iron	21.7	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:45	7439-89-6	
Lead	1.2	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:45	7439-92-1	
Manganese	0.043	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:45	7439-96-5	
Zinc	0.035	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:45	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	10400	mg/kg	3.2	1.6	20	09/27/09 14:42	10/01/09 05:11	7429-90-5	
Arsenic	21.5	mg/kg	0.41	0.20	20	09/27/09 14:42	10/01/09 05:11	7440-38-2	
Cadmium	0.085	mg/kg	0.081	0.041	20	09/27/09 14:42	10/01/09 05:11	7440-43-9	
Copper	473	mg/kg	0.41	0.20	20	09/27/09 14:42	10/01/09 05:11	7440-50-8	
Iron	81500	mg/kg	40.6	20.3	20	09/27/09 14:42	10/01/09 05:11	7439-89-6	
Lead	2140	mg/kg	0.081	0.041	20	09/27/09 14:42	10/01/09 05:11	7439-92-1	
Manganese	63.0	mg/kg	0.41	0.20	20	09/27/09 14:42	10/01/09 05:11	7439-96-5	
Zinc	57.0	mg/kg	4.1	2.0	20	09/27/09 14:42	10/01/09 05:11	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.4	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.2	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.022J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, HNO3 Extractable	0.025J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, Hot Water Extractable	0.0068J	% (w/w)	0.050		1		10/01/09 15:13		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:13		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	0.89	tons/1000	0.0		1		10/02/09 10:57		
Acid Potential	1.3	tons/1000	0.50		1		10/02/09 10:57		
Lime Requirement	2.9	tons/1000	0.0		1		10/02/09 10:57		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/02/09 10:57		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-4 4' **Lab ID:** 10112793012 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.14	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.054	% (w/w)	0.050	0.037	1		09/30/09 11:40		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1750	mg/kg	398	112	1		09/30/09 09:18	7440-44-0	
Total Organic Carbon	1820	mg/kg	400	112	1		09/30/09 09:24	7440-44-0	
Mean Total Organic Carbon	1790	mg/kg	399	112	1		09/30/09 09:24	7440-44-0	10M, 29M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-PMTP-5 9-10' Lab ID: 10112793013 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	7.0	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 04:51	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:51	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 04:51	7440-43-9	
Copper	0.055	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 04:51	7440-50-8	
Iron	8.7	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 04:51	7439-89-6	
Lead	0.44	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 04:51	7439-92-1	
Manganese	0.027	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 04:51	7439-96-5	
Zinc	0.027	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 04:51	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	33600	mg/kg	7.3	3.6	40	09/27/09 14:42	10/03/09 05:37	7429-90-5	
Arsenic	22.3	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:20	7440-38-2	
Cadmium	0.12	mg/kg	0.091	0.046	20	09/27/09 14:42	10/01/09 05:20	7440-43-9	
Copper	532	mg/kg	0.91	0.46	40	09/27/09 14:42	10/03/09 05:37	7440-50-8	
Iron	107000	mg/kg	911	456	400	09/27/09 14:42	10/03/09 05:42	7439-89-6	
Lead	1390	mg/kg	1.8	0.91	400	09/27/09 14:42	10/03/09 05:42	7439-92-1	
Manganese	238	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:20	7439-96-5	
Zinc	102	mg/kg	4.6	2.3	20	09/27/09 14:42	10/01/09 05:20	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	16.3	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.0	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	0.76	tons/1000	0.50		1		10/02/09 15:43		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.66	% (w/w)	0.050		1		10/01/09 15:14		
Sulfur, HNO3 Extractable	1.5	% (w/w)	0.050		1		10/01/09 15:14		
Sulfur, Hot Water Extractable	0.015J	% (w/w)	0.050		1		10/01/09 15:14		
Sulfur, Residual	0.016J	% (w/w)	0.050		1		10/01/09 15:14		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-62	tons/1000	0.0		1		10/02/09 10:58		
Acid Potential	62	tons/1000	0.50		1		10/02/09 10:58		
Lime Requirement	83	tons/1000	0.0		1		10/02/09 10:58		
SMP Lime Requirement	4.6	tons/1000	0.0		1		10/02/09 10:58		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-5 9-10' **Lab ID: 10112793013** Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.12	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	2.2	% (w/w)	0.050	0.037	1		09/30/09 11:49		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2480	mg/kg	426	119	1		09/30/09 09:30	7440-44-0	
Total Organic Carbon	2540	mg/kg	424	119	1		09/30/09 09:36	7440-44-0	
Mean Total Organic Carbon	2510	mg/kg	425	119	1		09/30/09 09:36	7440-44-0	12M, 39M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-PMTP-5' **Lab ID:** 10112793014 **Collected:** 09/11/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	11.1	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:08	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:08	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:08	7440-43-9	
Copper	0.083	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:08	7440-50-8	
Iron	17.3	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:08	7439-89-6	
Lead	0.51	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:08	7439-92-1	
Manganese	0.019	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:08	7439-96-5	
Zinc	0.032	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:08	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	26700	mg/kg	8.0	4.0	40	09/27/09 14:42	10/03/09 05:46	7429-90-5	
Arsenic	84.9	mg/kg	0.50	0.25	20	09/27/09 14:42	10/01/09 05:28	7440-38-2	
Cadmium	0.13	mg/kg	0.10	0.050	20	09/27/09 14:42	10/01/09 05:28	7440-43-9	
Copper	543	mg/kg	0.50	0.25	20	09/27/09 14:42	10/01/09 05:28	7440-50-8	
Iron	103000	mg/kg	995	498	400	09/27/09 14:42	10/03/09 05:50	7439-89-6	
Lead	2950	mg/kg	2.0	1.0	400	09/27/09 14:42	10/03/09 05:50	7439-92-1	
Manganese	117	mg/kg	0.50	0.25	20	09/27/09 14:42	10/01/09 05:28	7439-96-5	
Zinc	79.5	mg/kg	5.0	2.5	20	09/27/09 14:42	10/01/09 05:28	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.6	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.0	Std. Units	0.10	0.050	1		09/28/09 17:01		D6
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	0.8	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.14	% (w/w)	0.050		1		10/01/09 15:15		
Sulfur, HNO3 Extractable	0.069	% (w/w)	0.050		1		10/01/09 15:15		
Sulfur, Hot Water Extractable	0.096	% (w/w)	0.050		1		10/01/09 15:15		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:15		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-4.7	tons/1000	0.0		1		10/02/09 10:59		
Acid Potential	5.5	tons/1000	0.50		1		10/02/09 10:59		
Lime Requirement	13	tons/1000	0.0		1		10/02/09 10:59		
SMP Lime Requirement	4.6	tons/1000	0.0		1		10/02/09 10:59		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-PMTP-5 5' **Lab ID:** 10112793014 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.58	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.31	% (w/w)	0.050	0.037	1		09/30/09 13:47		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2620	mg/kg	459	128	1		09/30/09 09:41	7440-44-0	
Total Organic Carbon	2570	mg/kg	463	130	1		09/30/09 09:45	7440-44-0	
Mean Total Organic Carbon	2600	mg/kg	461	129	1		09/30/09 09:45	7440-44-0	13M, 28M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Sample Project No.: 10112793

Sample: 09-MHTP-03 8' **Lab ID:** 10112793015 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.64	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:14	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:14	7440-38-2	
Cadmium	0.014	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:14	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:14	7440-50-8	
Iron	0.64	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:14	7439-89-6	
Lead	0.0051	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:14	7439-92-1	
Manganese	13.5	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:14	7439-96-5	
Zinc	0.68	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:14	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	15100	mg/kg	3.7	1.8	20	09/27/09 14:42	10/01/09 05:37	7429-90-5	
Arsenic	21.6	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:37	7440-38-2	
Cadmium	1.8	mg/kg	0.092	0.046	20	09/27/09 14:42	10/01/09 05:37	7440-43-9	
Copper	53.4	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:37	7440-50-8	
Iron	29600	mg/kg	92.1	46.0	40	09/27/09 14:42	10/03/09 05:55	7439-89-6	
Lead	159	mg/kg	0.092	0.046	20	09/27/09 14:42	10/01/09 05:37	7439-92-1	
Manganese	1990	mg/kg	9.2	4.6	400	09/27/09 14:42	10/03/09 05:59	7439-96-5	
Zinc	322	mg/kg	4.6	2.3	20	09/27/09 14:42	10/01/09 05:37	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.3	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.0	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.064	% (w/w)	0.050		1		10/01/09 15:16		
Sulfur, HNO3 Extractable	0.59	% (w/w)	0.050		1		10/01/09 15:16		
Sulfur, Hot Water Extractable	0.51	% (w/w)	0.050		1		10/01/09 15:16		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:16		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-15	tons/1000	0.0		1		10/02/09 11:00		
Acid Potential	20	tons/1000	0.50		1		10/02/09 11:00		
Lime Requirement	32	tons/1000	0.0		1		10/02/09 11:00		
SMP Lime Requirement	6.1	tons/1000	0.0		1		10/02/09 11:00		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-03 8' **Lab ID: 10112793015** Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	9.6	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	1.2	% (w/w)	0.050	0.037	1		09/30/09 13:58		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	6460	mg/kg	1890	528	1		09/30/09 09:55	7440-44-0	
Total Organic Carbon	5000	mg/kg	1890	528	1		09/30/09 09:58	7440-44-0	
Mean Total Organic Carbon	5730	mg/kg	1890	528	1		09/30/09 09:58	7440-44-0	19M, 32M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-03 8 1/2' Lab ID: 10112793016 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:20	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:20	7440-38-2	
Cadmium	0.020	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:20	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:20	7440-50-8	
Iron	0.042	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:20	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:20	7439-92-1	
Manganese	10.2	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:20	7439-96-5	
Zinc	1.2	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:20	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	13900	mg/kg	3.7	1.8	20	09/27/09 14:42	10/01/09 05:55	7429-90-5	
Arsenic	22.2	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:55	7440-38-2	
Cadmium	2.4	mg/kg	0.092	0.046	20	09/27/09 14:42	10/01/09 05:55	7440-43-9	
Copper	55.4	mg/kg	0.46	0.23	20	09/27/09 14:42	10/01/09 05:55	7440-50-8	
Iron	27300	mg/kg	461	230	200	09/27/09 14:42	10/03/09 06:03	7439-89-6	
Lead	144	mg/kg	0.092	0.046	20	09/27/09 14:42	10/01/09 05:55	7439-92-1	
Manganese	2170	mg/kg	4.6	2.3	200	09/27/09 14:42	10/03/09 06:03	7439-96-5	
Zinc	277	mg/kg	4.6	2.3	20	09/27/09 14:42	10/01/09 05:55	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.0	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.7	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.0	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.053	% (w/w)	0.050		1		10/01/09 15:17		
Sulfur, HNO3 Extractable	0.38	% (w/w)	0.050		1		10/01/09 15:17		
Sulfur, Hot Water Extractable	0.37	% (w/w)	0.050		1		10/01/09 15:17		
Sulfur, Residual	0.035J	% (w/w)	0.050		1		10/01/09 15:17		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-13	tons/1000	0.0		1		10/02/09 11:00		
Acid Potential	14	tons/1000	0.50		1		10/02/09 11:00		
Lime Requirement	25	tons/1000	0.0		1		10/02/09 11:00		
SMP Lime Requirement	6.1	tons/1000	0.0		1		10/02/09 11:00		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-03 8 1/2' **Lab ID:** 10112793016 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	8.6	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.84	% (w/w)	0.050	0.037	1		09/30/09 14:14		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	5090	mg/kg	1790	500	1		09/30/09 10:01	7440-44-0	
Total Organic Carbon	4090	mg/kg	1690	475	1		09/30/09 10:04	7440-44-0	
Mean Total Organic Carbon	4580	mg/kg	1740	487	1		09/30/09 10:04	7440-44-0	18M, 31M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-4 7 1/2' Lab ID: 10112793017 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:26	7429-90-5	
Arsenic	0.012	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:26	7440-38-2	
Cadmium	0.078	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:26	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:26	7440-50-8	
Iron	0.079	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:26	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:26	7439-92-1	
Manganese	22.5	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:26	7439-96-5	
Zinc	0.65	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:26	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	7300	mg/kg	36.0	18.0	200	09/27/09 14:42	10/01/09 06:03	7429-90-5	
Arsenic	207	mg/kg	4.5	2.3	200	09/27/09 14:42	10/01/09 06:03	7440-38-2	
Cadmium	15.3	mg/kg	0.90	0.45	200	09/27/09 14:42	10/01/09 06:03	7440-43-9	
Copper	569	mg/kg	4.5	2.3	200	09/27/09 14:42	10/01/09 06:03	7440-50-8	
Iron	86300	mg/kg	450	225	200	09/27/09 14:42	10/01/09 06:03	7439-89-6	
Lead	1610	mg/kg	0.90	0.45	200	09/27/09 14:42	10/01/09 06:03	7439-92-1	
Manganese	4720	mg/kg	45.0	22.5	2000	09/27/09 14:42	10/03/09 06:12	7439-96-5	
Zinc	2120	mg/kg	45.0	22.5	200	09/27/09 14:42	10/01/09 06:03	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.8	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	97	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.81	% (w/w)	0.050		1		10/01/09 15:18		
Sulfur, HNO3 Extractable	7.9	% (w/w)	0.050		1		10/01/09 15:18		
Sulfur, Hot Water Extractable	1.5	% (w/w)	0.050		1		10/01/09 15:18		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 15:18		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-170	tons/1000	0.0		1		10/02/09 11:01		
Acid Potential	267	tons/1000	0.50		1		10/02/09 11:01		
Lime Requirement	334	tons/1000	0.0		1		10/02/09 11:01		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 11:01		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-4 7 1/2' **Lab ID:** 10112793017 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	6.7	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	10.3	% (w/w)	0.050	0.037	1		09/30/09 14:26		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1450	mg/kg	488	137	1		09/30/09 10:18	7440-44-0	
Total Organic Carbon	1400	mg/kg	485	136	1		09/30/09 10:21	7440-44-0	
Mean Total Organic Carbon	1430	mg/kg	487	136	1		09/30/09 10:21	7440-44-0	22M,5M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED
Project No.: 10112793

Sample: 09-MHTP-4A 7 1/2' Lab ID: 10112793018 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:32	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:32	7440-38-2	
Cadmium	0.078	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:32	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:32	7440-50-8	
Iron	0.098	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:32	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:32	7439-92-1	
Manganese	20.3	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:32	7439-96-5	
Zinc	0.56	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:32	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	7210	mg/kg	32.8	16.4	200	09/27/09 14:42	10/03/09 06:17	7429-90-5	
Arsenic	174	mg/kg	4.1	2.1	200	09/27/09 14:42	10/03/09 06:17	7440-38-2	
Cadmium	13.0	mg/kg	0.82	0.41	200	09/27/09 14:42	10/03/09 06:17	7440-43-9	
Copper	466	mg/kg	4.1	2.1	200	09/27/09 14:42	10/03/09 06:17	7440-50-8	
Iron	77800	mg/kg	410	205	200	09/27/09 14:42	10/03/09 06:17	7439-89-6	
Lead	1180	mg/kg	0.82	0.41	200	09/27/09 14:42	10/03/09 06:17	7439-92-1	
Manganese	967	mg/kg	4.1	2.1	200	09/27/09 14:42	10/01/09 06:12	7439-96-5	
Zinc	2130	mg/kg	41.0	20.5	200	09/27/09 14:42	10/03/09 06:17	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.9	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	79	tons/1000	0.50		1		10/02/09 15:44		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.0J	% (w/w)	0.050		1		10/01/09 15:26		
Sulfur, HNO3 Extractable	9.4	% (w/w)	0.050		1		10/01/09 15:26		
Sulfur, Hot Water Extractable	2.3	% (w/w)	0.050		1		10/01/09 15:26		
Sulfur, Residual	0.11	% (w/w)	0.050		1		10/01/09 15:26		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-219	tons/1000	0.0		1		10/02/09 16:22		
Acid Potential	298	tons/1000	0.50		1		10/02/09 16:22		
Lime Requirement	372	tons/1000	0.0		1		10/02/09 16:22		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 16:22		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-4A 7 1/2' **Lab ID:** 10112793018 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	5.8	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	11.6	% (w/w)	0.050	0.037	1		09/30/09 14:45		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1740	mg/kg	488	137	1		09/30/09 10:25	7440-44-0	
Total Organic Carbon	1790	mg/kg	485	136	1		09/30/09 10:28	7440-44-0	
Mean Total Organic Carbon	1770	mg/kg	487	136	1		09/30/09 10:28	7440-44-0	23M,8M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Sample Project No.: 10112793

Sample: 09-MHTP-4 8 1/2' Lab ID: 10112793019 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:37	7429-90-5	
Arsenic	0.0055	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:37	7440-38-2	
Cadmium	0.016	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:37	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:37	7440-50-8	
Iron	0.033	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:37	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:37	7439-92-1	
Manganese	14.7	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:37	7439-96-5	
Zinc	0.15	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:37	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	4870	mg/kg	31.8	15.9	200	09/27/09 14:42	10/01/09 06:20	7429-90-5	
Arsenic	382	mg/kg	4.0	2.0	200	09/27/09 14:42	10/01/09 06:20	7440-38-2	
Cadmium	29.0	mg/kg	0.80	0.40	200	09/27/09 14:42	10/01/09 06:20	7440-43-9	
Copper	1020	mg/kg	4.0	2.0	200	09/27/09 14:42	10/01/09 06:20	7440-50-8	
Iron	148000	mg/kg	398	199	200	09/27/09 14:42	10/01/09 06:20	7439-89-6	
Lead	3550	mg/kg	0.80	0.40	200	09/27/09 14:42	10/01/09 06:20	7439-92-1	
Manganese	8470	mg/kg	39.8	19.9	2000	09/27/09 14:42	10/03/09 06:35	7439-96-5	
Zinc	4880	mg/kg	39.8	19.9	200	09/27/09 14:42	10/01/09 06:20	7440-66-6	E
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	9.6	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.0	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	178	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.68	% (w/w)	0.050		1		10/01/09 15:27		
Sulfur, HNO3 Extractable	14.6	% (w/w)	0.050		1		10/01/09 15:27		
Sulfur, Hot Water Extractable	1.1	% (w/w)	0.050		1		10/01/09 15:27		
Sulfur, Residual	0.25	% (w/w)	0.050		1		10/01/09 15:27		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-303	tons/1000	0.0		1		10/02/09 13:14		
Acid Potential	481	tons/1000	0.50		1		10/02/09 13:14		
Lime Requirement	601	tons/1000	0.0		1		10/02/09 13:14		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 13:14		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-4 8 1/2' **Lab ID:** 10112793019 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	7.5	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	16.6	% (w/w)	0.050	0.037	1		09/30/09 15:00		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2470	mg/kg	476	133	1		09/30/09 10:33	7440-44-0	
Total Organic Carbon	3360	mg/kg	469	131	1		09/30/09 10:38	7440-44-0	
Mean Total Organic Carbon	2920	mg/kg	473	132	1		09/30/09 10:38	7440-44-0	16M, 25M

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Lab Project No.: 10112793

Sample: 09-MHTP-4 9' **Lab ID:** 10112793020 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/29/09 17:25	10/01/09 05:43	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:43	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/29/09 17:25	10/01/09 05:43	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:25	10/01/09 05:43	7440-50-8	
Iron	0.10	mg/L	0.025	0.025	1	09/29/09 17:25	10/01/09 05:43	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/29/09 17:25	10/01/09 05:43	7439-92-1	
Manganese	1.1	mg/L	0.0025	0.0025	1	09/29/09 17:25	10/01/09 05:43	7439-96-5	
Zinc	<0.010	mg/L	0.010	0.010	1	09/29/09 17:25	10/01/09 05:43	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9950	mg/kg	366	183	2000	09/27/09 15:21	09/30/09 13:10	7429-90-5	M0
Arsenic	50.3	mg/kg	0.46	0.23	20	09/27/09 15:21	09/30/09 02:34	7440-38-2	M0
Cadmium	3.6	mg/kg	0.091	0.046	20	09/27/09 15:21	09/30/09 02:34	7440-43-9	
Copper	135	mg/kg	0.46	0.23	20	09/27/09 15:21	09/30/09 02:34	7440-50-8	M0,R1
Iron	35900	mg/kg	4570	2290	2000	09/27/09 15:21	09/30/09 13:10	7439-89-6	M0
Lead	595	mg/kg	0.46	0.23	100	09/27/09 15:21	09/30/09 02:39	7439-92-1	M0,R1
Manganese	2310	mg/kg	45.7	22.9	2000	09/27/09 15:21	09/30/09 13:10	7439-96-5	M0
Zinc	1270	mg/kg	22.9	11.4	100	09/27/09 15:21	09/30/09 02:39	7440-66-6	M0,R1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.8	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.4	Std. Units	0.10	0.050	1		09/28/09 17:01		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	31	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.0J	% (w/w)	0.050		1		10/02/09 15:27		
Sulfur, HNO3 Extractable	2.0	% (w/w)	0.050		1		10/02/09 15:27		
Sulfur, Hot Water Extractable	0.52	% (w/w)	0.050		1		10/02/09 15:27		
Sulfur, Residual	0.019J	% (w/w)	0.050		1		10/02/09 15:27		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-32	tons/1000	0.0		1		10/02/09 14:29		
Acid Potential	63	tons/1000	0.50		1		10/02/09 14:29		
Lime Requirement	79	tons/1000	0.0		1		10/02/09 14:29		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 14:29		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Sample: 09-MHTP-4 9' **Lab ID: 10112793020** Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.1	mmhos/cm	0.010	0.0050	1		09/30/09 13:00		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	2.8	% (w/w)	0.055	0.041	1		09/30/09 15:22		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1220	mg/kg	495	139	1		09/30/09 10:41	7440-44-0	
Total Organic Carbon	1400	mg/kg	485	136	1		09/30/09 10:46	7440-44-0	
Mean Total Organic Carbon	1310	mg/kg	490	137	1		09/30/09 10:46	7440-44-0	17M, 26M

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MPRP/17340 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012

METHOD BLANK: 682633 Matrix: Solid

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014,
 10112793015, 10112793016, 10112793017, 10112793018, 10112793019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	1.6J	3.3	09/29/09 22:13	
Arsenic	mg/kg	<0.20	0.41	09/29/09 22:13	
Cadmium	mg/kg	<0.041	0.082	09/29/09 22:13	
Copper	mg/kg	<0.20	0.41	09/29/09 22:13	
Iron	mg/kg	<20.5	41.0	09/29/09 22:13	
Lead	mg/kg	0.079J	0.082	09/29/09 22:13	
Manganese	mg/kg	<0.20	0.41	09/29/09 22:13	
Zinc	mg/kg	<2.0	4.1	09/29/09 22:13	

LABORATORY CONTROL SAMPLE: 682634

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	13.6	15.1	111	75-125	
Arsenic	mg/kg	13.6	12.2	90	75-125	
Cadmium	mg/kg	13.6	12.3	91	75-125	
Copper	mg/kg	13.6	12.5	92	75-125	
Iron	mg/kg	170	163	96	75-125	
Lead	mg/kg	13.6	12.4	91	75-125	
Manganese	mg/kg	13.6	12.6	93	75-125	
Zinc	mg/kg	13.6	12.0	88	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 682635 682636

Parameter	Units	10112793001		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Aluminum	mg/kg	9670	18	16.9	10400	12100	3990	14152	70-130	15	20	P6
Arsenic	mg/kg	13.1	18	16.9	27.3	29.9	79	99	70-130	9	20	
Cadmium	mg/kg	0.91	18	16.9	17.1	18.8	90	105	70-130	10	20	
Copper	mg/kg	42.1	18	16.9	61.3	68.3	107	154	70-130	11	20	P6
Iron	mg/kg	18200	224	212	18000	20500	-56	1093	70-130	13	20	E,P6
Lead	mg/kg	30.8	18	16.9	45.3	49.9	81	112	70-130	10	20	
Manganese	mg/kg	1370	18	16.9	2070	2260	3909	5204	70-130	8	20	E,P6
Zinc	mg/kg	192	18	16.9	175	203	-98	64	70-130	15	20	P6

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

MATRIX SPIKE SAMPLE:		682637					
Parameter	Units	10112793011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	19200	16.8	28800	57041	70-130	E,P6
Arsenic	mg/kg	66.6	16.8	136	413	70-130	P6
Cadmium	mg/kg	0.23	16.8	15.8	93	70-130	
Copper	mg/kg	948	16.8	721	-1350	70-130	E,P6
Iron	mg/kg	106000	211	84000	-10497	70-130	E,P6
Lead	mg/kg	8100	16.8	6020	-12379	70-130	E,P6
Manganese	mg/kg	90.4	16.8	140	292	70-130	P6
Zinc	mg/kg	85.1	16.8	109	145	70-130	P6

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MT/2905 Analysis Method: ASA 10-3.3
 QC Batch Method: ASA 10-3.3 Analysis Description: ASA 10-3.3 Specific Conductance
 Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014,
 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

METHOD BLANK: 688497 Matrix: Water

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014,
 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	<0.0050	0.010	09/30/09 13:00	

LABORATORY CONTROL SAMPLE: 688498

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.3	1.3	104	53-147	

SAMPLE DUPLICATE: 689690

Parameter	Units	10112793002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.6	1.7	8	20	

SAMPLE DUPLICATE: 689691

Parameter	Units	10112793014 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	0.58	0.22	90	20	R1

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MPRP/17499 Analysis Method: EPA 6010
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
 Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014,
 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

METHOD BLANK: 688676 Matrix: Water

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007,
 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014,
 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	09/30/09 12:56	
Arsenic	mg/L	<0.0050	0.0050	09/30/09 12:56	
Cadmium	mg/L	<0.00050	0.00050	09/30/09 12:56	
Copper	mg/L	<0.0050	0.0050	09/30/09 12:56	
Iron	mg/L	<0.025	0.025	09/30/09 12:56	
Lead	mg/L	<0.0015	0.0015	09/30/09 12:56	
Manganese	mg/L	<0.0025	0.0025	09/30/09 12:56	
Zinc	mg/L	<0.010	0.010	09/30/09 12:56	

LABORATORY CONTROL SAMPLE: 688677

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	9.0	90	80-120	
Arsenic	mg/L	1	0.98	98	80-120	
Cadmium	mg/L	1	1.0	100	80-120	
Copper	mg/L	1	0.99	99	80-120	
Iron	mg/L	10	9.1	91	80-120	
Lead	mg/L	1	1.0	100	80-120	
Manganese	mg/L	1	0.98	98	80-120	
Zinc	mg/L	1	1.0	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 688678 688679

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10112793001 Result	Spike Conc.	Spike Conc.	MS Result						
Aluminum	mg/L	0.14	10	10	9.2	9.1	90	90	75-125	1	30
Arsenic	mg/L	<0.0050	1	1	1.0	1.0	102	100	75-125	2	30
Cadmium	mg/L	0.0013	1	1	1.0	1.0	102	101	75-125	1	30
Copper	mg/L	<0.0050	1	1	1.0	0.99	100	99	75-125	1	30
Iron	mg/L	0.061	10	10	9.2	9.1	91	90	75-125	1	30
Lead	mg/L	<0.0015	1	1	1.0	1.0	103	102	75-125	1	30
Manganese	mg/L	1.4	1	1	2.4	2.4	100	98	75-125	1	30
Zinc	mg/L	0.20	1	1	1.3	1.2	106	104	75-125	2	30

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

MATRIX SPIKE SAMPLE:		688680					
Parameter	Units	10112793020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	<0.10	10	9.0	90	75-125	
Arsenic	mg/L	<0.0050	1	1.1	108	75-125	
Cadmium	mg/L	<0.00050	1	1.1	107	75-125	
Copper	mg/L	<0.0050	1	1.0	103	75-125	
Iron	mg/L	0.10	10	9.5	93	75-125	
Lead	mg/L	<0.0015	1	1.1	108	75-125	
Manganese	mg/L	1.1	1	2.2	109	75-125	
Zinc	mg/L	<0.010	1	1.1	111	75-125	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MPRP/17342 Analysis Method: EPA 6020
QC Batch Method: EPA 3050 Analysis Description: 6020 MET
Associated Lab Samples: 10112793020

METHOD BLANK: 682643 Matrix: Solid

Associated Lab Samples: 10112793020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	<1.7	3.4	09/30/09 02:25	CU
Arsenic	mg/kg	<0.21	0.43	09/30/09 02:25	
Cadmium	mg/kg	<0.043	0.085	09/30/09 02:25	
Copper	mg/kg	<0.21	0.43	09/30/09 02:25	
Iron	mg/kg	<21.4	42.7	09/30/09 02:25	
Lead	mg/kg	<0.043	0.085	09/30/09 02:25	
Manganese	mg/kg	<0.21	0.43	09/30/09 02:25	
Zinc	mg/kg	<2.1	4.3	09/30/09 02:25	

LABORATORY CONTROL SAMPLE: 682644

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	17.7	18.9	107	75-125	CH
Arsenic	mg/kg	17.7	16.6	94	75-125	
Cadmium	mg/kg	17.7	17.0	96	75-125	
Copper	mg/kg	17.7	17.7	100	75-125	
Iron	mg/kg	221	230	104	75-125	
Lead	mg/kg	17.7	17.4	99	75-125	
Manganese	mg/kg	17.7	17.5	99	75-125	
Zinc	mg/kg	17.7	16.4	93	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 682645 682646

Parameter	Units	10112793020		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Aluminum	mg/kg	9950	15.2	17.7	9760	11300	-1232	7453	70-130	14	20	CH,E, M0	
Arsenic	mg/kg	50.3	15.2	17.7	46.5	38.4	-25	-67	70-130	19	20	M0	
Cadmium	mg/kg	3.6	15.2	17.7	16.4	18.4	84	84	70-130	12	20		
Copper	mg/kg	135	15.2	17.7	98.1	74.8	-245	-342	70-130	27	20	M0,R1	
Iron	mg/kg	35900	191	222	20500	19300	-8091	-7525	70-130	6	20	E,M0	
Lead	mg/kg	595	15.2	17.7	198	137	-2602	-2585	70-130	36	20	M0,R1	
Manganese	mg/kg	2310	15.2	17.7	1190	1010	-7300	-7299	70-130	16	20	E,M0	
Zinc	mg/kg	1270	15.2	17.7	451	214	-5357	-5955	70-130	71	20	E,M0, R1	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch:	MT/2865	Analysis Method:	ASA 103.2
QC Batch Method:	ASA 103.2	Analysis Description:	ASA 103.2 pH saturated paste
Associated Lab Samples:	10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020		

SAMPLE DUPLICATE: 685713

Parameter	Units	10112793002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	5.4	5.2	4	3	D6

SAMPLE DUPLICATE: 685714

Parameter	Units	10112793014 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	6.0	6.9	14	3	D6

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch:	WETA/4769	Analysis Method:	EPA 9060 Modified
QC Batch Method:	EPA 9060 Modified	Analysis Description:	9060 TOC Average
Associated Lab Samples:	10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010		

METHOD BLANK: 210971 Matrix: Solid
 Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	09/29/09 13:12	

LABORATORY CONTROL SAMPLE: 210972

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	990	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210973 210974

Parameter	Units	10112793001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	1320	985	988	2300	2450	100	114	50-150	6	30	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MPRP/17505

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

SAMPLE DUPLICATE: 689098

Parameter	Units	10112793001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	7.3	7.1	2	30	

SAMPLE DUPLICATE: 689099

Parameter	Units	10112793020 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.8	9.0	2	30	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: MT/2919

Analysis Method: LECO

QC Batch Method: LECO

Analysis Description: Sulfur Analysis Montana

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

METHOD BLANK: 688891

Matrix: Solid

Associated Lab Samples: 10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfur	% (w/w)	<0.037	0.050	09/29/09 12:30	

SAMPLE DUPLICATE: 688892

Parameter	Units	10112793003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	0.072	0.076	5	20	

SAMPLE DUPLICATE: 688893

Parameter	Units	10112793013 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	2.2	2.3	8	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch:	MT/2928	Analysis Method:	Modified Sobek 7
QC Batch Method:	Modified Sobek 7	Analysis Description:	Sobek SMP Buffer pH
Associated Lab Samples:	10112793001, 10112793002, 10112793003, 10112793004, 10112793005, 10112793006, 10112793007, 10112793008, 10112793009, 10112793010, 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017, 10112793018, 10112793019, 10112793020		

SAMPLE DUPLICATE: 689792

Parameter	Units	10112793001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.4	6.4	1	20	

SAMPLE DUPLICATE: 689793

Parameter	Units	10112793011 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.9	6.9	1	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

QC Batch: WETA/4771 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017,
 10112793018, 10112793019, 10112793020

METHOD BLANK: 210979 Matrix: Solid
 Associated Lab Samples: 10112793011, 10112793012, 10112793013, 10112793014, 10112793015, 10112793016, 10112793017,
 10112793018, 10112793019, 10112793020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	09/30/09 08:39	

LABORATORY CONTROL SAMPLE: 210980

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	911	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210981 210982

Parameter	Units	10112793011		210981		210982		% Rec Limits	Max RPD	Qual	
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec				MSD % Rec
Mean Total Organic Carbon	mg/kg	1270	973	976	1810	1950	55	70	50-150	8	30

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

10M Total Carbon result of

2560 mg/Kg,

MDL 141 mg/Kg,

RDL 503 mg/Kg.

11M Total Carbon result of

26600 mg/Kg,

MDL 1217 mg/Kg,

RDL 4348 mg/Kg.

12M Total Carbon result of

2750 mg/Kg,

MDL 138 mg/Kg,

RDL 494 mg/Kg.

13M Total Carbon result of

3190 mg/Kg,

MDL 138 mg/Kg,

RDL 491 mg/Kg.

14M Total Carbon result of

4080 mg/Kg,

MDL 277 mg/Kg,

RDL 990 mg/Kg.

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

ANALYTE QUALIFIERS

15M	Total Carbon result of 416 mg/Kg, MDL 70 mg/Kg, RDL 252 mg/Kg.
16M	Total Carbon result of 46300 mg/Kg, MDL 5090 mg/Kg, RDL 18200 mg/Kg.
17M	Total Carbon result of 5750 mg/Kg, MDL 295 mg/Kg, RDL 1050 mg/Kg.
18M	Total Carbon result of 5940 mg/Kg, MDL 505 mg/Kg, RDL 1800 mg/Kg.
19M	Total Carbon result of 6520 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
1M	Total Carbon result of 1220 mg/Kg, MDL 70.7 mg/Kg, RDL 253 mg/Kg.
20M	Total Carbon result of 742 mg/Kg, MDL 70.4 mg/Kg, RDL 251 mg/Kg.
21M	Total Inorganic Carbon result of 10400 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
22M	Total Inorganic Carbon result of 13180 mg/Kg, MDL 554 mg/Kg, RDL 1980 mg/Kg.

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

ANALYTE QUALIFIERS

23M	Total Inorganic Carbon result of 15240 mg/Kg, MDL 1300 mg/Kg, RDL 4650 mg/Kg.
24M	Total Inorganic Carbon result of 2590 mg/Kg, MDL 277 mg/Kg, RDL 990 mg/Kg.
25M	Total Inorganic Carbon result of 43380 mg/Kg, MDL 5090 mg/Kg, RDL 18200 mg/Kg.
26M	Total Inorganic Carbon result of 4440 mg/Kg, MDL 295 mg/Kg, RDL 1050 mg/Kg.
27M	Total Inorganic Carbon result of 564 mg/Kg, MDL 70.2 mg/Kg, RDL 251 mg/Kg.
28M	Total Inorganic Carbon result of 590 mg/Kg, MDL 138 mg/Kg, RDL 491 mg/Kg.
29M	Total Inorganic Carbon result of 770 mg/Kg, MDL 141 mg/Kg, RDL 503 mg/Kg.
2M	Total Carbon result of 1240 mg/Kg, MDL 70.2 mg/Kg, RDL 251 mg/Kg.
30M	Total Inorganic Carbon result of 877 mg/Kg, MDL 70.6 mg/Kg, RDL 252 mg/Kg.

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

ANALYTE QUALIFIERS

31M	Total Inorganic Carbon result of <1800 mg/Kg, MDL 505 mg/Kg, RDL 1800 mg/Kg.
32M	Total Inorganic Carbon result of <2000 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
33M	Total Inorganic Carbon result of <251 mg/Kg, MDL 70.4 mg/Kg, RDL 251 mg/Kg.
34M	Total Inorganic Carbon result of <253 mg/Kg, MDL 70.7 mg/Kg, RDL 253 mg/Kg.
35M	Total Inorganic Carbon result of <3920 mg/Kg, MDL 1098 mg/Kg, RDL 3920 mg/Kg.
36M	Total Inorganic Carbon result of <4348 mg/Kg, MDL 1217 mg/Kg, RDL 4348 mg/Kg.
37M	Total Inorganic Carbon result of <487 mg/Kg, MDL 136 mg/Kg, RDL 487 mg/Kg.
38M	Total Inorganic Carbon result of <493 mg/Kg, MDL 138 mg/Kg, RDL 493 mg/Kg.
39M	Total Inorganic Carbon result of <494 mg/Kg, MDL 138 mg/Kg, RDL 494 mg/Kg.

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

ANALYTE QUALIFIERS

3M	Total Carbon result of 12400 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
40M	Total Inorganic Carbon result of <498 mg/Kg, MDL 139 mg/Kg, RDL 498 mg/Kg.
4M	Total Carbon result of 1290 mg/Kg, MDL 136 mg/Kg, RDL 487 mg/Kg.
5M	Total Carbon result of 14600 mg/Kg, MDL 554 mg/Kg, RDL 1980 mg/Kg.
6M	Total Carbon result of 1530 mg/Kg, MDL 70.6 mg/Kg, RDL 252 mg/Kg.
7M	Total Carbon result of 1680 mg/Kg, MDL 139 mg/Kg, RDL 498 mg/Kg.
8M	Total Carbon result of 17000 mg/Kg, MDL 1300 mg/Kg, RDL 4650 mg/Kg.
9M	Total Carbon result of 22200 mg/Kg, MDL 1098 mg/Kg, RDL 3920 mg/Kg.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
CU	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

QUALIFIERS

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

ANALYTE QUALIFIERS

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793001	09-MHTP-7 9'	EPA 9060 Modified	WETA/4769		
10112793002	09-MHTP-8 8 1/2'	EPA 9060 Modified	WETA/4769		
10112793003	09-MHTP-8 9 1/2'	EPA 9060 Modified	WETA/4769		
10112793004	09-MHTP-8 10'	EPA 9060 Modified	WETA/4769		
10112793005	09-MHTP-9 10'	EPA 9060 Modified	WETA/4769		
10112793006	09-MHTP-9 16'	EPA 9060 Modified	WETA/4769		
10112793007	09-MHTP-10 8'	EPA 9060 Modified	WETA/4769		
10112793008	09-MHTP-10 16'	EPA 9060 Modified	WETA/4769		
10112793009	09-PMTP-1 8'	EPA 9060 Modified	WETA/4769		
10112793010	09-PMTP-1 9'	EPA 9060 Modified	WETA/4769		
10112793001	09-MHTP-7 9'	EPA 9060 Modified	WETA/4770		
10112793002	09-MHTP-8 8 1/2'	EPA 9060 Modified	WETA/4770		
10112793003	09-MHTP-8 9 1/2'	EPA 9060 Modified	WETA/4770		
10112793004	09-MHTP-8 10'	EPA 9060 Modified	WETA/4770		
10112793005	09-MHTP-9 10'	EPA 9060 Modified	WETA/4770		
10112793006	09-MHTP-9 16'	EPA 9060 Modified	WETA/4770		
10112793007	09-MHTP-10 8'	EPA 9060 Modified	WETA/4770		
10112793008	09-MHTP-10 16'	EPA 9060 Modified	WETA/4770		
10112793009	09-PMTP-1 8'	EPA 9060 Modified	WETA/4770		
10112793010	09-PMTP-1 9'	EPA 9060 Modified	WETA/4770		
10112793011	09-PMTP-4 8-9'	EPA 9060 Modified	WETA/4771		
10112793012	09-PMTP-4 4'	EPA 9060 Modified	WETA/4771		
10112793013	09-PMTP-5 9-10'	EPA 9060 Modified	WETA/4771		
10112793014	09-PMTP-5 5'	EPA 9060 Modified	WETA/4771		
10112793015	09-MHTP-03 8'	EPA 9060 Modified	WETA/4771		
10112793016	09-MHTP-03 8 1/2'	EPA 9060 Modified	WETA/4771		
10112793017	09-MHTP-4 7 1/2'	EPA 9060 Modified	WETA/4771		
10112793018	09-MHTP-4A 7 1/2'	EPA 9060 Modified	WETA/4771		
10112793019	09-MHTP-4 8 1/2'	EPA 9060 Modified	WETA/4771		
10112793020	09-MHTP-4 9'	EPA 9060 Modified	WETA/4771		
10112793011	09-PMTP-4 8-9'	EPA 9060 Modified	WETA/4772		
10112793012	09-PMTP-4 4'	EPA 9060 Modified	WETA/4772		
10112793013	09-PMTP-5 9-10'	EPA 9060 Modified	WETA/4772		
10112793014	09-PMTP-5 5'	EPA 9060 Modified	WETA/4772		
10112793015	09-MHTP-03 8'	EPA 9060 Modified	WETA/4772		
10112793016	09-MHTP-03 8 1/2'	EPA 9060 Modified	WETA/4772		
10112793017	09-MHTP-4 7 1/2'	EPA 9060 Modified	WETA/4772		
10112793018	09-MHTP-4A 7 1/2'	EPA 9060 Modified	WETA/4772		
10112793019	09-MHTP-4 8 1/2'	EPA 9060 Modified	WETA/4772		
10112793020	09-MHTP-4 9'	EPA 9060 Modified	WETA/4772		
10112793001	09-MHTP-7 9'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793002	09-MHTP-8 8 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793003	09-MHTP-8 9 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793004	09-MHTP-8 10'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793005	09-MHTP-9 10'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793006	09-MHTP-9 16'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793007	09-MHTP-10 8'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793008	09-MHTP-10 16'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793009	09-PMTP-1 8'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793010	09-PMTP-1 9'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793011	09-PMTP-4 8-9'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793012	09-PMTP-4 4'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793013	09-PMTP-5 9-10'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793014	09-PMTP-5 5'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793015	09-MHTP-03 8'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793016	09-MHTP-03 8 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793017	09-MHTP-4 7 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793018	09-MHTP-4A 7 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793019	09-MHTP-4 8 1/2'	EPA 3050	MPRP/17340	EPA 6020	ICPM/7144
10112793020	09-MHTP-4 9'	EPA 3050	MPRP/17342	EPA 6020	ICPM/7151
10112793001	09-MHTP-7 9'	ASA 103.2	MT/2865		
10112793002	09-MHTP-8 8 1/2'	ASA 103.2	MT/2865		
10112793003	09-MHTP-8 9 1/2'	ASA 103.2	MT/2865		
10112793004	09-MHTP-8 10'	ASA 103.2	MT/2865		
10112793005	09-MHTP-9 10'	ASA 103.2	MT/2865		
10112793006	09-MHTP-9 16'	ASA 103.2	MT/2865		
10112793007	09-MHTP-10 8'	ASA 103.2	MT/2865		
10112793008	09-MHTP-10 16'	ASA 103.2	MT/2865		
10112793009	09-PMTP-1 8'	ASA 103.2	MT/2865		
10112793010	09-PMTP-1 9'	ASA 103.2	MT/2865		
10112793011	09-PMTP-4 8-9'	ASA 103.2	MT/2865		
10112793012	09-PMTP-4 4'	ASA 103.2	MT/2865		
10112793013	09-PMTP-5 9-10'	ASA 103.2	MT/2865		
10112793014	09-PMTP-5 5'	ASA 103.2	MT/2865		
10112793015	09-MHTP-03 8'	ASA 103.2	MT/2865		
10112793016	09-MHTP-03 8 1/2'	ASA 103.2	MT/2865		
10112793017	09-MHTP-4 7 1/2'	ASA 103.2	MT/2865		
10112793018	09-MHTP-4A 7 1/2'	ASA 103.2	MT/2865		
10112793019	09-MHTP-4 8 1/2'	ASA 103.2	MT/2865		
10112793020	09-MHTP-4 9'	ASA 103.2	MT/2865		
10112793001	09-MHTP-7 9'	ASA 10-3.3	MT/2905		
10112793002	09-MHTP-8 8 1/2'	ASA 10-3.3	MT/2905		
10112793003	09-MHTP-8 9 1/2'	ASA 10-3.3	MT/2905		
10112793004	09-MHTP-8 10'	ASA 10-3.3	MT/2905		
10112793005	09-MHTP-9 10'	ASA 10-3.3	MT/2905		
10112793006	09-MHTP-9 16'	ASA 10-3.3	MT/2905		
10112793007	09-MHTP-10 8'	ASA 10-3.3	MT/2905		
10112793008	09-MHTP-10 16'	ASA 10-3.3	MT/2905		
10112793009	09-PMTP-1 8'	ASA 10-3.3	MT/2905		
10112793010	09-PMTP-1 9'	ASA 10-3.3	MT/2905		
10112793011	09-PMTP-4 8-9'	ASA 10-3.3	MT/2905		
10112793012	09-PMTP-4 4'	ASA 10-3.3	MT/2905		
10112793013	09-PMTP-5 9-10'	ASA 10-3.3	MT/2905		
10112793014	09-PMTP-5 5'	ASA 10-3.3	MT/2905		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793015	09-MHTP-03 8'	ASA 10-3.3	MT/2905		
10112793016	09-MHTP-03 8 1/2'	ASA 10-3.3	MT/2905		
10112793017	09-MHTP-4 7 1/2'	ASA 10-3.3	MT/2905		
10112793018	09-MHTP-4A 7 1/2'	ASA 10-3.3	MT/2905		
10112793019	09-MHTP-4 8 1/2'	ASA 10-3.3	MT/2905		
10112793020	09-MHTP-4 9'	ASA 10-3.3	MT/2905		
10112793001	09-MHTP-7 9'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793002	09-MHTP-8 8 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793003	09-MHTP-8 9 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793004	09-MHTP-8 10'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793005	09-MHTP-9 10'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793006	09-MHTP-9 16'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793007	09-MHTP-10 8'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793008	09-MHTP-10 16'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793009	09-PMTP-1 8'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793010	09-PMTP-1 9'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793011	09-PMTP-4 8-9'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793012	09-PMTP-4 4'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793013	09-PMTP-5 9-10'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793014	09-PMTP-5 5'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793015	09-MHTP-03 8'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793016	09-MHTP-03 8 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793017	09-MHTP-4 7 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793018	09-MHTP-4A 7 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793019	09-MHTP-4 8 1/2'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793020	09-MHTP-4 9'	EPA 3010	MPRP/17499	EPA 6010	ICP/7936
10112793001	09-MHTP-7 9'	Modified Sobek 7	MT/2917		
10112793002	09-MHTP-8 8 1/2'	Modified Sobek 7	MT/2917		
10112793003	09-MHTP-8 9 1/2'	Modified Sobek 7	MT/2917		
10112793004	09-MHTP-8 10'	Modified Sobek 7	MT/2917		
10112793005	09-MHTP-9 10'	Modified Sobek 7	MT/2917		
10112793006	09-MHTP-9 16'	Modified Sobek 7	MT/2917		
10112793007	09-MHTP-10 8'	Modified Sobek 7	MT/2917		
10112793008	09-MHTP-10 16'	Modified Sobek 7	MT/2917		
10112793009	09-PMTP-1 8'	Modified Sobek 7	MT/2917		
10112793010	09-PMTP-1 9'	Modified Sobek 7	MT/2917		
10112793011	09-PMTP-4 8-9'	Modified Sobek 7	MT/2917		
10112793012	09-PMTP-4 4'	Modified Sobek 7	MT/2917		
10112793013	09-PMTP-5 9-10'	Modified Sobek 7	MT/2917		
10112793014	09-PMTP-5 5'	Modified Sobek 7	MT/2917		
10112793015	09-MHTP-03 8'	Modified Sobek 7	MT/2917		
10112793016	09-MHTP-03 8 1/2'	Modified Sobek 7	MT/2917		
10112793017	09-MHTP-4 7 1/2'	Modified Sobek 7	MT/2917		
10112793018	09-MHTP-4A 7 1/2'	Modified Sobek 7	MT/2917		
10112793019	09-MHTP-4 8 1/2'	Modified Sobek 7	MT/2917		
10112793020	09-MHTP-4 9'	Modified Sobek 7	MT/2917		
10112793001	09-MHTP-7 9'	LECO	MT/2919		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793002	09-MHTP-8 8 1/2'	LECO	MT/2919		
10112793003	09-MHTP-8 9 1/2'	LECO	MT/2919		
10112793004	09-MHTP-8 10'	LECO	MT/2919		
10112793005	09-MHTP-9 10'	LECO	MT/2919		
10112793006	09-MHTP-9 16'	LECO	MT/2919		
10112793007	09-MHTP-10 8'	LECO	MT/2919		
10112793008	09-MHTP-10 16'	LECO	MT/2919		
10112793009	09-PMTP-1 8'	LECO	MT/2919		
10112793010	09-PMTP-1 9'	LECO	MT/2919		
10112793011	09-PMTP-4 8-9'	LECO	MT/2919		
10112793012	09-PMTP-4 4'	LECO	MT/2919		
10112793013	09-PMTP-5 9-10'	LECO	MT/2919		
10112793014	09-PMTP-5 5'	LECO	MT/2919		
10112793015	09-MHTP-03 8'	LECO	MT/2919		
10112793016	09-MHTP-03 8 1/2'	LECO	MT/2919		
10112793017	09-MHTP-4 7 1/2'	LECO	MT/2919		
10112793018	09-MHTP-4A 7 1/2'	LECO	MT/2919		
10112793019	09-MHTP-4 8 1/2'	LECO	MT/2919		
10112793020	09-MHTP-4 9'	LECO	MT/2919		
10112793001	09-MHTP-7 9'	% Moisture	MPRP/17505		
10112793002	09-MHTP-8 8 1/2'	% Moisture	MPRP/17505		
10112793003	09-MHTP-8 9 1/2'	% Moisture	MPRP/17505		
10112793004	09-MHTP-8 10'	% Moisture	MPRP/17505		
10112793005	09-MHTP-9 10'	% Moisture	MPRP/17505		
10112793006	09-MHTP-9 16'	% Moisture	MPRP/17505		
10112793007	09-MHTP-10 8'	% Moisture	MPRP/17505		
10112793008	09-MHTP-10 16'	% Moisture	MPRP/17505		
10112793009	09-PMTP-1 8'	% Moisture	MPRP/17505		
10112793010	09-PMTP-1 9'	% Moisture	MPRP/17505		
10112793011	09-PMTP-4 8-9'	% Moisture	MPRP/17505		
10112793012	09-PMTP-4 4'	% Moisture	MPRP/17505		
10112793013	09-PMTP-5 9-10'	% Moisture	MPRP/17505		
10112793014	09-PMTP-5 5'	% Moisture	MPRP/17505		
10112793015	09-MHTP-03 8'	% Moisture	MPRP/17505		
10112793016	09-MHTP-03 8 1/2'	% Moisture	MPRP/17505		
10112793017	09-MHTP-4 7 1/2'	% Moisture	MPRP/17505		
10112793018	09-MHTP-4A 7 1/2'	% Moisture	MPRP/17505		
10112793019	09-MHTP-4 8 1/2'	% Moisture	MPRP/17505		
10112793020	09-MHTP-4 9'	% Moisture	MPRP/17505		
10112793001	09-MHTP-7 9'	Modified Sobek 7	MT/2928		
10112793002	09-MHTP-8 8 1/2'	Modified Sobek 7	MT/2928		
10112793003	09-MHTP-8 9 1/2'	Modified Sobek 7	MT/2928		
10112793004	09-MHTP-8 10'	Modified Sobek 7	MT/2928		
10112793005	09-MHTP-9 10'	Modified Sobek 7	MT/2928		
10112793006	09-MHTP-9 16'	Modified Sobek 7	MT/2928		
10112793007	09-MHTP-10 8'	Modified Sobek 7	MT/2928		
10112793008	09-MHTP-10 16'	Modified Sobek 7	MT/2928		
10112793009	09-PMTP-1 8'	Modified Sobek 7	MT/2928		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793010	09-PMTP-1 9'	Modified Sobek 7	MT/2928		
10112793011	09-PMTP-4 8-9'	Modified Sobek 7	MT/2928		
10112793012	09-PMTP-4 4'	Modified Sobek 7	MT/2928		
10112793013	09-PMTP-5 9-10'	Modified Sobek 7	MT/2928		
10112793014	09-PMTP-5 5'	Modified Sobek 7	MT/2928		
10112793015	09-MHTP-03 8'	Modified Sobek 7	MT/2928		
10112793016	09-MHTP-03 8 1/2'	Modified Sobek 7	MT/2928		
10112793017	09-MHTP-4 7 1/2'	Modified Sobek 7	MT/2928		
10112793018	09-MHTP-4A 7 1/2'	Modified Sobek 7	MT/2928		
10112793019	09-MHTP-4 8 1/2'	Modified Sobek 7	MT/2928		
10112793020	09-MHTP-4 9'	Modified Sobek 7	MT/2928		
10112793001	09-MHTP-7 9'	Modified Sobek 7	MT/2936		
10112793002	09-MHTP-8 8 1/2'	Modified Sobek 7	MT/2936		
10112793003	09-MHTP-8 9 1/2'	Modified Sobek 7	MT/2936		
10112793004	09-MHTP-8 10'	Modified Sobek 7	MT/2936		
10112793005	09-MHTP-9 10'	Modified Sobek 7	MT/2936		
10112793006	09-MHTP-9 16'	Modified Sobek 7	MT/2936		
10112793007	09-MHTP-10 8'	Modified Sobek 7	MT/2936		
10112793008	09-MHTP-10 16'	Modified Sobek 7	MT/2936		
10112793009	09-PMTP-1 8'	Modified Sobek 7	MT/2936		
10112793010	09-PMTP-1 9'	Modified Sobek 7	MT/2936		
10112793011	09-PMTP-4 8-9'	Modified Sobek 7	MT/2936		
10112793012	09-PMTP-4 4'	Modified Sobek 7	MT/2936		
10112793013	09-PMTP-5 9-10'	Modified Sobek 7	MT/2936		
10112793014	09-PMTP-5 5'	Modified Sobek 7	MT/2936		
10112793015	09-MHTP-03 8'	Modified Sobek 7	MT/2936		
10112793016	09-MHTP-03 8 1/2'	Modified Sobek 7	MT/2936		
10112793017	09-MHTP-4 7 1/2'	Modified Sobek 7	MT/2936		
10112793018	09-MHTP-4A 7 1/2'	Modified Sobek 7	MT/2936		
10112793019	09-MHTP-4 8 1/2'	Modified Sobek 7	MT/2936		
10112793020	09-MHTP-4 9'	Modified Sobek 7	MT/2936		
10112793001	09-MHTP-7 9'	Modified Sobek 7	MT/2946		
10112793002	09-MHTP-8 8 1/2'	Modified Sobek 7	MT/2946		
10112793003	09-MHTP-8 9 1/2'	Modified Sobek 7	MT/2946		
10112793004	09-MHTP-8 10'	Modified Sobek 7	MT/2946		
10112793005	09-MHTP-9 10'	Modified Sobek 7	MT/2946		
10112793006	09-MHTP-9 16'	Modified Sobek 7	MT/2946		
10112793007	09-MHTP-10 8'	Modified Sobek 7	MT/2946		
10112793008	09-MHTP-10 16'	Modified Sobek 7	MT/2946		
10112793009	09-PMTP-1 8'	Modified Sobek 7	MT/2946		
10112793010	09-PMTP-1 9'	Modified Sobek 7	MT/2946		
10112793011	09-PMTP-4 8-9'	Modified Sobek 7	MT/2946		
10112793012	09-PMTP-4 4'	Modified Sobek 7	MT/2946		
10112793013	09-PMTP-5 9-10'	Modified Sobek 7	MT/2946		
10112793014	09-PMTP-5 5'	Modified Sobek 7	MT/2946		
10112793015	09-MHTP-03 8'	Modified Sobek 7	MT/2946		
10112793016	09-MHTP-03 8 1/2'	Modified Sobek 7	MT/2946		
10112793017	09-MHTP-4 7 1/2'	Modified Sobek 7	MT/2946		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208 REVISED

Pace Project No.: 10112793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112793018	09-MHTP-4A 7 1/2'	Modified Sobek 7	MT/2946		
10112793019	09-MHTP-4 8 1/2'	Modified Sobek 7	MT/2946		
10112793020	09-MHTP-4 9'	Modified Sobek 7	MT/2946		

November 10, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC- Mike Horse 09208
Pace Project No.: 10112795

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 18, 2009. The results relate only to the samples included in this report.

The total inorganic carbon concentrations are presented in the EPA 9060 project narrative section.

REVISED - The report has been revised to add missing qualifiers on QC and sample data, to correct the saturated paste electrical conductivity LCS recovery and add RPD limits to the sulfur QC data.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Florida/NELAP Certification #: E87605

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Minnesota Certification #: 027-053-137

Montana Certification #: MT CERT0092

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

Oregon Certification #: MN200001

Washington Certification #: C754

Tennessee Certification #: 02818

Pennsylvania Certification #: 68-00563

Montana Certification IDs

Montana Certification #: MT CERT0040

Idaho Certification #: MT00012

EPA Region 8 Certification #: 8TMS-Q

602 South 25th Street Billings, MT 59101

Green Bay Certification IDs

North Carolina Certification #: 503

North Dakota Certification #: R-150

South Carolina Certification #: 83006001

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

1241 Bellevue Street Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky Certification #: 82

New York Certification #: 11888

New York Certification #: 11887

California Certification #: 09268CA

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10112795001	09-MHTP-5 6 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112795002	09-MHTP-5 7'	Solid	09/09/09 00:00	09/18/09 10:30
10112795003	09-MHTP-6 5'	Solid	09/09/09 00:00	09/18/09 10:30
10112795004	09-MHTP-6 6'	Solid	09/09/09 00:00	09/18/09 10:30
10112795005	09-MHTP-6 6 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112795006	09-MHTP-7 7 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112795007	09-MHTP-7 8 1/2'	Solid	09/09/09 00:00	09/18/09 10:30
10112795008	09-MHTP-1 9 1/2'	Solid	09/08/09 00:00	09/18/09 10:30
10112795009	09-MHTP-1 10'	Solid	09/08/09 00:00	09/18/09 10:30
10112795010	09-MHTP-1 16'	Solid	09/08/09 00:00	09/18/09 10:30
10112795011	09-MHTP-2 4 1/2-5'	Solid	09/08/09 00:00	09/18/09 10:30
10112795012	09-MHTP-2 5 1/2'	Solid	09/08/09 00:00	09/18/09 10:30
10112795013	09-MHTP-2 6'	Solid	09/08/09 00:00	09/18/09 10:30
10112795014	09-MHTP-3 7'	Solid	09/09/09 00:00	09/18/09 10:30
10112795015	09-PMTP-9 8-9 1/2'	Solid	09/11/09 00:00	09/18/09 10:30
10112795016	09-PMTP-9 17'	Solid	09/11/09 00:00	09/18/09 10:30
10112795017	09-PMTP-8 1 1/2'	Solid	09/11/09 00:00	09/18/09 10:30
10112795018	09-PMTP-2 3'	Solid	09/11/09 00:00	09/18/09 10:30
10112795019	09-PMTP-6 2'	Solid	09/11/09 00:00	09/18/09 10:30
10112795020	09-PMTP-6 6'	Solid	09/11/09 00:00	09/18/09 10:30
10112795021	09-PMTP-7 6'	Solid	09/11/09 00:00	09/18/09 10:30

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10112795001	09-MHTP-5 6 1/2'	% Moisture	JDL	1	PASI-M		
		ASA 10-3.3	KAS	1	PASI-MT		
		ASA 103.2	EJS	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	CJS, RJS	8	PASI-M		
		EPA 9060 Modified	DJR	3	PASI-G		
		LECO	CAC	1	PASI-MT		
		Modified Sobek 7	CAC, EJS	10	PASI-MT		
		10112795002	09-MHTP-5 7'	% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
ASA 103.2	EJS			1	PASI-MT		
EPA 6010	IP			8	PASI-M		
EPA 6020	CJS, RJS			8	PASI-M		
EPA 9060 Modified	DJR			3	PASI-G		
LECO	CAC			1	PASI-MT		
Modified Sobek 7	CAC, EJS			10	PASI-MT		
10112795003	09-MHTP-6 5'			% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	CJS, RJS	8	PASI-M		
		EPA 9060 Modified	DJR	3	PASI-G		
		LECO	CAC	1	PASI-MT		
		Modified Sobek 7	CAC, EJS	10	PASI-MT		
		10112795004	09-MHTP-6 6'	% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
ASA 103.2	EJS			1	PASI-MT		
EPA 6010	IP			8	PASI-M		
EPA 6020	CJS, RJS			8	PASI-M		
EPA 9060 Modified	DJR			3	PASI-G		
LECO	CAC			1	PASI-MT		
Modified Sobek 7	CAC, EJS			10	PASI-MT		
10112795005	09-MHTP-6 6 1/2'			% Moisture	JDL	1	PASI-M
				ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT		
		EPA 6010	IP	8	PASI-M		
		EPA 6020	CJS, RJS	8	PASI-M		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10112795006	09-MHTP-7 7 1/2'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
10112795007	09-MHTP-7 8 1/2'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
10112795008	09-MHTP-1 9 1/2'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
10112795009	09-MHTP-1 10'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, SAC	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
10112795010	09-MHTP-1 16'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795011	09-MHTP-2 4 1/2-5'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795012	09-MHTP-2 5 1/2'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795013	09-MHTP-2 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795014	09-MHTP-3 7'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10112795015	09-PMTP-9 8-9 1/2'	LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
10112795016	09-PMTP-9 17'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
10112795017	09-PMTP-8 1 1/2'	EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
10112795018	09-PMTP-2 3'	EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
10112795019	09-PMTP-6 2'	ASA 103.2	EJS	1	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6010	IP	8	PASI-M
		EPA 6020	CJS, RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795020	09-PMTP-6 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS	10	PASI-MT
10112795021	09-PMTP-7 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	KAS	1	PASI-MT
		ASA 103.2	EJS	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, SA1	10	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208
Pace Project No.: 10112795

Method: EPA 6010
Description: 6010 MET ICP, SPLP
Client: Montana Dept. of Environmental Quality
Date: November 10, 2009

General Information:

21 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17521

B+: Analyte was detected in the associated method blank as well as in the sample.

- BLANK (Lab ID: 689527)
 - Lead
 - Zinc

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 689527)
 - Manganese

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17521

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112795001,10112795019

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 689531)
 - Aluminum

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- MS (Lab ID: 689529)
 - Manganese
- MSD (Lab ID: 689530)

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

QC Batch: MPRP/17521

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112795001,10112795019

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- Manganese

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17521

- 09-MHTP-5 6 1/2' (Lab ID: 10112795001)
 - Aluminum

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

QC Batch: MPRP/17342

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- LCS (Lab ID: 682644)
 - Aluminum
- MS (Lab ID: 682645)
 - Aluminum
- MSD (Lab ID: 682646)
 - Aluminum

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17341

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 682638)
 - Lead
 - Zinc

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

QC Batch: MPRP/17342

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112793020

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 682645)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc
- MSD (Lab ID: 682646)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 682646)
 - Copper
 - Lead
 - Zinc

QC Batch: MPRP/17341

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112795001,10112795011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 682640)
 - Aluminum
 - Copper
 - Iron
 - Manganese
 - Zinc
- MS (Lab ID: 682642)
 - Aluminum
 - Copper
 - Lead
 - Manganese
 - Zinc
- MSD (Lab ID: 682641)
 - Aluminum
 - Copper
 - Iron
 - Manganese
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17341

- 09-MHTP-2 4 1/2-5' (Lab ID: 10112795011)
 - Iron

QC Batch: MPRP/17342

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- 09-PMTP-7 6' (Lab ID: 10112795021)
 - Manganese

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 682645)
 - Aluminum
 - Iron
 - Manganese
 - Zinc
- MSD (Lab ID: 682646)
 - Aluminum
 - Iron
 - Manganese

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: % Moisture

Description: Dry Weight

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/2906

R1: RPD value was outside control limits.

- DUP (Lab ID: 689689)
- Sp. Conductance Saturated Paste

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: ASA 103.2

Description: ASA 103.2 pH

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for ASA 103.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: LECO

Description: Sulfur analysis Montana

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for LECO. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

General Information:

21 samples were analyzed for EPA 9060 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/4767

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10112795011,10112795016

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 210966)
- Mean Total Organic Carbon

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/4763

10M: Total Carbon result of

3070 mg/Kg,

MDL 566 mg/Kg,

RDL 2020 mg/Kg.

- 09-MHTP-5 7' (Lab ID: 10112795002)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4763

12M: Total Carbon result of

44500 mg/Kg,

MDL 2240 mg/Kg,

RDL 8000 mg/Kg.

- 09-MHTP-5 6 1/2' (Lab ID: 10112795001)
- Mean Total Organic Carbon

16M: Total Carbon result of

808 mg/Kg,

MDL 70.4 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-7 8 1/2' (Lab ID: 10112795007)
- Mean Total Organic Carbon

17M: Total Carbon result of

8130 mg/Kg,

MDL 544 mg/Kg,

RDL 1940 mg/Kg.

- 09-MHTP-7 7 1/2' (Lab ID: 10112795006)
- Mean Total Organic Carbon

1M: Total Carbon result of

10600 mg/Kg,

MDL 577 mg/Kg,

RDL 2060 mg/Kg.

- 09-MHTP-6 6 1/2' (Lab ID: 10112795005)
- Mean Total Organic Carbon

21M: Total Inorganic Carbon result of

1040 mg/Kg,

MDL 280 mg/Kg,

RDL 1000 mg/Kg.

- 09-MHTP-1 10' (Lab ID: 10112795009)
- Mean Total Organic Carbon

22M: Total Inorganic Carbon result of

2100 mg/Kg,

MDL 589 mg/Kg,

RDL 2100 mg/Kg.

- 09-MHTP-5 7' (Lab ID: 10112795002)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4763

23M: Total Inorganic Carbon result of

22900 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-6 5' (Lab ID: 10112795003)
- Mean Total Organic Carbon

24M: Total Inorganic Carbon result of

23300 mg/Kg,

MDL 2240 mg/Kg,

RDL 8000 mg/Kg.

- 09-MHTP-5 6 1/2' (Lab ID: 10112795001)
- Mean Total Organic Carbon

27M: Total Inorganic Carbon result of

3090 mg/Kg,

MDL 544 mg/Kg,

RDL 1940 mg/Kg.

- 09-MHTP-6 6' (Lab ID: 10112795004)
- Mean Total Organic Carbon

28M: Total Inorganic Carbon result of

3400 mg/Kg,

MDL 544 mg/Kg,

RDL 1940 mg/Kg.

- 09-MHTP-7 7 1/2' (Lab ID: 10112795006)
- Mean Total Organic Carbon

29M: Total Inorganic Carbon result of

3520 mg/Kg,

MDL 577 mg/Kg,

RDL 2060 mg/Kg.

- 09-MHTP-6 6 1/2' (Lab ID: 10112795005)
- Mean Total Organic Carbon

2M: Total Carbon result of

12000 mg/Kg,

MDL 571 mg/Kg,

RDL 2040 mg/Kg.

- 09-MHTP-1 9 1/2' (Lab ID: 10112795008)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4763

31M: Total Inorganic Carbon result of

6450 mg/Kg,

MDL 571 mg/Kg,

RDL 2040 mg/Kg.

- 09-MHTP-1 9 1/2' (Lab ID: 10112795008)
- Mean Total Organic Carbon

36M: Total Inorganic Carbon result of

<252 mg/Kg,

MDL 70.4 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-7 8 1/2' (Lab ID: 10112795007)
- Mean Total Organic Carbon

38M: Total Inorganic Carbon result of

<985 mg/Kg,

MDL 276 mg/Kg,

RDL 985 mg/Kg.

- 09-MHTP-1 16' (Lab ID: 10112795010)
- Mean Total Organic Carbon

3M: Total Carbon result of

12200 mg/Kg,

MDL 544 mg/Kg,

RDL 1940 mg/Kg.

- 09-MHTP-6 6' (Lab ID: 10112795004)
- Mean Total Organic Carbon

6M: Total Carbon result of

2120 mg/Kg,

MDL 276 mg/Kg,

RDL 985 mg/Kg.

- 09-MHTP-1 16' (Lab ID: 10112795010)
- Mean Total Organic Carbon

8M: Total Carbon result of

26900 mg/Kg,

MDL 320 mg/Kg,

RDL 1143 mg/Kg.

- 09-MHTP-6 5' (Lab ID: 10112795003)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4763

9M: Total Carbon result of

2700 mg/Kg,

MDL 280 mg/Kg,

RDL 1000 mg/Kg.

- 09-MHTP-1 10' (Lab ID: 10112795009)
- Mean Total Organic Carbon

QC Batch: WETA/4767

11M: Total Carbon result of

368 mg/Kg,

MDL 70.3 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-9 17' (Lab ID: 10112795016)
- Mean Total Organic Carbon

13M: Total Carbon result of

5670 mg/Kg,

MDL 283 mg/Kg,

RDL 1010 mg/Kg.

- 09-MHTP-2 5 1/2' (Lab ID: 10112795012)
- Mean Total Organic Carbon

14M: Total Carbon result of

629 mg/Kg,

MDL 70.5 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-2 6' (Lab ID: 10112795013)
- Mean Total Organic Carbon

15M: Total Carbon result of

6320 mg/Kg,

MDL 280 mg/Kg,

RDL 1000 mg/Kg.

- 09-PMTP-6 2' (Lab ID: 10112795019)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4767

18M: Total Carbon result of

8590 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-3 7' (Lab ID: 10112795014)
- Mean Total Organic Carbon

19M: Total Carbon result of

952 mg/Kg,

MDL 70.2 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-7 6' (Lab ID: 10112795021)
- Mean Total Organic Carbon

20M: Total Carbon result of

9520 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-PMTP-8 1 1/2' (Lab ID: 10112795017)
- Mean Total Organic Carbon

25M: Total Inorganic Carbon result of

2340 mg/Kg,

MDL 283 mg/Kg,

RDL 1010 mg/Kg.

- 09-MHTP-2 5 1/2' (Lab ID: 10112795012)
- Mean Total Organic Carbon

26M: Total Inorganic Carbon result of

268 mg/Kg,

MDL 70.2 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-7 6' (Lab ID: 10112795021)
- Mean Total Organic Carbon

30M: Total Inorganic Carbon result of

5420 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-MHTP-3 7' (Lab ID: 10112795014)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4767

32M: Total Inorganic Carbon result of

<1000 mg/Kg,

MDL 280 mg/Kg,

RDL 1000 mg/Kg.

- 09-MHTP-2 4 1/2-5' (Lab ID: 10112795011)
 - Mean Total Organic Carbon
- 09-PMTP-6 6' (Lab ID: 10112795020)
 - Mean Total Organic Carbon

33M: Total Inorganic Carbon result of

<1000 mg/Kg,

MDL 281 mg/Kg,

RDL 1000 mg/Kg.

- 09-PMTP-6 2' (Lab ID: 10112795019)
 - Mean Total Organic Carbon

34M: Total Inorganic Carbon result of

<2000 mg/Kg,

MDL 560 mg/Kg,

RDL 2000 mg/Kg.

- 09-PMTP-8 1 1/2' (Lab ID: 10112795017)
 - Mean Total Organic Carbon

35M: Total Inorganic Carbon result of

<251 mg/Kg,

MDL 70.3 mg/Kg,

RDL 251 mg/Kg.

- 09-PMTP-9 17' (Lab ID: 10112795016)
 - Mean Total Organic Carbon

37M: Total Inorganic Carbon result of

<252 mg/Kg,

MDL 70.5 mg/Kg,

RDL 252 mg/Kg.

- 09-MHTP-2 6' (Lab ID: 10112795013)
 - Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 10, 2009

Analyte Comments:

QC Batch: WETA/4767

38M: Total Inorganic Carbon result of

<985 mg/Kg,

MDL 276 mg/Kg,

RDL 985 mg/Kg.

- 09-PMTP-2 3' (Lab ID: 10112795018)
 - Mean Total Organic Carbon
- 09-PMTP-9 8-9 1/2' (Lab ID: 10112795015)
 - Mean Total Organic Carbon

4M: Total Carbon result of

1650 mg/Kg,

MDL 276 mg/Kg,

RDL 985 mg/Kg.

- 09-PMTP-9 8-9 1/2' (Lab ID: 10112795015)
 - Mean Total Organic Carbon

5M: Total Carbon result of

1860 mg/Kg,

MDL 276 mg/Kg,

RDL 985 mg/Kg.

- 09-PMTP-2 3' (Lab ID: 10112795018)
 - Mean Total Organic Carbon

7M: Total Carbon result of

2510 mg/Kg,

MDL 275 mg/Kg,

RDL 980 mg/Kg.

- 09-MHTP-2 4 1/2-5' (Lab ID: 10112795011)
 - Mean Total Organic Carbon

9M: Total Carbon result of

2700 mg/Kg,

MDL 280 mg/Kg,

RDL 1000 mg/Kg.

- 09-PMTP-6 6' (Lab ID: 10112795020)
 - Mean Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-5 6 1/2' **Lab ID:** 10112795001 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	0.25	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 00:30	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:30	7440-38-2	
Cadmium	0.084	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 00:30	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:30	7440-50-8	
Iron	0.16	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 00:30	7439-89-6	
Lead	0.0050	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 00:30	7439-92-1	B+
Manganese	30.4	mg/L	0.012	0.012	5	09/30/09 17:31	10/02/09 11:41	7439-96-5	P6
Zinc	11.2	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 00:30	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	29000	mg/kg	39.8	19.9	200	09/29/09 10:38	10/03/09 06:48	7429-90-5	M1
Arsenic	36.9	mg/kg	5.0	2.5	200	09/29/09 10:38	10/03/09 06:48	7440-38-2	
Cadmium	22.4	mg/kg	1.0	0.50	200	09/29/09 10:38	10/03/09 06:48	7440-43-9	
Copper	125	mg/kg	5.0	2.5	200	09/29/09 10:38	10/03/09 06:48	7440-50-8	M1
Iron	30300	mg/kg	498	249	200	09/29/09 10:38	10/03/09 06:48	7439-89-6	M1
Lead	310	mg/kg	1.0	0.50	200	09/29/09 10:38	10/03/09 06:48	7439-92-1	
Manganese	5130	mg/kg	10	5.0	400	09/29/09 10:38	10/05/09 10:56	7439-96-5	M1
Zinc	3060	mg/kg	99.6	49.8	400	09/29/09 10:38	10/05/09 10:56	7440-66-6	M1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	21.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.6	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.8	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.090	% (w/w)	0.050		1		09/30/09 16:31		
Sulfur, HNO3 Extractable	0.48	% (w/w)	0.050		1		09/30/09 16:31		
Sulfur, Hot Water Extractable	0.72	% (w/w)	0.050		1		09/30/09 16:31		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		09/30/09 16:31		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-11	tons/1000	0.0		1		10/02/09 14:02		
Acid Potential	17	tons/1000	0.50		1		10/02/09 14:02		
Lime Requirement	29	tons/1000	0.0		1		10/02/09 14:02		
SMP Lime Requirement	6.1	tons/1000	0.0		1		10/02/09 14:02		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-5 6 1/2' **Lab ID:** 10112795001 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	14.3	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	1.3	% (w/w)	0.050	0.037	1		09/30/09 16:31		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	22400	mg/kg	4000	1120	1		09/24/09 10:16	7440-44-0	
Total Organic Carbon	19900	mg/kg	4550	1270	1		09/24/09 10:21	7440-44-0	
Mean Total Organic Carbon	21300	mg/kg	4260	1190	1		09/24/09 10:21	7440-44-0	12M, 24M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-5 7' Lab ID: 10112795002 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	0.23	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 00:48	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:48	7440-38-2	
Cadmium	0.024	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 00:48	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:48	7440-50-8	
Iron	0.24	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 00:48	7439-89-6	
Lead	0.0040	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 00:48	7439-92-1	B+
Manganese	10.2	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 00:48	7439-96-5	
Zinc	2.9	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 00:48	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9830	mg/kg	37.8	18.9	200	09/29/09 10:38	10/03/09 07:01	7429-90-5	
Arsenic	26.0	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:01	7440-38-2	
Cadmium	2.4	mg/kg	0.94	0.47	200	09/29/09 10:38	10/03/09 07:01	7440-43-9	
Copper	69.8	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:01	7440-50-8	
Iron	23500	mg/kg	472	236	200	09/29/09 10:38	10/03/09 07:01	7439-89-6	
Lead	222	mg/kg	0.94	0.47	200	09/29/09 10:38	10/03/09 07:01	7439-92-1	
Manganese	1310	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:01	7439-96-5	
Zinc	570	mg/kg	47.2	23.6	200	09/29/09 10:38	10/05/09 11:10	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.2	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.8	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.7	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.0J	% (w/w)	0.050		1		09/30/09 16:43		
Sulfur, HNO3 Extractable	0.040J	% (w/w)	0.050		1		09/30/09 16:43		
Sulfur, Hot Water Extractable	0.32	% (w/w)	0.050		1		09/30/09 16:43		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		09/30/09 16:43		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	0.38	tons/1000	0.0		1		10/02/09 14:02		
Acid Potential	1.3	tons/1000	0.50		1		10/02/09 14:02		
Lime Requirement	2.9	tons/1000	0.0		1		10/02/09 14:02		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/02/09 14:02		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-5 7' **Lab ID:** 10112795002 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	7.9	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.37	% (w/w)	0.050	0.037	1		09/30/09 16:43		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	3440	mg/kg	2080	583	1		09/24/09 10:27	7440-44-0	
Total Organic Carbon	3770	mg/kg	2130	596	1		09/24/09 10:32	7440-44-0	
Mean Total Organic Carbon	3600	mg/kg	2110	589	1		09/24/09 10:32	7440-44-0	10M, 22M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 5' **Lab ID:** 10112795003 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	0.11	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 00:53	7429-90-5	
Arsenic	0.020	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:53	7440-38-2	
Cadmium	0.29	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 00:53	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:53	7440-50-8	
Iron	0.24	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 00:53	7439-89-6	
Lead	0.20	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 00:53	7439-92-1	
Manganese	15.8	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 00:53	7439-96-5	
Zinc	1.2	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 00:53	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	2560	mg/kg	37.7	18.9	200	09/29/09 10:38	10/03/09 07:05	7429-90-5	
Arsenic	389	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:05	7440-38-2	
Cadmium	38.2	mg/kg	0.94	0.47	200	09/29/09 10:38	10/03/09 07:05	7440-43-9	
Copper	1520	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:05	7440-50-8	
Iron	149000	mg/kg	472	236	200	09/29/09 10:38	10/03/09 07:05	7439-89-6	
Lead	2700	mg/kg	0.94	0.47	200	09/29/09 10:38	10/03/09 07:05	7439-92-1	
Manganese	10800	mg/kg	23.6	11.8	1000	09/29/09 10:38	10/05/09 13:22	7439-96-5	
Zinc	4230	mg/kg	236	118	1000	09/29/09 10:38	10/05/09 13:22	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.6	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.4	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	186	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.060	% (w/w)	0.050		1		09/30/09 17:24		
Sulfur, HNO3 Extractable	12.4	% (w/w)	0.050		1		09/30/09 17:24		
Sulfur, Hot Water Extractable	1.1	% (w/w)	0.050		1		09/30/09 17:24		
Sulfur, Residual	0.13	% (w/w)	0.050		1		09/30/09 17:24		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-209	tons/1000	0.0		1		10/02/09 14:03		
Acid Potential	394	tons/1000	0.50		1		10/02/09 14:03		
Lime Requirement	493	tons/1000	0.0		1		10/02/09 14:03		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 14:03		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 5' **Lab ID:** 10112795003 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	6.0	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	13.7	% (w/w)	0.050	0.037	1		09/30/09 17:21		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	4970	mg/kg	1960	549	1		09/24/09 10:40	7440-44-0	
Total Organic Carbon	3060	mg/kg	2040	571	1		09/24/09 10:46	7440-44-0	
Mean Total Organic Carbon	4030	mg/kg	2000	560	1		09/24/09 10:46	7440-44-0	23M,8M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 6' **Lab ID:** 10112795004 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	0.32	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 00:58	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:58	7440-38-2	
Cadmium	0.033	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 00:58	7440-43-9	
Copper	0.0051	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 00:58	7440-50-8	
Iron	0.28	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 00:58	7439-89-6	
Lead	0.0047	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 00:58	7439-92-1	B+
Manganese	16.0	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 00:58	7439-96-5	
Zinc	4.0	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 00:58	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	17500	mg/kg	36.2	18.1	200	09/29/09 10:38	10/03/09 07:09	7429-90-5	
Arsenic	27.9	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:09	7440-38-2	
Cadmium	5.2	mg/kg	0.91	0.45	200	09/29/09 10:38	10/03/09 07:09	7440-43-9	
Copper	118	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:09	7440-50-8	
Iron	29600	mg/kg	453	226	200	09/29/09 10:38	10/03/09 07:09	7439-89-6	
Lead	183	mg/kg	0.91	0.45	200	09/29/09 10:38	10/03/09 07:09	7439-92-1	
Manganese	1840	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:09	7439-96-5	
Zinc	1020	mg/kg	45.3	22.6	200	09/29/09 10:38	10/05/09 13:26	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	13.0	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.7	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.3	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.010J	% (w/w)	0.050		1		09/30/09 17:42		
Sulfur, HNO3 Extractable	0.30	% (w/w)	0.050		1		09/30/09 17:42		
Sulfur, Hot Water Extractable	0.29	% (w/w)	0.050		1		09/30/09 17:42		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		09/30/09 17:42		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-7.1	tons/1000	0.0		1		10/02/09 14:03		
Acid Potential	9.5	tons/1000	0.50		1		10/02/09 14:03		
Lime Requirement	15	tons/1000	0.0		1		10/02/09 14:03		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/02/09 14:03		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 6' **Lab ID:** 10112795004 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	9.4	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.59	% (w/w)	0.050	0.037	1		09/30/09 17:42		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	9240	mg/kg	1920	538	1		09/24/09 10:54	7440-44-0	
Total Organic Carbon	8970	mg/kg	1960	549	1		09/24/09 10:59	7440-44-0	
Mean Total Organic Carbon	9110	mg/kg	1940	544	1		09/24/09 10:59	7440-44-0	27M,3M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 6 1/2' **Lab ID:** 10112795005 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:02	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:02	7440-38-2	
Cadmium	0.040	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:02	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:02	7440-50-8	
Iron	0.026	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:02	7439-89-6	
Lead	0.0020	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:02	7439-92-1	B+
Manganese	19.7	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:02	7439-96-5	
Zinc	3.7	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:02	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	17100	mg/kg	39.0	19.5	200	09/29/09 10:38	10/03/09 07:23	7429-90-5	
Arsenic	53.6	mg/kg	4.9	2.4	200	09/29/09 10:38	10/03/09 07:23	7440-38-2	
Cadmium	4.0	mg/kg	0.97	0.49	200	09/29/09 10:38	10/03/09 07:23	7440-43-9	
Copper	215	mg/kg	4.9	2.4	200	09/29/09 10:38	10/03/09 07:23	7440-50-8	
Iron	37200	mg/kg	487	244	200	09/29/09 10:38	10/03/09 07:23	7439-89-6	
Lead	300	mg/kg	0.97	0.49	200	09/29/09 10:38	10/03/09 07:23	7439-92-1	
Manganese	1850	mg/kg	4.9	2.4	200	09/29/09 10:38	10/03/09 07:23	7439-96-5	
Zinc	1030	mg/kg	48.7	24.4	200	09/29/09 10:38	10/05/09 13:18	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	14.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.5	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	12	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.22	% (w/w)	0.050		1		09/30/09 17:53		
Sulfur, HNO3 Extractable	1.2	% (w/w)	0.050		1		09/30/09 17:53		
Sulfur, Hot Water Extractable	0.48	% (w/w)	0.050		1		09/30/09 17:53		
Sulfur, Residual	0.010J	% (w/w)	0.050		1		09/30/09 17:53		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-30	tons/1000	0.0		1		10/02/09 14:04		
Acid Potential	42	tons/1000	0.50		1		10/02/09 14:04		
Lime Requirement	57	tons/1000	0.0		1		10/02/09 14:04		
SMP Lime Requirement	3.1	tons/1000	0.0		1		10/02/09 14:04		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-6 6 1/2' **Lab ID:** 10112795005 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	8.2	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	1.9	% (w/w)	0.050	0.037	1		09/30/09 17:53		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	6000	mg/kg	1960	549	1		09/24/09 11:04	7440-44-0	
Total Organic Carbon	8120	mg/kg	1890	528	1		09/24/09 11:08	7440-44-0	
Mean Total Organic Carbon	7080	mg/kg	1920	538	1		09/24/09 11:08	7440-44-0	1M,29M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-7 7 1/2' **Lab ID:** 10112795006 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:07	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:07	7440-38-2	
Cadmium	0.0076	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:07	7440-43-9	
Copper	0.024	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:07	7440-50-8	
Iron	0.029	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:07	7439-89-6	
Lead	0.0015	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:07	7439-92-1	B+
Manganese	3.4	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:07	7439-96-5	
Zinc	0.94	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:07	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	10900	mg/kg	40.9	20.4	200	09/29/09 10:38	10/03/09 07:27	7429-90-5	
Arsenic	41.3	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 07:27	7440-38-2	
Cadmium	1.5	mg/kg	1.0	0.51	200	09/29/09 10:38	10/03/09 07:27	7440-43-9	
Copper	131	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 07:27	7440-50-8	
Iron	26800	mg/kg	511	256	200	09/29/09 10:38	10/03/09 07:27	7439-89-6	
Lead	348	mg/kg	1.0	0.51	200	09/29/09 10:38	10/03/09 07:27	7439-92-1	
Manganese	1570	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 07:27	7439-96-5	
Zinc	463	mg/kg	51.1	25.6	200	09/29/09 10:38	10/05/09 13:31	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.6	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.5	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.3	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.16	% (w/w)	0.050		1		09/30/09 18:06		
Sulfur, HNO3 Extractable	0.49	% (w/w)	0.050		1		09/30/09 18:06		
Sulfur, Hot Water Extractable	0.25	% (w/w)	0.050		1		09/30/09 18:06		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		09/30/09 18:06		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-17	tons/1000	0.0		1		10/02/09 14:04		
Acid Potential	19	tons/1000	0.50		1		10/02/09 14:04		
Lime Requirement	26	tons/1000	0.0		1		10/02/09 14:04		
SMP Lime Requirement	1.8	tons/1000	0.0		1		10/02/09 14:04		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-7 7 1/2' **Lab ID:** 10112795006 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.1	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.89	% (w/w)	0.050	0.037	1		09/30/09 18:06		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	3730	mg/kg	1890	528	1		09/24/09 11:41	7440-44-0	
Total Organic Carbon	5760	mg/kg	1960	549	1		09/24/09 11:48	7440-44-0	
Mean Total Organic Carbon	4730	mg/kg	1920	538	1		09/24/09 11:48	7440-44-0	17M, 28M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-7 8 1/2' **Lab ID:** 10112795007 **Collected:** 09/09/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	0.15	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:19	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:19	7440-38-2	
Cadmium	0.0077	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:19	7440-43-9	
Copper	0.036	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:19	7440-50-8	
Iron	0.058	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:19	7439-89-6	
Lead	0.0020	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:19	7439-92-1	B+
Manganese	3.6	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:19	7439-96-5	
Zinc	1.2	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:19	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	11100	mg/kg	37.9	18.9	200	09/29/09 10:38	10/03/09 07:32	7429-90-5	
Arsenic	26.8	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:32	7440-38-2	
Cadmium	1.4	mg/kg	0.95	0.47	200	09/29/09 10:38	10/03/09 07:32	7440-43-9	
Copper	99.2	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:32	7440-50-8	
Iron	24500	mg/kg	473	237	200	09/29/09 10:38	10/03/09 07:32	7439-89-6	
Lead	244	mg/kg	0.95	0.47	200	09/29/09 10:38	10/03/09 07:32	7439-92-1	
Manganese	1510	mg/kg	4.7	2.4	200	09/29/09 10:38	10/03/09 07:32	7439-96-5	
Zinc	351	mg/kg	47.3	23.7	200	09/29/09 10:38	10/03/09 20:47	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.9	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.0	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.7	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.040J	% (w/w)	0.050		1		10/01/09 08:00		
Sulfur, HNO3 Extractable	0.070	% (w/w)	0.050		1		10/01/09 08:00		
Sulfur, Hot Water Extractable	0.10	% (w/w)	0.050		1		10/01/09 08:00		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 08:00		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.3	tons/1000	0.0		1		10/02/09 14:04		
Acid Potential	3.1	tons/1000	0.50		1		10/02/09 14:04		
Lime Requirement	6.9	tons/1000	0.0		1		10/02/09 14:04		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/02/09 14:04		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-7 8 1/2' **Lab ID:** 10112795007 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	5.2	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.21	% (w/w)	0.050	0.037	1		10/01/09 07:50		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	586	mg/kg	250	70.0	1		09/24/09 12:04	7440-44-0	
Total Organic Carbon	601	mg/kg	250	70.0	1		09/24/09 12:12	7440-44-0	
Mean Total Organic Carbon	593	mg/kg	250	70.0	1		09/24/09 12:12	7440-44-0	16M, 36M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 9 1/2' Lab ID: 10112795008 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.23	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 10:47	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 10:47	7440-38-2	
Cadmium	0.012	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 10:47	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 10:47	7440-50-8	
Iron	0.57	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 10:47	7439-89-6	
Lead	0.053	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 10:47	7439-92-1	
Manganese	4.5	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 10:47	7439-96-5	
Zinc	0.11	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 10:47	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	7150	mg/kg	41.4	20.7	200	09/29/09 10:38	10/03/09 07:36	7429-90-5	
Arsenic	166	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 07:36	7440-38-2	
Cadmium	20.5	mg/kg	1.0	0.52	200	09/29/09 10:38	10/03/09 07:36	7440-43-9	
Copper	1280	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 07:36	7440-50-8	
Iron	66200	mg/kg	517	259	200	09/29/09 10:38	10/03/09 07:36	7439-89-6	
Lead	4030	mg/kg	1.0	0.52	200	09/29/09 10:38	10/03/09 07:36	7439-92-1	
Manganese	4600	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 07:36	7439-96-5	
Zinc	3570	mg/kg	51.7	25.9	200	09/29/09 10:38	10/03/09 20:51	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	9.7	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	56	tons/1000	0.50		1		10/02/09 15:47		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.56	% (w/w)	0.050		1		10/01/09 10:00		
Sulfur, HNO3 Extractable	2.9	% (w/w)	0.050		1		10/01/09 10:00		
Sulfur, Hot Water Extractable	1.2	% (w/w)	0.050		1		10/01/09 10:00		
Sulfur, Residual	0.030J	% (w/w)	0.050		1		10/01/09 10:00		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-48	tons/1000	0.0		1		10/02/09 15:57		
Acid Potential	104	tons/1000	0.50		1		10/02/09 15:57		
Lime Requirement	130	tons/1000	0.0		1		10/02/09 15:57		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 15:57		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 9 1/2' **Lab ID:** 10112795008 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	6.7	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	4.7	% (w/w)	0.050	0.037	1		10/01/09 09:50		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	4920	mg/kg	962	269	1		09/24/09 12:19	7440-44-0	
Total Organic Carbon	6190	mg/kg	980	275	1		09/24/09 12:28	7440-44-0	
Mean Total Organic Carbon	5550	mg/kg	971	272	1		09/24/09 12:28	7440-44-0	2M,31M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 10' **Lab ID:** 10112795009 **Collected:** 09/08/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.22	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 11:11	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:11	7440-38-2	
Cadmium	0.012	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 11:11	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:11	7440-50-8	
Iron	0.19	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 11:11	7439-89-6	
Lead	0.0035	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 11:11	7439-92-1	
Manganese	2.7	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 11:11	7439-96-5	
Zinc	1.3	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 11:11	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	14700	mg/kg	33.6	16.8	200	09/29/09 10:38	10/03/09 07:40	7429-90-5	
Arsenic	34.4	mg/kg	4.2	2.1	200	09/29/09 10:38	10/03/09 07:40	7440-38-2	
Cadmium	3.2	mg/kg	0.84	0.42	200	09/29/09 10:38	10/03/09 07:40	7440-43-9	
Copper	135	mg/kg	4.2	2.1	200	09/29/09 10:38	10/03/09 07:40	7440-50-8	
Iron	27600	mg/kg	420	210	200	09/29/09 10:38	10/03/09 07:40	7439-89-6	
Lead	404	mg/kg	0.84	0.42	200	09/29/09 10:38	10/03/09 07:40	7439-92-1	
Manganese	2190	mg/kg	4.2	2.1	200	09/29/09 10:38	10/03/09 07:40	7439-96-5	
Zinc	716	mg/kg	42.0	21.0	200	09/29/09 10:38	10/03/09 20:55	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.1	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.6	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.3	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.040J	% (w/w)	0.050		1		10/01/09 08:10		
Sulfur, HNO3 Extractable	0.090	% (w/w)	0.050		1		10/01/09 08:10		
Sulfur, Hot Water Extractable	0.14	% (w/w)	0.050		1		10/01/09 08:10		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 08:10		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.5	tons/1000	0.0		1		10/02/09 14:05		
Acid Potential	3.8	tons/1000	0.50		1		10/02/09 14:05		
Lime Requirement	12	tons/1000	0.0		1		10/02/09 14:05		
SMP Lime Requirement	6.1	tons/1000	0.0		1		10/02/09 14:05		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 10' **Lab ID:** 10112795009 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.8	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.27	% (w/w)	0.050	0.037	1		10/01/09 08:10		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1600	mg/kg	962	269	1		09/24/09 12:33	7440-44-0	
Total Organic Carbon	1710	mg/kg	990	277	1		09/24/09 12:42	7440-44-0	
Mean Total Organic Carbon	1660	mg/kg	976	273	1		09/24/09 12:42	7440-44-0	21M,9M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 16' **Lab ID:** 10112795010 **Collected:** 09/08/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.31	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 11:17	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:17	7440-38-2	
Cadmium	0.0011	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 11:17	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:17	7440-50-8	
Iron	0.27	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 11:17	7439-89-6	
Lead	0.0037	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 11:17	7439-92-1	
Manganese	0.63	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 11:17	7439-96-5	
Zinc	0.036	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 11:17	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	11200	mg/kg	36.8	18.4	200	09/29/09 10:38	10/03/09 07:45	7429-90-5	
Arsenic	25.9	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 07:45	7440-38-2	
Cadmium	3.9	mg/kg	0.92	0.46	200	09/29/09 10:38	10/03/09 07:45	7440-43-9	
Copper	76.1	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 07:45	7440-50-8	
Iron	24100	mg/kg	460	230	200	09/29/09 10:38	10/03/09 07:45	7439-89-6	
Lead	231	mg/kg	0.92	0.46	200	09/29/09 10:38	10/03/09 07:45	7439-92-1	
Manganese	1200	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 07:45	7439-96-5	
Zinc	787	mg/kg	46.0	23.0	200	09/29/09 10:38	10/03/09 21:00	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.2	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.4	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	3.8	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.030J	% (w/w)	0.050		1		10/01/09 08:26		
Sulfur, HNO3 Extractable	0.15	% (w/w)	0.050		1		10/01/09 08:26		
Sulfur, Hot Water Extractable	0.28	% (w/w)	0.050		1		10/01/09 08:26		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 08:26		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.4	tons/1000	0.0		1		10/02/09 14:05		
Acid Potential	5.2	tons/1000	0.50		1		10/02/09 14:05		
Lime Requirement	9.4	tons/1000	0.0		1		10/02/09 14:05		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/02/09 14:05		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-1 16' **Lab ID:** 10112795010 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	6.9	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.45	% (w/w)	0.050	0.037	1		10/01/09 08:12		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1590	mg/kg	980	275	1		09/24/09 12:48	7440-44-0	
Total Organic Carbon	1310	mg/kg	990	277	1		09/24/09 13:05	7440-44-0	
Mean Total Organic Carbon	1450	mg/kg	985	276	1		09/24/09 13:05	7440-44-0	38M,6M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 4 1/2-5' **Lab ID:** 10112795011 **Collected:** 09/08/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.11	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 11:23	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:23	7440-38-2	
Cadmium	0.016	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 11:23	7440-43-9	
Copper	0.074	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:23	7440-50-8	
Iron	0.11	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 11:23	7439-89-6	
Lead	0.0032	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 11:23	7439-92-1	
Manganese	1.5	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 11:23	7439-96-5	
Zinc	2.1	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 11:23	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9790	mg/kg	36.1	18.0	200	09/29/09 10:38	10/03/09 07:49	7429-90-5	M1
Arsenic	30.3	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:49	7440-38-2	
Cadmium	1.8	mg/kg	0.90	0.45	200	09/29/09 10:38	10/03/09 07:49	7440-43-9	
Copper	69.5	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:49	7440-50-8	M1
Iron	22300	mg/kg	451	225	200	09/29/09 10:38	10/03/09 07:49	7439-89-6	
Lead	56.9	mg/kg	0.90	0.45	200	09/29/09 10:38	10/03/09 07:49	7439-92-1	M1
Manganese	903	mg/kg	4.5	2.3	200	09/29/09 10:38	10/03/09 07:49	7439-96-5	M1
Zinc	346	mg/kg	45.1	22.5	200	09/29/09 10:38	10/03/09 21:04	7440-66-6	M1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	6.8	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	3.7	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	<0.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.040J	% (w/w)	0.050		1		10/01/09 08:36		
Sulfur, HNO3 Extractable	0.0J	% (w/w)	0.050		1		10/01/09 08:36		
Sulfur, Hot Water Extractable	0.11	% (w/w)	0.050		1		10/01/09 08:36		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 08:36		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.1	tons/1000	0.0		1		10/02/09 14:06		
Acid Potential	1.1	tons/1000	0.50		1		10/02/09 14:06		
Lime Requirement	8.0	tons/1000	0.0		1		10/02/09 14:06		
SMP Lime Requirement	5.3	tons/1000	0.0		1		10/02/09 14:06		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.2	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 4 1/2-5' **Lab ID:** 10112795011 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.0	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.15	% (w/w)	0.050	0.037	1		10/01/09 08:28		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1790	mg/kg	990	277	1		09/24/09 16:49	7440-44-0	
Total Organic Carbon	1320	mg/kg	1010	283	1		09/24/09 16:56	7440-44-0	
Mean Total Organic Carbon	1560	mg/kg	1000	280	1		09/24/09 16:56	7440-44-0	32M, 7M,MO

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 5 1/2' **Lab ID:** 10112795012 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.16	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 11:29	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:29	7440-38-2	
Cadmium	0.0057	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 11:29	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:29	7440-50-8	
Iron	0.13	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 11:29	7439-89-6	
Lead	0.0019	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 11:29	7439-92-1	
Manganese	0.74	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 11:29	7439-96-5	
Zinc	0.76	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 11:29	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	8720	mg/kg	33.0	16.5	200	09/29/09 10:38	10/03/09 07:58	7429-90-5	
Arsenic	28.3	mg/kg	4.1	2.1	200	09/29/09 10:38	10/03/09 07:58	7440-38-2	
Cadmium	1.3	mg/kg	0.83	0.41	200	09/29/09 10:38	10/03/09 07:58	7440-43-9	
Copper	47.7	mg/kg	4.1	2.1	200	09/29/09 10:38	10/03/09 07:58	7440-50-8	
Iron	20700	mg/kg	413	206	200	09/29/09 10:38	10/03/09 07:58	7439-89-6	
Lead	49.0	mg/kg	0.83	0.41	200	09/29/09 10:38	10/03/09 07:58	7439-92-1	
Manganese	604	mg/kg	4.1	2.1	200	09/29/09 10:38	10/03/09 07:58	7439-96-5	
Zinc	312	mg/kg	41.3	20.6	200	09/29/09 10:38	10/03/09 21:13	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.3	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	25	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.010J	% (w/w)	0.050		1		10/01/09 08:45		
Sulfur, HNO3 Extractable	0.0J	% (w/w)	0.050		1		10/01/09 08:45		
Sulfur, Hot Water Extractable	0.080	% (w/w)	0.050		1		10/01/09 08:45		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 08:45		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	25	tons/1000	0.0		1		10/02/09 14:06		
Acid Potential	0.31	tons/1000	0.50		1		10/02/09 14:06		
Lime Requirement	6.1	tons/1000	0.0		1		10/02/09 14:06		
SMP Lime Requirement	4.6	tons/1000	0.0		1		10/02/09 14:06		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.3	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 5 1/2' **Lab ID:** 10112795012 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	2.7	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.090	% (w/w)	0.050	0.037	1		10/01/09 08:38		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	4730	mg/kg	971	272	1		09/24/09 17:40	7440-44-0	
Total Organic Carbon	1930	mg/kg	971	272	1		09/24/09 17:45	7440-44-0	
Mean Total Organic Carbon	3330	mg/kg	971	272	1		09/24/09 17:45	7440-44-0	13M, 25M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 6' **Lab ID:** 10112795013 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/29/09 13:45									
Aluminum	0.19	mg/L	0.10	0.10	1	09/29/09 17:24	10/01/09 11:35	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:35	7440-38-2	
Cadmium	0.021	mg/L	0.00050	0.00050	1	09/29/09 17:24	10/01/09 11:35	7440-43-9	
Copper	0.15	mg/L	0.0050	0.0050	1	09/29/09 17:24	10/01/09 11:35	7440-50-8	
Iron	0.25	mg/L	0.025	0.025	1	09/29/09 17:24	10/01/09 11:35	7439-89-6	
Lead	0.0021	mg/L	0.0015	0.0015	1	09/29/09 17:24	10/01/09 11:35	7439-92-1	
Manganese	1.8	mg/L	0.0025	0.0025	1	09/29/09 17:24	10/01/09 11:35	7439-96-5	
Zinc	3.2	mg/L	0.010	0.010	1	09/29/09 17:24	10/01/09 11:35	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	6810	mg/kg	36.7	18.4	200	09/29/09 10:38	10/03/09 08:02	7429-90-5	
Arsenic	17.2	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 08:02	7440-38-2	
Cadmium	1.3	mg/kg	0.92	0.46	200	09/29/09 10:38	10/03/09 08:02	7440-43-9	
Copper	57.5	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 08:02	7440-50-8	
Iron	17400	mg/kg	459	230	200	09/29/09 10:38	10/03/09 08:02	7439-89-6	
Lead	33.8	mg/kg	0.92	0.46	200	09/29/09 10:38	10/03/09 21:17	7439-92-1	
Manganese	484	mg/kg	4.6	2.3	200	09/29/09 10:38	10/03/09 08:02	7439-96-5	
Zinc	300	mg/kg	45.9	23.0	200	09/29/09 10:38	10/03/09 21:17	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.7	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	3.8	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	<0.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.010J	% (w/w)	0.050		1		10/01/09 09:27		
Sulfur, HNO3 Extractable	0.0J	% (w/w)	0.050		1		10/01/09 09:27		
Sulfur, Hot Water Extractable	0.080	% (w/w)	0.050		1		10/01/09 09:27		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 09:27		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-0.31	tons/1000	0.0		1		10/02/09 14:06		
Acid Potential	0.31	tons/1000	0.50		1		10/02/09 14:06		
Lime Requirement	4.2	tons/1000	0.0		1		10/02/09 14:06		
SMP Lime Requirement	3.1	tons/1000	0.0		1		10/02/09 14:06		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-2 6' **Lab ID:** 10112795013 Collected: 09/08/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.2	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.090	% (w/w)	0.050	0.037	1		10/01/09 08:52		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	546	mg/kg	248	69.5	1		09/24/09 17:54	7440-44-0	
Total Organic Carbon	581	mg/kg	252	70.5	1		09/24/09 18:00	7440-44-0	
Mean Total Organic Carbon	564	mg/kg	250	70.0	1		09/24/09 18:00	7440-44-0	14M, 37M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-3 7' Lab ID: 10112795014 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	<0.10	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:24	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:24	7440-38-2	
Cadmium	0.012	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:24	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:24	7440-50-8	
Iron	0.047	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:24	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:24	7439-92-1	
Manganese	21.4	mg/L	0.012	0.012	5	09/30/09 17:31	10/02/09 11:55	7439-96-5	
Zinc	1.5	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:24	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	8990	mg/kg	42.0	21.0	200	09/29/09 10:38	10/03/09 08:16	7429-90-5	
Arsenic	96.5	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 08:16	7440-38-2	
Cadmium	4.6	mg/kg	1.0	0.52	200	09/29/09 10:38	10/03/09 08:16	7440-43-9	
Copper	253	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 08:16	7440-50-8	
Iron	54900	mg/kg	525	262	200	09/29/09 10:38	10/03/09 08:16	7439-89-6	
Lead	587	mg/kg	1.0	0.52	200	09/29/09 10:38	10/03/09 08:16	7439-92-1	
Manganese	2770	mg/kg	5.2	2.6	200	09/29/09 10:38	10/03/09 08:16	7439-96-5	
Zinc	1260	mg/kg	52.5	26.2	200	09/29/09 10:38	10/03/09 21:22	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.9	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.5	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	26	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.75	% (w/w)	0.050		1		10/01/09 09:47		
Sulfur, HNO3 Extractable	1.9	% (w/w)	0.050		1		10/01/09 09:47		
Sulfur, Hot Water Extractable	0.43	% (w/w)	0.050		1		10/01/09 09:47		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 09:47		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-50	tons/1000	0.0		1		10/02/09 14:07		
Acid Potential	76	tons/1000	0.50		1		10/02/09 14:07		
Lime Requirement	96	tons/1000	0.0		1		10/02/09 14:07		
SMP Lime Requirement	0.3	tons/1000	0.0		1		10/02/09 14:07		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-MHTP-3 7' **Lab ID:** 10112795014 Collected: 09/09/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	8.8	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	3.1	% (w/w)	0.050	0.037	1		10/01/09 09:31		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2920	mg/kg	962	269	1		09/24/09 18:05	7440-44-0	
Total Organic Carbon	3420	mg/kg	943	264	1		09/24/09 18:12	7440-44-0	
Mean Total Organic Carbon	3170	mg/kg	952	267	1		09/24/09 18:12	7440-44-0	18M, 30M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-9 8-9 1/2' **Lab ID:** 10112795015 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	98.0	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:29	7429-90-5	
Arsenic	0.058	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:29	7440-38-2	
Cadmium	0.0028	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:29	7440-43-9	
Copper	3.1	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:29	7440-50-8	
Iron	128	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:29	7439-89-6	
Lead	5.3	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:29	7439-92-1	
Manganese	0.69	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:29	7439-96-5	
Zinc	1.6	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:29	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	42200	mg/kg	40.9	20.4	200	09/29/09 10:38	10/03/09 08:20	7429-90-5	
Arsenic	49.8	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 08:20	7440-38-2	
Cadmium	1.5	mg/kg	1.0	0.51	200	09/29/09 10:38	10/03/09 08:20	7440-43-9	
Copper	1830	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 08:20	7440-50-8	
Iron	92800	mg/kg	511	256	200	09/29/09 10:38	10/03/09 08:20	7439-89-6	
Lead	5490	mg/kg	2.0	1.0	400	09/29/09 10:38	10/03/09 21:26	7439-92-1	
Manganese	651	mg/kg	5.1	2.6	200	09/29/09 10:38	10/03/09 08:20	7439-96-5	
Zinc	626	mg/kg	102	51.1	400	09/29/09 10:38	10/03/09 21:26	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	18.5	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	4.6	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.9	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.060	% (w/w)	0.050		1		10/01/09 10:09		
Sulfur, HNO3 Extractable	0.040J	% (w/w)	0.050		1		10/01/09 10:09		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 10:09		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 10:09		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	3.6	tons/1000	0.0		1		10/02/09 14:07		
Acid Potential	2.3	tons/1000	0.50		1		10/02/09 14:07		
Lime Requirement	2.8	tons/1000	0.0		1		10/02/09 14:07		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 14:07		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-9 8-9 1/2' **Lab ID:** 10112795015 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.65	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.090	% (w/w)	0.050	0.037	1		10/01/09 10:01		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1280	mg/kg	980	275	1		09/24/09 18:17	7440-44-0	
Total Organic Carbon	1200	mg/kg	962	269	1		09/24/09 18:22	7440-44-0	
Mean Total Organic Carbon	1240	mg/kg	971	272	1		09/24/09 18:22	7440-44-0	38M,4M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-9 17' **Lab ID:** 10112795016 **Collected:** 09/11/09 00:00 **Received:** 09/18/09 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	12.5	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:34	7429-90-5	
Arsenic	0.16	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:34	7440-38-2	
Cadmium	0.0034	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:34	7440-43-9	
Copper	0.41	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:34	7440-50-8	
Iron	48.5	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:34	7439-89-6	
Lead	6.8	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:34	7439-92-1	
Manganese	0.052	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:34	7439-96-5	
Zinc	0.52	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:34	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	6020	mg/kg	40.0	20.0	200	09/29/09 10:38	10/03/09 08:24	7429-90-5	
Arsenic	82.8	mg/kg	5.0	2.5	200	09/29/09 10:38	10/03/09 08:24	7440-38-2	
Cadmium	3.8	mg/kg	1.0	0.50	200	09/29/09 10:38	10/03/09 08:24	7440-43-9	
Copper	1060	mg/kg	5.0	2.5	200	09/29/09 10:38	10/03/09 08:24	7440-50-8	
Iron	162000	mg/kg	501	250	200	09/29/09 10:38	10/03/09 08:24	7439-89-6	
Lead	5880	mg/kg	2.5	1.3	500	09/29/09 10:38	10/05/09 13:35	7439-92-1	
Manganese	79.9	mg/kg	5.0	2.5	200	09/29/09 10:38	10/03/09 08:24	7439-96-5	
Zinc	763	mg/kg	125	62.6	500	09/29/09 10:38	10/05/09 13:35	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	15.4	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.6	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.19	% (w/w)	0.050		1		10/01/09 10:55		
Sulfur, HNO3 Extractable	0.11	% (w/w)	0.050		1		10/01/09 10:55		
Sulfur, Hot Water Extractable	0.10	% (w/w)	0.050		1		10/01/09 10:55		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 10:55		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-6.4	tons/1000	0.0		1		10/02/09 14:08		
Acid Potential	7.9	tons/1000	0.50		1		10/02/09 14:08		
Lime Requirement	9.9	tons/1000	0.0		1		10/02/09 14:08		
SMP Lime Requirement	0	tons/1000	0.0		1		10/02/09 14:08		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-9 17' **Lab ID: 10112795016** Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.29	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.40	% (w/w)	0.050	0.037	1		10/01/09 10:47		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	400	mg/kg	251	70.4	1		09/24/09 18:34	7440-44-0	
Total Organic Carbon	420	mg/kg	251	70.2	1		09/24/09 18:38	7440-44-0	
Mean Total Organic Carbon	410	mg/kg	251	70.3	1		09/24/09 18:38	7440-44-0	11M, 35M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-8 1 1/2' **Lab ID:** 10112795017 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	35.1	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:41	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:41	7440-38-2	
Cadmium	0.00064	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:41	7440-43-9	
Copper	0.23	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:41	7440-50-8	
Iron	39.5	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:41	7439-89-6	
Lead	0.082	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:41	7439-92-1	
Manganese	0.94	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:41	7439-96-5	
Zinc	0.37	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:41	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	26000	mg/kg	42.3	21.1	200	09/29/09 10:38	10/03/09 08:29	7429-90-5	
Arsenic	10.9	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:29	7440-38-2	
Cadmium	1.2	mg/kg	1.1	0.53	200	09/29/09 10:38	10/03/09 08:29	7440-43-9	
Copper	383	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:29	7440-50-8	
Iron	75000	mg/kg	528	264	200	09/29/09 10:38	10/03/09 08:29	7439-89-6	
Lead	105	mg/kg	1.1	0.53	200	09/29/09 10:38	10/03/09 08:29	7439-92-1	
Manganese	1180	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:29	7439-96-5	
Zinc	463	mg/kg	52.8	26.4	200	09/29/09 10:38	10/03/09 21:48	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.7	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.5	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	7.2	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.0J	% (w/w)	0.050		1		10/01/09 11:05		
Sulfur, HNO3 Extractable	0.010J	% (w/w)	0.050		1		10/01/09 11:05		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 11:05		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 11:05		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.7	tons/1000	0.0		1		10/02/09 14:08		
Acid Potential	0.47	tons/1000	0.50		1		10/02/09 14:08		
Lime Requirement	2.8	tons/1000	0.0		1		10/02/09 14:08		
SMP Lime Requirement	1.8	tons/1000	0.0		1		10/02/09 14:08		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.7	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-8 1 1/2' **Lab ID:** 10112795017 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.53	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/01/09 10:57		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	7760	mg/kg	971	272	1		09/24/09 19:16	7440-44-0	
Total Organic Carbon	7920	mg/kg	1030	289	1		09/24/09 19:32	7440-44-0	
Mean Total Organic Carbon	7840	mg/kg	1000	280	1		09/24/09 19:32	7440-44-0	20M, 34M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-2 3' **Lab ID:** 10112795018 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	13.2	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:46	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:46	7440-38-2	
Cadmium	0.023	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:46	7440-43-9	
Copper	0.44	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:46	7440-50-8	
Iron	17.8	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:46	7439-89-6	
Lead	0.29	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:46	7439-92-1	
Manganese	8.0	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:46	7439-96-5	
Zinc	0.77	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:46	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	27400	mg/kg	40.6	20.3	200	09/29/09 10:38	10/03/09 08:33	7429-90-5	
Arsenic	25.9	mg/kg	5.1	2.5	200	09/29/09 10:38	10/03/09 08:33	7440-38-2	
Cadmium	78.3	mg/kg	1.0	0.51	200	09/29/09 10:38	10/03/09 08:33	7440-43-9	
Copper	1670	mg/kg	5.1	2.5	200	09/29/09 10:38	10/03/09 08:33	7440-50-8	
Iron	81400	mg/kg	508	254	200	09/29/09 10:38	10/03/09 08:33	7439-89-6	
Lead	778	mg/kg	1.0	0.51	200	09/29/09 10:38	10/03/09 08:33	7439-92-1	
Manganese	28300	mg/kg	63.4	31.7	2500	09/29/09 10:38	10/05/09 13:39	7439-96-5	
Zinc	2730	mg/kg	50.8	25.4	200	09/29/09 10:38	10/03/09 21:53	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.8	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.0	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	14	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.010J	% (w/w)	0.050		1		10/01/09 11:20		
Sulfur, HNO3 Extractable	0.0090J	% (w/w)	0.050		1		10/01/09 11:20		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 11:20		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 11:20		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	14	tons/1000	0.0		1		10/02/09 14:08		
Acid Potential	0.49	tons/1000	0.50		1		10/02/09 14:08		
Lime Requirement	5.5	tons/1000	0.0		1		10/02/09 14:08		
SMP Lime Requirement	3.9	tons/1000	0.0		1		10/02/09 14:08		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-2 3' **Lab ID:** 10112795018 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.10	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/01/09 11:06		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1930	mg/kg	962	269	1		09/24/09 19:36	7440-44-0	
Total Organic Carbon	2590	mg/kg	1000	280	1		09/24/09 19:41	7440-44-0	
Mean Total Organic Carbon	2250	mg/kg	980	275	1		09/24/09 19:41	7440-44-0	38M,5M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-6 2' **Lab ID:** 10112795019 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	13.8	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:50	7429-90-5	M0
Arsenic	0.0054	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:50	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:50	7440-43-9	
Copper	0.13	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:50	7440-50-8	
Iron	18.0	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:50	7439-89-6	
Lead	0.52	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:50	7439-92-1	
Manganese	0.16	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:50	7439-96-5	
Zinc	0.090	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:50	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	22700	mg/kg	42.1	21.0	200	09/29/09 10:38	10/03/09 08:37	7429-90-5	
Arsenic	24.2	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:37	7440-38-2	
Cadmium	0.61J	mg/kg	1.1	0.53	200	09/29/09 10:38	10/03/09 08:37	7440-43-9	
Copper	415	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:37	7440-50-8	
Iron	70400	mg/kg	526	263	200	09/29/09 10:38	10/03/09 08:37	7439-89-6	
Lead	719	mg/kg	1.1	0.53	200	09/29/09 10:38	10/03/09 08:37	7439-92-1	
Manganese	433	mg/kg	5.3	2.6	200	09/29/09 10:38	10/03/09 08:37	7439-96-5	
Zinc	107	mg/kg	52.6	26.3	200	09/29/09 10:38	10/03/09 21:57	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.7	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	5.6	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	1.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.015J	% (w/w)	0.050		1		10/01/09 11:31		
Sulfur, HNO3 Extractable	0.016J	% (w/w)	0.050		1		10/01/09 11:31		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 11:31		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 11:31		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	0.62	tons/1000	0.0		1		10/02/09 14:10		
Acid Potential	0.86	tons/1000	0.50		1		10/02/09 14:10		
Lime Requirement	6.0	tons/1000	0.0		1		10/02/09 14:10		
SMP Lime Requirement	3.9	tons/1000	0.0		1		10/02/09 14:10		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-6 2' **Lab ID: 10112795019** Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.20	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/01/09 11:22		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	6960	mg/kg	1000	280	1		09/24/09 19:46	7440-44-0	
Total Organic Carbon	7250	mg/kg	1010	283	1		09/24/09 19:51	7440-44-0	
Mean Total Organic Carbon	7110	mg/kg	1010	281	1		09/24/09 19:51	7440-44-0	15M, 33M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-6 6' **Lab ID:** 10112795020 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	48.1	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 01:59	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:59	7440-38-2	
Cadmium	0.00052	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 01:59	7440-43-9	
Copper	0.73	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 01:59	7440-50-8	
Iron	36.8	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 01:59	7439-89-6	
Lead	0.31	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 01:59	7439-92-1	
Manganese	0.71	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 01:59	7439-96-5	
Zinc	0.13	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 01:59	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	58000	mg/kg	1910	954	10000	09/27/09 15:21	09/30/09 13:19	7429-90-5	
Arsenic	10.5	mg/kg	0.48	0.24	20	09/27/09 15:21	09/30/09 02:53	7440-38-2	
Cadmium	0.67	mg/kg	0.095	0.048	20	09/27/09 15:21	09/30/09 02:53	7440-43-9	
Copper	1250	mg/kg	23.8	11.9	1000	09/27/09 15:21	09/30/09 13:14	7440-50-8	
Iron	89900	mg/kg	2380	1190	1000	09/27/09 15:21	09/30/09 13:14	7439-89-6	
Lead	152	mg/kg	0.095	0.048	20	09/27/09 15:21	09/30/09 02:53	7439-92-1	
Manganese	1130	mg/kg	23.8	11.9	1000	09/27/09 15:21	09/30/09 13:14	7439-96-5	
Zinc	116	mg/kg	4.8	2.4	20	09/27/09 15:21	09/30/09 02:53	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	16.8	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.4	Std. Units	0.10	0.050	1		09/27/09 11:45		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.010J	% (w/w)	0.050		1		10/01/09 11:42		
Sulfur, HNO3 Extractable	0.010J	% (w/w)	0.050		1		10/01/09 11:42		
Sulfur, Hot Water Extractable	0.0J	% (w/w)	0.050		1		10/01/09 11:42		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 11:42		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	2.0	tons/1000	0.0		1		10/02/09 14:10		
Acid Potential	0.55	tons/1000	0.50		1		10/02/09 14:10		
Lime Requirement	5.6	tons/1000	0.0		1		10/02/09 14:10		
SMP Lime Requirement	3.9	tons/1000	0.0		1		10/02/09 14:10		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.4	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-6 6' **Lab ID: 10112795020** Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.069	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/01/09 11:33		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1800	mg/kg	952	267	1		09/24/09 19:56	7440-44-0	
Total Organic Carbon	1710	mg/kg	917	257	1		09/24/09 20:02	7440-44-0	
Mean Total Organic Carbon	1760	mg/kg	935	262	1		09/24/09 20:02	7440-44-0	32M,9M

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-7 6' **Lab ID:** 10112795021 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 09/30/09 14:27									
Aluminum	39.8	mg/L	0.10	0.10	1	09/30/09 17:31	10/02/09 02:03	7429-90-5	M0
Arsenic	0.095	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 02:03	7440-38-2	
Cadmium	0.0042	mg/L	0.00050	0.00050	1	09/30/09 17:31	10/02/09 02:03	7440-43-9	
Copper	0.74	mg/L	0.0050	0.0050	1	09/30/09 17:31	10/02/09 02:03	7440-50-8	
Iron	90.7	mg/L	0.025	0.025	1	09/30/09 17:31	10/02/09 02:03	7439-89-6	
Lead	2.5	mg/L	0.0015	0.0015	1	09/30/09 17:31	10/02/09 02:03	7439-92-1	
Manganese	0.071	mg/L	0.0025	0.0025	1	09/30/09 17:31	10/02/09 02:03	7439-96-5	
Zinc	1.0	mg/L	0.010	0.010	1	09/30/09 17:31	10/02/09 02:03	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9510	mg/kg	217	109	1000	09/27/09 15:21	09/30/09 13:24	7429-90-5	
Arsenic	98.3	mg/kg	0.54	0.27	20	09/27/09 15:21	09/30/09 03:02	7440-38-2	
Cadmium	1.7	mg/kg	0.11	0.054	20	09/27/09 15:21	09/30/09 03:02	7440-43-9	
Copper	1420	mg/kg	2.7	1.4	100	09/27/09 15:21	09/30/09 03:06	7440-50-8	
Iron	89800	mg/kg	2720	1360	1000	09/27/09 15:21	09/30/09 13:24	7439-89-6	
Lead	2200	mg/kg	5.4	2.7	1000	09/27/09 15:21	09/30/09 13:24	7439-92-1	
Manganese	58.4	mg/kg	27.2	13.6	1000	09/27/09 15:21	09/30/09 13:24	7439-96-5	D3
Zinc	551	mg/kg	27.2	13.6	100	09/27/09 15:21	09/30/09 03:06	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	17.1	%	0.10	0.10	1		09/30/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.3	Std. Units	0.10	0.050	1		09/27/09 12:05		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	<0.5	tons/1000	0.50		1		10/01/09 00:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.080	% (w/w)	0.050		1		10/01/09 12:02		
Sulfur, HNO3 Extractable	0.010J	% (w/w)	0.050		1		10/01/09 12:02		
Sulfur, Hot Water Extractable	0.010J	% (w/w)	0.050		1		10/01/09 12:02		
Sulfur, Residual	0.0J	% (w/w)	0.050		1		10/01/09 12:02		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-2.2	tons/1000	0.0		1		10/02/09 00:00		
Acid Potential	2.23	tons/1000	0.50		1		10/02/09 00:00		
Lime Requirement	3.16	tons/1000	0.0		1		10/02/09 00:00		
SMP Lime Requirement	0.3	tons/1000	0.0		1		10/02/09 00:00		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		09/30/09 00:00		

ANALYTICAL RESULTS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Sample: 09-PMTP-7 6' **Lab ID:** 10112795021 Collected: 09/11/09 00:00 Received: 09/18/09 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.43	mmhos/cm	0.010	0.0050	1		09/30/09 13:45		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.10	% (w/w)	0.050	0.037	1		10/01/09 11:50		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	711	mg/kg	249	69.8	1		09/24/09 20:12	7440-44-0	
Total Organic Carbon	656	mg/kg	251	70.2	1		09/24/09 20:16	7440-44-0	
Mean Total Organic Carbon	684	mg/kg	250	70.0	1		09/24/09 20:16	7440-44-0	19M, 26M

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MPRP/17342 Analysis Method: EPA 6020
QC Batch Method: EPA 3050 Analysis Description: 6020 MET
Associated Lab Samples: 10112795020, 10112795021

METHOD BLANK: 682643 Matrix: Solid

Associated Lab Samples: 10112795020, 10112795021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	<1.7	3.4	09/30/09 02:25	CU
Arsenic	mg/kg	<0.21	0.43	09/30/09 02:25	
Cadmium	mg/kg	<0.043	0.085	09/30/09 02:25	
Copper	mg/kg	<0.21	0.43	09/30/09 02:25	
Iron	mg/kg	<21.4	42.7	09/30/09 02:25	
Lead	mg/kg	<0.043	0.085	09/30/09 02:25	
Manganese	mg/kg	<0.21	0.43	09/30/09 02:25	
Zinc	mg/kg	<2.1	4.3	09/30/09 02:25	

LABORATORY CONTROL SAMPLE: 682644

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	17.7	18.9	107	75-125	CH
Arsenic	mg/kg	17.7	16.6	94	75-125	
Cadmium	mg/kg	17.7	17.0	96	75-125	
Copper	mg/kg	17.7	17.7	100	75-125	
Iron	mg/kg	221	230	104	75-125	
Lead	mg/kg	17.7	17.4	99	75-125	
Manganese	mg/kg	17.7	17.5	99	75-125	
Zinc	mg/kg	17.7	16.4	93	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 682645 682646

Parameter	Units	10112793020		682645		682646		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result							
Aluminum	mg/kg	9950	15.2	17.7	9760	11300	-1232	7453	70-130	14	20	CH,E, M0	
Arsenic	mg/kg	50.3	15.2	17.7	46.5	38.4	-25	-67	70-130	19	20	M0	
Cadmium	mg/kg	3.6	15.2	17.7	16.4	18.4	84	84	70-130	12	20		
Copper	mg/kg	135	15.2	17.7	98.1	74.8	-245	-342	70-130	27	20	M0,R1	
Iron	mg/kg	35900	191	222	20500	19300	-8091	-7525	70-130	6	20	E,M0	
Lead	mg/kg	595	15.2	17.7	198	137	-2602	-2585	70-130	36	20	M0,R1	
Manganese	mg/kg	2310	15.2	17.7	1190	1010	-7300	-7299	70-130	16	20	E,M0	
Zinc	mg/kg	1270	15.2	17.7	451	214	-5357	-5955	70-130	71	20	E,M0, R1	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MT/2906 Analysis Method: ASA 10-3.3
 QC Batch Method: ASA 10-3.3 Analysis Description: ASA 10-3.3 Specific Conductance
 Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014,
 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

METHOD BLANK: 688526 Matrix: Water
 Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014,
 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	<0.0050	0.010	09/30/09 13:45	

LABORATORY CONTROL SAMPLE: 688527

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.3	1.6	126	53-147	

SAMPLE DUPLICATE: 689688

Parameter	Units	10112795003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	6.0	6.0	0	20	

SAMPLE DUPLICATE: 689689

Parameter	Units	10112795020 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	0.069	0.14	68	20	R1

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MPRP/17521 Analysis Method: EPA 6010
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
 Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020,
 10112795021

METHOD BLANK: 689527 Matrix: Water

Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020,
 10112795021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	10/02/09 00:21	
Arsenic	mg/L	<0.0050	0.0050	10/02/09 00:21	
Cadmium	mg/L	<0.00050	0.00050	10/02/09 00:21	
Copper	mg/L	<0.0050	0.0050	10/02/09 00:21	
Iron	mg/L	<0.025	0.025	10/02/09 00:21	
Lead	mg/L	0.0025	0.0015	10/02/09 00:21	B+
Manganese	mg/L	0.0025	0.0025	10/02/09 00:21	P8
Zinc	mg/L	0.025	0.010	10/02/09 00:21	B+

LABORATORY CONTROL SAMPLE: 689528

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	9.9	99	80-120	
Arsenic	mg/L	1	1.0	100	80-120	
Cadmium	mg/L	1	1.0	102	80-120	
Copper	mg/L	1	1.0	102	80-120	
Iron	mg/L	10	9.9	99	80-120	
Lead	mg/L	1	1.0	100	80-120	
Manganese	mg/L	1	1.0	103	80-120	
Zinc	mg/L	1	1.0	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 689529 689530

Parameter	Units	10112795001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec				
Aluminum	mg/L	0.25	10	10	10	10.5	10.4	102	102	75-125	0	30	
Arsenic	mg/L	<0.0050	1	1	1	1.0	1.0	101	102	75-125	0	30	
Cadmium	mg/L	0.084	1	1	1	1.1	1.1	103	104	75-125	0	30	
Copper	mg/L	<0.0050	1	1	1	1.0	1.0	104	104	75-125	0	30	
Iron	mg/L	0.16	10	10	10	10.1	10.1	99	99	75-125	0	30	
Lead	mg/L	0.0050	1	1	1	0.99	0.99	98	98	75-125	0	30	
Manganese	mg/L	30.4	1	1	1	30.6	30.7	18	26	75-125	0	30	P6
Zinc	mg/L	11.2	1	1	1	12.0	12.0	77	79	75-125	0	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

MATRIX SPIKE SAMPLE:		689531					
Parameter	Units	10112795019 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	13.8	10	28.6	147	75-125	M0
Arsenic	mg/L	0.0054	1	1.0	100	75-125	
Cadmium	mg/L	<0.00050	1	1.0	103	75-125	
Copper	mg/L	0.13	1	1.2	105	75-125	
Iron	mg/L	18.0	10	29.1	112	75-125	
Lead	mg/L	0.52	1	1.6	104	75-125	
Manganese	mg/L	0.16	1	1.2	103	75-125	
Zinc	mg/L	0.090	1	1.1	103	75-125	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MPRP/17507

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10112795021

SAMPLE DUPLICATE: 689104

Parameter	Units	10112795021 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.1	15.6	9	30	

SAMPLE DUPLICATE: 689105

Parameter	Units	10113430005 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	22.0	22.3	1	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch:	MPRP/17506	Analysis Method:	% Moisture
QC Batch Method:	% Moisture	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020		

SAMPLE DUPLICATE: 689100

Parameter	Units	10112795001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	21.5	23.0	7	30	

SAMPLE DUPLICATE: 689101

Parameter	Units	10112795020 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	16.8	16.5	2	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MT/2929 Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7 Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014,
10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020

SAMPLE DUPLICATE: 689805

Parameter	Units	10112795001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.1	6.1	0	20	

SAMPLE DUPLICATE: 689806

Parameter	Units	10112795011 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.2	6.2	0	20	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: WETA/4767 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

METHOD BLANK: 210963 Matrix: Solid
 Associated Lab Samples: 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	09/24/09 16:14	

LABORATORY CONTROL SAMPLE: 210964

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	923	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210965 210966

Parameter	Units	10112795011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	1560	2000	1970	3930	4580	119	154	50-150	15	30	M0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210967 210968

Parameter	Units	10112795016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	410	503	504	742	916	66	100	50-150	21	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MPRP/17500 Analysis Method: EPA 6010
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
 Associated Lab Samples: 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013

METHOD BLANK: 688682 Matrix: Water
 Associated Lab Samples: 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	10/01/09 10:37	
Arsenic	mg/L	<0.0050	0.0050	10/01/09 10:37	
Cadmium	mg/L	<0.00050	0.00050	10/01/09 10:37	
Copper	mg/L	<0.0050	0.0050	10/01/09 10:37	
Iron	mg/L	<0.025	0.025	10/01/09 10:37	
Lead	mg/L	<0.0015	0.0015	10/01/09 10:37	
Manganese	mg/L	<0.0025	0.0025	10/01/09 10:37	
Zinc	mg/L	<0.010	0.010	10/01/09 10:37	

LABORATORY CONTROL SAMPLE: 688683

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	8.9	89	80-120	
Arsenic	mg/L	1	1.1	106	80-120	
Cadmium	mg/L	1	1.0	101	80-120	
Copper	mg/L	1	0.98	98	80-120	
Iron	mg/L	10	9.6	96	80-120	
Lead	mg/L	1	1.0	102	80-120	
Manganese	mg/L	1	0.98	98	80-120	
Zinc	mg/L	1	1.0	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 688684 688685

Parameter	Units	10112795008		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Aluminum	mg/L	0.23	10	10	8.8	9.1	86	89	75-125	3	30	
Arsenic	mg/L	<0.0050	1	1	1.1	1.1	112	113	75-125	1	30	
Cadmium	mg/L	0.012	1	1	1.0	1.0	102	102	75-125	0	30	
Copper	mg/L	<0.0050	1	1	1.0	1.0	101	100	75-125	1	30	
Iron	mg/L	0.57	10	10	9.7	10.1	92	96	75-125	4	30	
Lead	mg/L	0.053	1	1	1.1	1.1	106	106	75-125	1	30	
Manganese	mg/L	4.5	1	1	5.6	5.7	106	112	75-125	1	30	
Zinc	mg/L	0.11	1	1	1.2	1.2	108	109	75-125	1	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: WETA/4763 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795008, 10112795009, 10112795010

METHOD BLANK: 210931 Matrix: Solid
 Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007,
 10112795008, 10112795009, 10112795010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	09/24/09 08:51	

LABORATORY CONTROL SAMPLE: 210932

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	1000	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210933 210934

Parameter	Units	4022862006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	2860	3810	3670	5970	7400	82	124	50-150	21	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 210935 210936

Parameter	Units	10112795005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	7080	4120	4170	11600	12200	110	124	50-150	5	30	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208
Pace Project No.: 10112795

QC Batch: MPRP/17341 Analysis Method: EPA 6020
QC Batch Method: EPA 3050 Analysis Description: 6020 MET
Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013

METHOD BLANK: 682638 Matrix: Solid
Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	<1.9	3.7	10/05/09 10:48	
Arsenic	mg/kg	<0.23	0.47	10/03/09 06:39	
Cadmium	mg/kg	<0.047	0.093	10/03/09 06:39	
Copper	mg/kg	<0.23	0.47	10/05/09 10:48	
Iron	mg/kg	<23.4	46.7	10/05/09 10:48	
Lead	mg/kg	0.13	0.093	10/05/09 10:48	P8
Manganese	mg/kg	<0.23	0.47	10/05/09 10:48	
Zinc	mg/kg	7.9	4.7	10/05/09 10:48	P8

LABORATORY CONTROL SAMPLE: 682639

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	19.4	15.1	78	75-125	
Arsenic	mg/kg	19.4	18.9	97	75-125	
Cadmium	mg/kg	19.4	19.6	101	75-125	
Copper	mg/kg	19.4	20.2	104	75-125	
Iron	mg/kg	243	240	99	75-125	
Lead	mg/kg	19.4	19.3	100	75-125	
Manganese	mg/kg	19.4	20.0	103	75-125	
Zinc	mg/kg	19.4	19.9	103	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 682640 682641

Parameter	Units	10112795001		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Aluminum	mg/kg	29000	21.5	21	31200	32500	10117	16507	70-130	4	20	M1
Arsenic	mg/kg	36.9	21.5	21	58.7	64.0	101	129	70-130	9	20	
Cadmium	mg/kg	22.4	21.5	21	43.7	44.7	99	106	70-130	2	20	
Copper	mg/kg	125	21.5	21	173	171	222	221	70-130	1	20	M1
Iron	mg/kg	30300	270	264	31400	34200	407	1498	70-130	9	20	M1
Lead	mg/kg	310	21.5	21	335	325	118	70	70-130	3	20	
Manganese	mg/kg	5130	21.5	21	4710	4790	-1933	-1607	70-130	2	20	M1
Zinc	mg/kg	3060	21.5	21	3310	2890	1141	-829	70-130	14	20	M1

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

MATRIX SPIKE SAMPLE:		682642					
Parameter	Units	10112795011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	9790	16.6	12600	16787	70-130	M1
Arsenic	mg/kg	30.3	16.6	48.8	112	70-130	
Cadmium	mg/kg	1.8	16.6	20.1	110	70-130	
Copper	mg/kg	69.5	16.6	102	194	70-130	M1
Iron	mg/kg	22300	208	22500	118	70-130	
Lead	mg/kg	56.9	16.6	81.9	150	70-130	M1
Manganese	mg/kg	903	16.6	820	-498	70-130	M1
Zinc	mg/kg	346	16.6	430	506	70-130	M1

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MT/2864

Analysis Method: ASA 103.2

QC Batch Method: ASA 103.2

Analysis Description: ASA 103.2 pH saturated paste

Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020

SAMPLE DUPLICATE: 685577

Parameter	Units	10112795003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	6.4	6.4	1	3	

SAMPLE DUPLICATE: 685578

Parameter	Units	10112795020 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	6.4	6.4	1	3	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MT/2920

Analysis Method: LECO

QC Batch Method: LECO

Analysis Description: Sulfur Analysis Montana

Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

METHOD BLANK: 688894

Matrix: Solid

Associated Lab Samples: 10112795001, 10112795002, 10112795003, 10112795004, 10112795005, 10112795006, 10112795007, 10112795008, 10112795009, 10112795010, 10112795011, 10112795012, 10112795013, 10112795014, 10112795015, 10112795016, 10112795017, 10112795018, 10112795019, 10112795020, 10112795021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfur	% (w/w)	<0.037	0.050	09/30/09 15:41	

SAMPLE DUPLICATE: 688895

Parameter	Units	10112795003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	13.7	14.3	5	20	

SAMPLE DUPLICATE: 688896

Parameter	Units	10112795013 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	0.090	0.087	12	20	

QUALITY CONTROL DATA

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

QC Batch: MT/2930

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10112795021

SAMPLE DUPLICATE: 689820

Parameter	Units	10112795021 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.9	6.9	0	20	

QUALIFIERS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

10M Total Carbon result of

3070 mg/Kg,

MDL 566 mg/Kg,

RDL 2020 mg/Kg.

11M Total Carbon result of

368 mg/Kg,

MDL 70.3 mg/Kg,

RDL 251 mg/Kg.

12M Total Carbon result of

44500 mg/Kg,

MDL 2240 mg/Kg,

RDL 8000 mg/Kg.

13M Total Carbon result of

5670 mg/Kg,

MDL 283 mg/Kg,

RDL 1010 mg/Kg.

14M Total Carbon result of

629 mg/Kg,

MDL 70.5 mg/Kg,

RDL 252 mg/Kg.

QUALIFIERS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

ANALYTE QUALIFIERS

15M	Total Carbon result of 6320 mg/Kg, MDL 280 mg/Kg, RDL 1000 mg/Kg.
16M	Total Carbon result of 808 mg/Kg, MDL 70.4 mg/Kg, RDL 252 mg/Kg.
17M	Total Carbon result of 8130 mg/Kg, MDL 544 mg/Kg, RDL 1940 mg/Kg.
18M	Total Carbon result of 8590 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
19M	Total Carbon result of 952 mg/Kg, MDL 70.2 mg/Kg, RDL 251 mg/Kg.
1M	Total Carbon result of 10600 mg/Kg, MDL 577 mg/Kg, RDL 2060 mg/Kg.
20M	Total Carbon result of 9520 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
21M	Total Inorganic Carbon result of 1040 mg/Kg, MDL 280 mg/Kg, RDL 1000 mg/Kg.
22M	Total Inorganic Carbon result of 2100 mg/Kg, MDL 589 mg/Kg, RDL 2100 mg/Kg.

QUALIFIERS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

ANALYTE QUALIFIERS

23M	Total Inorganic Carbon result of 22900 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
24M	Total Inorganic Carbon result of 23300 mg/Kg, MDL 2240 mg/Kg, RDL 8000 mg/Kg.
25M	Total Inorganic Carbon result of 2340 mg/Kg, MDL 283 mg/Kg, RDL 1010 mg/Kg.
26M	Total Inorganic Carbon result of 268 mg/Kg, MDL 70.2 mg/Kg, RDL 251 mg/Kg.
27M	Total Inorganic Carbon result of 3090 mg/Kg, MDL 544 mg/Kg, RDL 1940 mg/Kg.
28M	Total Inorganic Carbon result of 3400 mg/Kg, MDL 544 mg/Kg, RDL 1940 mg/Kg.
29M	Total Inorganic Carbon result of 3520 mg/Kg, MDL 577 mg/Kg, RDL 2060 mg/Kg.
2M	Total Carbon result of 12000 mg/Kg, MDL 571 mg/Kg, RDL 2040 mg/Kg.
30M	Total Inorganic Carbon result of 5420 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.

QUALIFIERS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

ANALYTE QUALIFIERS

31M	Total Inorganic Carbon result of 6450 mg/Kg, MDL 571 mg/Kg, RDL 2040 mg/Kg.
32M	Total Inorganic Carbon result of <1000 mg/Kg, MDL 280 mg/Kg, RDL 1000 mg/Kg.
33M	Total Inorganic Carbon result of <1000 mg/Kg, MDL 281 mg/Kg, RDL 1000 mg/Kg.
34M	Total Inorganic Carbon result of <2000 mg/Kg, MDL 560 mg/Kg, RDL 2000 mg/Kg.
35M	Total Inorganic Carbon result of <251 mg/Kg, MDL 70.3 mg/Kg, RDL 251 mg/Kg.
36M	Total Inorganic Carbon result of <252 mg/Kg, MDL 70.4 mg/Kg, RDL 252 mg/Kg.
37M	Total Inorganic Carbon result of <252 mg/Kg, MDL 70.5 mg/Kg, RDL 252 mg/Kg.
38M	Total Inorganic Carbon result of <985 mg/Kg, MDL 276 mg/Kg, RDL 985 mg/Kg.
3M	Total Carbon result of 12200 mg/Kg, MDL 544 mg/Kg, RDL 1940 mg/Kg.

QUALIFIERS

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

ANALYTE QUALIFIERS

4M	Total Carbon result of 1650 mg/Kg, MDL 276 mg/Kg, RDL 985 mg/Kg.
5M	Total Carbon result of 1860 mg/Kg, MDL 276 mg/Kg, RDL 985 mg/Kg.
6M	Total Carbon result of 2120 mg/Kg, MDL 276 mg/Kg, RDL 985 mg/Kg.
7M	Total Carbon result of 2510 mg/Kg, MDL 275 mg/Kg, RDL 980 mg/Kg.
8M	Total Carbon result of 26900 mg/Kg, MDL 320 mg/Kg, RDL 1143 mg/Kg.
9M	Total Carbon result of 2700 mg/Kg, MDL 280 mg/Kg, RDL 1000 mg/Kg.
B+	Analyte was detected in the associated method blank as well as in the sample.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
CU	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.
R1	RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795001	09-MHTP-5 6 1/2'	EPA 9060 Modified	WETA/4763		
10112795002	09-MHTP-5 7'	EPA 9060 Modified	WETA/4763		
10112795003	09-MHTP-6 5'	EPA 9060 Modified	WETA/4763		
10112795004	09-MHTP-6 6'	EPA 9060 Modified	WETA/4763		
10112795005	09-MHTP-6 6 1/2'	EPA 9060 Modified	WETA/4763		
10112795006	09-MHTP-7 7 1/2'	EPA 9060 Modified	WETA/4763		
10112795007	09-MHTP-7 8 1/2'	EPA 9060 Modified	WETA/4763		
10112795008	09-MHTP-1 9 1/2'	EPA 9060 Modified	WETA/4763		
10112795009	09-MHTP-1 10'	EPA 9060 Modified	WETA/4763		
10112795010	09-MHTP-1 16'	EPA 9060 Modified	WETA/4763		
10112795001	09-MHTP-5 6 1/2'	EPA 9060 Modified	WETA/4764		
10112795002	09-MHTP-5 7'	EPA 9060 Modified	WETA/4764		
10112795003	09-MHTP-6 5'	EPA 9060 Modified	WETA/4764		
10112795004	09-MHTP-6 6'	EPA 9060 Modified	WETA/4764		
10112795005	09-MHTP-6 6 1/2'	EPA 9060 Modified	WETA/4764		
10112795006	09-MHTP-7 7 1/2'	EPA 9060 Modified	WETA/4764		
10112795007	09-MHTP-7 8 1/2'	EPA 9060 Modified	WETA/4764		
10112795008	09-MHTP-1 9 1/2'	EPA 9060 Modified	WETA/4764		
10112795009	09-MHTP-1 10'	EPA 9060 Modified	WETA/4764		
10112795010	09-MHTP-1 16'	EPA 9060 Modified	WETA/4764		
10112795011	09-MHTP-2 4 1/2-5'	EPA 9060 Modified	WETA/4767		
10112795012	09-MHTP-2 5 1/2'	EPA 9060 Modified	WETA/4767		
10112795013	09-MHTP-2 6'	EPA 9060 Modified	WETA/4767		
10112795014	09-MHTP-3 7'	EPA 9060 Modified	WETA/4767		
10112795015	09-PMTP-9 8-9 1/2'	EPA 9060 Modified	WETA/4767		
10112795016	09-PMTP-9 17'	EPA 9060 Modified	WETA/4767		
10112795017	09-PMTP-8 1 1/2'	EPA 9060 Modified	WETA/4767		
10112795018	09-PMTP-2 3'	EPA 9060 Modified	WETA/4767		
10112795019	09-PMTP-6 2'	EPA 9060 Modified	WETA/4767		
10112795020	09-PMTP-6 6'	EPA 9060 Modified	WETA/4767		
10112795021	09-PMTP-7 6'	EPA 9060 Modified	WETA/4767		
10112795011	09-MHTP-2 4 1/2-5'	EPA 9060 Modified	WETA/4768		
10112795012	09-MHTP-2 5 1/2'	EPA 9060 Modified	WETA/4768		
10112795013	09-MHTP-2 6'	EPA 9060 Modified	WETA/4768		
10112795014	09-MHTP-3 7'	EPA 9060 Modified	WETA/4768		
10112795015	09-PMTP-9 8-9 1/2'	EPA 9060 Modified	WETA/4768		
10112795016	09-PMTP-9 17'	EPA 9060 Modified	WETA/4768		
10112795017	09-PMTP-8 1 1/2'	EPA 9060 Modified	WETA/4768		
10112795018	09-PMTP-2 3'	EPA 9060 Modified	WETA/4768		
10112795019	09-PMTP-6 2'	EPA 9060 Modified	WETA/4768		
10112795020	09-PMTP-6 6'	EPA 9060 Modified	WETA/4768		
10112795021	09-PMTP-7 6'	EPA 9060 Modified	WETA/4768		
10112795001	09-MHTP-5 6 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795002	09-MHTP-5 7'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795003	09-MHTP-6 5'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795004	09-MHTP-6 6'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795005	09-MHTP-6 6 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795006	09-MHTP-7 7 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795007	09-MHTP-7 8 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795008	09-MHTP-1 9 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795009	09-MHTP-1 10'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795010	09-MHTP-1 16'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795011	09-MHTP-2 4 1/2-5'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795012	09-MHTP-2 5 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795013	09-MHTP-2 6'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795014	09-MHTP-3 7'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795015	09-PMTP-9 8-9 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795016	09-PMTP-9 17'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795017	09-PMTP-8 1 1/2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795018	09-PMTP-2 3'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795019	09-PMTP-6 2'	EPA 3050	MPRP/17341	EPA 6020	ICPM/7161
10112795020	09-PMTP-6 6'	EPA 3050	MPRP/17342	EPA 6020	ICPM/7151
10112795021	09-PMTP-7 6'	EPA 3050	MPRP/17342	EPA 6020	ICPM/7151
10112795001	09-MHTP-5 6 1/2'	ASA 103.2	MT/2864		
10112795002	09-MHTP-5 7'	ASA 103.2	MT/2864		
10112795003	09-MHTP-6 5'	ASA 103.2	MT/2864		
10112795004	09-MHTP-6 6'	ASA 103.2	MT/2864		
10112795005	09-MHTP-6 6 1/2'	ASA 103.2	MT/2864		
10112795006	09-MHTP-7 7 1/2'	ASA 103.2	MT/2864		
10112795007	09-MHTP-7 8 1/2'	ASA 103.2	MT/2864		
10112795008	09-MHTP-1 9 1/2'	ASA 103.2	MT/2864		
10112795009	09-MHTP-1 10'	ASA 103.2	MT/2864		
10112795010	09-MHTP-1 16'	ASA 103.2	MT/2864		
10112795011	09-MHTP-2 4 1/2-5'	ASA 103.2	MT/2864		
10112795012	09-MHTP-2 5 1/2'	ASA 103.2	MT/2864		
10112795013	09-MHTP-2 6'	ASA 103.2	MT/2864		
10112795014	09-MHTP-3 7'	ASA 103.2	MT/2864		
10112795015	09-PMTP-9 8-9 1/2'	ASA 103.2	MT/2864		
10112795016	09-PMTP-9 17'	ASA 103.2	MT/2864		
10112795017	09-PMTP-8 1 1/2'	ASA 103.2	MT/2864		
10112795018	09-PMTP-2 3'	ASA 103.2	MT/2864		
10112795019	09-PMTP-6 2'	ASA 103.2	MT/2864		
10112795020	09-PMTP-6 6'	ASA 103.2	MT/2864		
10112795021	09-PMTP-7 6'	ASA 103.2	MT/2891		
10112795001	09-MHTP-5 6 1/2'	ASA 10-3.3	MT/2906		
10112795002	09-MHTP-5 7'	ASA 10-3.3	MT/2906		
10112795003	09-MHTP-6 5'	ASA 10-3.3	MT/2906		
10112795004	09-MHTP-6 6'	ASA 10-3.3	MT/2906		
10112795005	09-MHTP-6 6 1/2'	ASA 10-3.3	MT/2906		
10112795006	09-MHTP-7 7 1/2'	ASA 10-3.3	MT/2906		
10112795007	09-MHTP-7 8 1/2'	ASA 10-3.3	MT/2906		
10112795008	09-MHTP-1 9 1/2'	ASA 10-3.3	MT/2906		
10112795009	09-MHTP-1 10'	ASA 10-3.3	MT/2906		
10112795010	09-MHTP-1 16'	ASA 10-3.3	MT/2906		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795011	09-MHTP-2 4 1/2-5'	ASA 10-3.3	MT/2906		
10112795012	09-MHTP-2 5 1/2'	ASA 10-3.3	MT/2906		
10112795013	09-MHTP-2 6'	ASA 10-3.3	MT/2906		
10112795014	09-MHTP-3 7'	ASA 10-3.3	MT/2906		
10112795015	09-PMTP-9 8-9 1/2'	ASA 10-3.3	MT/2906		
10112795016	09-PMTP-9 17'	ASA 10-3.3	MT/2906		
10112795017	09-PMTP-8 1 1/2'	ASA 10-3.3	MT/2906		
10112795018	09-PMTP-2 3'	ASA 10-3.3	MT/2906		
10112795019	09-PMTP-6 2'	ASA 10-3.3	MT/2906		
10112795020	09-PMTP-6 6'	ASA 10-3.3	MT/2906		
10112795021	09-PMTP-7 6'	ASA 10-3.3	MT/2906		
10112795008	09-MHTP-1 9 1/2'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795009	09-MHTP-1 10'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795010	09-MHTP-1 16'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795011	09-MHTP-2 4 1/2-5'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795012	09-MHTP-2 5 1/2'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795013	09-MHTP-2 6'	EPA 3010	MPRP/17500	EPA 6010	ICP/7935
10112795001	09-MHTP-5 6 1/2'	Modified Sobek 7	MT/2918		
10112795002	09-MHTP-5 7'	Modified Sobek 7	MT/2918		
10112795003	09-MHTP-6 5'	Modified Sobek 7	MT/2918		
10112795004	09-MHTP-6 6'	Modified Sobek 7	MT/2918		
10112795005	09-MHTP-6 6 1/2'	Modified Sobek 7	MT/2918		
10112795006	09-MHTP-7 7 1/2'	Modified Sobek 7	MT/2918		
10112795007	09-MHTP-7 8 1/2'	Modified Sobek 7	MT/2918		
10112795008	09-MHTP-1 9 1/2'	Modified Sobek 7	MT/2918		
10112795009	09-MHTP-1 10'	Modified Sobek 7	MT/2918		
10112795010	09-MHTP-1 16'	Modified Sobek 7	MT/2918		
10112795011	09-MHTP-2 4 1/2-5'	Modified Sobek 7	MT/2918		
10112795012	09-MHTP-2 5 1/2'	Modified Sobek 7	MT/2918		
10112795013	09-MHTP-2 6'	Modified Sobek 7	MT/2918		
10112795014	09-MHTP-3 7'	Modified Sobek 7	MT/2918		
10112795015	09-PMTP-9 8-9 1/2'	Modified Sobek 7	MT/2918		
10112795016	09-PMTP-9 17'	Modified Sobek 7	MT/2918		
10112795017	09-PMTP-8 1 1/2'	Modified Sobek 7	MT/2918		
10112795018	09-PMTP-2 3'	Modified Sobek 7	MT/2918		
10112795019	09-PMTP-6 2'	Modified Sobek 7	MT/2918		
10112795020	09-PMTP-6 6'	Modified Sobek 7	MT/2918		
10112795021	09-PMTP-7 6'	Modified Sobek 7	MT/2918		
10112795001	09-MHTP-5 6 1/2'	LECO	MT/2920		
10112795002	09-MHTP-5 7'	LECO	MT/2920		
10112795003	09-MHTP-6 5'	LECO	MT/2920		
10112795004	09-MHTP-6 6'	LECO	MT/2920		
10112795005	09-MHTP-6 6 1/2'	LECO	MT/2920		
10112795006	09-MHTP-7 7 1/2'	LECO	MT/2920		
10112795007	09-MHTP-7 8 1/2'	LECO	MT/2920		
10112795008	09-MHTP-1 9 1/2'	LECO	MT/2920		
10112795009	09-MHTP-1 10'	LECO	MT/2920		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795010	09-MHTP-1 16'	LECO	MT/2920		
10112795011	09-MHTP-2 4 1/2-5'	LECO	MT/2920		
10112795012	09-MHTP-2 5 1/2'	LECO	MT/2920		
10112795013	09-MHTP-2 6'	LECO	MT/2920		
10112795014	09-MHTP-3 7'	LECO	MT/2920		
10112795015	09-PMTP-9 8-9 1/2'	LECO	MT/2920		
10112795016	09-PMTP-9 17'	LECO	MT/2920		
10112795017	09-PMTP-8 1 1/2'	LECO	MT/2920		
10112795018	09-PMTP-2 3'	LECO	MT/2920		
10112795019	09-PMTP-6 2'	LECO	MT/2920		
10112795020	09-PMTP-6 6'	LECO	MT/2920		
10112795021	09-PMTP-7 6'	LECO	MT/2920		
10112795001	09-MHTP-5 6 1/2'	% Moisture	MPRP/17506		
10112795002	09-MHTP-5 7'	% Moisture	MPRP/17506		
10112795003	09-MHTP-6 5'	% Moisture	MPRP/17506		
10112795004	09-MHTP-6 6'	% Moisture	MPRP/17506		
10112795005	09-MHTP-6 6 1/2'	% Moisture	MPRP/17506		
10112795006	09-MHTP-7 7 1/2'	% Moisture	MPRP/17506		
10112795007	09-MHTP-7 8 1/2'	% Moisture	MPRP/17506		
10112795008	09-MHTP-1 9 1/2'	% Moisture	MPRP/17506		
10112795009	09-MHTP-1 10'	% Moisture	MPRP/17506		
10112795010	09-MHTP-1 16'	% Moisture	MPRP/17506		
10112795011	09-MHTP-2 4 1/2-5'	% Moisture	MPRP/17506		
10112795012	09-MHTP-2 5 1/2'	% Moisture	MPRP/17506		
10112795013	09-MHTP-2 6'	% Moisture	MPRP/17506		
10112795014	09-MHTP-3 7'	% Moisture	MPRP/17506		
10112795015	09-PMTP-9 8-9 1/2'	% Moisture	MPRP/17506		
10112795016	09-PMTP-9 17'	% Moisture	MPRP/17506		
10112795017	09-PMTP-8 1 1/2'	% Moisture	MPRP/17506		
10112795018	09-PMTP-2 3'	% Moisture	MPRP/17506		
10112795019	09-PMTP-6 2'	% Moisture	MPRP/17506		
10112795020	09-PMTP-6 6'	% Moisture	MPRP/17506		
10112795021	09-PMTP-7 6'	% Moisture	MPRP/17507		
10112795001	09-MHTP-5 6 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795002	09-MHTP-5 7'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795003	09-MHTP-6 5'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795004	09-MHTP-6 6'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795005	09-MHTP-6 6 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795006	09-MHTP-7 7 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795007	09-MHTP-7 8 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795014	09-MHTP-3 7'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795015	09-PMTP-9 8-9 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795016	09-PMTP-9 17'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795017	09-PMTP-8 1 1/2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795018	09-PMTP-2 3'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795019	09-PMTP-6 2'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795020	09-PMTP-6 6'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795021	09-PMTP-7 6'	EPA 3010	MPRP/17521	EPA 6010	ICP/7945
10112795001	09-MHTP-5 6 1/2'	Modified Sobek 7	MT/2929		
10112795002	09-MHTP-5 7'	Modified Sobek 7	MT/2929		
10112795003	09-MHTP-6 5'	Modified Sobek 7	MT/2929		
10112795004	09-MHTP-6 6'	Modified Sobek 7	MT/2929		
10112795005	09-MHTP-6 6 1/2'	Modified Sobek 7	MT/2929		
10112795006	09-MHTP-7 7 1/2'	Modified Sobek 7	MT/2929		
10112795007	09-MHTP-7 8 1/2'	Modified Sobek 7	MT/2929		
10112795008	09-MHTP-1 9 1/2'	Modified Sobek 7	MT/2929		
10112795009	09-MHTP-1 10'	Modified Sobek 7	MT/2929		
10112795010	09-MHTP-1 16'	Modified Sobek 7	MT/2929		
10112795011	09-MHTP-2 4 1/2-5'	Modified Sobek 7	MT/2929		
10112795012	09-MHTP-2 5 1/2'	Modified Sobek 7	MT/2929		
10112795013	09-MHTP-2 6'	Modified Sobek 7	MT/2929		
10112795014	09-MHTP-3 7'	Modified Sobek 7	MT/2929		
10112795015	09-PMTP-9 8-9 1/2'	Modified Sobek 7	MT/2929		
10112795016	09-PMTP-9 17'	Modified Sobek 7	MT/2929		
10112795017	09-PMTP-8 1 1/2'	Modified Sobek 7	MT/2929		
10112795018	09-PMTP-2 3'	Modified Sobek 7	MT/2929		
10112795019	09-PMTP-6 2'	Modified Sobek 7	MT/2929		
10112795020	09-PMTP-6 6'	Modified Sobek 7	MT/2929		
10112795021	09-PMTP-7 6'	Modified Sobek 7	MT/2930		
10112795001	09-MHTP-5 6 1/2'	Modified Sobek 7	MT/2937		
10112795002	09-MHTP-5 7'	Modified Sobek 7	MT/2937		
10112795003	09-MHTP-6 5'	Modified Sobek 7	MT/2937		
10112795004	09-MHTP-6 6'	Modified Sobek 7	MT/2937		
10112795005	09-MHTP-6 6 1/2'	Modified Sobek 7	MT/2937		
10112795006	09-MHTP-7 7 1/2'	Modified Sobek 7	MT/2937		
10112795007	09-MHTP-7 8 1/2'	Modified Sobek 7	MT/2937		
10112795008	09-MHTP-1 9 1/2'	Modified Sobek 7	MT/2937		
10112795009	09-MHTP-1 10'	Modified Sobek 7	MT/2937		
10112795010	09-MHTP-1 16'	Modified Sobek 7	MT/2937		
10112795011	09-MHTP-2 4 1/2-5'	Modified Sobek 7	MT/2937		
10112795012	09-MHTP-2 5 1/2'	Modified Sobek 7	MT/2937		
10112795013	09-MHTP-2 6'	Modified Sobek 7	MT/2937		
10112795014	09-MHTP-3 7'	Modified Sobek 7	MT/2937		
10112795015	09-PMTP-9 8-9 1/2'	Modified Sobek 7	MT/2937		
10112795016	09-PMTP-9 17'	Modified Sobek 7	MT/2937		
10112795017	09-PMTP-8 1 1/2'	Modified Sobek 7	MT/2937		
10112795018	09-PMTP-2 3'	Modified Sobek 7	MT/2937		
10112795019	09-PMTP-6 2'	Modified Sobek 7	MT/2937		
10112795020	09-PMTP-6 6'	Modified Sobek 7	MT/2937		
10112795021	09-PMTP-7 6'	Modified Sobek 7	MT/2937		
10112795001	09-MHTP-5 6 1/2'	Modified Sobek 7	MT/2947		
10112795002	09-MHTP-5 7'	Modified Sobek 7	MT/2947		
10112795003	09-MHTP-6 5'	Modified Sobek 7	MT/2947		
10112795004	09-MHTP-6 6'	Modified Sobek 7	MT/2947		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC- Mike Horse 09208

Pace Project No.: 10112795

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10112795005	09-MHTP-6 6 1/2'	Modified Sobek 7	MT/2947		
10112795006	09-MHTP-7 7 1/2'	Modified Sobek 7	MT/2947		
10112795007	09-MHTP-7 8 1/2'	Modified Sobek 7	MT/2947		
10112795008	09-MHTP-1 9 1/2'	Modified Sobek 7	MT/2947		
10112795009	09-MHTP-1 10'	Modified Sobek 7	MT/2947		
10112795010	09-MHTP-1 16'	Modified Sobek 7	MT/2947		
10112795011	09-MHTP-2 4 1/2-5'	Modified Sobek 7	MT/2947		
10112795012	09-MHTP-2 5 1/2'	Modified Sobek 7	MT/2947		
10112795013	09-MHTP-2 6'	Modified Sobek 7	MT/2947		
10112795014	09-MHTP-3 7'	Modified Sobek 7	MT/2947		
10112795015	09-PMTP-9 8-9 1/2'	Modified Sobek 7	MT/2947		
10112795016	09-PMTP-9 17'	Modified Sobek 7	MT/2947		
10112795017	09-PMTP-8 1 1/2'	Modified Sobek 7	MT/2947		
10112795018	09-PMTP-2 3'	Modified Sobek 7	MT/2947		
10112795019	09-PMTP-6 2'	Modified Sobek 7	MT/2947		
10112795020	09-PMTP-6 6'	Modified Sobek 7	MT/2947		
10112795021	09-PMTP-7 6'	Modified Sobek 7	MT/2947		

October 14, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC Mike Horse 09208
Pace Project No.: 10113726

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 30, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

Page 1 of 91

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CERTIFICATIONS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Florida/NELAP Certification #: E87605

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Minnesota Certification #: 027-053-137

Montana Certification #: MT CERT0092

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Washington Certification #: C754

Tennessee Certification #: 02818

Montana Certification IDs

Idaho Certification #: MT00012

EPA Region 8 Certification #: 8TMS-Q

602 South 25th Street Billings, MT 59101

Montana Certification #: MT CERT0040

Green Bay Certification IDs

New York Certification #: 11887

New York Certification #: 11888

North Carolina Certification #: 503

North Dakota Certification #: R-150

South Carolina Certification #: 83006001

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

1241 Bellevue Street Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Minnesota Certification #: 055-999-334

Louisiana Certification #: 04168

California Certification #: 09268CA

Kentucky Certification #: 82

Kentucky Certification #: 83

SAMPLE SUMMARY

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10113726001	09-PMTP-3 9'	Solid	09/11/09 00:00	09/30/09 10:35
10113726002	09-PMTP-11 12-14'	Solid	09/14/09 00:00	09/30/09 10:35
10113726003	09-PMTP-11 9-10'	Solid	09/14/09 00:00	09/30/09 10:35
10113726004	09-PMTP-10 3'	Solid	09/11/09 00:00	09/30/09 10:35
10113726005	09-PMTP-3 4'	Solid	09/11/09 00:00	09/30/09 10:35
10113726006	09-PMTP-3 7'	Solid	09/11/09 00:00	09/30/09 10:35
10113726007	09-PMTP-10 1 1/2-2 1/2'	Solid	09/11/09 00:00	09/30/09 10:35
10113726008	09-MHTP-5 51/2	Solid	09/09/09 00:00	09/30/09 10:35
10113726009	09-PMTP-7 2'	Solid	09/11/09 00:00	09/30/09 10:35
10113726010	09-SGTP-1 11'	Solid	09/14/09 00:00	09/30/09 10:35
10113726011	09-SGTP-1 12'	Solid	09/14/09 00:00	09/30/09 10:35
10113726012	09-SGTP-2 3'	Solid	09/14/09 00:00	09/30/09 10:35
10113726013	09-SGTP-2 5'	Solid	09/14/09 00:00	09/30/09 10:35
10113726014	09-SGTP-2 8'	Solid	09/14/09 00:00	09/30/09 10:35
10113726015	09-SGTP-3 6'	Solid	09/15/09 00:00	09/30/09 10:35
10113726016	09-SGTP-3 16'	Solid	09/15/09 00:00	09/30/09 10:35
10113726017	09-SGTP-4 2'	Solid	09/15/09 00:00	09/30/09 10:35
10113726018	09-SGTP-4 6'	Solid	09/15/09 00:00	09/30/09 10:35
10113726019	09-SGTP-4 12'	Solid	09/15/09 00:00	09/30/09 10:35
10113726020	09-SGTP-5 9'	Solid	09/15/09 00:00	09/30/09 10:35

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10113726001	09-PMTP-3 9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726002	09-PMTP-11 12-14'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726003	09-PMTP-11 9-10'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726004	09-PMTP-10 3'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726005	09-PMTP-3 4'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726006	09-PMTP-3 7'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726007	09-PMTP-10 1 1/2-2 1/2'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726008	09-MHTP-5 51/2	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726009	09-PMTP-7 2'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208
Pace Project No.: 10113726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10113726010	09-SGTP-1 11'	LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
10113726011	09-SGTP-1 12'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
10113726012	09-SGTP-2 3'	EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
10113726013	09-SGTP-2 5'	EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
10113726014	09-SGTP-2 8'	ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726015	09-SGTP-3 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726016	09-SGTP-3 16'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726017	09-SGTP-4 2'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726018	09-SGTP-4 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726019	09-SGTP-4 12'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113726020	09-SGTP-5 9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	CR1	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17723

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 694521)
- Zinc

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17723

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113726001,10113726020

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 694523)
 - Aluminum
- MSD (Lab ID: 694524)
 - Aluminum

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- MS (Lab ID: 694525)
 - Aluminum
 - Iron

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17723

- 09-MHTP-5 51/2' (Lab ID: 10113726008)
 - Zinc
- 09-PMTP-10 1 1/2-2 1/2' (Lab ID: 10113726007)
 - Zinc
- 09-PMTP-10 3' (Lab ID: 10113726004)
 - Zinc
- 09-PMTP-11 12-14' (Lab ID: 10113726002)
 - Zinc
- 09-PMTP-11 9-10' (Lab ID: 10113726003)
 - Zinc
- 09-SGTP-4 12' (Lab ID: 10113726019)
 - Zinc
- 09-SGTP-4 2' (Lab ID: 10113726017)
 - Zinc
- 09-SGTP-4 6' (Lab ID: 10113726018)
 - Zinc
- 09-SGTP-5 9' (Lab ID: 10113726020)
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208
Pace Project No.: 10113726

Method: EPA 6020
Description: 6020 MET ICPMS
Client: Montana Dept. of Environmental Quality
Date: October 14, 2009

General Information:

20 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

QC Batch: MPRP/17627

IR: The internal standard recovery associated with this result exceeds the upper control limit. The reported result should be considered an estimated value.

- 09-PMTP-11 12-14' (Lab ID: 10113726002)
 - Aluminum
 - Iron
 - Manganese
- 09-SGTP-3 16' (Lab ID: 10113726016)
 - Aluminum
 - Iron
 - Manganese
- MS (Lab ID: 692037)
 - Aluminum
 - Iron
 - Manganese
- MS (Lab ID: 692039)
 - Aluminum
 - Iron
 - Manganese

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17627

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 692035)

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

QC Batch: MPRP/17627

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- Manganese

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17627

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113726001,10113726011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 692037)
 - Aluminum
 - Copper
 - Iron
 - Lead
 - Manganese
- MS (Lab ID: 692039)
 - Aluminum
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc
- MSD (Lab ID: 692038)
 - Aluminum
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17627

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- 09-SGTP-1 11' (Lab ID: 10113726010)
 - Cadmium

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: MPRP/17627

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- 09-SGTP-2 3' (Lab ID: 10113726012)
 - Cadmium
- 09-SGTP-2 5' (Lab ID: 10113726013)
 - Cadmium
- 09-SGTP-2 8' (Lab ID: 10113726014)
 - Cadmium
- 09-SGTP-3 16' (Lab ID: 10113726016)
 - Cadmium
- 09-SGTP-3 6' (Lab ID: 10113726015)
 - Cadmium

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- 09-MHTP-5 51/2 (Lab ID: 10113726008)
 - Manganese
 - Lead
 - Zinc
- 09-PMTP-10 3' (Lab ID: 10113726004)
 - Manganese
- MS (Lab ID: 692037)
 - Aluminum
 - Iron
 - Lead
 - Iron
- MSD (Lab ID: 692038)
 - Aluminum
 - Iron
 - Lead

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: % Moisture

Description: Dry Weight

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: ASA 103.2

Description: ASA 103.2 pH

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for ASA 103.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: LECO

Description: Sulfur analysis Montana

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for LECO. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

20 samples were analyzed for EPA 9060 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/4877

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113726011

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 216255)
 - Mean Total Organic Carbon
- MSD (Lab ID: 216256)
 - Mean Total Organic Carbon

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/4875

12M: Total Carbon result of 1200 mg/Kg

MDL 88.3 mg/Kg

RDL 315 mg/Kg

- 09-SGTP-1 11' (Lab ID: 10113726010)
 - Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4875

13M: Total Carbon result of 1680 mg/Kg

MDL 142 mg/Kg

RDL 506 mg/Kg

- 09-PMTP-11 9-10' (Lab ID: 10113726003)
- Mean Total Organic Carbon

14M: Total Carbon result of 1780 mg/Kg

MDL 70.6 mg/Kg

RDL 252 mg/Kg

- 09-PMTP-11 12-14' (Lab ID: 10113726002)
- Mean Total Organic Carbon

15M: Total Carbon result of 1810 mg/Kg

MDL 71.5 mg/Kg

RDL 255 mg/Kg

- 09-PMTP-3 4' (Lab ID: 10113726005)
- Mean Total Organic Carbon

16M: Total Carbon result of 2280 mg/Kg

MDL 134 mg/Kg

RDL 477 mg/Kg

- 09-PMTP-10 3' (Lab ID: 10113726004)
- Mean Total Organic Carbon

17M: Total Carbon result of 25600 mg/Kg

MDL 1000 mg/Kg

RDL 3570 mg/Kg

- 09-MHTP-5 51/2 (Lab ID: 10113726008)
- Mean Total Organic Carbon

18M: Total Carbon result of 3280 mg/Kg

MDL 144 mg/Kg

RDL 515 mg/Kg

- 09-PMTP-7 2' (Lab ID: 10113726009)
- Mean Total Organic Carbon

19M: Total Carbon result of 402 mg/Kg

MDL 88.3 mg/Kg

RDL 315 mg/Kg

- 09-SGTP-1 11' (Lab ID: 10113726010)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4875

20M: Total Carbon result of 5570 mg/Kg

MDL 286 mg/Kg

RDL 1020 mg/Kg

- 09-PMTP-10 1 1/2-2 1/2' (Lab ID: 10113726007)
- Mean Total Organic Carbon

21M: Total Carbon result of 749 mg/Kg

MDL 72.0 mg/Kg

RDL 257 mg/Kg

- 09-PMTP-3 7' (Lab ID: 10113726006)
- Mean Total Organic Carbon

22M: Total Carbon result of 772 mg/Kg

MDL 71.5 mg/Kg

RDL 255 mg/Kg

- 09-PMTP-3 9' (Lab ID: 10113726001)
- Mean Total Organic Carbon

32M: Total Inorganic Carbon result of 1020 mg/Kg

MDL 134 mg/Kg

RDL 477 mg/Kg

- 09-PMTP-10 3' (Lab ID: 10113726004)
- Mean Total Organic Carbon

33M: Total Inorganic Carbon result of 1850 mg/Kg

MDL 514 mg/Kg

RDL 1840 mg/Kg

- 09-PMTP-10 1 1/2-2 1/2' (Lab ID: 10113726007)
- Mean Total Organic Carbon

34M: Total Inorganic Carbon result of 19260 mg/Kg

MDL 1000 mg/Kg

RDL 3570 mg/Kg

- 09-MHTP-5 51/2 (Lab ID: 10113726008)
- Mean Total Organic Carbon

35M: Total Inorganic Carbon result of 268 mg/Kg

MDL 72.0 mg/Kg

RDL 257 mg/Kg

- 09-PMTP-3 7' (Lab ID: 10113726006)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4875

36M: Total Inorganic Carbon result of 550 mg/Kg

MDL 71.5 mg/Kg

RDL 255 mg/Kg

- 09-PMTP-3 4' (Lab ID: 10113726005)
- Mean Total Organic Carbon

37M: Total Inorganic Carbon result of 836 mg/Kg

MDL 70.9 mg/Kg

RDL 253 mg/Kg

- 09-PMTP-11 12-14' (Lab ID: 10113726002)
- Mean Total Organic Carbon

38M: Total Inorganic Carbon result of 862 mg/Kg

MDL 142 mg/Kg

RDL 506 mg/Kg

- 09-PMTP-11 9-10' (Lab ID: 10113726003)
- Mean Total Organic Carbon

39M: Total Inorganic Carbon result of <1000 mg/Kg

MDL 144 mg/Kg

RDL 515 mg/Kg

- 09-PMTP-3 9' (Lab ID: 10113726001)
- Mean Total Organic Carbon

40M: Total Inorganic Carbon result of <995 mg/Kg

MDL 279 mg/Kg

RDL 995 mg/Kg

- 09-PMTP-7 2' (Lab ID: 10113726009)
- Mean Total Organic Carbon

QC Batch: WETA/4877

10M: Total Carbon Result of 839 mg/Kg

MDL 70.2 mg/Kg

RDL 251 mg/Kg

- 09-SGTP-3 16' (Lab ID: 10113726016)
- Mean Total Organic Carbon

11M: Total Carbon Result of 8830 mg/Kg

MDL 596 mg/Kg

RDL 2130 mg/Kg

- 09-SGTP-4 2' (Lab ID: 10113726017)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4877

1M: Total Carbon Result of 1070 mg/Kg

MDL 70.3 mg/Kg

RDL 251 mg/Kg

- 09-SGTP-2 5' (Lab ID: 10113726013)
- Mean Total Organic Carbon

23M: Total Inorganic Carbon Result of 1000 mg/Kg

MDL 139 mg/Kg

RDL 498 mg/Kg

- 09-SGTP-5 9' (Lab ID: 10113726020)
- Mean Total Organic Carbon

24M: Total Inorganic Carbon Result of 314 mg/Kg

MDL 71.1 mg/Kg

RDL 254 mg/Kg

- 09-SGTP-4 6' (Lab ID: 10113726018)
- Mean Total Organic Carbon

25M: Total Inorganic Carbon Result of 3920 mg/Kg

MDL 596 mg/Kg

RDL 2130 mg/Kg

- 09-SGTP-4 2' (Lab ID: 10113726017)
- Mean Total Organic Carbon

26M: Total Inorganic Carbon Result of 539 mg/Kg

MDL 137 mg/Kg

RDL 489 mg/Kg

- 09-SGTP-1 12' (Lab ID: 10113726011)
- Mean Total Organic Carbon

27M: Total Inorganic Carbon Result of <252 mg/Kg

MDL 70.5 mg/Kg

RDL 252 mg/Kg

- 09-SGTP-2 8' (Lab ID: 10113726014)
- Mean Total Organic Carbon

28M: Total Inorganic Carbon Result of <253 mg/Kg

MDL 70.9 mg/Kg

RDL 253 mg/Kg

- 09-SGTP-2 5' (Lab ID: 10113726013)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4877

29M: Total Inorganic Carbon Result of <253 mg/Kg

MDL 71.0 mg/Kg

RDL 253 mg/Kg

- 09-SGTP-3 16' (Lab ID: 10113726016)
- Mean Total Organic Carbon

2M: Total Carbon Result of 1090 mg/Kg

MDL 70.2 mg/Kg

RDL 251 mg/Kg

- 09-SGTP-4 12' (Lab ID: 10113726019)
- Mean Total Organic Carbon

30M: Total Inorganic Carbon Result of <254 mg/Kg

MDL 71.2 mg/Kg

RDL 254 mg/Kg

- 09-SGTP-2 3' (Lab ID: 10113726012)
- Mean Total Organic Carbon

31M: Total Inorganic Carbon Result of <255 mg/Kg

MDL 71.3 mg/Kg

RDL 255 mg/Kg

- 09-SGTP-3 6' (Lab ID: 10113726015)
- Mean Total Organic Carbon

3M: Total Carbon Result of 1090 mg/Kg

MDL 70.5 mg/Kg

RDL 252 mg/Kg

- 09-SGTP-4 6' (Lab ID: 10113726018)
- Mean Total Organic Carbon

41M: Total organic carbon result greater than total carbon result.

- 09-SGTP-2 5' (Lab ID: 10113726013)
- Mean Total Organic Carbon
- 09-SGTP-2 8' (Lab ID: 10113726014)
- Mean Total Organic Carbon

4M: Total Carbon Result of 1130 mg/Kg

MDL 93.6 mg/Kg

RDL 334 mg/Kg

- 09-SGTP-1 12' (Lab ID: 10113726011)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4877

5M: Total Carbon Result of 1240 mg/Kg

MDL 71.2 mg/Kg

RDL 254 mg/Kg

- 09-SGTP-2 3' (Lab ID: 10113726012)
- Mean Total Organic Carbon

6M: Total Carbon Result of 1480 mg/Kg

MDL 71.3 mg/Kg

RDL 255 mg/Kg

- 09-SGTP-3 6' (Lab ID: 10113726015)
- Mean Total Organic Carbon

7M: Total Carbon Result of 2330 mg/Kg

MDL 139 mg/Kg

RDL 498 mg/Kg

- 09-SGTP-5 9' (Lab ID: 10113726020)
- Mean Total Organic Carbon

8M: Total Carbon Result of 375 mg/Kg

MDL 71.6 mg/Kg

RDL 256 mg/Kg

- 09-SGTP-4 12' (Lab ID: 10113726019)
- Mean Total Organic Carbon

9M: Total Carbon Result of 684 mg/Kg

MDL 70.5 mg/Kg

RDL 252 mg/Kg

- 09-SGTP-2 8' (Lab ID: 10113726014)
- Mean Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 9' **Lab ID:** 10113726001 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	22.8	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 15:33	7429-90-5	M0
Arsenic	0.011	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:33	7440-38-2	
Cadmium	0.0018	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 15:33	7440-43-9	
Copper	0.11	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:33	7440-50-8	
Iron	19.5	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 15:33	7439-89-6	
Lead	0.20	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 15:33	7439-92-1	
Manganese	0.26	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 15:33	7439-96-5	
Zinc	0.10	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 15:33	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	33200	mg/kg	39.3	19.7	200	10/13/09 18:34	10/14/09 11:37	7429-90-5	M1
Arsenic	14.3	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 11:37	7440-38-2	
Cadmium	0.68J	mg/kg	0.98	0.49	200	10/13/09 18:34	10/14/09 11:37	7440-43-9	
Copper	258	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 11:37	7440-50-8	M1
Iron	63400	mg/kg	492	246	200	10/13/09 18:34	10/14/09 11:37	7439-89-6	M1
Lead	607	mg/kg	0.98	0.49	200	10/13/09 18:34	10/14/09 11:37	7439-92-1	M1
Manganese	379	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 11:37	7439-96-5	M1
Zinc	141	mg/kg	49.2	24.6	200	10/13/09 18:34	10/14/09 11:37	7440-66-6	M1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.6	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.2	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.0	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.7	tons/1000	0.0		1		10/14/09 09:19		
Acid Potential	0.21	tons/1000	0.50		1		10/14/09 09:19		
Lime Requirement	2.5	tons/1000	0.0		1		10/14/09 09:19		
SMP Lime Requirement	1.8	tons/1000	0.0		1		10/14/09 09:19		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.7	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 9' **Lab ID: 10113726001** Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.16	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 14:27		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1540	mg/kg	513	144	1		10/06/09 10:09	7440-44-0	
Total Organic Carbon	715	mg/kg	518	145	1		10/06/09 10:15	7440-44-0	
Mean Total Organic Carbon	1130	mg/kg	515	144	1		10/06/09 10:15	7440-44-0	22M, 39M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-11 12-14' **Lab ID:** 10113726002 **Collected:** 09/14/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	11.6	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 15:47	7429-90-5	
Arsenic	0.037	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:47	7440-38-2	
Cadmium	0.0082	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 15:47	7440-43-9	
Copper	0.43	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:47	7440-50-8	
Iron	44.8	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 15:47	7439-89-6	
Lead	0.042	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 15:47	7439-92-1	
Manganese	1.6	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 15:47	7439-96-5	
Zinc	0.74	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 15:47	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	11000	mg/kg	35.3	17.6	200	10/13/09 18:34	10/14/09 11:56	7429-90-5	IR
Arsenic	20.5	mg/kg	4.4	2.2	200	10/13/09 18:34	10/14/09 11:56	7440-38-2	
Cadmium	8.3	mg/kg	0.88	0.44	200	10/13/09 18:34	10/14/09 11:56	7440-43-9	
Copper	758	mg/kg	4.4	2.2	200	10/13/09 18:34	10/14/09 11:56	7440-50-8	
Iron	67600	mg/kg	441	221	200	10/13/09 18:34	10/14/09 11:56	7439-89-6	IR
Lead	78.1	mg/kg	0.88	0.44	200	10/13/09 18:34	10/14/09 11:56	7439-92-1	
Manganese	2020	mg/kg	4.4	2.2	200	10/13/09 18:34	10/14/09 11:56	7439-96-5	IR
Zinc	1200	mg/kg	44.1	22.1	200	10/13/09 18:34	10/14/09 11:56	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	13.5	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	7.6	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	7.2	tons/1000	0.0		1		10/14/09 09:20		
Acid Potential	0.41	tons/1000	0.50		1		10/14/09 09:20		
Lime Requirement	0.88	tons/1000	0.0		1		10/14/09 09:20		
SMP Lime Requirement	0.30	tons/1000	0.0		1		10/14/09 09:20		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-11 12-14' **Lab ID:** 10113726002 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.076	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 14:44		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1070	mg/kg	254	71.2	1		10/06/09 10:48	7440-44-0	
Total Organic Carbon	821	mg/kg	252	70.5	1		10/06/09 10:54	7440-44-0	
Mean Total Organic Carbon	944	mg/kg	253	70.9	1		10/06/09 10:54	7440-44-0	14M, 37M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-11 9-10' **Lab ID:** 10113726003 **Collected:** 09/14/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	18.1	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 15:54	7429-90-5	
Arsenic	0.071	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:54	7440-38-2	
Cadmium	0.0070	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 15:54	7440-43-9	
Copper	0.83	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 15:54	7440-50-8	
Iron	58.8	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 15:54	7439-89-6	
Lead	0.019	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 15:54	7439-92-1	
Manganese	0.77	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 15:54	7439-96-5	
Zinc	0.73	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 15:54	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	28500	mg/kg	39.6	19.8	200	10/13/09 18:34	10/14/09 12:01	7429-90-5	
Arsenic	116	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 12:01	7440-38-2	
Cadmium	2.2	mg/kg	0.99	0.49	200	10/13/09 18:34	10/14/09 12:01	7440-43-9	
Copper	2380	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 12:01	7440-50-8	
Iron	211000	mg/kg	494	247	200	10/13/09 18:34	10/14/09 12:01	7439-89-6	
Lead	12.0	mg/kg	0.99	0.49	200	10/13/09 18:34	10/14/09 12:01	7439-92-1	
Manganese	1590	mg/kg	4.9	2.5	200	10/13/09 18:34	10/14/09 12:01	7439-96-5	
Zinc	2330	mg/kg	49.4	24.7	200	10/13/09 18:34	10/14/09 12:01	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.8	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.0	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	14.1	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	13.6	tons/1000	0.0		1		10/14/09 09:20		
Acid Potential	0.46	tons/1000	0.50		1		10/14/09 09:20		
Lime Requirement	0.95	tons/1000	0.0		1		10/14/09 09:20		
SMP Lime Requirement	0.30	tons/1000	0.0		1		10/14/09 09:20		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-11 9-10' **Lab ID:** 10113726003 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.073	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 14:57		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	865	mg/kg	252	70.5	1		10/06/09 11:00	7440-44-0	
Total Organic Carbon	772	mg/kg	253	70.7	1		10/06/09 11:04	7440-44-0	
Mean Total Organic Carbon	818	mg/kg	252	70.6	1		10/06/09 11:04	7440-44-0	13M, 38M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-10 3' **Lab ID: 10113726004** Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	29.0	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:00	7429-90-5	
Arsenic	0.014	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:00	7440-38-2	
Cadmium	0.0064	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:00	7440-43-9	
Copper	0.37	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:00	7440-50-8	
Iron	37.4	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:00	7439-89-6	
Lead	0.64	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:00	7439-92-1	
Manganese	2.8	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:00	7439-96-5	
Zinc	0.52	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:00	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	43600	mg/kg	36.3	18.1	200	10/13/09 18:34	10/14/09 12:05	7429-90-5	
Arsenic	6.7	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 12:05	7440-38-2	
Cadmium	10.4	mg/kg	0.91	0.45	200	10/13/09 18:34	10/14/09 12:05	7440-43-9	
Copper	759	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 12:05	7440-50-8	
Iron	94100	mg/kg	453	227	200	10/13/09 18:34	10/14/09 12:05	7439-89-6	
Lead	1820	mg/kg	0.91	0.45	200	10/13/09 18:34	10/14/09 12:05	7439-92-1	
Manganese	4800	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 12:05	7439-96-5	E
Zinc	1070	mg/kg	45.3	22.7	200	10/13/09 18:34	10/14/09 12:05	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	6.5	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.3	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	8.4	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	8.0	tons/1000	0.0		1		10/14/09 09:21		
Acid Potential	0.41	tons/1000	0.50		1		10/14/09 09:21		
Lime Requirement	0.88	tons/1000	0.0		1		10/14/09 09:21		
SMP Lime Requirement	0.30	tons/1000	0.0		1		10/14/09 09:21		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-10 3' **Lab ID:** 10113726004 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.14	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 15:20		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1200	mg/kg	253	70.7	1		10/06/09 11:08	7440-44-0	
Total Organic Carbon	1320	mg/kg	253	70.9	1		10/06/09 11:13	7440-44-0	
Mean Total Organic Carbon	1260	mg/kg	253	70.8	1		10/06/09 11:13	7440-44-0	16M, 32M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 4' **Lab ID:** 10113726005 **Collected:** 09/11/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	17.3	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:14	7429-90-5	
Arsenic	0.019	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:14	7440-38-2	
Cadmium	0.0026	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:14	7440-43-9	
Copper	0.091	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:14	7440-50-8	
Iron	21.3	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:14	7439-89-6	
Lead	0.42	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:14	7439-92-1	
Manganese	0.23	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:14	7439-96-5	
Zinc	0.069	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:14	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	38900	mg/kg	36.5	18.3	200	10/13/09 18:34	10/14/09 12:10	7429-90-5	
Arsenic	26.1	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:10	7440-38-2	
Cadmium	0.80J	mg/kg	0.91	0.46	200	10/13/09 18:34	10/14/09 12:10	7440-43-9	
Copper	239	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:10	7440-50-8	
Iron	62600	mg/kg	456	228	200	10/13/09 18:34	10/14/09 12:10	7439-89-6	
Lead	1160	mg/kg	0.91	0.46	200	10/13/09 18:34	10/14/09 12:10	7439-92-1	
Manganese	593	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:10	7439-96-5	
Zinc	199	mg/kg	45.6	22.8	200	10/13/09 18:34	10/14/09 12:10	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.6	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.2	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	4.9	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	4.8	tons/1000	0.0		1		10/14/09 09:21		
Acid Potential	0.23	tons/1000	0.50		1		10/14/09 09:21		
Lime Requirement	3.2	tons/1000	0.0		1		10/14/09 09:21		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/14/09 09:21		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 4' **Lab ID:** 10113726005 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.14	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 15:31		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1300	mg/kg	251	70.2	1		10/06/09 11:20	7440-44-0	
Total Organic Carbon	1220	mg/kg	251	70.2	1		10/06/09 11:24	7440-44-0	
Mean Total Organic Carbon	1260	mg/kg	251	70.2	1		10/06/09 11:24	7440-44-0	15M, 36M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 7' **Lab ID:** 10113726006 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	28.8	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:19	7429-90-5	
Arsenic	0.016	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:19	7440-38-2	
Cadmium	0.0024	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:19	7440-43-9	
Copper	0.15	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:19	7440-50-8	
Iron	22.7	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:19	7439-89-6	
Lead	0.28	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:19	7439-92-1	
Manganese	0.36	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:19	7439-96-5	
Zinc	0.088	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:19	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	55500	mg/kg	42.1	21.1	200	10/13/09 18:34	10/14/09 12:25	7429-90-5	
Arsenic	23.2	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 12:25	7440-38-2	
Cadmium	0.89J	mg/kg	1.1	0.53	200	10/13/09 18:34	10/14/09 12:25	7440-43-9	
Copper	387	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 12:25	7440-50-8	
Iron	86900	mg/kg	526	263	200	10/13/09 18:34	10/14/09 12:25	7439-89-6	
Lead	1020	mg/kg	1.1	0.53	200	10/13/09 18:34	10/14/09 12:25	7439-92-1	
Manganese	588	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 12:25	7439-96-5	
Zinc	227	mg/kg	52.6	26.3	200	10/13/09 18:34	10/14/09 12:25	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.9	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.8	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.4	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.1	tons/1000	0.0		1		10/14/09 09:22		
Acid Potential	0.28	tons/1000	0.50		1		10/14/09 09:22		
Lime Requirement	3.3	tons/1000	0.0		1		10/14/09 09:22		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/14/09 09:22		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-3 7' **Lab ID:** 10113726006 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.061	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 15:41		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	469	mg/kg	253	70.9	1		10/06/09 11:27	7440-44-0	
Total Organic Carbon	492	mg/kg	251	70.4	1		10/06/09 11:31	7440-44-0	
Mean Total Organic Carbon	481	mg/kg	252	70.6	1		10/06/09 11:31	7440-44-0	21M, 35M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-10 1 1/2-2 1/2' **Lab ID:** 10113726007 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	55.3	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:23	7429-90-5	
Arsenic	0.035	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:23	7440-38-2	
Cadmium	0.0096	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:23	7440-43-9	
Copper	0.66	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:23	7440-50-8	
Iron	76.0	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:23	7439-89-6	
Lead	0.92	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:23	7439-92-1	
Manganese	2.8	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:23	7439-96-5	
Zinc	0.80	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:23	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	51400	mg/kg	37.1	18.5	200	10/13/09 18:34	10/14/09 12:30	7429-90-5	
Arsenic	19.3	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:30	7440-38-2	
Cadmium	6.8	mg/kg	0.93	0.46	200	10/13/09 18:34	10/14/09 12:30	7440-43-9	
Copper	942	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:30	7440-50-8	
Iron	118000	mg/kg	464	232	200	10/13/09 18:34	10/14/09 12:30	7439-89-6	
Lead	2100	mg/kg	0.93	0.46	200	10/13/09 18:34	10/14/09 12:30	7439-92-1	
Manganese	3180	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 12:30	7439-96-5	
Zinc	995	mg/kg	46.4	23.2	200	10/13/09 18:34	10/14/09 12:30	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.1	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.5	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.9	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.2	tons/1000	0.0		1		10/14/09 09:22		
Acid Potential	0.70	tons/1000	0.50		1		10/14/09 09:22		
Lime Requirement	3.9	tons/1000	0.0		1		10/14/09 09:22		
SMP Lime Requirement	2.4	tons/1000	0.0		1		10/14/09 09:22		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.6	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-10 1 1/2-2 1/2' **Lab ID:** 10113726007 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.20	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 16:29		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	3450	mg/kg	1920	538	1		10/06/09 11:41	7440-44-0	
Total Organic Carbon	3970	mg/kg	1750	491	1		10/06/09 11:44	7440-44-0	
Mean Total Organic Carbon	3720	mg/kg	1830	514	1		10/06/09 11:44	7440-44-0	20M, 33M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-MHTP-5 51/2 **Lab ID:** 10113726008 Collected: 09/09/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	0.27	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:30	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:30	7440-38-2	
Cadmium	0.079	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:30	7440-43-9	
Copper	0.0073	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:30	7440-50-8	
Iron	0.19	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:30	7439-89-6	
Lead	0.018	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:30	7439-92-1	
Manganese	27.7	mg/L	0.0050	0.0050	2	10/09/09 14:40	10/13/09 10:59	7439-96-5	
Zinc	2.6	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:30	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	5380	mg/kg	40.2	20.1	200	10/13/09 18:34	10/14/09 12:35	7429-90-5	
Arsenic	744	mg/kg	5.0	2.5	200	10/13/09 18:34	10/14/09 12:35	7440-38-2	
Cadmium	30.5	mg/kg	1.0	0.50	200	10/13/09 18:34	10/14/09 12:35	7440-43-9	
Copper	2310	mg/kg	5.0	2.5	200	10/13/09 18:34	10/14/09 12:35	7440-50-8	
Iron	255000	mg/kg	503	251	200	10/13/09 18:34	10/14/09 12:35	7439-89-6	
Lead	4730	mg/kg	1.0	0.50	200	10/13/09 18:34	10/14/09 12:35	7439-92-1	E
Manganese	14300	mg/kg	5.0	2.5	200	10/13/09 18:34	10/14/09 12:35	7439-96-5	E
Zinc	4780	mg/kg	50.3	25.1	200	10/13/09 18:34	10/14/09 12:35	7440-66-6	E
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.8	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	98.8	tons/1000	0.50		1		10/09/09 17:30		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	13.0	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	1.8	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	0.082	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-311	tons/1000	0.0		1		10/14/09 09:22		
Acid Potential	409	tons/1000	0.50		1		10/14/09 09:22		
Lime Requirement	512	tons/1000	0.0		1		10/14/09 09:22		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:22		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-MHTP-5 51/2 **Lab ID:** 10113726008 Collected: 09/09/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	10.8	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	14.5	% (w/w)	0.050	0.037	1		10/12/09 16:49		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	5150	mg/kg	1000	280	1		10/06/09 11:50	7440-44-0	
Total Organic Carbon	7540	mg/kg	1010	283	1		10/06/09 11:55	7440-44-0	
Mean Total Organic Carbon	6340	mg/kg	1010	281	1		10/06/09 11:55	7440-44-0	17M, 34M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-7 2' **Lab ID:** 10113726009 **Collected:** 09/11/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	22.7	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:37	7429-90-5	
Arsenic	0.027	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:37	7440-38-2	
Cadmium	0.0038	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:37	7440-43-9	
Copper	0.21	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:37	7440-50-8	
Iron	35.1	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:37	7439-89-6	
Lead	0.33	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:37	7439-92-1	
Manganese	0.44	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:37	7439-96-5	
Zinc	0.17	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:37	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	27600	mg/kg	38.5	19.2	200	10/13/09 18:34	10/14/09 12:39	7429-90-5	
Arsenic	40.3	mg/kg	4.8	2.4	200	10/13/09 18:34	10/14/09 12:39	7440-38-2	
Cadmium	1.1	mg/kg	0.96	0.48	200	10/13/09 18:34	10/14/09 12:39	7440-43-9	
Copper	476	mg/kg	4.8	2.4	200	10/13/09 18:34	10/14/09 12:39	7440-50-8	
Iron	73400	mg/kg	481	240	200	10/13/09 18:34	10/14/09 12:39	7439-89-6	
Lead	1300	mg/kg	0.96	0.48	200	10/13/09 18:34	10/14/09 12:39	7439-92-1	
Manganese	442	mg/kg	4.8	2.4	200	10/13/09 18:34	10/14/09 12:39	7439-96-5	
Zinc	293	mg/kg	48.1	24.0	200	10/13/09 18:34	10/14/09 12:39	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	5.5	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.5	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	3.7	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	3.1	tons/1000	0.0		1		10/14/09 09:23		
Acid Potential	0.62	tons/1000	0.50		1		10/14/09 09:23		
Lime Requirement	4.7	tons/1000	0.0		1		10/14/09 09:23		
SMP Lime Requirement	3.1	tons/1000	0.0		1		10/14/09 09:23		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-PMTP-7 2' **Lab ID:** 10113726009 Collected: 09/11/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.19	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/12/09 17:03		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	3550	mg/kg	1000	280	1		10/06/09 11:58	7440-44-0	
Total Organic Carbon	2690	mg/kg	990	277	1		10/06/09 12:01	7440-44-0	
Mean Total Organic Carbon	3120	mg/kg	995	279	1		10/06/09 12:01	7440-44-0	18M, 40M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-1 11' **Lab ID:** 10113726010 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	32.7	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:41	7429-90-5	
Arsenic	0.052	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:41	7440-38-2	
Cadmium	0.0055	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:41	7440-43-9	
Copper	0.39	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:41	7440-50-8	
Iron	46.8	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:41	7439-89-6	
Lead	0.11	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:41	7439-92-1	
Manganese	0.29	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:41	7439-96-5	
Zinc	0.11	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:41	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	35200	mg/kg	39.2	19.6	200	10/13/09 18:34	10/14/09 12:44	7429-90-5	
Arsenic	60.4	mg/kg	4.9	2.4	200	10/13/09 18:34	10/14/09 12:44	7440-38-2	
Cadmium	<0.49	mg/kg	0.98	0.49	200	10/13/09 18:34	10/14/09 12:44	7440-43-9	D3
Copper	558	mg/kg	4.9	2.4	200	10/13/09 18:34	10/14/09 12:44	7440-50-8	
Iron	83600	mg/kg	490	245	200	10/13/09 18:34	10/14/09 12:44	7439-89-6	
Lead	140	mg/kg	0.98	0.49	200	10/13/09 18:34	10/14/09 12:44	7439-92-1	
Manganese	637	mg/kg	4.9	2.4	200	10/13/09 18:34	10/14/09 12:44	7439-96-5	
Zinc	150	mg/kg	49.0	24.5	200	10/13/09 18:34	10/14/09 12:44	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.0	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	10.4	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.090	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	0.13	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	0.090	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	4.2	tons/1000	0.0		1		10/14/09 09:24		
Acid Potential	6.2	tons/1000	0.50		1		10/14/09 09:24		
Lime Requirement	7.7	tons/1000	0.0		1		10/14/09 09:24		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:24		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-1 11' **Lab ID:** 10113726010 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.24	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.31	% (w/w)	0.050	0.037	1		10/13/09 08:46		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	810	mg/kg	250	70.0	1		10/06/09 12:05	7440-44-0	
Total Organic Carbon	786	mg/kg	251	70.4	1		10/06/09 12:08	7440-44-0	
Mean Total Organic Carbon	798	mg/kg	251	70.2	1		10/06/09 12:08	7440-44-0	12M, 19M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-1 12' **Lab ID:** 10113726011 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	29.5	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:48	7429-90-5	
Arsenic	0.085	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:48	7440-38-2	
Cadmium	0.0078	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:48	7440-43-9	
Copper	0.34	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:48	7440-50-8	
Iron	57.9	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:48	7439-89-6	
Lead	0.20	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:48	7439-92-1	
Manganese	0.15	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:48	7439-96-5	
Zinc	0.12	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:48	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	25800	mg/kg	41.4	20.7	200	10/13/09 18:34	10/14/09 12:49	7429-90-5	M1
Arsenic	72.5	mg/kg	5.2	2.6	200	10/13/09 18:34	10/14/09 12:49	7440-38-2	
Cadmium	<0.52	mg/kg	1.0	0.52	200	10/13/09 18:34	10/14/09 12:49	7440-43-9	
Copper	410	mg/kg	5.2	2.6	200	10/13/09 18:34	10/14/09 12:49	7440-50-8	M1
Iron	72200	mg/kg	517	259	200	10/13/09 18:34	10/14/09 12:49	7439-89-6	M1
Lead	162	mg/kg	1.0	0.52	200	10/13/09 18:34	10/14/09 12:49	7439-92-1	M1
Manganese	368	mg/kg	5.2	2.6	200	10/13/09 18:34	10/14/09 12:49	7439-96-5	M1
Zinc	200	mg/kg	51.7	25.9	200	10/13/09 18:34	10/14/09 12:49	7440-66-6	M1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.5	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.2	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	9.2	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	0.17	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	0.17	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	3.7	tons/1000	0.0		1		10/14/09 09:24		
Acid Potential	5.5	tons/1000	0.50		1		10/14/09 09:24		
Lime Requirement	6.9	tons/1000	0.0		1		10/14/09 09:24		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:24		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-1 12' **Lab ID:** 10113726011 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.18	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.35	% (w/w)	0.050	0.037	1		10/13/09 09:03		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	636	mg/kg	490	137	1		10/06/09 13:39	7440-44-0	
Total Organic Carbon	546	mg/kg	488	137	1		10/06/09 13:45	7440-44-0	
Mean Total Organic Carbon	591	mg/kg	489	137	1		10/06/09 13:45	7440-44-0	26M, 4M,MO

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 3' **Lab ID:** 10113726012 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	39.9	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 16:54	7429-90-5	
Arsenic	0.031	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:54	7440-38-2	
Cadmium	0.0037	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 16:54	7440-43-9	
Copper	0.58	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 16:54	7440-50-8	
Iron	39.4	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 16:54	7439-89-6	
Lead	0.055	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 16:54	7439-92-1	
Manganese	0.13	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 16:54	7439-96-5	
Zinc	0.076	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 16:54	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	26800	mg/kg	37.5	18.8	200	10/13/09 18:34	10/14/09 12:58	7429-90-5	
Arsenic	14.5	mg/kg	4.7	2.3	200	10/13/09 18:34	10/14/09 12:58	7440-38-2	
Cadmium	<0.47	mg/kg	0.94	0.47	200	10/13/09 18:34	10/14/09 12:58	7440-43-9	D3
Copper	594	mg/kg	4.7	2.3	200	10/13/09 18:34	10/14/09 12:58	7440-50-8	
Iron	58800	mg/kg	469	234	200	10/13/09 18:34	10/14/09 12:58	7439-89-6	
Lead	65.1	mg/kg	0.94	0.47	200	10/13/09 18:34	10/14/09 12:58	7439-92-1	
Manganese	148	mg/kg	4.7	2.3	200	10/13/09 18:34	10/14/09 12:58	7439-96-5	
Zinc	78.9	mg/kg	46.9	23.4	200	10/13/09 18:34	10/14/09 12:58	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	9.6	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.2	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.3	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	0.21	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	0.17	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.5	tons/1000	0.0		1		10/14/09 09:24		
Acid Potential	6.9	tons/1000	0.50		1		10/14/09 09:24		
Lime Requirement	8.6	tons/1000	0.0		1		10/14/09 09:24		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:24		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 3' **Lab ID:** 10113726012 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.13	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.38	% (w/w)	0.050	0.037	1		10/13/09 09:18		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1260	mg/kg	253	70.9	1		10/06/09 14:20	7440-44-0	
Total Organic Carbon	1250	mg/kg	254	71.2	1		10/06/09 14:25	7440-44-0	
Mean Total Organic Carbon	1260	mg/kg	254	71.1	1		10/06/09 14:25	7440-44-0	30M,5M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 5' **Lab ID:** 10113726013 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	40.2	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:08	7429-90-5	
Arsenic	0.035	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:08	7440-38-2	
Cadmium	0.0040	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:08	7440-43-9	
Copper	0.57	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:08	7440-50-8	
Iron	43.1	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:08	7439-89-6	
Lead	0.061	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:08	7439-92-1	
Manganese	0.12	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:08	7439-96-5	
Zinc	0.10	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:08	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	26700	mg/kg	37.6	18.8	200	10/13/09 18:34	10/14/09 13:03	7429-90-5	
Arsenic	12.2	mg/kg	4.7	2.4	200	10/13/09 18:34	10/14/09 13:03	7440-38-2	
Cadmium	<0.47	mg/kg	0.94	0.47	200	10/13/09 18:34	10/14/09 13:03	7440-43-9	D3
Copper	561	mg/kg	4.7	2.4	200	10/13/09 18:34	10/14/09 13:03	7440-50-8	
Iron	48200	mg/kg	470	235	200	10/13/09 18:34	10/14/09 13:03	7439-89-6	
Lead	51.2	mg/kg	0.94	0.47	200	10/13/09 18:34	10/14/09 13:03	7439-92-1	
Manganese	154	mg/kg	4.7	2.4	200	10/13/09 18:34	10/14/09 13:03	7439-96-5	
Zinc	61.4	mg/kg	47.0	23.5	200	10/13/09 18:34	10/14/09 13:03	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.7	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.5	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	0.23	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	0.16	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.7	tons/1000	0.0		1		10/14/09 09:25		
Acid Potential	7.2	tons/1000	0.50		1		10/14/09 09:25		
Lime Requirement	9.0	tons/1000	0.0		1		10/14/09 09:25		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:25		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.2	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 5' **Lab ID: 10113726013** Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.084	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.37	% (w/w)	0.050	0.037	1		10/13/09 09:45		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1200	mg/kg	252	70.5	1		10/06/09 14:31	7440-44-0	
Total Organic Carbon	1740	mg/kg	254	71.1	1		10/06/09 14:55	7440-44-0	
Mean Total Organic Carbon	1470	mg/kg	253	70.8	1		10/06/09 14:55	7440-44-0	1M, 28M, 41M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 8' **Lab ID: 10113726014** Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	27.0	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:15	7429-90-5	
Arsenic	0.031	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:15	7440-38-2	
Cadmium	0.0034	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:15	7440-43-9	
Copper	0.39	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:15	7440-50-8	
Iron	37.0	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:15	7439-89-6	
Lead	0.085	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:15	7439-92-1	
Manganese	0.048	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:15	7439-96-5	
Zinc	0.11	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:15	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9800	mg/kg	33.6	16.8	200	10/13/09 18:34	10/14/09 13:07	7429-90-5	
Arsenic	10.6	mg/kg	4.2	2.1	200	10/13/09 18:34	10/14/09 13:07	7440-38-2	
Cadmium	<0.42	mg/kg	0.84	0.42	200	10/13/09 18:34	10/14/09 13:07	7440-43-9	D3
Copper	278	mg/kg	4.2	2.1	200	10/13/09 18:34	10/14/09 13:07	7440-50-8	
Iron	26000	mg/kg	421	210	200	10/13/09 18:34	10/14/09 13:07	7439-89-6	
Lead	85.3	mg/kg	0.84	0.42	200	10/13/09 18:34	10/14/09 13:07	7439-92-1	
Manganese	31.1	mg/kg	4.2	2.1	200	10/13/09 18:34	10/14/09 13:07	7439-96-5	
Zinc	38.7J	mg/kg	42.1	21.0	200	10/13/09 18:34	10/14/09 13:07	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.6	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.9	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.1	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	0.094	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	0.070	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-1.2	tons/1000	0.0		1		10/14/09 09:25		
Acid Potential	3.3	tons/1000	0.50		1		10/14/09 09:25		
Lime Requirement	4.2	tons/1000	0.0		1		10/14/09 09:25		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:25		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.2	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-2 8' **Lab ID:** 10113726014 Collected: 09/14/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.081	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.18	% (w/w)	0.050	0.037	1		10/13/09 10:04		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	431	mg/kg	251	70.4	1		10/06/09 15:02	7440-44-0	
Total Organic Carbon	1790	mg/kg	251	70.2	1		10/06/09 15:11	7440-44-0	
Mean Total Organic Carbon	1110	mg/kg	251	70.3	1		10/06/09 15:11	7440-44-0	27M, 41M,9M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-3 6' **Lab ID:** 10113726015 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	87.6	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:19	7429-90-5	
Arsenic	0.051	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:19	7440-38-2	
Cadmium	0.0076	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:19	7440-43-9	
Copper	0.96	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:19	7440-50-8	
Iron	82.0	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:19	7439-89-6	
Lead	0.12	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:19	7439-92-1	
Manganese	0.57	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:19	7439-96-5	
Zinc	0.20	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:19	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	65300	mg/kg	42.1	21.1	200	10/13/09 18:34	10/14/09 13:22	7429-90-5	
Arsenic	24.6	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 13:22	7440-38-2	
Cadmium	<0.53	mg/kg	1.1	0.53	200	10/13/09 18:34	10/14/09 13:22	7440-43-9	D3
Copper	1170	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 13:22	7440-50-8	
Iron	147000	mg/kg	527	263	200	10/13/09 18:34	10/14/09 13:22	7439-89-6	
Lead	80.9	mg/kg	1.1	0.53	200	10/13/09 18:34	10/14/09 13:22	7439-92-1	
Manganese	657	mg/kg	5.3	2.6	200	10/13/09 18:34	10/14/09 13:22	7439-96-5	
Zinc	168	mg/kg	52.7	26.3	200	10/13/09 18:34	10/14/09 13:22	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	16.7	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	13.3	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	12.6	tons/1000	0.0		1		10/14/09 09:26		
Acid Potential	.73	tons/1000	0.50		1		10/14/09 09:26		
Lime Requirement	.91	tons/1000	0.0		1		10/14/09 09:26		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:26		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-3 6' **Lab ID:** 10113726015 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.17	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/13/09 10:52		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1580	mg/kg	251	70.2	1		10/06/09 15:18	7440-44-0	
Total Organic Carbon	1210	mg/kg	251	70.4	1		10/06/09 15:25	7440-44-0	
Mean Total Organic Carbon	1390	mg/kg	251	70.3	1		10/06/09 15:25	7440-44-0	31M,6M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-3 16' **Lab ID:** 10113726016 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	66.4	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:26	7429-90-5	
Arsenic	0.039	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:26	7440-38-2	
Cadmium	0.0056	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:26	7440-43-9	
Copper	0.69	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:26	7440-50-8	
Iron	59.6	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:26	7439-89-6	
Lead	0.11	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:26	7439-92-1	
Manganese	0.46	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:26	7439-96-5	
Zinc	0.16	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:26	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	64500	mg/kg	36.4	18.2	200	10/13/09 18:34	10/14/09 13:27	7429-90-5	IR
Arsenic	30.0	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:27	7440-38-2	
Cadmium	<0.46	mg/kg	0.91	0.46	200	10/13/09 18:34	10/14/09 13:27	7440-43-9	D3
Copper	1270	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:27	7440-50-8	
Iron	152000	mg/kg	455	228	200	10/13/09 18:34	10/14/09 13:27	7439-89-6	IR
Lead	117	mg/kg	0.91	0.46	200	10/13/09 18:34	10/14/09 13:27	7439-92-1	
Manganese	753	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:27	7439-96-5	IR
Zinc	180	mg/kg	45.5	22.8	200	10/13/09 18:34	10/14/09 13:27	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	19.3	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	13.0	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	12.4	tons/1000	0.0		1		10/14/09 09:26		
Acid Potential	0.57	tons/1000	0.50		1		10/14/09 09:26		
Lime Requirement	2.0	tons/1000	0.0		1		10/14/09 09:26		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/14/09 09:26		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-3 16' **Lab ID:** 10113726016 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.075	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/13/09 11:07		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	910	mg/kg	254	71.1	1		10/06/09 15:45	7440-44-0	
Total Organic Carbon	961	mg/kg	253	70.9	1		10/06/09 15:51	7440-44-0	
Mean Total Organic Carbon	935	mg/kg	253	71.0	1		10/06/09 15:51	7440-44-0	10M, 29M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 2' **Lab ID:** 10113726017 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	25.6	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:33	7429-90-5	
Arsenic	0.048	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:33	7440-38-2	
Cadmium	0.0052	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:33	7440-43-9	
Copper	0.35	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:33	7440-50-8	
Iron	50.9	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:33	7439-89-6	
Lead	0.29	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:33	7439-92-1	
Manganese	0.79	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:33	7439-96-5	
Zinc	0.27	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:33	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	28400	mg/kg	36.3	18.1	200	10/13/09 18:34	10/14/09 13:31	7429-90-5	
Arsenic	39.3	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 13:31	7440-38-2	
Cadmium	1.2	mg/kg	0.91	0.45	200	10/13/09 18:34	10/14/09 13:31	7440-43-9	
Copper	739	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 13:31	7440-50-8	
Iron	119000	mg/kg	453	227	200	10/13/09 18:34	10/14/09 13:31	7439-89-6	
Lead	501	mg/kg	0.91	0.45	200	10/13/09 18:34	10/14/09 13:31	7439-92-1	
Manganese	1420	mg/kg	4.5	2.3	200	10/13/09 18:34	10/14/09 13:31	7439-96-5	
Zinc	330	mg/kg	45.3	22.7	200	10/13/09 18:34	10/14/09 13:31	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	5.7	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.0	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	3.9	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	3.0	tons/1000	0.0		1		10/14/09 09:26		
Acid Potential	0.90	tons/1000	0.50		1		10/14/09 09:26		
Lime Requirement	2.4	tons/1000	0.0		1		10/14/09 09:26		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/14/09 09:26		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 2' **Lab ID:** 10113726017 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.14	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.053	% (w/w)	0.050	0.037	1		10/13/09 11:34		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	5700	mg/kg	1040	292	1		10/06/09 16:28	7440-44-0	
Total Organic Carbon	4090	mg/kg	1080	301	1		10/06/09 16:38	7440-44-0	
Mean Total Organic Carbon	4910	mg/kg	1060	296	1		10/06/09 16:38	7440-44-0	11M, 25M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 6' **Lab ID:** 10113726018 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	53.8	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:39	7429-90-5	
Arsenic	0.047	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:39	7440-38-2	
Cadmium	0.0058	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:39	7440-43-9	
Copper	0.43	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:39	7440-50-8	
Iron	56.9	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:39	7439-89-6	
Lead	0.35	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:39	7439-92-1	
Manganese	0.82	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:39	7439-96-5	
Zinc	0.27	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:39	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	24100	mg/kg	36.6	18.3	200	10/13/09 18:34	10/14/09 13:36	7429-90-5	
Arsenic	14.2	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:36	7440-38-2	
Cadmium	0.66J	mg/kg	0.92	0.46	200	10/13/09 18:34	10/14/09 13:36	7440-43-9	
Copper	281	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:36	7440-50-8	
Iron	50200	mg/kg	458	229	200	10/13/09 18:34	10/14/09 13:36	7439-89-6	
Lead	193	mg/kg	0.92	0.46	200	10/13/09 18:34	10/14/09 13:36	7439-92-1	
Manganese	866	mg/kg	4.6	2.3	200	10/13/09 18:34	10/14/09 13:36	7439-96-5	
Zinc	178	mg/kg	45.8	22.9	200	10/13/09 18:34	10/14/09 13:36	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.4	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.7	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.6	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.1	tons/1000	0.0		1		10/14/09 09:27		
Acid Potential	0.59	tons/1000	0.50		1		10/14/09 09:27		
Lime Requirement	0.74	tons/1000	0.0		1		10/14/09 09:27		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:27		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 6' **Lab ID:** 10113726018 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.11	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/13/09 11:54		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	717	mg/kg	254	71.2	1		10/06/09 16:44	7440-44-0	
Total Organic Carbon	834	mg/kg	253	70.9	1		10/06/09 16:51	7440-44-0	
Mean Total Organic Carbon	776	mg/kg	254	71.1	1		10/06/09 16:51	7440-44-0	24M,3M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 12' **Lab ID:** 10113726019 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	60.2	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:46	7429-90-5	
Arsenic	0.069	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:46	7440-38-2	
Cadmium	0.0074	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:46	7440-43-9	
Copper	0.67	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:46	7440-50-8	
Iron	69.2	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:46	7439-89-6	
Lead	0.77	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:46	7439-92-1	
Manganese	0.85	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:46	7439-96-5	
Zinc	0.31	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:46	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	29500	mg/kg	35.7	17.8	200	10/13/09 18:34	10/14/09 13:41	7429-90-5	
Arsenic	38.7	mg/kg	4.5	2.2	200	10/13/09 18:34	10/14/09 13:41	7440-38-2	
Cadmium	1.0	mg/kg	0.89	0.45	200	10/13/09 18:34	10/14/09 13:41	7440-43-9	
Copper	739	mg/kg	4.5	2.2	200	10/13/09 18:34	10/14/09 13:41	7440-50-8	
Iron	99100	mg/kg	446	223	200	10/13/09 18:34	10/14/09 13:41	7439-89-6	
Lead	667	mg/kg	0.89	0.45	200	10/13/09 18:34	10/14/09 13:41	7439-92-1	
Manganese	1070	mg/kg	4.5	2.2	200	10/13/09 18:34	10/14/09 13:41	7439-96-5	
Zinc	270	mg/kg	44.6	22.3	200	10/13/09 18:34	10/14/09 13:41	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.1	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.0	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	7.7	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	7.2	tons/1000	0.0		1		10/14/09 09:27		
Acid Potential	0.56	tons/1000	0.50		1		10/14/09 09:27		
Lime Requirement	0.70	tons/1000	0.0		1		10/14/09 09:27		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:27		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-4 12' **Lab ID:** 10113726019 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.21	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/13/09 12:17		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	627	mg/kg	256	71.6	1		10/06/09 16:58	7440-44-0	
Total Organic Carbon	803	mg/kg	256	71.6	1		10/06/09 17:05	7440-44-0	
Mean Total Organic Carbon	715	mg/kg	256	71.6	1		10/06/09 17:05	7440-44-0	2M,8M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-5 9' **Lab ID: 10113726020** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:31									
Aluminum	82.2	mg/L	0.10	0.10	1	10/09/09 14:40	10/12/09 17:53	7429-90-5	P6
Arsenic	0.099	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:53	7440-38-2	
Cadmium	0.012	mg/L	0.00050	0.00050	1	10/09/09 14:40	10/12/09 17:53	7440-43-9	
Copper	1.2	mg/L	0.0050	0.0050	1	10/09/09 14:40	10/12/09 17:53	7440-50-8	
Iron	117	mg/L	0.025	0.025	1	10/09/09 14:40	10/12/09 17:53	7439-89-6	P6
Lead	0.37	mg/L	0.0015	0.0015	1	10/09/09 14:40	10/12/09 17:53	7439-92-1	
Manganese	1.2	mg/L	0.0025	0.0025	1	10/09/09 14:40	10/12/09 17:53	7439-96-5	
Zinc	0.46	mg/L	0.010	0.010	1	10/09/09 14:40	10/12/09 17:53	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	38300	mg/kg	32.5	16.2	200	10/13/09 18:34	10/14/09 13:45	7429-90-5	
Arsenic	48.6	mg/kg	4.1	2.0	200	10/13/09 18:34	10/14/09 13:45	7440-38-2	
Cadmium	0.81	mg/kg	0.81	0.41	200	10/13/09 18:34	10/14/09 13:45	7440-43-9	
Copper	841	mg/kg	4.1	2.0	200	10/13/09 18:34	10/14/09 13:45	7440-50-8	
Iron	98500	mg/kg	406	203	200	10/13/09 18:34	10/14/09 13:45	7439-89-6	
Lead	367	mg/kg	0.81	0.41	200	10/13/09 18:34	10/14/09 13:45	7439-92-1	
Manganese	1370	mg/kg	4.1	2.0	200	10/13/09 18:34	10/14/09 13:45	7439-96-5	
Zinc	311	mg/kg	40.6	20.3	200	10/13/09 18:34	10/14/09 13:45	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.4	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.9	Std. Units	0.10	0.050	1		10/08/09 08:40		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.9	tons/1000	0.50		1		10/08/09 16:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:50		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.0	tons/1000	0.0		1		10/14/09 09:28		
Acid Potential	0.91	tons/1000	0.50		1		10/14/09 09:28		
Lime Requirement	1.5	tons/1000	0.0		1		10/14/09 09:28		
SMP Lime Requirement	0.30	tons/1000	0.0		1		10/14/09 09:28		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Sample: 09-SGTP-5 9' **Lab ID:** 10113726020 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.12	mmhos/cm	0.010	0.0050	1		10/08/09 14:03		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.039J	% (w/w)	0.050	0.037	1		10/13/09 13:47		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1300	mg/kg	254	71.2	1		10/06/09 17:13	7440-44-0	
Total Organic Carbon	1370	mg/kg	254	71.1	1		10/06/09 17:20	7440-44-0	
Mean Total Organic Carbon	1330	mg/kg	254	71.2	1		10/06/09 17:20	7440-44-0	23M,7M

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MT/2981 Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7 Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007,
10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014,
10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

SAMPLE DUPLICATE: 693656

Parameter	Units	10113726001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.7	6.7	0	20	

SAMPLE DUPLICATE: 693657

Parameter	Units	10113726011 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	7.0	7.0	0	20	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208
Pace Project No.: 10113726

QC Batch: MT/2982 Analysis Method: ASA 10-3.3
QC Batch Method: ASA 10-3.3 Analysis Description: ASA 10-3.3 Specific Conductance
Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 693658 Matrix: Water
Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	<0.0050	0.010	10/08/09 14:03	

LABORATORY CONTROL SAMPLE: 693659

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.3	1.0	80	53-147	

SAMPLE DUPLICATE: 693660

Parameter	Units	10113726007 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	0.20	0.21	5	20	

SAMPLE DUPLICATE: 693661

Parameter	Units	10113726017 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	0.14	0.17	19	20	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: WETA/4877 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 216253 Matrix: Solid
 Associated Lab Samples: 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	10/06/09 13:13	

LABORATORY CONTROL SAMPLE: 216254

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	956	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 216255 216256

Parameter	Units	10113726011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	591	976	988	2110	2740	156	217	50-150	26	30	M0

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MPRP/17627 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 692035 Matrix: Solid

Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	<1.7	3.3	10/14/09 11:28	
Arsenic	mg/kg	<0.21	0.41	10/14/09 11:28	
Cadmium	mg/kg	<0.041	0.083	10/14/09 11:28	
Copper	mg/kg	<0.21	0.41	10/14/09 11:28	
Iron	mg/kg	<20.7	41.3	10/14/09 11:28	
Lead	mg/kg	<0.041	0.083	10/14/09 11:28	
Manganese	mg/kg	0.23J	0.41	10/14/09 11:28	P8
Zinc	mg/kg	<2.1	4.1	10/14/09 11:28	

LABORATORY CONTROL SAMPLE: 692036

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	17.2	19.1	111	75-125	
Arsenic	mg/kg	17.2	17.3	100	75-125	
Cadmium	mg/kg	17.2	16.9	98	75-125	
Copper	mg/kg	17.2	18.2	105	75-125	
Iron	mg/kg	216	231	107	75-125	
Lead	mg/kg	17.2	17.5	101	75-125	
Manganese	mg/kg	17.2	17.6	102	75-125	
Zinc	mg/kg	17.2	17.3	101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 692037 692038

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result						
Aluminum	mg/kg	18.4	33200	18.9	26000	-39181	-42365	70-130	3	20	E,IR, M1
Arsenic	mg/kg	18.4	14.3	18.9	35.0	113	128	70-130	9	20	
Cadmium	mg/kg	18.4	0.68J	18.9	20.6	108	111	70-130	5	20	
Copper	mg/kg	18.4	258	18.9	285	146	434	70-130	18	20	M1
Iron	mg/kg	230	63400	235	40400	-9979	-11035	70-130	8	20	E,IR, M1
Lead	mg/kg	18.4	607	18.9	949	1856	1178	70-130	13	20	E,M1
Manganese	mg/kg	18.4	379	18.9	244	-731	-522	70-130	14	20	IR,M1
Zinc	mg/kg	18.4	141	18.9	158	93	180	70-130	10	20	M1

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

MATRIX SPIKE SAMPLE:		692039					
Parameter	Units	10113726011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	25800	21.9	20900	-22180	70-130	IR,M1
Arsenic	mg/kg	72.5	21.9	94.8	102	70-130	
Cadmium	mg/kg	<0.52	21.9	25.6	116	70-130	
Copper	mg/kg	410	21.9	375	-160	70-130	M1
Iron	mg/kg	72200	274	51300	-7628	70-130	E,IR,M1
Lead	mg/kg	162	21.9	196	153	70-130	M1
Manganese	mg/kg	368	21.9	264	-474	70-130	IR,M1
Zinc	mg/kg	200	21.9	160	-180	70-130	M1

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MT/2992

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek Acid Base Potential

Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 694026

Matrix: Solid

Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Neutralization Potential	tons/1000	0	0.50	10/08/09 16:00	

SAMPLE DUPLICATE: 694550

Parameter	Units	10113726006 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	6.4	6.3			

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MPRP/17723 Analysis Method: EPA 6010
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
 Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 694521 Matrix: Water

Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	10/12/09 15:24	
Arsenic	mg/L	<0.0050	0.0050	10/12/09 15:24	
Cadmium	mg/L	<0.00050	0.00050	10/12/09 15:24	
Copper	mg/L	<0.0050	0.0050	10/12/09 15:24	
Iron	mg/L	<0.025	0.025	10/12/09 15:24	
Lead	mg/L	<0.0015	0.0015	10/12/09 15:24	
Manganese	mg/L	<0.0025	0.0025	10/12/09 15:24	
Zinc	mg/L	0.020	0.010	10/12/09 15:24	B

LABORATORY CONTROL SAMPLE: 694522

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	8.9	89	80-120	
Arsenic	mg/L	1	0.87	87	80-120	
Cadmium	mg/L	1	0.87	87	80-120	
Copper	mg/L	1	0.86	86	80-120	
Iron	mg/L	10	9.0	90	80-120	
Lead	mg/L	1	0.86	86	80-120	
Manganese	mg/L	1	0.87	87	80-120	
Zinc	mg/L	1	0.88	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 694523 694524

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result						
Aluminum	mg/L	10	22.8	10	39.0	162	167	75-125	1	30	M0
Arsenic	mg/L	1	0.011	1	0.91	90	89	75-125	1	30	
Cadmium	mg/L	1	0.0018	1	0.91	90	89	75-125	2	30	
Copper	mg/L	1	0.11	1	1.0	91	88	75-125	3	30	
Iron	mg/L	10	19.5	10	30.3	109	108	75-125	0	30	
Lead	mg/L	1	0.20	1	1.1	91	91	75-125	0	30	
Manganese	mg/L	1	0.26	1	1.2	92	89	75-125	2	30	
Zinc	mg/L	1	0.10	1	1.0	90	88	75-125	2	30	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

MATRIX SPIKE SAMPLE:		694525					
Parameter	Units	10113726020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	82.2	10	119	364	75-125	P6
Arsenic	mg/L	0.099	1	0.95	85	75-125	
Cadmium	mg/L	0.012	1	0.88	87	75-125	
Copper	mg/L	1.2	1	2.0	78	75-125	
Iron	mg/L	117	10	122	53	75-125	P6
Lead	mg/L	0.37	1	1.2	80	75-125	
Manganese	mg/L	1.2	1	2.0	75	75-125	
Zinc	mg/L	0.46	1	1.3	86	75-125	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MT/3006

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek Acid Base Potential

Associated Lab Samples: 10113726008

METHOD BLANK: 694557

Matrix: Solid

Associated Lab Samples: 10113726008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Neutralization Potential	tons/1000	0	0.50	10/09/09 17:30	

SAMPLE DUPLICATE: 694555

Parameter	Units	10113726008 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	98.8	97.8			

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

QC Batch: MT/3021 Analysis Method: LECO
 QC Batch Method: LECO Analysis Description: Sulfur Analysis Montana
 Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

METHOD BLANK: 695353 Matrix: Solid
 Associated Lab Samples: 10113726001, 10113726002, 10113726003, 10113726004, 10113726005, 10113726006, 10113726007, 10113726008, 10113726009, 10113726010, 10113726011, 10113726012, 10113726013, 10113726014, 10113726015, 10113726016, 10113726017, 10113726018, 10113726019, 10113726020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfur	% (w/w)	<0.037	0.050	10/12/09 14:05	

SAMPLE DUPLICATE: 695354

Parameter	Units	10113726006 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	<0.037	<0.042			

SAMPLE DUPLICATE: 695355

Parameter	Units	10113726014 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	0.18	0.20	0		

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

10M	Total Carbon Result of 839 mg/Kg MDL 70.2 mg/Kg RDL 251 mg/Kg
11M	Total Carbon Result of 8830 mg/Kg MDL 596 mg/Kg RDL 2130 mg/Kg
12M	Total Carbon result of 1200 mg/Kg MDL 88.3 mg/Kg RDL 315 mg/Kg
13M	Total Carbon result of 1680 mg/Kg MDL 142 mg/Kg RDL 506 mg/Kg
14M	Total Carbon result of 1780 mg/Kg MDL 70.6 mg/Kg RDL 252 mg/Kg
15M	Total Carbon result of 1810 mg/Kg MDL 71.5 mg/Kg RDL 255 mg/Kg
16M	Total Carbon result of 2280 mg/Kg MDL 134 mg/Kg RDL 477 mg/Kg

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

ANALYTE QUALIFIERS

17M	Total Carbon result of 25600 mg/Kg MDL 1000 mg/Kg RDL 3570 mg/Kg
18M	Total Carbon result of 3280 mg/Kg MDL 144 mg/Kg RDL 515 mg/Kg
19M	Total Carbon result of 402 mg/Kg MDL 88.3 mg/Kg RDL 315 mg/Kg
1M	Total Carbon Result of 1070 mg/Kg MDL 70.3 mg/Kg RDL 251 mg/Kg
20M	Total Carbon result of 5570 mg/Kg MDL 286 mg/Kg RDL 1020 mg/Kg
21M	Total Carbon result of 749 mg/Kg MDL 72.0 mg/Kg RDL 257 mg/Kg
22M	Total Carbon result of 772 mg/Kg MDL 71.5 mg/Kg RDL 255 mg/Kg
23M	Total Inorganic Carbon Result of 1000 mg/Kg MDL 139 mg/Kg RDL 498 mg/Kg
24M	Total Inorganic Carbon Result of 314 mg/Kg MDL 71.1 mg/Kg RDL 254 mg/Kg
25M	Total Inorganic Carbon Result of 3920 mg/Kg MDL 596 mg/Kg RDL 2130 mg/Kg
26M	Total Inorganic Carbon Result of 539 mg/Kg MDL 137 mg/Kg RDL 489 mg/Kg
27M	Total Inorganic Carbon Result of <252 mg/Kg MDL 70.5 mg/Kg RDL 252 mg/Kg
28M	Total Inorganic Carbon Result of <253 mg/Kg MDL 70.9 mg/Kg RDL 253 mg/Kg

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

ANALYTE QUALIFIERS

29M	Total Inorganic Carbon Result of <253 mg/Kg MDL 71.0 mg/Kg RDL 253 mg/Kg
2M	Total Carbon Result of 1090 mg/Kg MDL 70.2 mg/Kg RDL 251 mg/Kg
30M	Total Inorganic Carbon Result of <254 mg/Kg MDL 71.2 mg/Kg RDL 254 mg/Kg
31M	Total Inorganic Carbon Result of <255 mg/Kg MDL 71.3 mg/Kg RDL 255 mg/Kg
32M	Total Inorganic Carbon result of 1020 mg/Kg MDL 134 mg/Kg RDL 477 mg/Kg
33M	Total Inorganic Carbon result of 1850 mg/Kg MDL 514 mg/Kg RDL 1840 mg/Kg
34M	Total Inorganic Carbon result of 19260 mg/Kg MDL 1000 mg/Kg RDL 3570 mg/Kg
35M	Total Inorganic Carbon result of 268 mg/Kg MDL 72.0 mg/Kg RDL 257 mg/Kg
36M	Total Inorganic Carbon result of 550 mg/Kg MDL 71.5 mg/Kg RDL 255 mg/Kg
37M	Total Inorganic Carbon result of 836 mg/Kg MDL 70.9 mg/Kg RDL 253 mg/Kg
38M	Total Inorganic Carbon result of 862 mg/Kg MDL 142 mg/Kg RDL 506 mg/Kg
39M	Total Inorganic Carbon result of <1000 mg/Kg MDL 144 mg/Kg RDL 515 mg/Kg
3M	Total Carbon Result of 1090 mg/Kg MDL 70.5 mg/Kg RDL 252 mg/Kg

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

ANALYTE QUALIFIERS

40M	Total Inorganic Carbon result of <995 mg/Kg MDL 279 mg/Kg RDL 995 mg/Kg
41M	Total organic carbon result greater than total carbon result.
4M	Total Carbon Result of 1130 mg/Kg MDL 93.6 mg/Kg RDL 334 mg/Kg
5M	Total Carbon Result of 1240 mg/Kg MDL 71.2 mg/Kg RDL 254 mg/Kg
6M	Total Carbon Result of 1480 mg/Kg MDL 71.3 mg/Kg RDL 255 mg/Kg
7M	Total Carbon Result of 2330 mg/Kg MDL 139 mg/Kg RDL 498 mg/Kg
8M	Total Carbon Result of 375 mg/Kg MDL 71.6 mg/Kg RDL 256 mg/Kg
9M	Total Carbon Result of 684 mg/Kg MDL 70.5 mg/Kg RDL 252 mg/Kg
B	Analyte was detected in the associated method blank.
B+	Analyte was detected in the associated method blank as well as in the sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
IR	The internal standard recovery associated with this result exceeds the upper control limit. The reported result should be considered an estimated value.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208
Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726001	09-PMTP-3 9'	EPA 9060 Modified	WETA/4875		
10113726002	09-PMTP-11 12-14'	EPA 9060 Modified	WETA/4875		
10113726003	09-PMTP-11 9-10'	EPA 9060 Modified	WETA/4875		
10113726004	09-PMTP-10 3'	EPA 9060 Modified	WETA/4875		
10113726005	09-PMTP-3 4'	EPA 9060 Modified	WETA/4875		
10113726006	09-PMTP-3 7'	EPA 9060 Modified	WETA/4875		
10113726007	09-PMTP-10 1 1/2-2 1/2'	EPA 9060 Modified	WETA/4875		
10113726008	09-MHTP-5 51/2	EPA 9060 Modified	WETA/4875		
10113726009	09-PMTP-7 2'	EPA 9060 Modified	WETA/4875		
10113726010	09-SGTP-1 11'	EPA 9060 Modified	WETA/4875		
10113726001	09-PMTP-3 9'	EPA 9060 Modified	WETA/4876		
10113726002	09-PMTP-11 12-14'	EPA 9060 Modified	WETA/4876		
10113726003	09-PMTP-11 9-10'	EPA 9060 Modified	WETA/4876		
10113726004	09-PMTP-10 3'	EPA 9060 Modified	WETA/4876		
10113726005	09-PMTP-3 4'	EPA 9060 Modified	WETA/4876		
10113726006	09-PMTP-3 7'	EPA 9060 Modified	WETA/4876		
10113726007	09-PMTP-10 1 1/2-2 1/2'	EPA 9060 Modified	WETA/4876		
10113726008	09-MHTP-5 51/2	EPA 9060 Modified	WETA/4876		
10113726009	09-PMTP-7 2'	EPA 9060 Modified	WETA/4876		
10113726010	09-SGTP-1 11'	EPA 9060 Modified	WETA/4876		
10113726011	09-SGTP-1 12'	EPA 9060 Modified	WETA/4877		
10113726012	09-SGTP-2 3'	EPA 9060 Modified	WETA/4877		
10113726013	09-SGTP-2 5'	EPA 9060 Modified	WETA/4877		
10113726014	09-SGTP-2 8'	EPA 9060 Modified	WETA/4877		
10113726015	09-SGTP-3 6'	EPA 9060 Modified	WETA/4877		
10113726016	09-SGTP-3 16'	EPA 9060 Modified	WETA/4877		
10113726017	09-SGTP-4 2'	EPA 9060 Modified	WETA/4877		
10113726018	09-SGTP-4 6'	EPA 9060 Modified	WETA/4877		
10113726019	09-SGTP-4 12'	EPA 9060 Modified	WETA/4877		
10113726020	09-SGTP-5 9'	EPA 9060 Modified	WETA/4877		
10113726011	09-SGTP-1 12'	EPA 9060 Modified	WETA/4878		
10113726012	09-SGTP-2 3'	EPA 9060 Modified	WETA/4878		
10113726013	09-SGTP-2 5'	EPA 9060 Modified	WETA/4878		
10113726014	09-SGTP-2 8'	EPA 9060 Modified	WETA/4878		
10113726015	09-SGTP-3 6'	EPA 9060 Modified	WETA/4878		
10113726016	09-SGTP-3 16'	EPA 9060 Modified	WETA/4878		
10113726017	09-SGTP-4 2'	EPA 9060 Modified	WETA/4878		
10113726018	09-SGTP-4 6'	EPA 9060 Modified	WETA/4878		
10113726019	09-SGTP-4 12'	EPA 9060 Modified	WETA/4878		
10113726020	09-SGTP-5 9'	EPA 9060 Modified	WETA/4878		
10113726001	09-PMTP-3 9'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726002	09-PMTP-11 12-14'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726003	09-PMTP-11 9-10'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726004	09-PMTP-10 3'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726005	09-PMTP-3 4'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726006	09-PMTP-3 7'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726007	09-PMTP-10 1 1/2-2 1/2'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726008	09-MHTP-5 51/2	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726009	09-PMTP-7 2'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726010	09-SGTP-1 11'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726011	09-SGTP-1 12'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726012	09-SGTP-2 3'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726013	09-SGTP-2 5'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726014	09-SGTP-2 8'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726015	09-SGTP-3 6'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726016	09-SGTP-3 16'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726017	09-SGTP-4 2'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726018	09-SGTP-4 6'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726019	09-SGTP-4 12'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726020	09-SGTP-5 9'	EPA 3050	MPRP/17627	EPA 6020	ICPM/7252
10113726001	09-PMTP-3 9'	ASA 103.2	MT/2959		
10113726002	09-PMTP-11 12-14'	ASA 103.2	MT/2959		
10113726003	09-PMTP-11 9-10'	ASA 103.2	MT/2959		
10113726004	09-PMTP-10 3'	ASA 103.2	MT/2959		
10113726005	09-PMTP-3 4'	ASA 103.2	MT/2959		
10113726006	09-PMTP-3 7'	ASA 103.2	MT/2959		
10113726007	09-PMTP-10 1 1/2-2 1/2'	ASA 103.2	MT/2959		
10113726008	09-MHTP-5 51/2	ASA 103.2	MT/2959		
10113726009	09-PMTP-7 2'	ASA 103.2	MT/2959		
10113726010	09-SGTP-1 11'	ASA 103.2	MT/2959		
10113726011	09-SGTP-1 12'	ASA 103.2	MT/2959		
10113726012	09-SGTP-2 3'	ASA 103.2	MT/2959		
10113726013	09-SGTP-2 5'	ASA 103.2	MT/2959		
10113726014	09-SGTP-2 8'	ASA 103.2	MT/2959		
10113726015	09-SGTP-3 6'	ASA 103.2	MT/2959		
10113726016	09-SGTP-3 16'	ASA 103.2	MT/2959		
10113726017	09-SGTP-4 2'	ASA 103.2	MT/2959		
10113726018	09-SGTP-4 6'	ASA 103.2	MT/2959		
10113726019	09-SGTP-4 12'	ASA 103.2	MT/2959		
10113726020	09-SGTP-5 9'	ASA 103.2	MT/2959		
10113726001	09-PMTP-3 9'	Modified Sobek 7	MT/2981		
10113726002	09-PMTP-11 12-14'	Modified Sobek 7	MT/2981		
10113726003	09-PMTP-11 9-10'	Modified Sobek 7	MT/2981		
10113726004	09-PMTP-10 3'	Modified Sobek 7	MT/2981		
10113726005	09-PMTP-3 4'	Modified Sobek 7	MT/2981		
10113726006	09-PMTP-3 7'	Modified Sobek 7	MT/2981		
10113726007	09-PMTP-10 1 1/2-2 1/2'	Modified Sobek 7	MT/2981		
10113726008	09-MHTP-5 51/2	Modified Sobek 7	MT/2981		
10113726009	09-PMTP-7 2'	Modified Sobek 7	MT/2981		
10113726010	09-SGTP-1 11'	Modified Sobek 7	MT/2981		
10113726011	09-SGTP-1 12'	Modified Sobek 7	MT/2981		
10113726012	09-SGTP-2 3'	Modified Sobek 7	MT/2981		
10113726013	09-SGTP-2 5'	Modified Sobek 7	MT/2981		
10113726014	09-SGTP-2 8'	Modified Sobek 7	MT/2981		
10113726015	09-SGTP-3 6'	Modified Sobek 7	MT/2981		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726016	09-SGTP-3 16'	Modified Sobek 7	MT/2981		
10113726017	09-SGTP-4 2'	Modified Sobek 7	MT/2981		
10113726018	09-SGTP-4 6'	Modified Sobek 7	MT/2981		
10113726019	09-SGTP-4 12'	Modified Sobek 7	MT/2981		
10113726020	09-SGTP-5 9'	Modified Sobek 7	MT/2981		
10113726001	09-PMTP-3 9'	ASA 10-3.3	MT/2982		
10113726002	09-PMTP-11 12-14'	ASA 10-3.3	MT/2982		
10113726003	09-PMTP-11 9-10'	ASA 10-3.3	MT/2982		
10113726004	09-PMTP-10 3'	ASA 10-3.3	MT/2982		
10113726005	09-PMTP-3 4'	ASA 10-3.3	MT/2982		
10113726006	09-PMTP-3 7'	ASA 10-3.3	MT/2982		
10113726007	09-PMTP-10 1 1/2-2 1/2'	ASA 10-3.3	MT/2982		
10113726008	09-MHTP-5 51/2	ASA 10-3.3	MT/2982		
10113726009	09-PMTP-7 2'	ASA 10-3.3	MT/2982		
10113726010	09-SGTP-1 11'	ASA 10-3.3	MT/2982		
10113726011	09-SGTP-1 12'	ASA 10-3.3	MT/2982		
10113726012	09-SGTP-2 3'	ASA 10-3.3	MT/2982		
10113726013	09-SGTP-2 5'	ASA 10-3.3	MT/2982		
10113726014	09-SGTP-2 8'	ASA 10-3.3	MT/2982		
10113726015	09-SGTP-3 6'	ASA 10-3.3	MT/2982		
10113726016	09-SGTP-3 16'	ASA 10-3.3	MT/2982		
10113726017	09-SGTP-4 2'	ASA 10-3.3	MT/2982		
10113726018	09-SGTP-4 6'	ASA 10-3.3	MT/2982		
10113726019	09-SGTP-4 12'	ASA 10-3.3	MT/2982		
10113726020	09-SGTP-5 9'	ASA 10-3.3	MT/2982		
10113726001	09-PMTP-3 9'	Modified Sobek 7	MT/2992		
10113726002	09-PMTP-11 12-14'	Modified Sobek 7	MT/2992		
10113726003	09-PMTP-11 9-10'	Modified Sobek 7	MT/2992		
10113726004	09-PMTP-10 3'	Modified Sobek 7	MT/2992		
10113726005	09-PMTP-3 4'	Modified Sobek 7	MT/2992		
10113726006	09-PMTP-3 7'	Modified Sobek 7	MT/2992		
10113726007	09-PMTP-10 1 1/2-2 1/2'	Modified Sobek 7	MT/2992		
10113726009	09-PMTP-7 2'	Modified Sobek 7	MT/2992		
10113726010	09-SGTP-1 11'	Modified Sobek 7	MT/2992		
10113726011	09-SGTP-1 12'	Modified Sobek 7	MT/2992		
10113726012	09-SGTP-2 3'	Modified Sobek 7	MT/2992		
10113726013	09-SGTP-2 5'	Modified Sobek 7	MT/2992		
10113726014	09-SGTP-2 8'	Modified Sobek 7	MT/2992		
10113726015	09-SGTP-3 6'	Modified Sobek 7	MT/2992		
10113726016	09-SGTP-3 16'	Modified Sobek 7	MT/2992		
10113726017	09-SGTP-4 2'	Modified Sobek 7	MT/2992		
10113726018	09-SGTP-4 6'	Modified Sobek 7	MT/2992		
10113726019	09-SGTP-4 12'	Modified Sobek 7	MT/2992		
10113726020	09-SGTP-5 9'	Modified Sobek 7	MT/2992		
10113726001	09-PMTP-3 9'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726002	09-PMTP-11 12-14'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726003	09-PMTP-11 9-10'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726004	09-PMTP-10 3'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726005	09-PMTP-3 4'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726006	09-PMTP-3 7'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726007	09-PMTP-10 1 1/2-2 1/2'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726008	09-MHTP-5 51/2	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726009	09-PMTP-7 2'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726010	09-SGTP-1 11'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726011	09-SGTP-1 12'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726012	09-SGTP-2 3'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726013	09-SGTP-2 5'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726014	09-SGTP-2 8'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726015	09-SGTP-3 6'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726016	09-SGTP-3 16'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726017	09-SGTP-4 2'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726018	09-SGTP-4 6'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726019	09-SGTP-4 12'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726020	09-SGTP-5 9'	EPA 3010	MPRP/17723	EPA 6010	ICP/8021
10113726008	09-MHTP-5 51/2	Modified Sobek 7	MT/3006		
10113726001	09-PMTP-3 9'	% Moisture	MPRP/17728		
10113726002	09-PMTP-11 12-14'	% Moisture	MPRP/17728		
10113726003	09-PMTP-11 9-10'	% Moisture	MPRP/17728		
10113726004	09-PMTP-10 3'	% Moisture	MPRP/17728		
10113726005	09-PMTP-3 4'	% Moisture	MPRP/17728		
10113726006	09-PMTP-3 7'	% Moisture	MPRP/17728		
10113726007	09-PMTP-10 1 1/2-2 1/2'	% Moisture	MPRP/17728		
10113726008	09-MHTP-5 51/2	% Moisture	MPRP/17728		
10113726009	09-PMTP-7 2'	% Moisture	MPRP/17728		
10113726010	09-SGTP-1 11'	% Moisture	MPRP/17728		
10113726011	09-SGTP-1 12'	% Moisture	MPRP/17728		
10113726012	09-SGTP-2 3'	% Moisture	MPRP/17728		
10113726013	09-SGTP-2 5'	% Moisture	MPRP/17728		
10113726014	09-SGTP-2 8'	% Moisture	MPRP/17728		
10113726015	09-SGTP-3 6'	% Moisture	MPRP/17728		
10113726016	09-SGTP-3 16'	% Moisture	MPRP/17728		
10113726017	09-SGTP-4 2'	% Moisture	MPRP/17728		
10113726018	09-SGTP-4 6'	% Moisture	MPRP/17728		
10113726019	09-SGTP-4 12'	% Moisture	MPRP/17728		
10113726020	09-SGTP-5 9'	% Moisture	MPRP/17728		
10113726001	09-PMTP-3 9'	LECO	MT/3021		
10113726002	09-PMTP-11 12-14'	LECO	MT/3021		
10113726003	09-PMTP-11 9-10'	LECO	MT/3021		
10113726004	09-PMTP-10 3'	LECO	MT/3021		
10113726005	09-PMTP-3 4'	LECO	MT/3021		
10113726006	09-PMTP-3 7'	LECO	MT/3021		
10113726007	09-PMTP-10 1 1/2-2 1/2'	LECO	MT/3021		
10113726008	09-MHTP-5 51/2	LECO	MT/3021		
10113726009	09-PMTP-7 2'	LECO	MT/3021		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726010	09-SGTP-1 11'	LECO	MT/3021		
10113726011	09-SGTP-1 12'	LECO	MT/3021		
10113726012	09-SGTP-2 3'	LECO	MT/3021		
10113726013	09-SGTP-2 5'	LECO	MT/3021		
10113726014	09-SGTP-2 8'	LECO	MT/3021		
10113726015	09-SGTP-3 6'	LECO	MT/3021		
10113726016	09-SGTP-3 16'	LECO	MT/3021		
10113726017	09-SGTP-4 2'	LECO	MT/3021		
10113726018	09-SGTP-4 6'	LECO	MT/3021		
10113726019	09-SGTP-4 12'	LECO	MT/3021		
10113726020	09-SGTP-5 9'	LECO	MT/3021		
10113726001	09-PMTP-3 9'	Modified Sobek 7	MT/3034		
10113726002	09-PMTP-11 12-14'	Modified Sobek 7	MT/3034		
10113726003	09-PMTP-11 9-10'	Modified Sobek 7	MT/3034		
10113726004	09-PMTP-10 3'	Modified Sobek 7	MT/3034		
10113726005	09-PMTP-3 4'	Modified Sobek 7	MT/3034		
10113726006	09-PMTP-3 7'	Modified Sobek 7	MT/3034		
10113726007	09-PMTP-10 1 1/2-2 1/2'	Modified Sobek 7	MT/3034		
10113726008	09-MHTP-5 51/2	Modified Sobek 7	MT/3034		
10113726009	09-PMTP-7 2'	Modified Sobek 7	MT/3034		
10113726010	09-SGTP-1 11'	Modified Sobek 7	MT/3034		
10113726011	09-SGTP-1 12'	Modified Sobek 7	MT/3034		
10113726012	09-SGTP-2 3'	Modified Sobek 7	MT/3034		
10113726013	09-SGTP-2 5'	Modified Sobek 7	MT/3034		
10113726014	09-SGTP-2 8'	Modified Sobek 7	MT/3034		
10113726015	09-SGTP-3 6'	Modified Sobek 7	MT/3034		
10113726016	09-SGTP-3 16'	Modified Sobek 7	MT/3034		
10113726017	09-SGTP-4 2'	Modified Sobek 7	MT/3034		
10113726018	09-SGTP-4 6'	Modified Sobek 7	MT/3034		
10113726019	09-SGTP-4 12'	Modified Sobek 7	MT/3034		
10113726020	09-SGTP-5 9'	Modified Sobek 7	MT/3034		
10113726001	09-PMTP-3 9'	Modified Sobek 7	MT/3039		
10113726002	09-PMTP-11 12-14'	Modified Sobek 7	MT/3039		
10113726003	09-PMTP-11 9-10'	Modified Sobek 7	MT/3039		
10113726004	09-PMTP-10 3'	Modified Sobek 7	MT/3039		
10113726005	09-PMTP-3 4'	Modified Sobek 7	MT/3039		
10113726006	09-PMTP-3 7'	Modified Sobek 7	MT/3039		
10113726007	09-PMTP-10 1 1/2-2 1/2'	Modified Sobek 7	MT/3039		
10113726008	09-MHTP-5 51/2	Modified Sobek 7	MT/3039		
10113726009	09-PMTP-7 2'	Modified Sobek 7	MT/3039		
10113726010	09-SGTP-1 11'	Modified Sobek 7	MT/3039		
10113726011	09-SGTP-1 12'	Modified Sobek 7	MT/3039		
10113726012	09-SGTP-2 3'	Modified Sobek 7	MT/3039		
10113726013	09-SGTP-2 5'	Modified Sobek 7	MT/3039		
10113726014	09-SGTP-2 8'	Modified Sobek 7	MT/3039		
10113726015	09-SGTP-3 6'	Modified Sobek 7	MT/3039		
10113726016	09-SGTP-3 16'	Modified Sobek 7	MT/3039		
10113726017	09-SGTP-4 2'	Modified Sobek 7	MT/3039		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113726018	09-SGTP-4 6'	Modified Sobek 7	MT/3039		
10113726019	09-SGTP-4 12'	Modified Sobek 7	MT/3039		
10113726020	09-SGTP-5 9'	Modified Sobek 7	MT/3039		

October 14, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC Mike Horse 09208
Pace Project No.: 10113729

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on September 30, 2009.
The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Minnesota Certification IDs

1700 Elm Street SE, Suite 200 Minneapolis, MN 55414

Wisconsin Certification #: 999407970

Alaska Certification #: UST-078

Arizona Certification #: AZ-0014

California Certification #: 01155CA

Florida/NELAP Certification #: E87605

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Minnesota Certification #: 027-053-137

Montana Certification #: MT CERT0092

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Washington Certification #: C754

Tennessee Certification #: 02818

Montana Certification IDs

Idaho Certification #: MT00012

EPA Region 8 Certification #: 8TMS-Q

602 South 25th Street Billings, MT 59101

Montana Certification #: MT CERT0040

Green Bay Certification IDs

New York Certification #: 11887

New York Certification #: 11888

North Carolina Certification #: 503

North Dakota Certification #: R-150

South Carolina Certification #: 83006001

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

1241 Bellevue Street Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Minnesota Certification #: 055-999-334

Louisiana Certification #: 04168

California Certification #: 09268CA

Kentucky Certification #: 82

Kentucky Certification #: 83

SAMPLE SUMMARY

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10113729001	09-SGTP-5 16'	Solid	09/15/09 00:00	09/30/09 10:35
10113729002	09-SGTP-6 2'	Solid	09/15/09 00:00	09/30/09 10:35
10113729003	09-SGTP-6 6'	Solid	09/15/09 00:00	09/30/09 10:35
10113729004	09-SGTP-7 8'	Solid	09/15/09 00:00	09/30/09 10:35
10113729005	09-SGTP-7 12'	Solid	09/15/09 00:00	09/30/09 10:35
10113729006	09-SGTP-8 4'	Solid	09/15/09 00:00	09/30/09 10:35
10113729007	09-SGTP-8 9'	Solid	09/15/09 00:00	09/30/09 10:35
10113729008	09-SGTP-9 6'	Solid	09/16/09 00:00	09/30/09 10:35
10113729009	09-SGTP-9 9'	Solid	09/16/09 00:00	09/30/09 10:35

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10113729001	09-SGTP-5 16'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
10113729002	09-SGTP-6 2'	Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
10113729003	09-SGTP-6 6'	LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
10113729004	09-SGTP-7 8'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
10113729005	09-SGTP-7 12'	EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113729006	09-SGTP-8 4'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113729007	09-SGTP-8 9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113729008	09-SGTP-9 6'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT
10113729009	09-SGTP-9 9'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		LECO	EJS	1	PASI-MT
		Modified Sobek 7	CAC, EJS, KS1	10	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208
Pace Project No.: 10113729

Method: EPA 6010
Description: 6010 MET ICP, SPLP
Client: Montana Dept. of Environmental Quality
Date: October 14, 2009

General Information:

9 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17724

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 694526)
 - Arsenic
 - Manganese
 - Zinc

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17724

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113729001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 694528)
 - Aluminum
 - Iron
- MSD (Lab ID: 694529)
 - Aluminum
 - Iron

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17724

- 09-SGTP-5 16' (Lab ID: 10113729001)
 - Zinc
- 09-SGTP-6 2' (Lab ID: 10113729002)
 - Zinc
- 09-SGTP-6 6' (Lab ID: 10113729003)
 - Zinc
- 09-SGTP-7 8' (Lab ID: 10113729004)
 - Zinc
- 09-SGTP-8 4' (Lab ID: 10113729006)
 - Zinc
- 09-SGTP-8 9' (Lab ID: 10113729007)
 - Zinc
- 09-SGTP-9 9' (Lab ID: 10113729009)
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/17628

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 692040)
- Lead

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/17628

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113729001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 692042)
 - Aluminum
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

QC Batch: MPRP/17628

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10113729001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 692043)
 - Aluminum
 - Copper
 - Iron
 - Lead
 - Manganese
 - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 692043)
 - Aluminum
 - Iron
 - Lead
 - Manganese
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/17628

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- 09-SGTP-6 2' (Lab ID: 10113729002)
 - Cadmium
- 09-SGTP-6 6' (Lab ID: 10113729003)
 - Cadmium
- 09-SGTP-7 12' (Lab ID: 10113729005)
 - Cadmium
- 09-SGTP-7 8' (Lab ID: 10113729004)
 - Cadmium
- 09-SGTP-8 4' (Lab ID: 10113729006)
 - Cadmium
- 09-SGTP-9 6' (Lab ID: 10113729008)
 - Cadmium
- 09-SGTP-9 9' (Lab ID: 10113729009)
 - Cadmium

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: % Moisture

Description: Dry Weight

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/2983

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 693667)
- Sp. Conductance Saturated Paste

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: ASA 103.2

Description: ASA 103.2 pH

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for ASA 103.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: LECO

Description: Sulfur analysis Montana

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for LECO. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

General Information:

9 samples were analyzed for EPA 9060 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/4873

10M: Total Inorganic Carbon Result of 1260 mg/Kg

MDL 141 mg/Kg

RDL 503 mg/Kg

- 09-SGTP-7 8' (Lab ID: 10113729004)
 - Mean Total Organic Carbon

11M: Total Inorganic Carbon Result of <253 mg/Kg

MDL 70.7 mg/Kg

RDL 253 mg/Kg

- 09-SGTP-9 6' (Lab ID: 10113729008)
 - Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4873

12M: Total Inorganic Carbon Result of <255 mg/Kg

MDL 71.3 mg/Kg

RDL 255 mg/Kg

- 09-SGTP-9 9' (Lab ID: 10113729009)
- Mean Total Organic Carbon

13M: Total Inorganic Carbon Result of <2780 mg/Kg

MDL 778 mg/Kg

RDL 2780 mg/Kg

- 09-SGTP-8 9' (Lab ID: 10113729007)
- Mean Total Organic Carbon

14M: Total Inorganic Carbon Result of <4350 mg/Kg

MDL 1220 mg/Kg

RDL 4350 mg/Kg

- 09-SGTP-8 4' (Lab ID: 10113729006)
- Mean Total Organic Carbon

15M: Total Inorganic Carbon Result of <490 mg/Kg

MDL 137 mg/Kg

RDL 490 mg/Kg

- 09-SGTP-7 12' (Lab ID: 10113729005)
- Mean Total Organic Carbon

16M: Total Inorganic Carbon Result of <498 mg/Kg

MDL 139 mg/Kg

RDL 498 mg/Kg

- 09-SGTP-6 2' (Lab ID: 10113729002)
- Mean Total Organic Carbon

17M: Total Inorganic Carbon Result of <503 mg/Kg

MDL 141 mg/Kg

RDL 503 mg/Kg

- 09-SGTP-6 6' (Lab ID: 10113729003)
- Mean Total Organic Carbon

18M: Total Inorganic Carbon Result of <513 mg/Kg

MDL 144 mg/Kg

RDL 513 mg/Kg

- 09-SGTP-5 16' (Lab ID: 10113729001)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4873

19M: Total organic carbon result greater than total carbon result.

- 09-SGTP-8 9' (Lab ID: 10113729007)
 - Mean Total Organic Carbon

1M: Total Carbon Result of 1380 mg/Kg

MDL 144 mg/Kg

RDL 513 mg/Kg

- 09-SGTP-5 16' (Lab ID: 10113729001)
 - Mean Total Organic Carbon

2M: Total Carbon Result of 1390 mg/Kg

MDL 141 mg/Kg

RDL 503 mg/Kg

- 09-SGTP-6 6' (Lab ID: 10113729003)
 - Mean Total Organic Carbon

3M: Total Carbon Result of 1470 mg/Kg

MDL 70.3 mg/Kg

RDL 251 mg/Kg

- 09-SGTP-9 6' (Lab ID: 10113729008)
 - Mean Total Organic Carbon

4M: Total Carbon Result of 2400 mg/Kg

MDL 283 mg/Kg

RDL 1010 mg/Kg

- 09-SGTP-8 9' (Lab ID: 10113729007)
 - Mean Total Organic Carbon

5M: Total Carbon Result of 2500 mg/Kg

MDL 140 mg/Kg

RDL 500 mg/Kg

- 09-SGTP-7 8' (Lab ID: 10113729004)
 - Mean Total Organic Carbon

6M: Total Carbon Result of 3350 mg/Kg

MDL 139 mg/Kg

RDL 498 mg/Kg

- 09-SGTP-6 2' (Lab ID: 10113729002)
 - Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: October 14, 2009

Analyte Comments:

QC Batch: WETA/4873

7M: Total Carbon Result of 851 mg/Kg

MDL 137 mg/Kg

RDL 490 mg/Kg

- 09-SGTP-7 12' (Lab ID: 10113729005)
- Mean Total Organic Carbon

8M: Total Carbon Result of 900 mg/Kg

MDL 70.7 mg/Kg

RDL 253 mg/Kg

- 09-SGTP-9 9' (Lab ID: 10113729009)
- Mean Total Organic Carbon

9M: Total Carbon Result of 9570 mg/Kg

MDL 1080 mg/Kg

RDL 3850 mg/Kg

- 09-SGTP-8 4' (Lab ID: 10113729006)
- Mean Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-5 16' **Lab ID:** 10113729001 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	43.0	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 18:37	7429-90-5	M0
Arsenic	0.039	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 18:37	7440-38-2	B+
Cadmium	0.0051	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 18:37	7440-43-9	
Copper	0.40	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 18:37	7440-50-8	
Iron	48.3	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 18:37	7439-89-6	M0
Lead	0.15	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 18:37	7439-92-1	
Manganese	0.69	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 18:37	7439-96-5	B+
Zinc	0.29	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 18:37	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	17800	mg/kg	15.0	7.5	100	10/13/09 18:58	10/14/09 11:36	7429-90-5	M1
Arsenic	15.3	mg/kg	1.9	0.94	100	10/13/09 18:58	10/14/09 11:36	7440-38-2	M1
Cadmium	0.96	mg/kg	0.37	0.19	100	10/13/09 18:58	10/14/09 11:36	7440-43-9	
Copper	238	mg/kg	1.9	0.94	100	10/13/09 18:58	10/14/09 11:36	7440-50-8	M1
Iron	37300	mg/kg	187	93.5	100	10/13/09 18:58	10/14/09 11:36	7439-89-6	M1
Lead	161	mg/kg	0.37	0.19	100	10/13/09 18:58	10/14/09 11:36	7439-92-1	M1
Manganese	1230	mg/kg	1.9	0.94	100	10/13/09 18:58	10/14/09 11:36	7439-96-5	M1
Zinc	173	mg/kg	18.7	9.4	100	10/13/09 18:58	10/14/09 11:36	7440-66-6	M1
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	7.2	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.5	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	11.2	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	10.4	tons/1000	0.0		1		10/14/09 09:46		
Acid Potential	0.77	tons/1000	0.50		1		10/14/09 09:46		
Lime Requirement	0.96	tons/1000	0.0		1		10/14/09 09:46		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:46		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-5 16' **Lab ID:** 10113729001 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.057	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/09/09 15:25		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	896	mg/kg	254	71.2	1		10/05/09 12:48	7440-44-0	
Total Organic Carbon	1150	mg/kg	256	71.6	1		10/05/09 12:53	7440-44-0	
Mean Total Organic Carbon	1020	mg/kg	255	71.4	1		10/05/09 12:53	7440-44-0	18M,1M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-6 2' Lab ID: 10113729002 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	41.4	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 18:57	7429-90-5	
Arsenic	0.035	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 18:57	7440-38-2	B+
Cadmium	0.0042	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 18:57	7440-43-9	
Copper	0.30	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 18:57	7440-50-8	
Iron	44.2	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 18:57	7439-89-6	
Lead	0.11	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 18:57	7439-92-1	
Manganese	0.66	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 18:57	7439-96-5	B+
Zinc	0.31	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 18:57	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	19800	mg/kg	33.0	16.5	200	10/13/09 18:58	10/14/09 11:53	7429-90-5	
Arsenic	20.4	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 11:53	7440-38-2	
Cadmium	<0.41	mg/kg	0.82	0.41	200	10/13/09 18:58	10/14/09 11:53	7440-43-9	D3
Copper	228	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 11:53	7440-50-8	
Iron	43900	mg/kg	412	206	200	10/13/09 18:58	10/14/09 11:53	7439-89-6	
Lead	206	mg/kg	0.82	0.41	200	10/13/09 18:58	10/14/09 11:53	7439-92-1	
Manganese	367	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 11:53	7439-96-5	
Zinc	107	mg/kg	41.2	20.6	200	10/13/09 18:58	10/14/09 11:53	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	6.0	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.9	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.8	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.0	tons/1000	0.0		1		10/14/09 09:46		
Acid Potential	0.80	tons/1000	0.50		1		10/14/09 09:46		
Lime Requirement	1.0	tons/1000	0.0		1		10/14/09 09:46		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:46		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-6 2' **Lab ID:** 10113729002 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.14	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.039J	% (w/w)	0.050	0.037	1		10/09/09 15:30		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2860	mg/kg	493	138	1		10/05/09 13:31	7440-44-0	
Total Organic Carbon	3370	mg/kg	495	139	1		10/05/09 13:37	7440-44-0	
Mean Total Organic Carbon	3120	mg/kg	494	138	1		10/05/09 13:37	7440-44-0	16M,6M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-6 6' **Lab ID:** 10113729003 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	71.3	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:04	7429-90-5	
Arsenic	0.063	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:04	7440-38-2	B+
Cadmium	0.0079	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:04	7440-43-9	
Copper	1.0	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:04	7440-50-8	
Iron	77.7	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:04	7439-89-6	
Lead	0.20	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:04	7439-92-1	
Manganese	0.86	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:04	7439-96-5	B+
Zinc	0.28	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:04	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	28300	mg/kg	31.0	15.5	200	10/13/09 18:58	10/14/09 12:07	7429-90-5	
Arsenic	27.8	mg/kg	3.9	1.9	200	10/13/09 18:58	10/14/09 12:07	7440-38-2	
Cadmium	0.74J	mg/kg	0.77	0.39	200	10/13/09 18:58	10/14/09 12:07	7440-43-9	D3
Copper	657	mg/kg	3.9	1.9	200	10/13/09 18:58	10/14/09 12:07	7440-50-8	
Iron	70500	mg/kg	387	193	200	10/13/09 18:58	10/14/09 12:07	7439-89-6	
Lead	142	mg/kg	0.77	0.39	200	10/13/09 18:58	10/14/09 12:07	7439-92-1	
Manganese	588	mg/kg	3.9	1.9	200	10/13/09 18:58	10/14/09 12:07	7439-96-5	
Zinc	123	mg/kg	38.7	19.3	200	10/13/09 18:58	10/14/09 12:07	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	13.3	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.6	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	8.7	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	8.0	tons/1000	0.0		1		10/14/09 09:47		
Acid Potential	0.75	tons/1000	0.50		1		10/14/09 09:47		
Lime Requirement	0.94	tons/1000	0.0		1		10/14/09 09:47		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:47		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-6 6' **Lab ID:** 10113729003 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.10	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.039J	% (w/w)	0.050	0.037	1		10/09/09 15:56		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1250	mg/kg	500	140	1		10/05/09 13:40	7440-44-0	
Total Organic Carbon	1070	mg/kg	503	141	1		10/05/09 13:43	7440-44-0	
Mean Total Organic Carbon	1160	mg/kg	501	140	1		10/05/09 13:43	7440-44-0	17M,2M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-7 8' **Lab ID: 10113729004** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	89.5	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:19	7429-90-5	
Arsenic	0.098	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:19	7440-38-2	B+
Cadmium	0.012	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:19	7440-43-9	
Copper	0.82	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:19	7440-50-8	
Iron	118	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:19	7439-89-6	
Lead	0.18	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:19	7439-92-1	
Manganese	1.1	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:19	7439-96-5	B+
Zinc	0.49	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:19	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	22100	mg/kg	39.1	19.6	200	10/13/09 18:58	10/14/09 12:11	7429-90-5	
Arsenic	21.7	mg/kg	4.9	2.4	200	10/13/09 18:58	10/14/09 12:11	7440-38-2	
Cadmium	<0.49	mg/kg	0.98	0.49	200	10/13/09 18:58	10/14/09 12:11	7440-43-9	D3
Copper	197	mg/kg	4.9	2.4	200	10/13/09 18:58	10/14/09 12:11	7440-50-8	
Iron	34800	mg/kg	489	244	200	10/13/09 18:58	10/14/09 12:11	7439-89-6	
Lead	73.3	mg/kg	0.98	0.49	200	10/13/09 18:58	10/14/09 12:11	7439-92-1	
Manganese	322	mg/kg	4.9	2.4	200	10/13/09 18:58	10/14/09 12:11	7439-96-5	
Zinc	100	mg/kg	48.9	24.4	200	10/13/09 18:58	10/14/09 12:11	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	14.0	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.9	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.7	tons/1000	0.0		1		10/14/09 09:47		
Acid Potential	1.2	tons/1000	0.50		1		10/14/09 09:47		
Lime Requirement	2.8	tons/1000	0.0		1		10/14/09 09:47		
SMP Lime Requirement	1.0	tons/1000	0.0		1		10/14/09 09:47		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-7 8' **Lab ID: 10113729004** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.15	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.054	% (w/w)	0.050	0.037	1		10/09/09 16:17		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1200	mg/kg	508	142	1		10/05/09 13:47	7440-44-0	
Total Organic Carbon	1280	mg/kg	498	139	1		10/05/09 13:51	7440-44-0	
Mean Total Organic Carbon	1240	mg/kg	503	141	1		10/05/09 13:51	7440-44-0	10M,5M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-7 12' **Lab ID:** 10113729005 **Collected:** 09/15/09 00:00 **Received:** 09/30/09 10:35 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	101	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:26	7429-90-5	
Arsenic	0.059	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:26	7440-38-2	B+
Cadmium	0.0097	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:26	7440-43-9	
Copper	1.6	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:26	7440-50-8	
Iron	107	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:26	7439-89-6	
Lead	0.089	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:26	7439-92-1	
Manganese	0.63	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:26	7439-96-5	B+
Zinc	0.18	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:26	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	50400	mg/kg	41.3	20.7	200	10/13/09 18:58	10/14/09 12:16	7429-90-5	
Arsenic	15.0	mg/kg	5.2	2.6	200	10/13/09 18:58	10/14/09 12:16	7440-38-2	
Cadmium	<0.52	mg/kg	1.0	0.52	200	10/13/09 18:58	10/14/09 12:16	7440-43-9	D3
Copper	917	mg/kg	5.2	2.6	200	10/13/09 18:58	10/14/09 12:16	7440-50-8	
Iron	114000	mg/kg	517	258	200	10/13/09 18:58	10/14/09 12:16	7439-89-6	
Lead	54.5	mg/kg	1.0	0.52	200	10/13/09 18:58	10/14/09 12:16	7439-92-1	
Manganese	618	mg/kg	5.2	2.6	200	10/13/09 18:58	10/14/09 12:16	7439-96-5	
Zinc	106	mg/kg	51.7	25.8	200	10/13/09 18:58	10/14/09 12:16	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	17.3	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.3	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.3	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.8	tons/1000	0.0		1		10/14/09 09:47		
Acid Potential	0.56	tons/1000	0.50		1		10/14/09 09:47		
Lime Requirement	0.70	tons/1000	0.0		1		10/14/09 09:47		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:47		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-7 12' **Lab ID:** 10113729005 Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.11	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/09/09 16:31		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	805	mg/kg	252	70.5	1		10/05/09 14:13	7440-44-0	
Total Organic Carbon	627	mg/kg	252	70.5	1		10/05/09 14:16	7440-44-0	
Mean Total Organic Carbon	716	mg/kg	252	70.5	1		10/05/09 14:16	7440-44-0	15M,7M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-8 4' **Lab ID: 10113729006** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	48.2	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:33	7429-90-5	
Arsenic	0.044	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:33	7440-38-2	B+
Cadmium	0.0054	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:33	7440-43-9	
Copper	0.29	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:33	7440-50-8	
Iron	43.4	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:33	7439-89-6	
Lead	0.25	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:33	7439-92-1	
Manganese	0.71	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:33	7439-96-5	B+
Zinc	0.36	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:33	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	11700	mg/kg	33.0	16.5	200	10/13/09 18:58	10/14/09 12:20	7429-90-5	
Arsenic	9.6	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 12:20	7440-38-2	
Cadmium	0.53J	mg/kg	0.82	0.41	200	10/13/09 18:58	10/14/09 12:20	7440-43-9	D3
Copper	86.5	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 12:20	7440-50-8	
Iron	20500	mg/kg	412	206	200	10/13/09 18:58	10/14/09 12:20	7439-89-6	
Lead	65.7	mg/kg	0.82	0.41	200	10/13/09 18:58	10/14/09 12:20	7439-92-1	
Manganese	483	mg/kg	4.1	2.1	200	10/13/09 18:58	10/14/09 12:20	7439-96-5	
Zinc	111	mg/kg	41.2	20.6	200	10/13/09 18:58	10/14/09 12:20	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.1	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.4	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.9	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.2	tons/1000	0.0		1		10/14/09 09:48		
Acid Potential	0.72	tons/1000	0.50		1		10/14/09 09:48		
Lime Requirement	0.90	tons/1000	0.0		1		10/14/09 09:48		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:48		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-8 4' **Lab ID: 10113729006** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance	Analytical Method: ASA 10-3.3								
Sp. Conductance Saturated Paste	0.17	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana	Analytical Method: LECO								
Sulfur	<0.037	% (w/w)	0.050	0.037	1		10/09/09 17:00		
Total Organic Carbon	Analytical Method: EPA 9060 Modified								
Total Organic Carbon	12000	mg/kg	4170	1170	1		10/05/09 14:33	7440-44-0	
Total Organic Carbon	11600	mg/kg	4550	1270	1		10/05/09 14:36	7440-44-0	
Mean Total Organic Carbon	11800	mg/kg	4350	1220	1		10/05/09 14:36	7440-44-0	14M,9M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-8 9' **Lab ID: 10113729007** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	32.1	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:39	7429-90-5	
Arsenic	0.033	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:39	7440-38-2	B+
Cadmium	0.0054	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:39	7440-43-9	
Copper	0.37	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:39	7440-50-8	
Iron	36.1	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:39	7439-89-6	
Lead	0.15	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:39	7439-92-1	
Manganese	1.0	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:39	7439-96-5	B+
Zinc	0.34	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:39	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	12400	mg/kg	38.5	19.3	200	10/13/09 18:58	10/14/09 12:24	7429-90-5	
Arsenic	12.6	mg/kg	4.8	2.4	200	10/13/09 18:58	10/14/09 12:24	7440-38-2	
Cadmium	1.3	mg/kg	0.96	0.48	200	10/13/09 18:58	10/14/09 12:24	7440-43-9	
Copper	164	mg/kg	4.8	2.4	200	10/13/09 18:58	10/14/09 12:24	7440-50-8	
Iron	21800	mg/kg	482	241	200	10/13/09 18:58	10/14/09 12:24	7439-89-6	
Lead	66.9	mg/kg	0.96	0.48	200	10/13/09 18:58	10/14/09 12:24	7439-92-1	
Manganese	804	mg/kg	4.8	2.4	200	10/13/09 18:58	10/14/09 12:24	7439-96-5	
Zinc	187	mg/kg	48.2	24.1	200	10/13/09 18:58	10/14/09 12:24	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	12.1	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.4	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	10.8	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	0.079	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	0.049J	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	8.0	tons/1000	0.0		1		10/14/09 09:48		
Acid Potential	2.8	tons/1000	0.50		1		10/14/09 09:48		
Lime Requirement	3.4	tons/1000	0.0		1		10/14/09 09:48		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:48		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.1	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-8 9' **Lab ID: 10113729007** Collected: 09/15/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.24	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.14	% (w/w)	0.050	0.037	1		10/09/09 17:22		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	5710	mg/kg	2940	824	1		10/05/09 14:39	7440-44-0	
Total Organic Carbon	4730	mg/kg	2630	737	1		10/05/09 14:42	7440-44-0	
Mean Total Organic Carbon	5190	mg/kg	2780	778	1		10/05/09 14:42	7440-44-0	13M, 19M,4M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-9 6' **Lab ID:** 10113729008 Collected: 09/16/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	46.5	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:44	7429-90-5	
Arsenic	0.066	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:44	7440-38-2	B+
Cadmium	0.0083	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:44	7440-43-9	
Copper	0.77	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:44	7440-50-8	
Iron	80.7	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:44	7439-89-6	
Lead	0.24	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:44	7439-92-1	
Manganese	0.46	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:44	7439-96-5	B+
Zinc	0.18	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:44	7440-66-6	B+
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	18000	mg/kg	37.3	18.7	200	10/13/09 18:58	10/14/09 12:28	7429-90-5	
Arsenic	20.1	mg/kg	4.7	2.3	200	10/13/09 18:58	10/14/09 12:28	7440-38-2	
Cadmium	<0.47	mg/kg	0.93	0.47	200	10/13/09 18:58	10/14/09 12:28	7440-43-9	D3
Copper	402	mg/kg	4.7	2.3	200	10/13/09 18:58	10/14/09 12:28	7440-50-8	
Iron	57200	mg/kg	466	233	200	10/13/09 18:58	10/14/09 12:28	7439-89-6	
Lead	107	mg/kg	0.93	0.47	200	10/13/09 18:58	10/14/09 12:28	7439-92-1	
Manganese	270	mg/kg	4.7	2.3	200	10/13/09 18:58	10/14/09 12:28	7439-96-5	
Zinc	87.5	mg/kg	46.6	23.3	200	10/13/09 18:58	10/14/09 12:28	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	6.8	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.1	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	7.1	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	0.12	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	0.070	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	2.7	tons/1000	0.0		1		10/14/09 09:49		
Acid Potential	4.5	tons/1000	0.50		1		10/14/09 09:49		
Lime Requirement	5.9	tons/1000	0.0		1		10/14/09 09:49		
SMP Lime Requirement	0.30	tons/1000	0.0		1		10/14/09 09:49		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.9	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-9 6' **Lab ID: 10113729008** Collected: 09/16/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.31	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.22	% (w/w)	0.050	0.037	1		10/12/09 08:41		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1390	mg/kg	251	70.4	1		10/05/09 14:45	7440-44-0	
Total Organic Carbon	1510	mg/kg	254	71.1	1		10/05/09 14:56	7440-44-0	
Mean Total Organic Carbon	1450	mg/kg	253	70.7	1		10/05/09 14:56	7440-44-0	11M,3M

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-9 9' **Lab ID: 10113729009** Collected: 09/16/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 10/09/09 12:32									
Aluminum	75.0	mg/L	0.10	0.10	1	10/09/09 14:39	10/12/09 19:51	7429-90-5	
Arsenic	0.082	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:51	7440-38-2	B+
Cadmium	0.011	mg/L	0.00050	0.00050	1	10/09/09 14:39	10/12/09 19:51	7440-43-9	
Copper	0.89	mg/L	0.0050	0.0050	1	10/09/09 14:39	10/12/09 19:51	7440-50-8	
Iron	108	mg/L	0.025	0.025	1	10/09/09 14:39	10/12/09 19:51	7439-89-6	
Lead	0.33	mg/L	0.0015	0.0015	1	10/09/09 14:39	10/12/09 19:51	7439-92-1	
Manganese	0.60	mg/L	0.0025	0.0025	1	10/09/09 14:39	10/12/09 19:51	7439-96-5	B+
Zinc	0.25	mg/L	0.010	0.010	1	10/09/09 14:39	10/12/09 19:51	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	22600	mg/kg	35.5	17.8	200	10/13/09 18:58	10/14/09 12:33	7429-90-5	
Arsenic	32.2	mg/kg	4.4	2.2	200	10/13/09 18:58	10/14/09 12:33	7440-38-2	
Cadmium	<0.44	mg/kg	0.89	0.44	200	10/13/09 18:58	10/14/09 12:33	7440-43-9	D3
Copper	340	mg/kg	4.4	2.2	200	10/13/09 18:58	10/14/09 12:33	7440-50-8	
Iron	56900	mg/kg	444	222	200	10/13/09 18:58	10/14/09 12:33	7439-89-6	
Lead	206	mg/kg	0.89	0.44	200	10/13/09 18:58	10/14/09 12:33	7439-92-1	
Manganese	391	mg/kg	4.4	2.2	200	10/13/09 18:58	10/14/09 12:33	7439-96-5	
Zinc	98.9	mg/kg	44.4	22.2	200	10/13/09 18:58	10/14/09 12:33	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	9.2	%	0.10	0.10	1		10/09/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.0	Std. Units	0.10	0.050	1		10/08/09 09:20		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	9.8	tons/1000	0.50		1		10/08/09 14:00		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, HNO3 Extractable	0.12	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Hot Water Extractable	0.080	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		10/14/09 11:40		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	5.8	tons/1000	0.0		1		10/14/09 09:49		
Acid Potential	4.1	tons/1000	0.50		1		10/14/09 09:49		
Lime Requirement	5.1	tons/1000	0.0		1		10/14/09 09:49		
SMP Lime Requirement	0	tons/1000	0.0		1		10/14/09 09:49		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.0	Std. Units	0.10		1		10/08/09 00:00		

ANALYTICAL RESULTS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Sample: 09-SGTP-9 9' **Lab ID: 10113729009** Collected: 09/16/09 00:00 Received: 09/30/09 10:35 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.13	mmhos/cm	0.010	0.0050	1		10/08/09 16:27		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.21	% (w/w)	0.050	0.037	1		10/12/09 09:00		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	835	mg/kg	255	71.4	1		10/05/09 15:02	7440-44-0	
Total Organic Carbon	830	mg/kg	254	71.2	1		10/05/09 15:07	7440-44-0	
Mean Total Organic Carbon	833	mg/kg	255	71.3	1		10/05/09 15:07	7440-44-0	12M,8M

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MPRP/17628

Analysis Method: EPA 6020

QC Batch Method: EPA 3050

Analysis Description: 6020 MET

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

METHOD BLANK: 692040

Matrix: Solid

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	<1.8	3.5	10/14/09 11:27	
Arsenic	mg/kg	<0.22	0.44	10/14/09 11:27	
Cadmium	mg/kg	<0.044	0.088	10/14/09 11:27	
Copper	mg/kg	<0.22	0.44	10/14/09 11:27	
Iron	mg/kg	<22.1	44.2	10/14/09 11:27	
Lead	mg/kg	0.13	0.088	10/14/09 11:27	P8
Manganese	mg/kg	0.39J	0.44	10/14/09 11:27	
Zinc	mg/kg	<2.2	4.4	10/14/09 11:27	

LABORATORY CONTROL SAMPLE: 692041

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	14.6	16.7	114	75-125	
Arsenic	mg/kg	14.6	14.0	96	75-125	
Cadmium	mg/kg	14.6	13.9	95	75-125	
Copper	mg/kg	14.6	14.3	98	75-125	
Iron	mg/kg	182	184	101	75-125	
Lead	mg/kg	14.6	15.1	104	75-125	
Manganese	mg/kg	14.6	14.6	100	75-125	
Zinc	mg/kg	14.6	13.9	95	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 692042

692043

Parameter	Units	10113729001		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result						
Aluminum	mg/kg	17800	16.2	17.2	27800	18600	61450	4693	70-130	39	20	M1,R1	
Arsenic	mg/kg	15.3	16.2	17.2	40.9	34.6	158	112	70-130	17	20	M1	
Cadmium	mg/kg	0.96	16.2	17.2	19.2	16.0	112	87	70-130	18	20		
Copper	mg/kg	238	16.2	17.2	332	287	578	281	70-130	15	20	M1	
Iron	mg/kg	37300	203	215	49400	38700	5980	648	70-130	24	20	M1,R1	
Lead	mg/kg	161	16.2	17.2	163	129	17	-182	70-130	23	20	M1,R1	
Manganese	mg/kg	1230	16.2	17.2	1230	706	17	-3032	70-130	54	20	M1,R1	
Zinc	mg/kg	173	16.2	17.2	208	136	217	-215	70-130	42	20	M1,R1	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch:	MT/2960	Analysis Method:	ASA 103.2
QC Batch Method:	ASA 103.2	Analysis Description:	ASA 103.2 pH saturated paste
Associated Lab Samples:	10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009		

SAMPLE DUPLICATE: 692256

Parameter	Units	10113729006 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	7.4	7.3	1	3	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch:	MT/3019	Analysis Method:	LECO
QC Batch Method:	LECO	Analysis Description:	Sulfur Analysis Montana
Associated Lab Samples:	10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009		

METHOD BLANK:	695249	Matrix:	Solid
Associated Lab Samples:	10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfur	% (w/w)	<0.037	0.050	10/09/09 14:27	

SAMPLE DUPLICATE: 695250

Parameter	Units	10113729005 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	<0.037	<0.045			

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MT/2984

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

SAMPLE DUPLICATE: 693671

Parameter	Units	10113729001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	7.0	7.0	0	20	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MPRP/17729

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004

SAMPLE DUPLICATE: 694750

Parameter	Units	10113184001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	34.5	35.0	1	30	

SAMPLE DUPLICATE: 694751

Parameter	Units	10113729004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	14.0	14.1	1	30	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MPRP/17724 Analysis Method: EPA 6010
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
 Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

METHOD BLANK: 694526 Matrix: Water
 Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	10/12/09 18:28	
Arsenic	mg/L	0.0050	0.0050	10/12/09 18:28	B
Cadmium	mg/L	<0.00050	0.00050	10/12/09 18:28	
Copper	mg/L	<0.0050	0.0050	10/12/09 18:28	
Iron	mg/L	<0.025	0.025	10/12/09 18:28	
Lead	mg/L	<0.0015	0.0015	10/12/09 18:28	
Manganese	mg/L	0.31	0.0025	10/12/09 18:28	B
Zinc	mg/L	0.022	0.010	10/12/09 18:28	B

LABORATORY CONTROL SAMPLE: 694527

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	9.8	98	80-120	
Arsenic	mg/L	1	0.96	96	80-120	
Cadmium	mg/L	1	0.95	95	80-120	
Copper	mg/L	1	0.92	92	80-120	
Iron	mg/L	10	10.1	101	80-120	
Lead	mg/L	1	0.95	95	80-120	
Manganese	mg/L	1	0.94	94	80-120	
Zinc	mg/L	1	0.97	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 694528 694529

Parameter	Units	10113729001		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result						
Aluminum	mg/L	43.0	10	10	76.8	75.5	337	325	75-125	2	30	M0	
Arsenic	mg/L	0.039	1	1	0.97	0.96	93	92	75-125	1	30		
Cadmium	mg/L	0.0051	1	1	0.94	0.92	93	92	75-125	1	30		
Copper	mg/L	0.40	1	1	1.4	1.4	97	97	75-125	0	30		
Iron	mg/L	48.3	10	10	65.7	64.7	174	163	75-125	2	30	M0	
Lead	mg/L	0.15	1	1	1.1	1.1	93	92	75-125	1	30		
Manganese	mg/L	0.69	1	1	1.7	1.7	100	100	75-125	0	30		
Zinc	mg/L	0.29	1	1	1.3	1.2	96	95	75-125	1	30		

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MT/2983

Analysis Method: ASA 10-3.3

QC Batch Method: ASA 10-3.3

Analysis Description: ASA 10-3.3 Specific Conductance

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

METHOD BLANK: 693664

Matrix: Water

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	<0.0050	0.010	10/08/09 16:27	

LABORATORY CONTROL SAMPLE: 693665

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	.85	0.93	109	53-147	

SAMPLE DUPLICATE: 693667

Parameter	Units	10113729006 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	0.17	0.23	30	20	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MT/2993

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek Acid Base Potential

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

METHOD BLANK: 694038

Matrix: Solid

Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Neutralization Potential	tons/1000	0	0.50	10/08/09 14:00	

SAMPLE DUPLICATE: 694039

Parameter	Units	10113729009 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	9.8	11.0			

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: MPRP/17730 Analysis Method: % Moisture
 QC Batch Method: % Moisture Analysis Description: Dry Weight/Percent Moisture
 Associated Lab Samples: 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

SAMPLE DUPLICATE: 694753

Parameter	Units	10113729005 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.3	16.9	2	30	

SAMPLE DUPLICATE: 694754

Parameter	Units	10114089001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.7	10.0	4	30	

QUALITY CONTROL DATA

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

QC Batch: WETA/4873 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

METHOD BLANK: 216243 Matrix: Solid
 Associated Lab Samples: 10113729001, 10113729002, 10113729003, 10113729004, 10113729005, 10113729006, 10113729007, 10113729008, 10113729009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	10/05/09 12:24	

LABORATORY CONTROL SAMPLE: 216244

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	907	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 216245 216246

Parameter	Units	10113729001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	1020	508	511	1350	1360	64	66	50-150	.8	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 216247 216248

Parameter	Units	10113729005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mean Total Organic Carbon	mg/kg	716	503	504	1050	1110	65	79	50-150	6	30	

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

10M Total Inorganic Carbon Result of 1260 mg/Kg

MDL 141 mg/Kg

RDL 503 mg/Kg

11M Total Inorganic Carbon Result of <253 mg/Kg

MDL 70.7 mg/Kg

RDL 253 mg/Kg

12M Total Inorganic Carbon Result of <255 mg/Kg

MDL 71.3 mg/Kg

RDL 255 mg/Kg

13M Total Inorganic Carbon Result of <2780 mg/Kg

MDL 778 mg/Kg

RDL 2780 mg/Kg

14M Total Inorganic Carbon Result of <4350 mg/Kg

MDL 1220 mg/Kg

RDL 4350 mg/Kg

15M Total Inorganic Carbon Result of <490 mg/Kg

MDL 137 mg/Kg

RDL 490 mg/Kg

16M Total Inorganic Carbon Result of <498 mg/Kg

MDL 139 mg/Kg

RDL 498 mg/Kg

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

ANALYTE QUALIFIERS

17M	Total Inorganic Carbon Result of <503 mg/Kg MDL 141 mg/Kg RDL 503 mg/Kg
18M	Total Inorganic Carbon Result of <513 mg/Kg MDL 144 mg/Kg RDL 513 mg/Kg
19M	Total organic carbon result greater than total carbon result.
1M	Total Carbon Result of 1380 mg/Kg MDL 144 mg/Kg RDL 513 mg/Kg
2M	Total Carbon Result of 1390 mg/Kg MDL 141 mg/Kg RDL 503 mg/Kg
3M	Total Carbon Result of 1470 mg/Kg MDL 70.3 mg/Kg RDL 251 mg/Kg
4M	Total Carbon Result of 2400 mg/Kg MDL 283 mg/Kg RDL 1010 mg/Kg
5M	Total Carbon Result of 2500 mg/Kg MDL 140 mg/Kg RDL 500 mg/Kg
6M	Total Carbon Result of 3350 mg/Kg MDL 139 mg/Kg RDL 498 mg/Kg
7M	Total Carbon Result of 851 mg/Kg MDL 137 mg/Kg RDL 490 mg/Kg
8M	Total Carbon Result of 900 mg/Kg MDL 70.7 mg/Kg RDL 253 mg/Kg
9M	Total Carbon Result of 9570 mg/Kg MDL 1080 mg/Kg RDL 3850 mg/Kg
B	Analyte was detected in the associated method blank.
B+	Analyte was detected in the associated method blank as well as in the sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

QUALIFIERS

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

ANALYTE QUALIFIERS

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113729001	09-SGTP-5 16'	EPA 9060 Modified	WETA/4873		
10113729002	09-SGTP-6 2'	EPA 9060 Modified	WETA/4873		
10113729003	09-SGTP-6 6'	EPA 9060 Modified	WETA/4873		
10113729004	09-SGTP-7 8'	EPA 9060 Modified	WETA/4873		
10113729005	09-SGTP-7 12'	EPA 9060 Modified	WETA/4873		
10113729006	09-SGTP-8 4'	EPA 9060 Modified	WETA/4873		
10113729007	09-SGTP-8 9'	EPA 9060 Modified	WETA/4873		
10113729008	09-SGTP-9 6'	EPA 9060 Modified	WETA/4873		
10113729009	09-SGTP-9 9'	EPA 9060 Modified	WETA/4873		
10113729001	09-SGTP-5 16'	EPA 9060 Modified	WETA/4874		
10113729002	09-SGTP-6 2'	EPA 9060 Modified	WETA/4874		
10113729003	09-SGTP-6 6'	EPA 9060 Modified	WETA/4874		
10113729004	09-SGTP-7 8'	EPA 9060 Modified	WETA/4874		
10113729005	09-SGTP-7 12'	EPA 9060 Modified	WETA/4874		
10113729006	09-SGTP-8 4'	EPA 9060 Modified	WETA/4874		
10113729007	09-SGTP-8 9'	EPA 9060 Modified	WETA/4874		
10113729008	09-SGTP-9 6'	EPA 9060 Modified	WETA/4874		
10113729009	09-SGTP-9 9'	EPA 9060 Modified	WETA/4874		
10113729001	09-SGTP-5 16'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729002	09-SGTP-6 2'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729003	09-SGTP-6 6'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729004	09-SGTP-7 8'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729005	09-SGTP-7 12'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729006	09-SGTP-8 4'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729007	09-SGTP-8 9'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729008	09-SGTP-9 6'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729009	09-SGTP-9 9'	EPA 3050	MPRP/17628	EPA 6020	ICPM/7251
10113729001	09-SGTP-5 16'	ASA 103.2	MT/2960		
10113729002	09-SGTP-6 2'	ASA 103.2	MT/2960		
10113729003	09-SGTP-6 6'	ASA 103.2	MT/2960		
10113729004	09-SGTP-7 8'	ASA 103.2	MT/2960		
10113729005	09-SGTP-7 12'	ASA 103.2	MT/2960		
10113729006	09-SGTP-8 4'	ASA 103.2	MT/2960		
10113729007	09-SGTP-8 9'	ASA 103.2	MT/2960		
10113729008	09-SGTP-9 6'	ASA 103.2	MT/2960		
10113729009	09-SGTP-9 9'	ASA 103.2	MT/2960		
10113729001	09-SGTP-5 16'	ASA 10-3.3	MT/2983		
10113729002	09-SGTP-6 2'	ASA 10-3.3	MT/2983		
10113729003	09-SGTP-6 6'	ASA 10-3.3	MT/2983		
10113729004	09-SGTP-7 8'	ASA 10-3.3	MT/2983		
10113729005	09-SGTP-7 12'	ASA 10-3.3	MT/2983		
10113729006	09-SGTP-8 4'	ASA 10-3.3	MT/2983		
10113729007	09-SGTP-8 9'	ASA 10-3.3	MT/2983		
10113729008	09-SGTP-9 6'	ASA 10-3.3	MT/2983		
10113729009	09-SGTP-9 9'	ASA 10-3.3	MT/2983		
10113729001	09-SGTP-5 16'	Modified Sobek 7	MT/2984		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113729002	09-SGTP-6 2'	Modified Sobek 7	MT/2984		
10113729003	09-SGTP-6 6'	Modified Sobek 7	MT/2984		
10113729004	09-SGTP-7 8'	Modified Sobek 7	MT/2984		
10113729005	09-SGTP-7 12'	Modified Sobek 7	MT/2984		
10113729006	09-SGTP-8 4'	Modified Sobek 7	MT/2984		
10113729007	09-SGTP-8 9'	Modified Sobek 7	MT/2984		
10113729008	09-SGTP-9 6'	Modified Sobek 7	MT/2984		
10113729009	09-SGTP-9 9'	Modified Sobek 7	MT/2984		
10113729001	09-SGTP-5 16'	Modified Sobek 7	MT/2993		
10113729002	09-SGTP-6 2'	Modified Sobek 7	MT/2993		
10113729003	09-SGTP-6 6'	Modified Sobek 7	MT/2993		
10113729004	09-SGTP-7 8'	Modified Sobek 7	MT/2993		
10113729005	09-SGTP-7 12'	Modified Sobek 7	MT/2993		
10113729006	09-SGTP-8 4'	Modified Sobek 7	MT/2993		
10113729007	09-SGTP-8 9'	Modified Sobek 7	MT/2993		
10113729008	09-SGTP-9 6'	Modified Sobek 7	MT/2993		
10113729009	09-SGTP-9 9'	Modified Sobek 7	MT/2993		
10113729001	09-SGTP-5 16'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729002	09-SGTP-6 2'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729003	09-SGTP-6 6'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729004	09-SGTP-7 8'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729005	09-SGTP-7 12'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729006	09-SGTP-8 4'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729007	09-SGTP-8 9'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729008	09-SGTP-9 6'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729009	09-SGTP-9 9'	EPA 3010	MPRP/17724	EPA 6010	ICP/8018
10113729001	09-SGTP-5 16'	% Moisture	MPRP/17729		
10113729002	09-SGTP-6 2'	% Moisture	MPRP/17729		
10113729003	09-SGTP-6 6'	% Moisture	MPRP/17729		
10113729004	09-SGTP-7 8'	% Moisture	MPRP/17729		
10113729005	09-SGTP-7 12'	% Moisture	MPRP/17730		
10113729006	09-SGTP-8 4'	% Moisture	MPRP/17730		
10113729007	09-SGTP-8 9'	% Moisture	MPRP/17730		
10113729008	09-SGTP-9 6'	% Moisture	MPRP/17730		
10113729009	09-SGTP-9 9'	% Moisture	MPRP/17730		
10113729001	09-SGTP-5 16'	LECO	MT/3019		
10113729002	09-SGTP-6 2'	LECO	MT/3019		
10113729003	09-SGTP-6 6'	LECO	MT/3019		
10113729004	09-SGTP-7 8'	LECO	MT/3019		
10113729005	09-SGTP-7 12'	LECO	MT/3019		
10113729006	09-SGTP-8 4'	LECO	MT/3019		
10113729007	09-SGTP-8 9'	LECO	MT/3019		
10113729008	09-SGTP-9 6'	LECO	MT/3019		
10113729009	09-SGTP-9 9'	LECO	MT/3019		
10113729001	09-SGTP-5 16'	Modified Sobek 7	MT/3035		
10113729002	09-SGTP-6 2'	Modified Sobek 7	MT/3035		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC Mike Horse 09208

Pace Project No.: 10113729

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10113729003	09-SGTP-6 6'	Modified Sobek 7	MT/3035		
10113729004	09-SGTP-7 8'	Modified Sobek 7	MT/3035		
10113729005	09-SGTP-7 12'	Modified Sobek 7	MT/3035		
10113729006	09-SGTP-8 4'	Modified Sobek 7	MT/3035		
10113729007	09-SGTP-8 9'	Modified Sobek 7	MT/3035		
10113729008	09-SGTP-9 6'	Modified Sobek 7	MT/3035		
10113729009	09-SGTP-9 9'	Modified Sobek 7	MT/3035		
10113729001	09-SGTP-5 16'	Modified Sobek 7	MT/3038		
10113729002	09-SGTP-6 2'	Modified Sobek 7	MT/3038		
10113729003	09-SGTP-6 6'	Modified Sobek 7	MT/3038		
10113729004	09-SGTP-7 8'	Modified Sobek 7	MT/3038		
10113729005	09-SGTP-7 12'	Modified Sobek 7	MT/3038		
10113729006	09-SGTP-8 4'	Modified Sobek 7	MT/3038		
10113729007	09-SGTP-8 9'	Modified Sobek 7	MT/3038		
10113729008	09-SGTP-9 6'	Modified Sobek 7	MT/3038		
10113729009	09-SGTP-9 9'	Modified Sobek 7	MT/3038		

November 16, 2009

Shellie Haaland
Montana Dept. of Environmental Quality
PO Box 200901
Helena, MT 596200901

RE: Project: UBMC-Mike Horse 09208
Pace Project No.: 10116045

Dear Shellie Haaland:

Enclosed are the analytical results for sample(s) received by the laboratory on November 02, 2009.
The results relate only to the samples included in this report.

This report contains data that were produced by a subcontracted laboratory that performed fields of testing that do not require certification.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Thomas Smith, Terragraphics Environmental Engineering,
Inc.

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Minnesota Certification IDs

Alaska Certification #: UST-078
Arizona Certification #: AZ-0014
1700 Elm Street SE, Suite 200 Minneapolis, MN 55414
Wisconsin Certification #: 999407970
Washington Certification #: C754
Tennessee Certification #: 02818
Pennsylvania Certification #: 68-00563
Oregon Certification #: MN200001
North Dakota Certification #: R-036
North Carolina Certification #: 530
New York Certification #: 11647

New Jersey Certification #: MN-002
Montana Certification #: MT CERT0092
Minnesota Certification #: 027-053-137
Maine Certification #: 2007029
Louisiana Certification #: LA080009
Louisiana Certification #: 03086
Kansas Certification #: E-10167
Iowa Certification #: 368
California Certification #: 01155CA
Florida/NELAP Certification #: E87605
Illinois Certification #: 200011

Montana Certification IDs

Idaho Certification #: MT00012
Montana Certification #: MT CERT0040

602 South 25th Street Billings, MT 59101
EPA Region 8 Certification #: 8TMS-Q

Green Bay Certification IDs

Minnesota Certification #: 055-999-334
Louisiana Certification #: 04168
Kentucky Certification #: 82
Illinois Certification #: 200050
Florida/NELAP Certification #: E87948
California Certification #: 09268CA
Wisconsin DATCP Certification #: 105-444

Wisconsin Certification #: 405132750
South Carolina Certification #: 83006001
New York Certification #: 11887
New York Certification #: 11888
1241 Bellevue Street Green Bay, WI 54302
North Dakota Certification #: R-150
North Carolina Certification #: 503

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10116045001	09-MHTP-4, 9 1/2'	Solid	09/09/09 00:00	11/02/09 10:10
10116045002	09-MHTP-6, 7 1/2'	Solid	09/09/09 00:00	11/02/09 10:10
10116045003	09-PMBH-2, 5-10'	Solid	09/16/09 00:00	11/02/09 10:10
10116045004	09-PMBH-2, 6-8'	Solid	09/16/09 00:00	11/02/09 10:10
10116045005	09-PMTP-9, 2'	Solid	09/11/09 00:00	11/02/09 10:10

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10116045001	09-MHTP-4, 9 1/2'	% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
10116045002	09-MHTP-6, 7 1/2'	Modified Sobek 7	CAC, CB	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
10116045003	09-PMBH-2, 5-10'	LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, CB	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
10116045004	09-PMBH-2, 6-8'	EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, CB	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
		EPA 6010	IP	8	PASI-M
10116045005	09-PMTP-9, 2'	EPA 6020	RJS	8	PASI-M
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, CB	10	PASI-MT
		% Moisture	JDL	1	PASI-M
		ASA 10-3.3	CAC	1	PASI-MT
		ASA 103.2	CAC	1	PASI-MT
10116045005	09-PMTP-9, 2'	EPA 6010	IP	8	PASI-M
		EPA 6020	RJS	8	PASI-M
		EPA 6010	IP	8	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 9060 Modified	DJR	3	PASI-G
		LECO	CAC	1	PASI-MT
		Modified Sobek 7	CAC, CB	10	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/18242

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 712024)

- Arsenic
- Manganese
- Zinc

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/18242

- 09-MHTP-6, 7 1/2' (Lab ID: 10116045002)
 - Manganese
 - Zinc
- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
 - Manganese

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 6010

Description: 6010 MET ICP, SPLP

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

Analyte Comments:

QC Batch: MPRP/18242

- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
 - Zinc
- 09-PMBH-2, 6-8' (Lab ID: 10116045004)
 - Manganese
 - Zinc
- 09-PMTP-9, 2' (Lab ID: 10116045005)
 - Manganese

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/18099

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 707078)
- Lead

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/18099

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10115860014,5031702001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 707080)
 - Aluminum
 - Iron
 - Manganese
 - Zinc
- MS (Lab ID: 707082)
 - Aluminum
- MSD (Lab ID: 707081)
 - Aluminum

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

QC Batch: MPRP/18099

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10115860014,5031702001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- Copper
- Iron
- Manganese
- Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/18099

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- 09-MHTP-4, 9 1/2' (Lab ID: 10116045001)
 - Cadmium
- 09-PMTP-9, 2' (Lab ID: 10116045005)
 - Cadmium

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: % Moisture

Description: Dry Weight

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: ASA 103.2

Description: ASA 103.2 pH

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for ASA 103.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: LECO

Description: Sulfur analysis Montana

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for LECO. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MT/3189

B: Analyte was detected in the associated method blank.

- BLANK (Lab ID: 714302)
- Neutralization Potential

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208
Pace Project No.: 10116045

Method: EPA 9060 Modified
Description: Total Organic Carbon
Client: Montana Dept. of Environmental Quality
Date: November 16, 2009

General Information:

5 samples were analyzed for EPA 9060 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received outside the recognized method holding time.

- 09-MHTP-4, 9 1/2' (Lab ID: 10116045001)
- 09-MHTP-6, 7 1/2' (Lab ID: 10116045002)
- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
- 09-PMBH-2, 6-8' (Lab ID: 10116045004)
- 09-PMTP-9, 2' (Lab ID: 10116045005)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WETA/5188

10M: Total Inorganic Carbon result of <489 mg/Kg.

MDL 137 mg/Kg

RDL 489 mg/Kg

- 09-MHTP-4, 9 1/2' (Lab ID: 10116045001)
 - Mean Total Organic Carbon

11M: Total Organic Carbon result is greater than the Total Carbon Result.

- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
 - Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

Analyte Comments:

QC Batch: WETA/5188

1M: Total Carbon result of 1390 mg/Kg.

MDL 137 mg/Kg

RDL 489 mg/Kg

- 09-MHTP-4, 9 1/2' (Lab ID: 10116045001)
- Mean Total Organic Carbon

2M: Total Carbon result of 3570 mg/Kg.

MDL 265 mg/Kg

RDL 948 mg/Kg

- 09-PMTP-9, 2' (Lab ID: 10116045005)
- Mean Total Organic Carbon

3M: Total Carbon result of 4790 mg/Kg.

MDL 528 mg/Kg

RDL 1890 mg/Kg

- 09-MHTP-6, 7 1/2' (Lab ID: 10116045002)
- Mean Total Organic Carbon

4M: Total Carbon result of 550 mg/Kg.

MDL 70.4 mg/Kg

RDL 251 mg/Kg

- 09-PMBH-2, 6-8' (Lab ID: 10116045004)
- Mean Total Organic Carbon

5M: Total Carbon result of <253 mg/Kg.

MDL 70.7 mg/Kg

RDL 253 mg/Kg

- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
- Mean Total Organic Carbon

6M: Total Inorganic Carbon result of 1480 mg/Kg.

MDL 265 mg/Kg

RDL 948 mg/Kg

- 09-PMTP-9, 2' (Lab ID: 10116045005)
- Mean Total Organic Carbon

7M: Total Inorganic Carbon result of 2270 mg/Kg.

MDL 528 mg/Kg

RDL 1890 mg/Kg

- 09-MHTP-6, 7 1/2' (Lab ID: 10116045002)
- Mean Total Organic Carbon

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Method: EPA 9060 Modified

Description: Total Organic Carbon

Client: Montana Dept. of Environmental Quality

Date: November 16, 2009

Analyte Comments:

QC Batch: WETA/5188

8M: Total Inorganic Carbon result of <251 mg/Kg.

MDL 70.4 mg/Kg

RDL 251 mg/Kg

- 09-PMBH-2, 6-8' (Lab ID: 10116045004)
- Mean Total Organic Carbon

9M: Total Inorganic Carbon result of <253 mg/Kg.

MDL 70.7 mg/Kg

RDL 253 mg/Kg

- 09-PMBH-2, 5-10' (Lab ID: 10116045003)
- Mean Total Organic Carbon

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-MHTP-4, 9 1/2' **Lab ID:** 10116045001 **Collected:** 09/09/09 00:00 **Received:** 11/02/09 10:10 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 11/11/09 16:38									
Aluminum	<0.10	mg/L	0.10	0.10	1	11/11/09 19:49	11/12/09 15:37	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:37	7440-38-2	
Cadmium	<0.00050	mg/L	0.00050	0.00050	1	11/11/09 19:49	11/12/09 15:37	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:37	7440-50-8	
Iron	0.056	mg/L	0.025	0.025	1	11/11/09 19:49	11/12/09 15:37	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	11/11/09 19:49	11/12/09 15:37	7439-92-1	
Manganese	0.014	mg/L	0.0025	0.0025	1	11/11/09 19:49	11/12/09 15:37	7439-96-5	Z2
Zinc	0.014	mg/L	0.010	0.010	1	11/11/09 19:49	11/12/09 15:37	7440-66-6	Z2
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	9740	mg/kg	41.0	20.5	200	11/04/09 11:19	11/12/09 04:12	7429-90-5	
Arsenic	16.7	mg/kg	5.1	2.6	200	11/04/09 11:19	11/12/09 04:12	7440-38-2	
Cadmium	<0.51	mg/kg	1.0	0.51	200	11/04/09 11:19	11/12/09 04:12	7440-43-9	D3
Copper	31.6	mg/kg	5.1	2.6	200	11/04/09 11:19	11/12/09 04:12	7440-50-8	
Iron	19200	mg/kg	513	257	200	11/04/09 11:19	11/12/09 04:12	7439-89-6	
Lead	56.0	mg/kg	1.0	0.51	200	11/04/09 11:19	11/12/09 04:12	7439-92-1	
Manganese	902	mg/kg	5.1	2.6	200	11/04/09 11:19	11/12/09 04:12	7439-96-5	
Zinc	131	mg/kg	51.3	25.7	200	11/04/09 11:19	11/12/09 04:12	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.1	%	0.10	0.10	1		11/03/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.4	Std. Units	0.10	0.050	1		11/04/09 17:23		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	5.3	tons/1000	0.50		1		11/04/09 15:30		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 12:37		
Sulfur, HNO3 Extractable	0.077	% (w/w)	0.050	0.037	1		11/06/09 12:37		
Sulfur, Hot Water Extractable	0.35	% (w/w)	0.050	0.037	1		11/06/09 12:37		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		11/06/09 12:37		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	2.4	tons/1000	0.0		1		11/13/09 11:07		
Acid Potential	2.8	tons/1000	0.50		1		11/13/09 11:07		
Lime Requirement	3.6	tons/1000	0.0		1		11/13/09 11:07		
SMP Lime Requirement	0	tons/1000	0.0		1		11/13/09 11:07		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	7.2	Std. Units	0.10		1		11/11/09 16:27		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-MHTP-4, 9 1/2' **Lab ID:** 10116045001 Collected: 09/09/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	4.3	mmhos/cm	0.010	0.0050	1		11/11/09 17:25		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.44	% (w/w)	0.050	0.037	1		11/06/09 12:37		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	1270	mg/kg	490	137	1		11/14/09 09:50	7440-44-0	
Total Organic Carbon	911	mg/kg	485	136	1		11/14/09 09:53	7440-44-0	
Mean Total Organic Carbon	1090	mg/kg	488	137	1		11/14/09 09:53	7440-44-0	10M, 1M,H3

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-MHTP-6, 7 1/2' **Lab ID:** 10116045002 Collected: 09/09/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 11/11/09 16:38									
Aluminum	<0.10	mg/L	0.10	0.10	1	11/11/09 19:49	11/12/09 15:51	7429-90-5	
Arsenic	<0.0050	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:51	7440-38-2	
Cadmium	0.023	mg/L	0.00050	0.00050	1	11/11/09 19:49	11/12/09 15:51	7440-43-9	
Copper	<0.0050	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:51	7440-50-8	
Iron	0.030	mg/L	0.025	0.025	1	11/11/09 19:49	11/12/09 15:51	7439-89-6	
Lead	<0.0015	mg/L	0.0015	0.0015	1	11/11/09 19:49	11/12/09 15:51	7439-92-1	
Manganese	15.1	mg/L	0.0025	0.0025	1	11/11/09 19:49	11/12/09 15:51	7439-96-5	
Zinc	1.3	mg/L	0.010	0.010	1	11/11/09 19:49	11/12/09 15:51	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	14100	mg/kg	33.1	16.5	200	11/04/09 11:19	11/12/09 04:16	7429-90-5	
Arsenic	43.4	mg/kg	4.1	2.1	200	11/04/09 11:19	11/12/09 04:16	7440-38-2	
Cadmium	4.0	mg/kg	0.83	0.41	200	11/04/09 11:19	11/12/09 04:16	7440-43-9	
Copper	113	mg/kg	4.1	2.1	200	11/04/09 11:19	11/12/09 04:16	7440-50-8	
Iron	29700	mg/kg	413	207	200	11/04/09 11:19	11/12/09 04:16	7439-89-6	
Lead	269	mg/kg	0.83	0.41	200	11/04/09 11:19	11/12/09 04:16	7439-92-1	
Manganese	1460	mg/kg	4.1	2.1	200	11/04/09 11:19	11/12/09 04:16	7439-96-5	
Zinc	603	mg/kg	41.3	20.7	200	11/04/09 11:19	11/12/09 04:16	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	11.1	%	0.10	0.10	1		11/03/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	6.8	Std. Units	0.10	0.050	1		11/04/09 17:23		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	19	tons/1000	0.50		1		11/04/09 15:30		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	0.080	% (w/w)	0.050	0.037	1		11/06/09 13:01		
Sulfur, HNO3 Extractable	1.5	% (w/w)	0.050	0.037	1		11/06/09 13:01		
Sulfur, Hot Water Extractable	0.78	% (w/w)	0.050	0.037	1		11/06/09 13:01		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:01		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	-31	tons/1000	0.0		1		11/13/09 11:08		
Acid Potential	50	tons/1000	0.50		1		11/13/09 11:08		
Lime Requirement	66	tons/1000	0.0		1		11/13/09 11:08		
SMP Lime Requirement	3.1	tons/1000	0.0		1		11/13/09 11:08		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		11/11/09 16:27		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-MHTP-6, 7 1/2' Lab ID: 10116045002 Collected: 09/09/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	11.0	mmhos/cm	0.010	0.0050	1		11/11/09 17:25		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	2.4	% (w/w)	0.050	0.037	1		11/06/09 13:01		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	3110	mg/kg	503	141	1		11/14/09 11:10	7440-44-0	
Total Organic Carbon	1940	mg/kg	495	139	1		11/14/09 11:15	7440-44-0	
Mean Total Organic Carbon	2520	mg/kg	499	140	1		11/14/09 11:15	7440-44-0	3M, 7M, H3

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMBH-2, 5-10' **Lab ID:** 10116045003 **Collected:** 09/16/09 00:00 **Received:** 11/02/09 10:10 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 11/11/09 16:38									
Aluminum	27.3	mg/L	0.10	0.10	1	11/11/09 19:49	11/12/09 15:55	7429-90-5	
Arsenic	0.043	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:55	7440-38-2	Z2
Cadmium	0.013	mg/L	0.00050	0.00050	1	11/11/09 19:49	11/12/09 15:55	7440-43-9	
Copper	0.39	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 15:55	7440-50-8	
Iron	75.1	mg/L	0.025	0.025	1	11/11/09 19:49	11/12/09 15:55	7439-89-6	
Lead	0.15	mg/L	0.0015	0.0015	1	11/11/09 19:49	11/12/09 15:55	7439-92-1	
Manganese	3.6	mg/L	0.0025	0.0025	1	11/11/09 19:49	11/12/09 15:55	7439-96-5	
Zinc	1.3	mg/L	0.010	0.010	1	11/11/09 19:49	11/12/09 15:55	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	22400	mg/kg	34.5	17.3	200	11/04/09 11:19	11/12/09 04:32	7429-90-5	
Arsenic	8.6	mg/kg	4.3	2.2	200	11/04/09 11:19	11/12/09 04:32	7440-38-2	
Cadmium	6.0	mg/kg	0.86	0.43	200	11/04/09 11:19	11/12/09 04:32	7440-43-9	
Copper	416	mg/kg	4.3	2.2	200	11/04/09 11:19	11/12/09 04:32	7440-50-8	
Iron	99700	mg/kg	432	216	200	11/04/09 11:19	11/12/09 04:32	7439-89-6	
Lead	219	mg/kg	0.86	0.43	200	11/04/09 11:19	11/12/09 04:32	7439-92-1	
Manganese	2480	mg/kg	4.3	2.2	200	11/04/09 11:19	11/12/09 04:32	7439-96-5	
Zinc	1100	mg/kg	43.2	21.6	200	11/04/09 11:19	11/12/09 04:32	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	6.6	%	0.10	0.10	1		11/03/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	8.3	Std. Units	0.10	0.050	1		11/04/09 17:23		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	8.2	tons/1000	0.50		1		11/04/09 15:30		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:33		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:33		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:33		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:33		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	7.9	tons/1000	0.0		1		11/13/09 11:08		
Acid Potential	0.32	tons/1000	0.50		1		11/13/09 11:08		
Lime Requirement	1.7	tons/1000	0.0		1		11/13/09 11:08		
SMP Lime Requirement	1.0	tons/1000	0.0		1		11/13/09 11:08		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.8	Std. Units	0.10		1		11/11/09 16:27		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMBH-2, 5-10' Lab ID: 10116045003 Collected: 09/16/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.26	mmhos/cm	0.010	0.0050	1		11/11/09 17:25		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:33		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	377	mg/kg	251	70.4	1		11/14/09 11:39	7440-44-0	
Total Organic Carbon	431	mg/kg	251	70.4	1		11/14/09 11:43	7440-44-0	
Mean Total Organic Carbon	404	mg/kg	251	70.4	1		11/14/09 11:43	7440-44-0	11M, 5M,9M, H3

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMBH-2, 6-8' **Lab ID:** 10116045004 **Collected:** 09/16/09 00:00 **Received:** 11/02/09 10:10 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 11/11/09 16:38									
Aluminum	17.9	mg/L	0.10	0.10	1	11/11/09 19:49	11/12/09 16:02	7429-90-5	
Arsenic	0.034	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 16:02	7440-38-2	Z2
Cadmium	0.012	mg/L	0.00050	0.00050	1	11/11/09 19:49	11/12/09 16:02	7440-43-9	
Copper	0.31	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 16:02	7440-50-8	
Iron	51.7	mg/L	0.025	0.025	1	11/11/09 19:49	11/12/09 16:02	7439-89-6	
Lead	0.14	mg/L	0.0015	0.0015	1	11/11/09 19:49	11/12/09 16:02	7439-92-1	
Manganese	4.2	mg/L	0.0025	0.0025	1	11/11/09 19:49	11/12/09 16:02	7439-96-5	
Zinc	1.2	mg/L	0.010	0.010	1	11/11/09 19:49	11/12/09 16:02	7440-66-6	
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	45300	mg/kg	41.4	20.7	200	11/04/09 11:19	11/12/09 04:36	7429-90-5	Z2
Arsenic	21.0	mg/kg	5.2	2.6	200	11/04/09 11:19	11/12/09 04:36	7440-38-2	
Cadmium	16.4	mg/kg	1.0	0.52	200	11/04/09 11:19	11/12/09 04:36	7440-43-9	
Copper	980	mg/kg	5.2	2.6	200	11/04/09 11:19	11/12/09 04:36	7440-50-8	
Iron	219000	mg/kg	517	259	200	11/04/09 11:19	11/12/09 04:36	7439-89-6	
Lead	320	mg/kg	1.0	0.52	200	11/04/09 11:19	11/12/09 04:36	7439-92-1	Z2
Manganese	3150	mg/kg	12.9	6.5	500	11/04/09 11:19	11/13/09 16:05	7439-96-5	
Zinc	2940	mg/kg	51.7	25.9	200	11/04/09 11:19	11/12/09 04:36	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	10.5	%	0.10	0.10	1		11/03/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.9	Std. Units	0.10	0.050	1		11/04/09 17:23		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	6.6	tons/1000	0.50		1		11/04/09 15:30		
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:46		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:46		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:46		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:46		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	6.4	tons/1000	0.0		1		11/13/09 11:09		
Acid Potential	0.17	tons/1000	0.50		1		11/13/09 11:09		
Lime Requirement	4.1	tons/1000	0.0		1		11/13/09 11:09		
SMP Lime Requirement	3.1	tons/1000	0.0		1		11/13/09 11:09		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.5	Std. Units	0.10		1		11/11/09 16:27		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMBH-2, 6-8' **Lab ID:** 10116045004 Collected: 09/16/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.15	mmhos/cm	0.010	0.0050	1		11/11/09 17:25		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	<0.037	% (w/w)	0.050	0.037	1		11/06/09 13:48		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	348	mg/kg	251	70.2	1		11/14/09 11:46	7440-44-0	
Total Organic Carbon	326	mg/kg	252	70.5	1		11/14/09 11:50	7440-44-0	
Mean Total Organic Carbon	337	mg/kg	251	70.4	1		11/14/09 11:50	7440-44-0	4M, 8M, H3

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMTP-9, 2' Lab ID: 10116045005 Collected: 09/11/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP									
Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Leachate Method/Date: EPA 1312; 11/11/09 16:38									
Aluminum	13.5	mg/L	0.10	0.10	1	11/11/09 19:49	11/12/09 16:09	7429-90-5	
Arsenic	0.019	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 16:09	7440-38-2	Z2
Cadmium	0.0012	mg/L	0.00050	0.00050	1	11/11/09 19:49	11/12/09 16:09	7440-43-9	
Copper	0.082	mg/L	0.0050	0.0050	1	11/11/09 19:49	11/12/09 16:09	7440-50-8	
Iron	13.5	mg/L	0.025	0.025	1	11/11/09 19:49	11/12/09 16:09	7439-89-6	
Lead	0.26	mg/L	0.0015	0.0015	1	11/11/09 19:49	11/12/09 16:09	7439-92-1	
Manganese	0.091	mg/L	0.0025	0.0025	1	11/11/09 19:49	11/12/09 16:09	7439-96-5	
Zinc	0.11	mg/L	0.010	0.010	1	11/11/09 19:49	11/12/09 16:09	7440-66-6	Z2
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	16800	mg/kg	29.1	14.5	200	11/04/09 11:19	11/12/09 04:40	7429-90-5	
Arsenic	23.6	mg/kg	3.6	1.8	200	11/04/09 11:19	11/12/09 04:40	7440-38-2	
Cadmium	0.37J	mg/kg	0.73	0.36	200	11/04/09 11:19	11/12/09 04:40	7440-43-9	D3
Copper	549	mg/kg	3.6	1.8	200	11/04/09 11:19	11/12/09 04:40	7440-50-8	
Iron	72200	mg/kg	364	182	200	11/04/09 11:19	11/12/09 04:40	7439-89-6	
Lead	963	mg/kg	0.73	0.36	200	11/04/09 11:19	11/12/09 04:40	7439-92-1	
Manganese	549	mg/kg	3.6	1.8	200	11/04/09 11:19	11/12/09 04:40	7439-96-5	
Zinc	127	mg/kg	36.4	18.2	200	11/04/09 11:19	11/12/09 04:40	7440-66-6	
Dry Weight									
Analytical Method: % Moisture									
Percent Moisture	8.3	%	0.10	0.10	1		11/03/09 00:00		
ASA 103.2 pH									
Analytical Method: ASA 103.2									
pH, Saturated Paste	7.4	Std. Units	0.10	0.050	1		11/04/09 17:23		
Sobek Acid Base Potential									
Analytical Method: Modified Sobek 7									
Neutralization Potential	2.2	tons/1000	0.50		1		11/04/09 15:30		Z2
Sobek Extractable Sulfur									
Analytical Method: Modified Sobek 7									
Sulfur, HCl Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 14:00		
Sulfur, HNO3 Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 14:00		
Sulfur, Hot Water Extractable	<0.037	% (w/w)	0.050	0.037	1		11/06/09 14:00		
Sulfur, Residual	<0.037	% (w/w)	0.050	0.037	1		11/06/09 14:00		
Sobek Calculations									
Analytical Method: Modified Sobek 7									
Acid/Base Potential	1.5	tons/1000	0.0		1		11/13/09 11:10		
Acid Potential	0.63	tons/1000	0.50		1		11/13/09 11:10		
Lime Requirement	5.7	tons/1000	0.0		1		11/13/09 11:10		
SMP Lime Requirement	3.9	tons/1000	0.0		1		11/13/09 11:10		
Sobek SMP Buffer pH									
Analytical Method: Modified Sobek 7									
SMP Buffer pH	6.4	Std. Units	0.10		1		11/11/09 16:27		

ANALYTICAL RESULTS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Sample: 09-PMTP-9, 2' **Lab ID: 10116045005** Collected: 09/11/09 00:00 Received: 11/02/09 10:10 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3							
Sp. Conductance Saturated Paste	0.15	mmhos/cm	0.010	0.0050	1		11/11/09 17:25		
Sulfur analysis Montana		Analytical Method: LECO							
Sulfur	0.037J	% (w/w)	0.050	0.037	1		11/06/09 14:00		
Total Organic Carbon		Analytical Method: EPA 9060 Modified							
Total Organic Carbon	2010	mg/kg	493	138	1		11/14/09 11:20	7440-44-0	
Total Organic Carbon	2180	mg/kg	498	139	1		11/14/09 11:25	7440-44-0	
Mean Total Organic Carbon	2090	mg/kg	495	139	1		11/14/09 11:25	7440-44-0	2M, 6M, H3

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MPRP/18087

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

SAMPLE DUPLICATE: 706722

Parameter	Units	10116101001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	3.3	3.3	2	30	

SAMPLE DUPLICATE: 706723

Parameter	Units	10116025004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	19.3	14.8	27	30	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MT/3183 Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7 Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

SAMPLE DUPLICATE: 707185

Parameter	Units	10116045002 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.5	6.5	0	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MT/3188

Analysis Method: ASA 10-3.3

QC Batch Method: ASA 10-3.3

Analysis Description: ASA 10-3.3 Specific Conductance

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 707567

Matrix: Water

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	<0.0050	0.010	11/11/09 17:25	

LABORATORY CONTROL SAMPLE: 707568

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.3	1.5	111	55-145	

SAMPLE DUPLICATE: 707569

Parameter	Units	10116045002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	11.0	10.7	3	20	

SAMPLE DUPLICATE: 707570

Parameter	Units	10115916002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	1.5	1.5	0	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MT/3189

Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7

Analysis Description: Sobek Acid Base Potential

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 714302

Matrix: Solid

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Neutralization Potential	tons/1000	0.25	0.50	11/04/09 15:30	B

SAMPLE DUPLICATE: 707588

Parameter	Units	10116045002 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	19	18			

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: WETA/5188 Analysis Method: EPA 9060 Modified
 QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
 Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 232835 Matrix: Solid
 Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	<70.0	250	11/14/09 08:56	

LABORATORY CONTROL SAMPLE: 232836

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	1000	995	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 232837 232838

Parameter	Units	10116045001		MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD	
Mean Total Organic Carbon	mg/kg	1090	980	983	1910	2250	84	118	50-150	16	30	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MPRP/18099 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 707078 Matrix: Solid
 Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	1.7J	3.3	11/12/09 10:05	
Arsenic	mg/kg	<0.21	0.41	11/12/09 10:05	
Cadmium	mg/kg	<0.041	0.083	11/12/09 10:05	
Copper	mg/kg	<0.21	0.41	11/12/09 10:05	
Iron	mg/kg	<20.7	41.3	11/12/09 10:05	
Lead	mg/kg	0.13	0.083	11/12/09 10:05	B
Manganese	mg/kg	<0.21	0.41	11/12/09 10:05	
Zinc	mg/kg	<2.1	4.1	11/12/09 10:05	

LABORATORY CONTROL SAMPLE: 707079

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	17.1	19.5	114	75-125	
Arsenic	mg/kg	17.1	16.5	97	75-125	
Cadmium	mg/kg	17.1	17.1	100	75-125	
Copper	mg/kg	17.1	17.4	102	75-125	
Iron	mg/kg	214	216	101	75-125	
Lead	mg/kg	17.1	17.2	100	75-125	
Manganese	mg/kg	17.1	17.2	100	75-125	
Zinc	mg/kg	17.1	17.3	101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 707080 707081

Parameter	Units	10115860014		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Aluminum	mg/kg	4580	58.2	61.6	6590	6840	3451	3670	70-130	4	20	M0	
Arsenic	mg/kg	5.6	58.2	61.6	62.0	63.9	97	95	70-130	3	20		
Cadmium	mg/kg	8.7	58.2	61.6	68.9	71.1	103	101	70-130	3	20		
Copper	mg/kg	325	58.2	61.6	400	413	129	143	70-130	3	20	M0	
Iron	mg/kg	6830	726	767	8480	8900	226	269	70-130	5	20	M0	
Lead	mg/kg	25.5	58.2	61.6	89.7	88.4	110	102	70-130	1	20		
Manganese	mg/kg	2000	58.2	61.6	2260	2330	450	536	70-130	3	20	M0	
Zinc	mg/kg	417	58.2	61.6	495	511	135	154	70-130	3	20	M0	

MATRIX SPIKE SAMPLE: 707082

Parameter	Units	5031702001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	382	23.1	601	944	70-130	M0

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

MATRIX SPIKE SAMPLE:		707082					
Parameter	Units	5031702001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	0.84	23.1	27.5	115	70-130	
Cadmium	mg/kg	0.20	23.1	26.4	113	70-130	
Copper	mg/kg	2.5	23.1	27.2	106	70-130	
Iron	mg/kg	950	289	1330	129	70-130	
Lead	mg/kg	0.86	23.1	27.0	113	70-130	
Manganese	mg/kg	20.4	23.1	50.0	128	70-130	
Zinc	mg/kg	13.2	23.1	37.8	106	70-130	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MT/3184

Analysis Method: ASA 103.2

QC Batch Method: ASA 103.2

Analysis Description: ASA 103.2 pH saturated paste

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

SAMPLE DUPLICATE: 707184

Parameter	Units	10116045002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	6.8	6.8	0	20	

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MPRP/18242 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET SPLP
Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 712024 Matrix: Water
Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	<0.10	0.10	11/12/09 15:28	
Arsenic	mg/L	0.0089	0.0050	11/12/09 15:28	B
Cadmium	mg/L	<0.00050	0.00050	11/12/09 15:28	
Copper	mg/L	<0.0050	0.0050	11/12/09 15:28	
Iron	mg/L	<0.025	0.025	11/12/09 15:28	
Lead	mg/L	<0.0015	0.0015	11/12/09 15:28	
Manganese	mg/L	0.0048	0.0025	11/12/09 15:28	B
Zinc	mg/L	0.032	0.010	11/12/09 15:28	B

LABORATORY CONTROL SAMPLE: 712025

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	10	9.7	97	80-120	
Arsenic	mg/L	1	0.96	96	80-120	
Cadmium	mg/L	1	0.97	97	80-120	
Copper	mg/L	1	0.95	95	80-120	
Iron	mg/L	10	10.0	100	80-120	
Lead	mg/L	1	0.96	96	80-120	
Manganese	mg/L	1	0.97	97	80-120	
Zinc	mg/L	1	1.0	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 712026 712027

Parameter	Units	10116045001		712027		MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual	
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result						MSD Result
Aluminum	mg/L	<0.10	10	10	10.0	9.7	100	97	75-125	3	30
Arsenic	mg/L	<0.0050	1	1	0.98	0.98	97	98	75-125	0	30
Cadmium	mg/L	<0.0005 0	1	1	0.97	0.97	97	97	75-125	0	30
Copper	mg/L	<0.0050	1	1	0.94	0.94	94	94	75-125	1	30
Iron	mg/L	0.056	10	10	10.1	10	101	99	75-125	2	30
Lead	mg/L	<0.0015	1	1	0.96	0.96	96	96	75-125	0	30
Manganese	mg/L	0.014	1	1	0.96	0.96	94	95	75-125	1	30
Zinc	mg/L	0.014	1	1	0.99	0.99	98	98	75-125	0	30

QUALITY CONTROL DATA

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

QC Batch: MT/3205

Analysis Method: LECO

QC Batch Method: LECO

Analysis Description: Sulfur Analysis Montana

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

METHOD BLANK: 709323

Matrix: Solid

Associated Lab Samples: 10116045001, 10116045002, 10116045003, 10116045004, 10116045005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfur	% (w/w)	<0.037	0.050	11/06/09 12:27	

SAMPLE DUPLICATE: 709324

Parameter	Units	10116045002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	2.4	2.3	5	20	

QUALIFIERS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

10M Total Inorganic Carbon result of <489 mg/Kg.
MDL 137 mg/Kg
RDL 489 mg/Kg

11M Total Organic Carbon result is greater than the Total Carbon Result.

1M Total Carbon result of 1390 mg/Kg.
MDL 137 mg/Kg
RDL 489 mg/Kg

2M Total Carbon result of 3570 mg/Kg.
MDL 265 mg/Kg
RDL 948 mg/Kg

3M Total Carbon result of 4790 mg/Kg.
MDL 528 mg/Kg
RDL 1890 mg/Kg

4M Total Carbon result of 550 mg/Kg.
MDL 70.4 mg/Kg
RDL 251 mg/Kg

5M Total Carbon result of <253 mg/Kg.
MDL 70.7 mg/Kg
RDL 253 mg/Kg

QUALIFIERS

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

ANALYTE QUALIFIERS

6M	Total Inorganic Carbon result of 1480 mg/Kg. MDL 265 mg/Kg RDL 948 mg/Kg
7M	Total Inorganic Carbon result of 2270 mg/Kg. MDL 528 mg/Kg RDL 1890 mg/Kg
8M	Total Inorganic Carbon result of <251 mg/Kg. MDL 70.4 mg/Kg RDL 251 mg/Kg
9M	Total Inorganic Carbon result of <253 mg/Kg. MDL 70.7 mg/Kg RDL 253 mg/Kg
B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H3	Sample was received outside the recognized method holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
Z2	Analyte present in the associated method blank above the detection limit.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208
Pace Project No.: 10116045

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10116045001	09-MHTP-4, 9 1/2'	EPA 9060 Modified	WETA/5188		
10116045002	09-MHTP-6, 7 1/2'	EPA 9060 Modified	WETA/5188		
10116045003	09-PMBH-2, 5-10'	EPA 9060 Modified	WETA/5188		
10116045004	09-PMBH-2, 6-8'	EPA 9060 Modified	WETA/5188		
10116045005	09-PMTP-9, 2'	EPA 9060 Modified	WETA/5188		
10116045001	09-MHTP-4, 9 1/2'	EPA 9060 Modified	WETA/5189		
10116045002	09-MHTP-6, 7 1/2'	EPA 9060 Modified	WETA/5189		
10116045003	09-PMBH-2, 5-10'	EPA 9060 Modified	WETA/5189		
10116045004	09-PMBH-2, 6-8'	EPA 9060 Modified	WETA/5189		
10116045005	09-PMTP-9, 2'	EPA 9060 Modified	WETA/5189		
10116045001	09-MHTP-4, 9 1/2'	% Moisture	MPRP/18087		
10116045002	09-MHTP-6, 7 1/2'	% Moisture	MPRP/18087		
10116045003	09-PMBH-2, 5-10'	% Moisture	MPRP/18087		
10116045004	09-PMBH-2, 6-8'	% Moisture	MPRP/18087		
10116045005	09-PMTP-9, 2'	% Moisture	MPRP/18087		
10116045001	09-MHTP-4, 9 1/2'	EPA 3050	MPRP/18099	EPA 6020	ICPM/7447
10116045002	09-MHTP-6, 7 1/2'	EPA 3050	MPRP/18099	EPA 6020	ICPM/7447
10116045003	09-PMBH-2, 5-10'	EPA 3050	MPRP/18099	EPA 6020	ICPM/7447
10116045004	09-PMBH-2, 6-8'	EPA 3050	MPRP/18099	EPA 6020	ICPM/7447
10116045005	09-PMTP-9, 2'	EPA 3050	MPRP/18099	EPA 6020	ICPM/7447
10116045001	09-MHTP-4, 9 1/2'	Modified Sobek 7	MT/3183		
10116045002	09-MHTP-6, 7 1/2'	Modified Sobek 7	MT/3183		
10116045003	09-PMBH-2, 5-10'	Modified Sobek 7	MT/3183		
10116045004	09-PMBH-2, 6-8'	Modified Sobek 7	MT/3183		
10116045005	09-PMTP-9, 2'	Modified Sobek 7	MT/3183		
10116045001	09-MHTP-4, 9 1/2'	ASA 103.2	MT/3184		
10116045002	09-MHTP-6, 7 1/2'	ASA 103.2	MT/3184		
10116045003	09-PMBH-2, 5-10'	ASA 103.2	MT/3184		
10116045004	09-PMBH-2, 6-8'	ASA 103.2	MT/3184		
10116045005	09-PMTP-9, 2'	ASA 103.2	MT/3184		
10116045001	09-MHTP-4, 9 1/2'	Modified Sobek 7	MT/3185		
10116045002	09-MHTP-6, 7 1/2'	Modified Sobek 7	MT/3185		
10116045003	09-PMBH-2, 5-10'	Modified Sobek 7	MT/3185		
10116045004	09-PMBH-2, 6-8'	Modified Sobek 7	MT/3185		
10116045005	09-PMTP-9, 2'	Modified Sobek 7	MT/3185		
10116045001	09-MHTP-4, 9 1/2'	ASA 10-3.3	MT/3188		
10116045002	09-MHTP-6, 7 1/2'	ASA 10-3.3	MT/3188		
10116045003	09-PMBH-2, 5-10'	ASA 10-3.3	MT/3188		
10116045004	09-PMBH-2, 6-8'	ASA 10-3.3	MT/3188		
10116045005	09-PMTP-9, 2'	ASA 10-3.3	MT/3188		
10116045001	09-MHTP-4, 9 1/2'	Modified Sobek 7	MT/3189		
10116045002	09-MHTP-6, 7 1/2'	Modified Sobek 7	MT/3189		
10116045003	09-PMBH-2, 5-10'	Modified Sobek 7	MT/3189		
10116045004	09-PMBH-2, 6-8'	Modified Sobek 7	MT/3189		
10116045005	09-PMTP-9, 2'	Modified Sobek 7	MT/3189		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UBMC-Mike Horse 09208

Pace Project No.: 10116045

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10116045001	09-MHTP-4, 9 1/2'	LECO	MT/3205		
10116045002	09-MHTP-6, 7 1/2'	LECO	MT/3205		
10116045003	09-PMBH-2, 5-10'	LECO	MT/3205		
10116045004	09-PMBH-2, 6-8'	LECO	MT/3205		
10116045005	09-PMTP-9, 2'	LECO	MT/3205		
10116045001	09-MHTP-4, 9 1/2'	Modified Sobek 7	MT/3207		
10116045002	09-MHTP-6, 7 1/2'	Modified Sobek 7	MT/3207		
10116045003	09-PMBH-2, 5-10'	Modified Sobek 7	MT/3207		
10116045004	09-PMBH-2, 6-8'	Modified Sobek 7	MT/3207		
10116045005	09-PMTP-9, 2'	Modified Sobek 7	MT/3207		
10116045001	09-MHTP-4, 9 1/2'	EPA 3010	MPRP/18242	EPA 6010	ICP/8198
10116045002	09-MHTP-6, 7 1/2'	EPA 3010	MPRP/18242	EPA 6010	ICP/8198
10116045003	09-PMBH-2, 5-10'	EPA 3010	MPRP/18242	EPA 6010	ICP/8198
10116045004	09-PMBH-2, 6-8'	EPA 3010	MPRP/18242	EPA 6010	ICP/8198
10116045005	09-PMTP-9, 2'	EPA 3010	MPRP/18242	EPA 6010	ICP/8198



January 11, 2010

TerraGraphics Environmental Engineering, Inc.
302 N. Last Chance Gulch, Suite 409
Helena, MT 59714

Attn: Mr. Tom Smith

Dear Tom:

Please find enclosed the laboratory testing results for the Paymaster and Shave Gulch repository sites. All testing was performed in accordance with applicable ASTM test methodologies except as noted herein. Test results are summarized in Tables 1 and 2 and applicable test results for individual tests are also enclosed. These have been sent via e-mail in PDF and Excel formats.

Mixed samples that combined material from several test pits were prepared into one mass sample. Triaxial specimens were compacted at optimum water content to a dry unit weight equal to 95% of the uncorrected proctor value modified to reflect only the minus 1/2-inch portion of the proctor. Therefore, the triaxial test specimen unit weight modified by an oversize correction of the amount of the 1/2 to 3/4-inch material will equal 95% of the maximum dry unit weight calculated for the 3/4-inch material in accordance with ASTM D-698, Method C. Please note that these samples all contained significant +3/4-inch material so there is also a corresponding oversize correction for the raw material. The unit weights presented in Table 1 provide corrected values for the entire sample (the 3/4-inch material corrected upward to reflect the additional rock content). The initial wet and dry unit weights for the triaxial samples reflect the uncorrected proctor results corrected downward to reflect samples with a 1/2-inch maximum size.

Strength values were determined by three point consolidated undrained triaxial testing with pore water pressure measurements. The test sample for PMTP-9 at 8 to 9.5' and PMTP-10 at 3 to 4' required a fourth point to verify results that were suspect. The fourth point verified the low calculated angles of internal friction and high cohesion intercepts for this sample. This material should be treated with caution during the analyses. It may be advantageous to perform additional characterization testing of the soils tested in the triaxial testing in order to allow strength interpretation of other soils that were not tested in the triaxial apparatus. We have retained all unused sample in case additional testing is desired.

Hydraulic conductivity values were determined using flexible wall testing under initially unsaturated conditions in a triaxial cell. It is our understanding that this was requested because it was felt that the soils would not be fully saturated in the field. In general a fully saturated soil would tend to have a slightly higher permeability than an unsaturated soil.

In general the soils that were tested suggest relatively high strength material if compacted to 95% of the maximum dry unit weight at optimum water content. Low strength materials such as clay could either be blended with stronger material if necessary or used for non-structural purposes. I would advise against using recompacted native materials as a liner under the repository unless they are proven to be of both sufficient material volume and sufficiently low permeability to produce a uniform liner.

If you have any further testing or geotechnical engineering requirements we would be happy to assist you with them.

Sincerely,

A handwritten signature in black ink that reads "Patrick L. Redmond". The signature is written in a cursive, slightly slanted style.

Patrick Redmond, PE
Geotechnical Engineer/Principal

Attachments sent via e-mail

**Table 1. Geotechnical Testing Summary
Paymaster and Shave Gulch Sites
Terragraphics**

Sample I.D.	Sample Date	Sample Location	Sample Depth (ft)	ASTM D2488 General Material Description	ASTM D2488	ASTM D2216											CU Triaxial with Pore Pressure ASTM D4767 Method A				
					USCS Classification	Moisture Content	ASTM D4318	ASTM D4318	ASTM D4318	ASTM D4318	ASTM D698	ASTM D698	Initial	Initial	ASTM D854	ASTM C127	ASTM D5084 Method C	Total Stress	Total Stress	Effective Stress	Effective Stress
					Based on Lab Testing	As Received (%)	Liquid Limit	Plastic Limit	Plasticity Index	Atterberg Classification	Dry Unit Weight (pcf)	Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Specific Gravity (-) #10	Specific Gravity (+) 3/4"	Permeability (cm/sec)	Angle of Internal Friction (deg.)	Total Stress Cohesion Intercept (psf)	Effective Stress Angle of Internal Friction (deg.)	Cohesion Intercept (psf)
09-PMBH-1	9/16/2009	Paymaster Site Borehole 1	0-2	Silty, Clayey Sand with Gravel	SC-SM	8.17	27	21	6	CL-ML					2.91						
09-PMBH-1	9/16/2009	Paymaster Site Borehole 1	4-5			10.49	32	23	9	CL											
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	0-2	Poorly Graded Sand with Silty Clay and Gravel	SP-SC	4.58	26	20	6	CL-ML					2.80						
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	4-6			12.84															
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	8-10			15.28															
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	14-14.5			22.14															
09-PMBH-4	9/22/2009	Paymaster Site Borehole 4	2-4			4.45															
09-PMBH-5	9/21/2009	Paymaster Site Borehole 5	14-16	Sandy Lean Clay	CL	19.65	44	20	24	CL											
09-PMBH-5	9/21/2009	Paymaster Site Borehole 5	16-18	Clayey Sand	SC	29.80	49	28	21	CL											
09-PMBH-6	9/15/2009	Paymaster Site Borehole 6	2-4			13.96								3.07							
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	0-2			6.56	23	19	4	CL-ML				2.87							
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	4-6			16.26															
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	8-10	Silty Sand	SM	30.57	42	37	5	ML											
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	12-12.75			20.44															
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	4-6	Silty Sand with Gravel	SM	10.55	30	25	5	ML											
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	8-10			12.15															
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	12-14			8.75															
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	2-4			22.83	35	25	10	ML											
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	4-6			19.25															
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	6-6.5			18.79						141.4	119.1			7.0E-07					
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	6.5-7			14.52						129.8	113.4			5.4E-07					
09-PMBH-10	9/21/2009	Paymaster Site Borehole 10	6-8			16.99	32	17	15	CL			139.9	119.6		1.8E-07					
09-PMBH-10	9/21/2009	Paymaster Site Borehole 10	14-16			16.10	33	18	15	CL			138.6	119.4		8.9E-08					
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	0-2			10.18															
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	8-10	Clayey Sand with Gravel	SC	18.59	31	21	10	CL											
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	10-12			14.54															
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	14-16			9.32															
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	24-26			10.31															
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	0-2			7.18	22	17	5	CL-ML											
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	2-4			9.08								2.87							
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	6-8			5.34															
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	10-12			13.67															
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	14-16			10.29															
PMTTP-4, PMTP-5, PMTP-6 @ 2'-3' & PMTP-7 @ 2'(A)	9/11/2009	Paymaster Site Test Pits 4,5,6,7	2-3	Silty Gravel with Sand, GM (Visual Classification)									132.9	117.8							
PMTTP-4, PMTP-5, PMTP-6 @ 2'-3' & PMTP-7 @ 2'(B)	9/11/2009	Paymaster Site Test Pits 4,5,6,7	2-3	Silty Gravel with Sand, GM (Visual Classification)							132	9	132.4	117.3	2.53		19	322	38	0	
PMTTP-4, PMTP-5, PMTP-6 @ 2'-3' & PMTP-7 @ 2'(C)	9/11/2009	Paymaster Site Test Pits 4,5,6,7	2-3	Silty Gravel with Sand, GM (Visual Classification)									131.2	116.8							

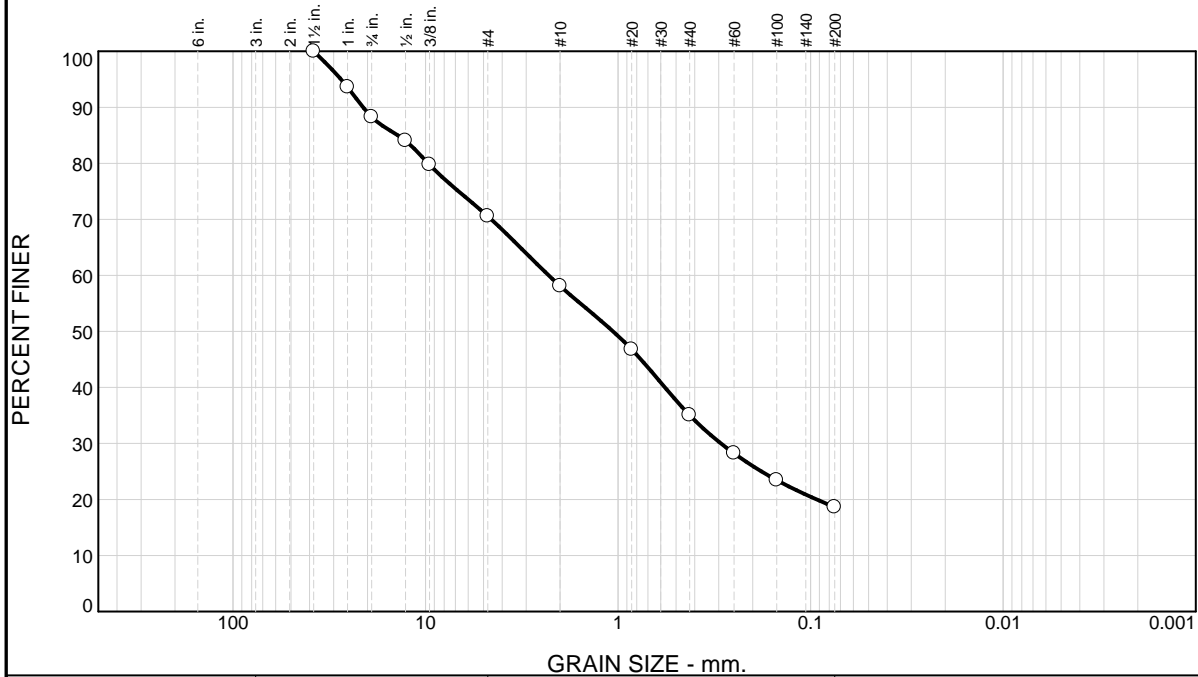
**Table 2. Particle Size Distribution Summary
Paymaster and Shave Gulch Sites
Terragraphics**

Sample I.D.	Sample Date	Sample Location	Sample Depth (ft)	ASTM D2488 General Material Description	ASTM D2488 USCS Classification Based on Lab Testing	Particle Size Distribution ASTM D422				
						Passing 3" (%) Passing	Passing #4 (%) Passing	Passing #10 (%) Passing	Passing #200 (%) Passing	Passing 0.002 mm (%) Passing
09-PMBH-1	9/16/2009	Paymaster Site Borehole 1	0-2	Silty, Clayey Sand with Gravel	SC-SM	100	70.6	58.1	18.6	NA
09-PMBH-1	9/16/2009	Paymaster Site Borehole 1	4-5							
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	0-2	Poorly Graded Sand with Silty Clay and Gravel	SP-SC	100	57.7	42	11.9	NA
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	4-6			100	71.3	61.4	14.4	NA
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	8-10							
09-PMBH-2	9/16/2009	Paymaster Site Borehole 2	14-14.5							
09-PMBH-4	9/22/2009	Paymaster Site Borehole 4	2-4							
09-PMBH-5	9/21/2009	Paymaster Site Borehole 5	14-16	Sandy Lean Clay	CL	100	98.9	95	52.3	22.2
09-PMBH-5	9/21/2009	Paymaster Site Borehole 5	16-18	Clayey Sand	SC	100	94.9	85.2	47	17.8
09-PMBH-6	9/15/2009	Paymaster Site Borehole 6	2-4			100	76.1	68	10	NA
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	0-2							
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	4-6							
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	8-10	Silty Sand	SM	100	90	79.4	18.2	NA
09-PMBH-7	9/16/2009	Paymaster Site Borehole 7	12-12.75							
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	4-6	Silty Sand with Gravel	SM	100	78.4	69	20.7	NA
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	8-10			100	73.8	67.6	17.2	NA
09-PMBH-8	9/22/2009	Paymaster Site Borehole 8	12-14							
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	2-4							

**Table 2. Particle Size Distribution Summary
Paymaster and Shave Gulch Sites
Terragraphics**

Sample I.D.	Sample Date	Sample Location	Sample Depth (ft)	ASTM D2488 General Material Description	ASTM D2488 USCS Classification Based on Lab Testing	Particle Size Distribution ASTM D422				
						Passing 3" (%) Passing	Passing #4 (%) Passing	Passing #10 (%) Passing	Passing #200 (%) Passing	Passing 0.002 mm (%) Passing
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	4-6			100	58.4	50	19.9	6.5
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	6-6.5							
09-PMBH-9	9/18/2009	Paymaster Site Borehole 9	6.5-7							
09-PMBH-10	9/21/2009	Paymaster Site Borehole 10	6-8							
09-PMBH-10	9/21/2009	Paymaster Site Borehole 10	14-16							
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	0-2							
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	8-10	Clayey Sand with Gravel	SC	100	71	54.1	38.9	9.7
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	10-12							
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	14-16							
09-SGBH-1	9/17/2009	Shave Gulch Site Borehole 1	24-26							
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	0-2							
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	2-4			100	58.1	47	24.9	7.1
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	6-8							
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	10-12							
09-SGBH-2	9/17/2009	Shave Gulch Site Borehole 2	14-16							

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.7	17.7	12.5	23.1	16.4	18.6	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	93.6		
.75	88.3		
.5	84.0		
.375	79.8		
#4	70.6		
#10	58.1		
#20	46.8		
#40	35.0		
#60	28.2		
#100	23.4		
#200	18.6		

* (no specification provided)

Material Description

silty, clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 27 PI= 6

Classification

USCS (D 2487)= SC-SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 21.0915 D₈₅= 13.9183 D₆₀= 2.2924
D₅₀= 1.0615 D₃₀= 0.2924 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____
Tested By: NKG
Checked By: _____
Title: _____

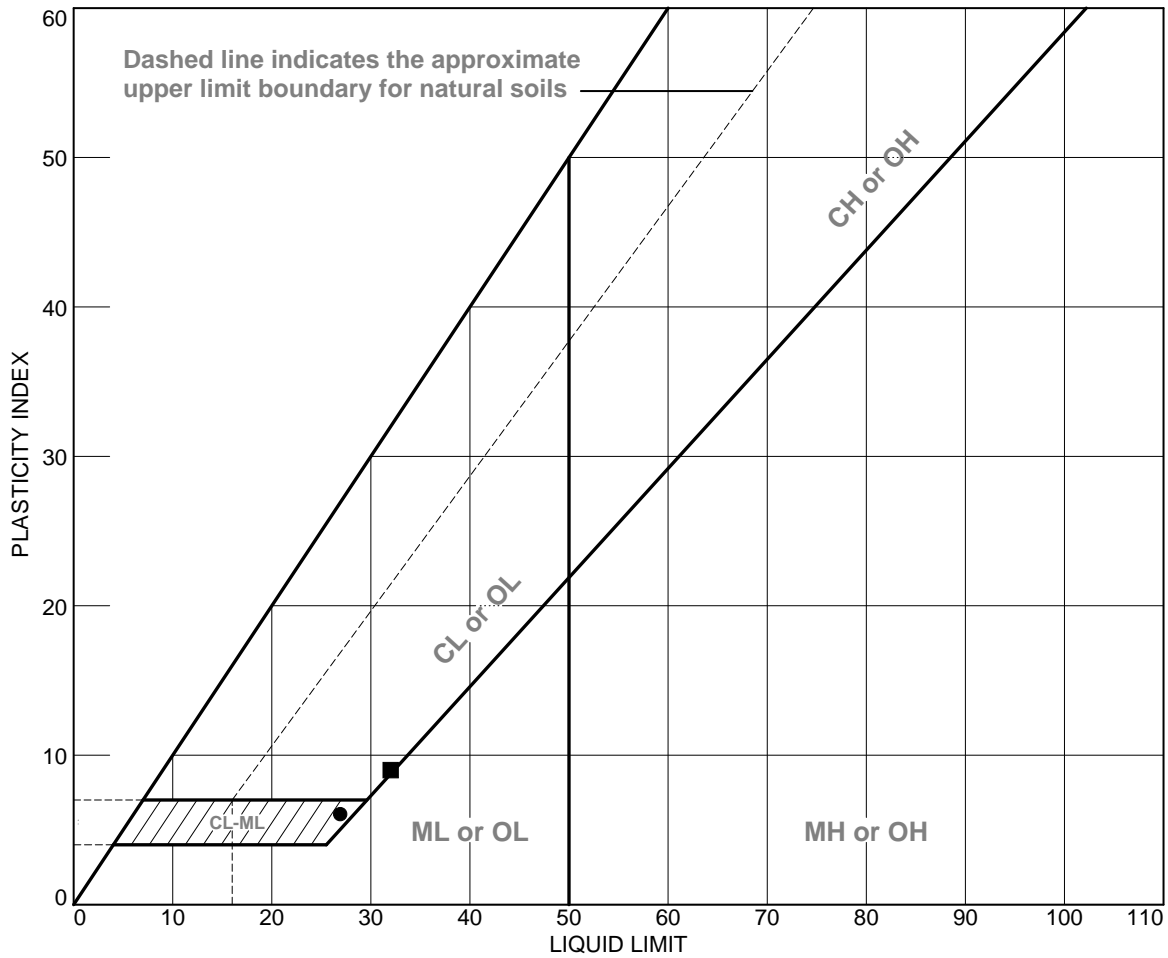
Source of Sample: 09-PMBH-1

Depth: 0-2'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT



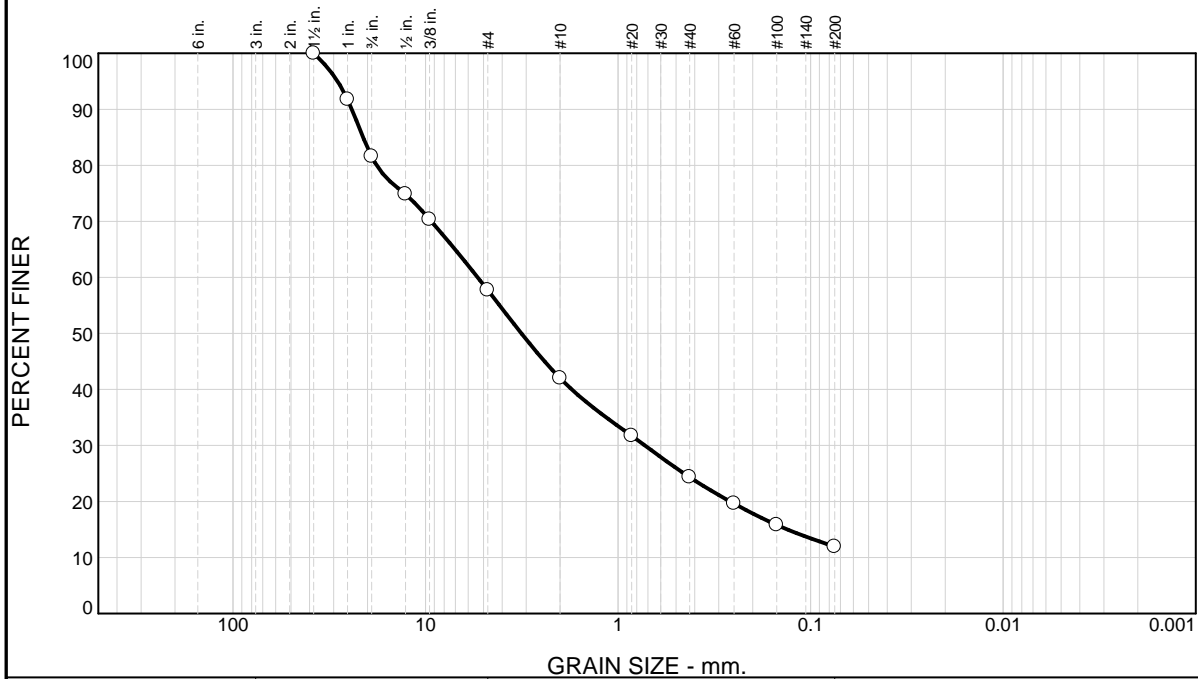
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-1		0-2'		21	27	6	SC-SM
■	09-PMBH-1		4-5'		23	32	9	

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____
---	---

Figure

Tested By: NKG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.4	23.9	15.7	17.7	12.4	11.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	91.7		
.75	81.6		
.5	74.8		
.375	70.3		
#4	57.7		
#10	42.0		
#20	31.7		
#40	24.3		
#60	19.6		
#100	15.8		
#200	11.9		

* (no specification provided)

Material Description

poorly graded sand with siltyclay and gravel

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 26 PI= 6

Classification

USCS (D 2487)= SP-SC AASHTO (M 145)= A-1-a

Coefficients

D₉₀= 24.1304 D₈₅= 21.0919 D₆₀= 5.3588
D₅₀= 3.1769 D₃₀= 0.7264 D₁₅= 0.1322
D₁₀= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____
Tested By: NKG
Checked By: _____
Title: _____

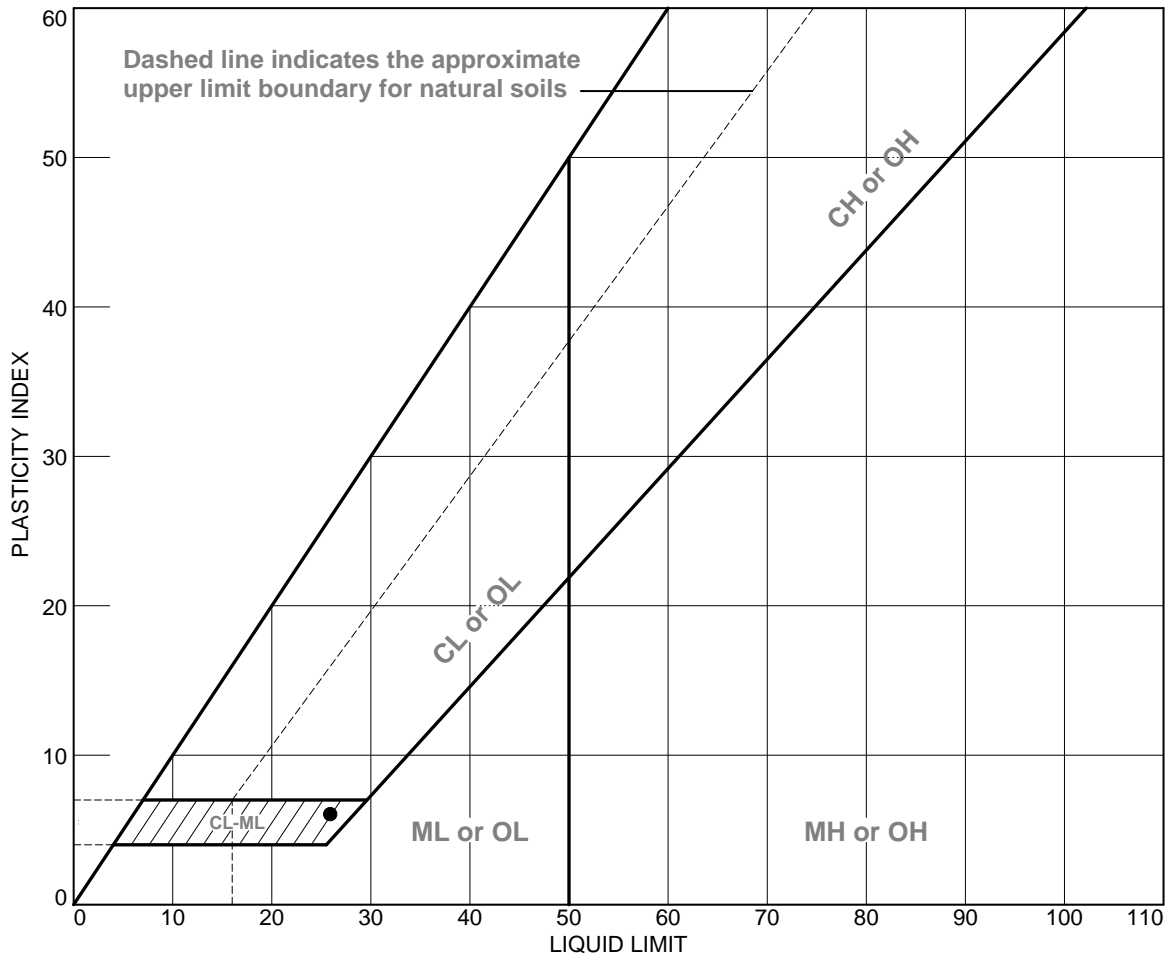
Source of Sample: 09-PMBH-2

Depth: 0-2'

Date Sampled: _____

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LIQUID AND PLASTIC LIMITS TEST REPORT



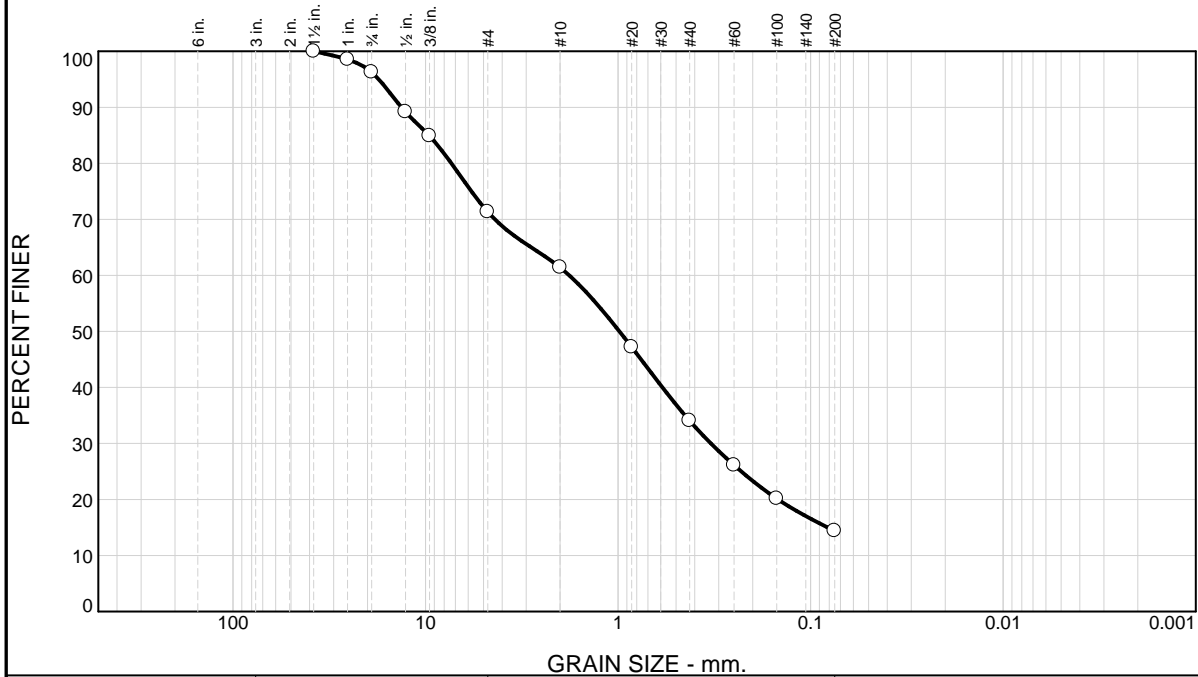
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-2		0-2'		20	26	6	SP-SC

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____
---	---

Figure

Tested By: NKG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.7	25.0	9.9	27.3	19.7	14.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	98.5		
.75	96.3		
.5	89.2		
.375	84.9		
#4	71.3		
#10	61.4		
#20	47.2		
#40	34.1		
#60	26.1		
#100	20.1		
#200	14.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D₉₀= 13.3317 D₈₅= 9.5914 D₆₀= 1.7919
D₅₀= 0.9836 D₃₀= 0.3296 D₁₅= 0.0815
D₁₀= C_u= C_c=

Remarks

Date Received: Date Tested:

Tested By: NKG

Checked By: _____

Title: _____

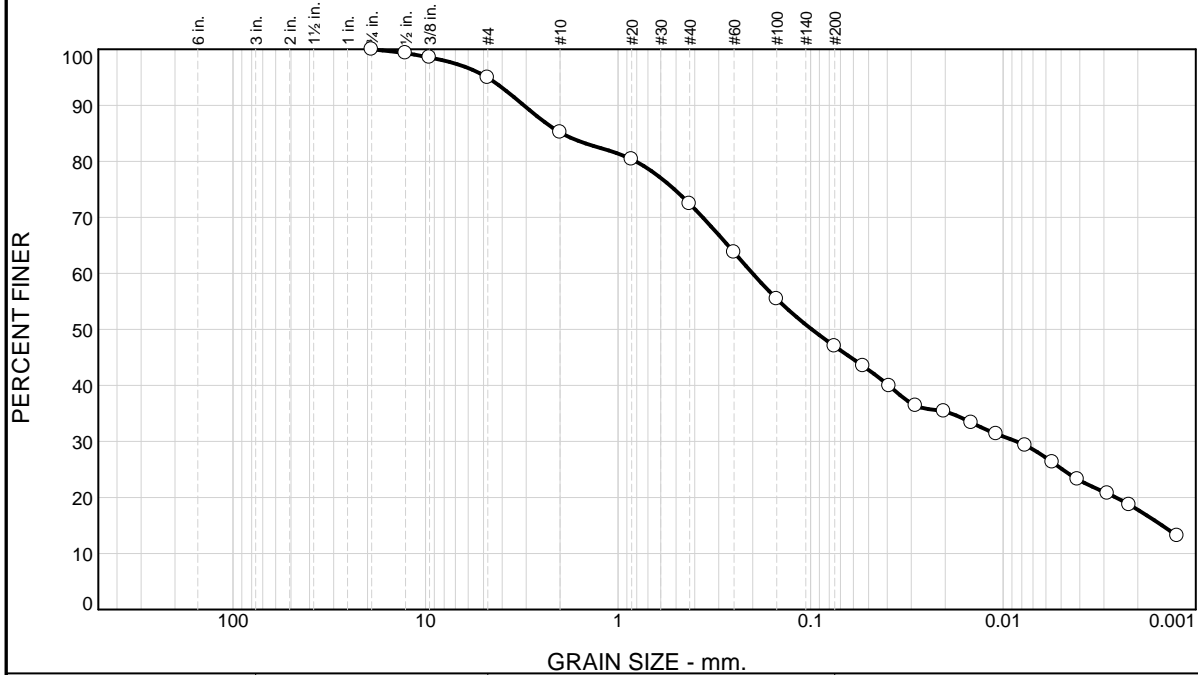
Source of Sample: 09-PMBH-2

Depth: 4-6'

Date Sampled:

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	9.7	12.8	25.4	21.8	25.2

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.5	99.3		
.375	98.5		
#4	94.9		
#10	85.2		
#20	80.4		
#40	72.4		
#60	63.8		
#100	55.4		
#200	47.0		
0.0534 mm.	43.5		
0.0391 mm.	39.9		
0.0285 mm.	36.4		
0.0203 mm.	35.4		
0.0146 mm.	33.4		
0.0109 mm.	31.3		
0.0077 mm.	29.3		
0.0055 mm.	26.3		
0.0041 mm.	23.2		
0.0029 mm.	20.7		
0.0022 mm.	18.7		
0.0012 mm.	13.1		

* (no specification provided)

Material Description

clayey sand

Atterberg Limits (ASTM D 4318)

PL= 28 LL= 49 PI= 21

Classification

USCS (D 2487)= SC AASHTO (M 145)= A-7-6(6)

Coefficients

D₉₀= 3.0860 D₈₅= 1.9600 D₆₀= 0.2002
D₅₀= 0.0985 D₃₀= 0.0085 D₁₅= 0.0015
D₁₀= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____
Tested By: _____
Checked By: _____
Title: _____

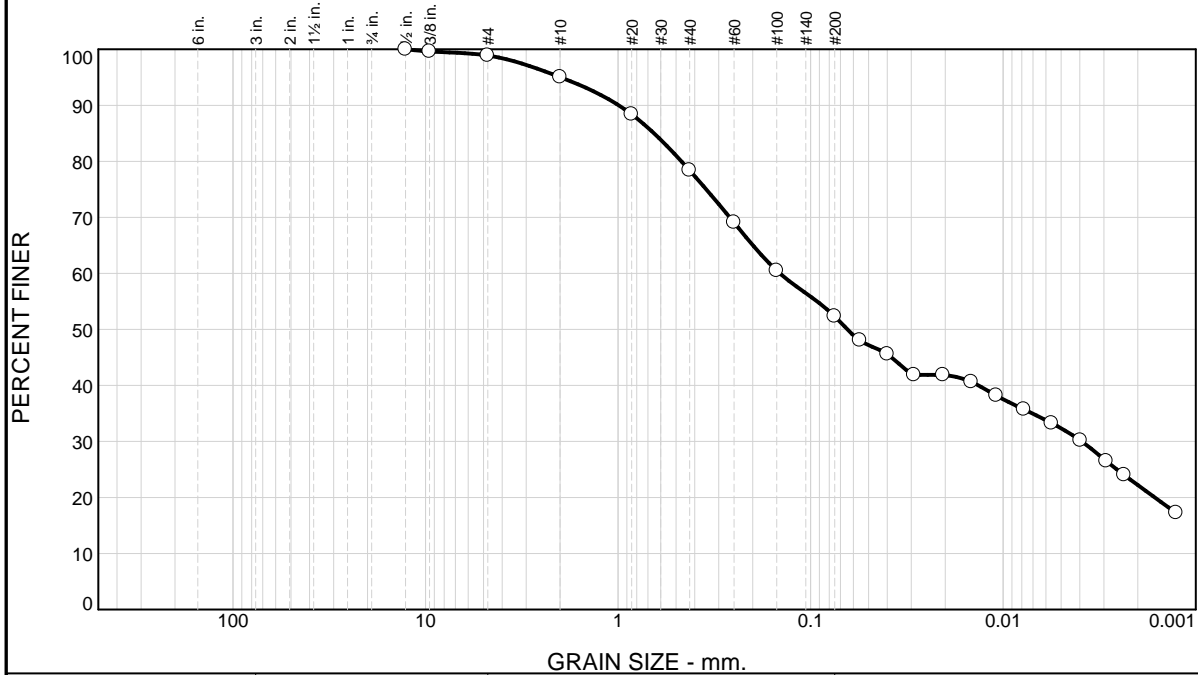
Source of Sample: 09-PMBH-5

Depth: 16-18'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
---	--

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	3.9	16.6	26.1	20.0	32.3

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5	100.0		
.375	99.6		
#4	98.9		
#10	95.0		
#20	88.4		
#40	78.4		
#60	69.1		
#100	60.5		
#200	52.3		
0.0555 mm.	48.0		
0.0400 mm.	45.6		
0.0290 mm.	41.9		
0.0205 mm.	41.9		
0.0146 mm.	40.6		
0.0109 mm.	38.2		
0.0078 mm.	35.7		
0.0056 mm.	33.3		
0.0040 mm.	30.2		
0.0029 mm.	26.5		
0.0024 mm.	24.0		
0.0013 mm.	17.2		

* (no specification provided)

Material Description

sandy lean clay

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 44 PI= 24

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-7-6(9)

Coefficients

D₉₀= 0.9922 D₈₅= 0.6504 D₆₀= 0.1446
D₅₀= 0.0645 D₃₀= 0.0039 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: Date Tested:

Tested By: NKG

Checked By: _____

Title: _____

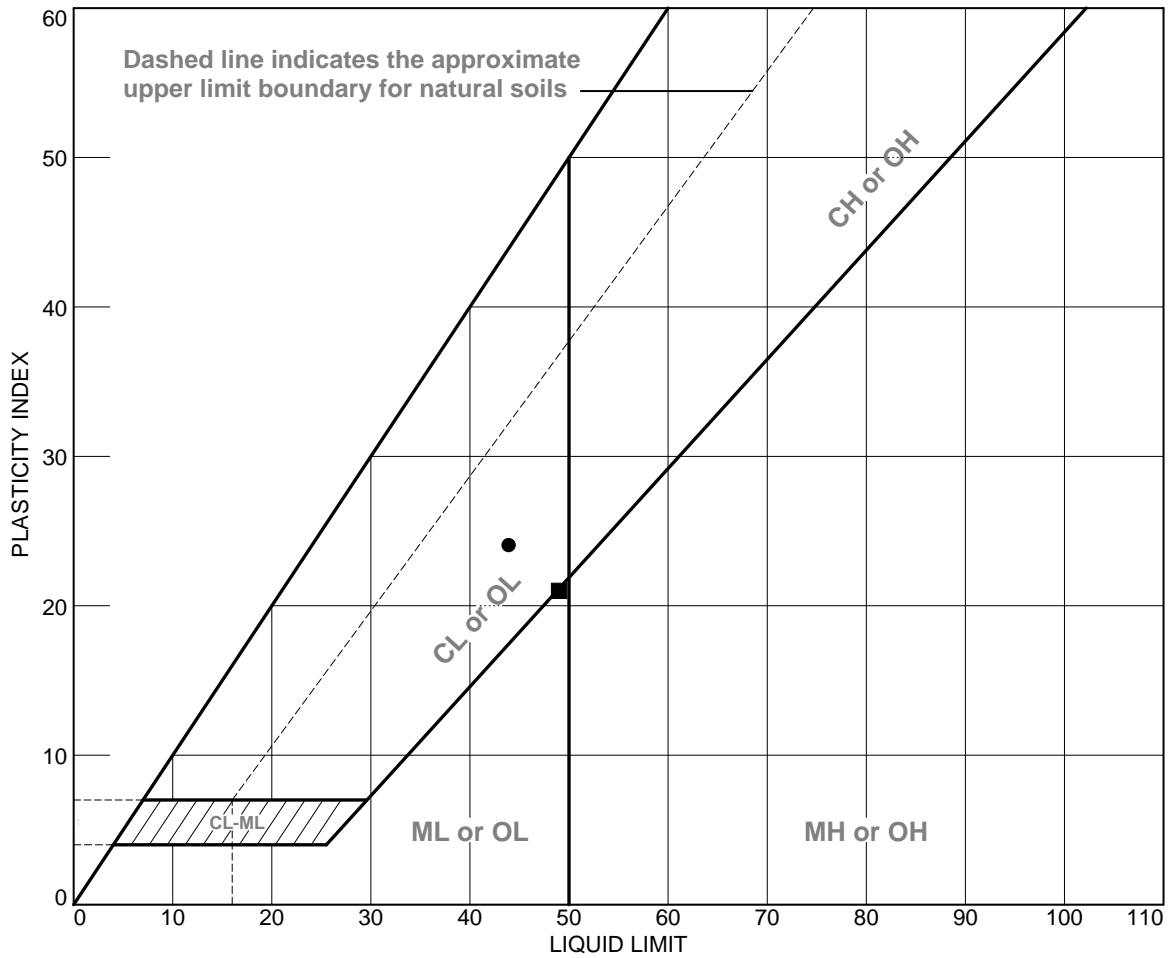
Source of Sample: 09-PMBH-5

Depth: 14-16'

Date Sampled:

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT



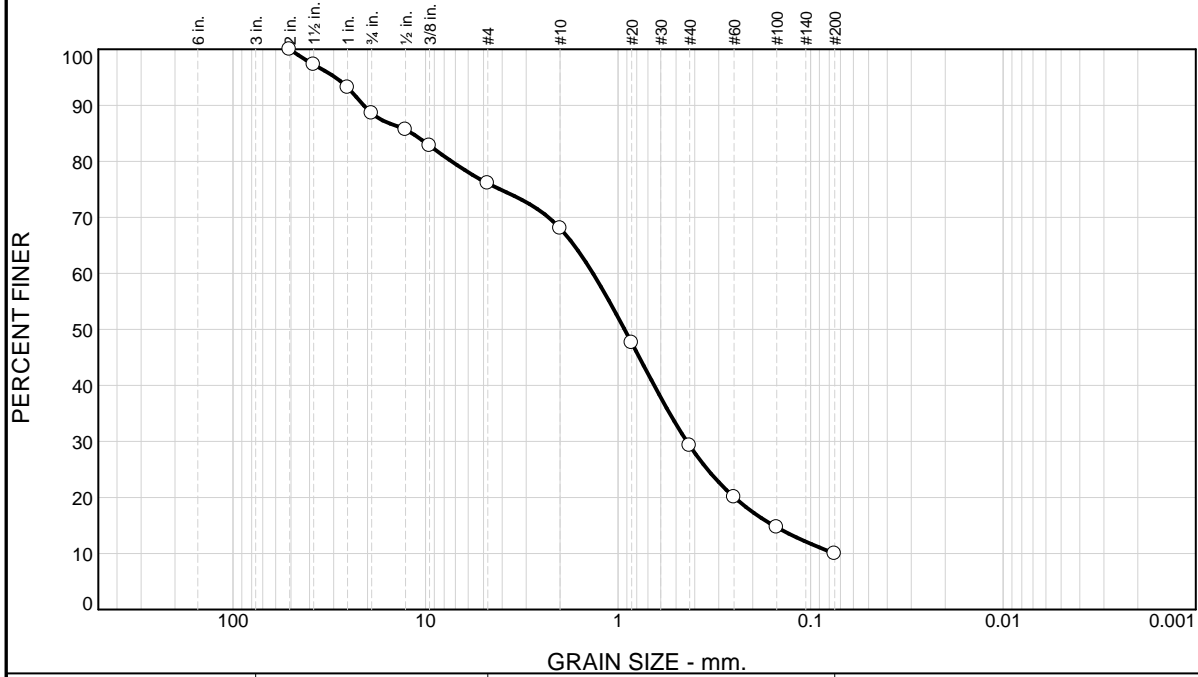
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-5		14-16'		20	44	24	CL
■	09-PMBH-5		16-18'		28	49	21	SC

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____
---	---

Figure

Tested By: NKG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.4	12.5	8.1	38.7	19.3	10.0	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	97.3		
1	93.2		
.75	88.6		
.5	85.6		
.375	82.8		
#4	76.1		
#10	68.0		
#20	47.6		
#40	29.3		
#60	20.1		
#100	14.7		
#200	10.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= _____ AASHTO (M 145)= _____

Coefficients

D₉₀= 20.9577 D₈₅= 11.7496 D₆₀= 1.3505
D₅₀= 0.9255 D₃₀= 0.4391 D₁₅= 0.1559
D₁₀= 0.0754 C_u= 17.92 C_c= 1.89

Remarks

Date Received: _____ Date Tested: _____
Tested By: NKG
Checked By: _____
Title: _____

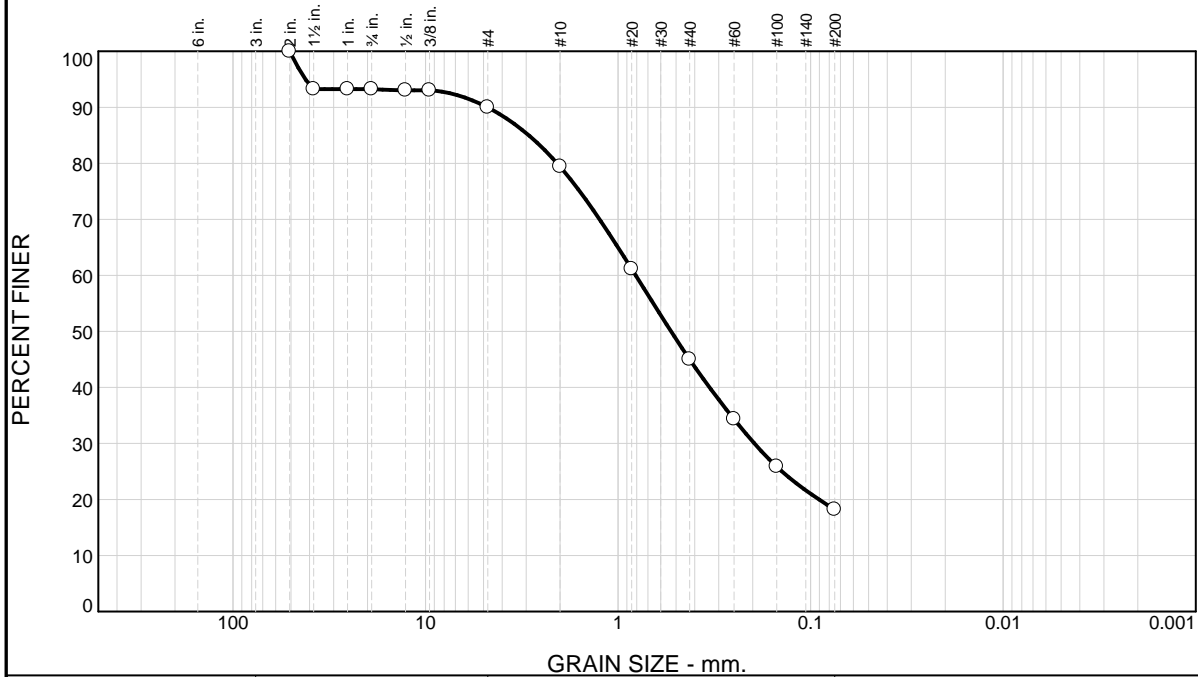
Source of Sample: 09-PMBH-6

Depth: 2-4'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
---	--

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.8	3.2	10.6	34.4	26.8	18.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	93.2		
1	93.2		
.75	93.2		
.5	93.0		
.375	93.0		
#4	90.0		
#10	79.4		
#20	61.2		
#40	45.0		
#60	34.3		
#100	25.8		
#200	18.2		

* (no specification provided)

Material Description

silty sand

Atterberg Limits (ASTM D 4318)

PL= 37 LL= 42 PI= 5

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 4.7657 D₈₅= 2.9075 D₆₀= 0.8097
D₅₀= 0.5304 D₃₀= 0.1959 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: Date Tested:
Tested By: NKG
Checked By: _____
Title: _____

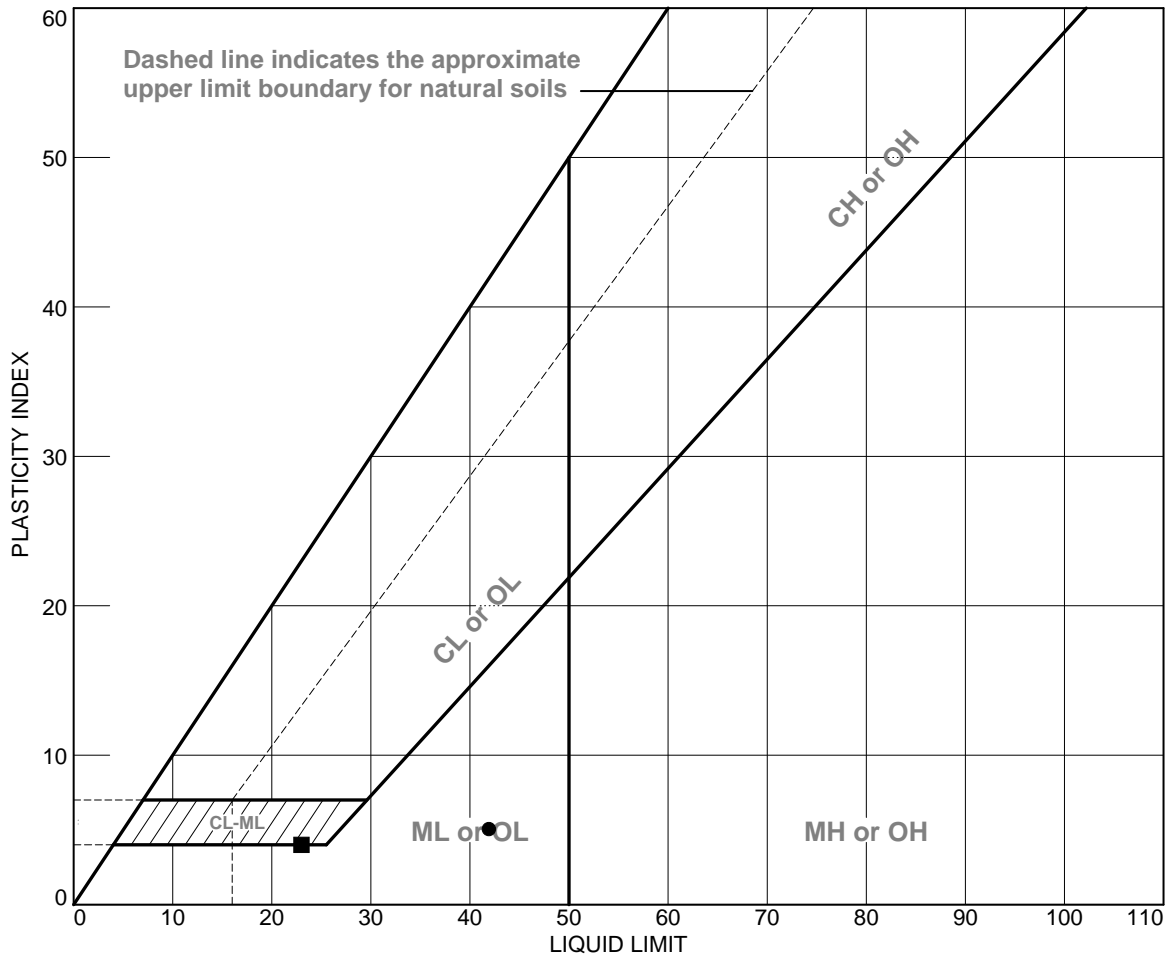
Source of Sample: 09-PMBH-7

Depth: 8-10.0'

Date Sampled:

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT



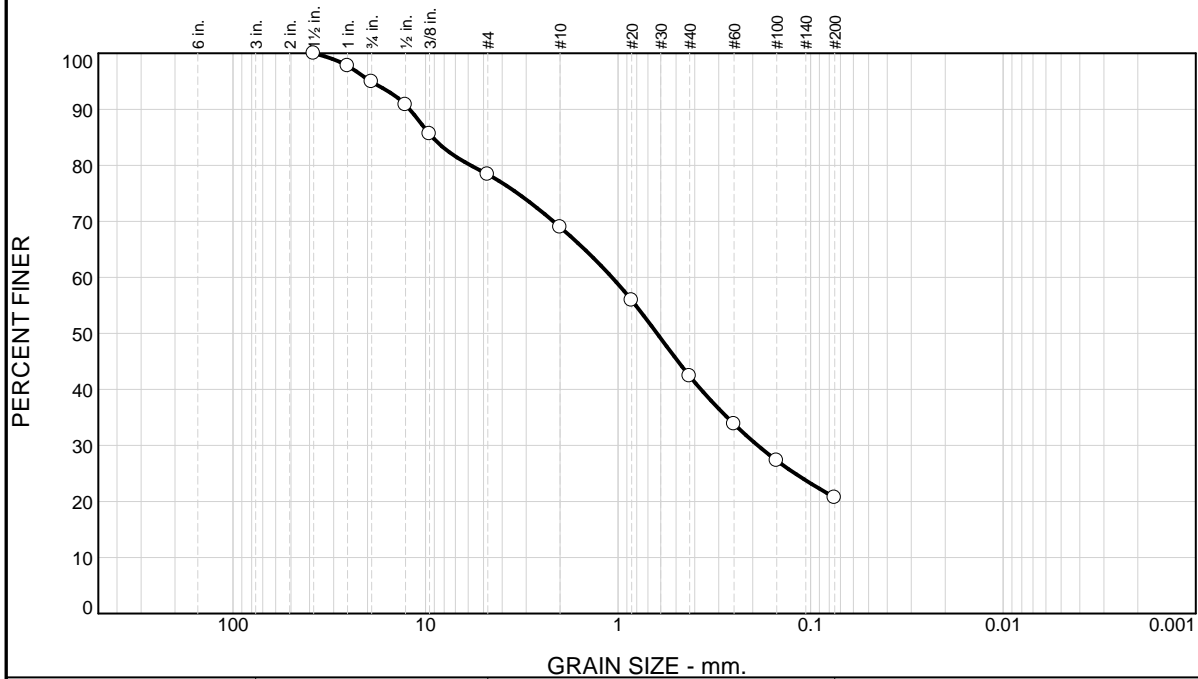
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-7		8-10.0'		37	42	5	SM
■	09-PMBH-7		0-2'		19	23	4	

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---	---

Figure

Tested By: NKG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.1	16.5	9.4	26.6	21.7	20.7	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	97.8		
.75	94.9		
.5	90.8		
.375	85.6		
#4	78.4		
#10	69.0		
#20	55.9		
#40	42.4		
#60	33.8		
#100	27.3		
#200	20.7		

* (no specification provided)

Material Description

silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 25 LL= 30 PI= 5

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 12.0828 D₈₅= 9.1881 D₆₀= 1.0752
D₅₀= 0.6273 D₃₀= 0.1882 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____
Tested By: NKG
Checked By: _____
Title: _____

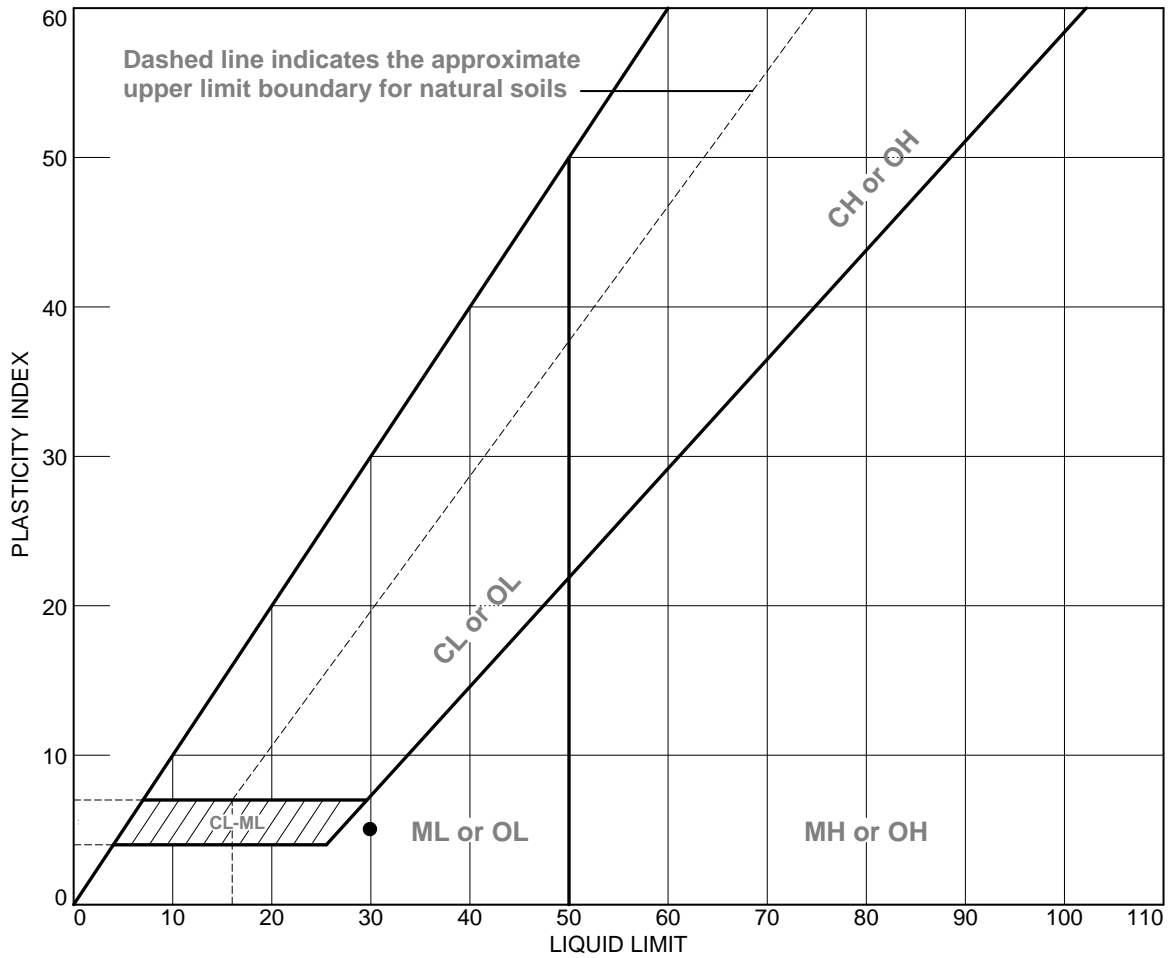
Source of Sample: 09-PMBH-8

Depth: 4-6'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT



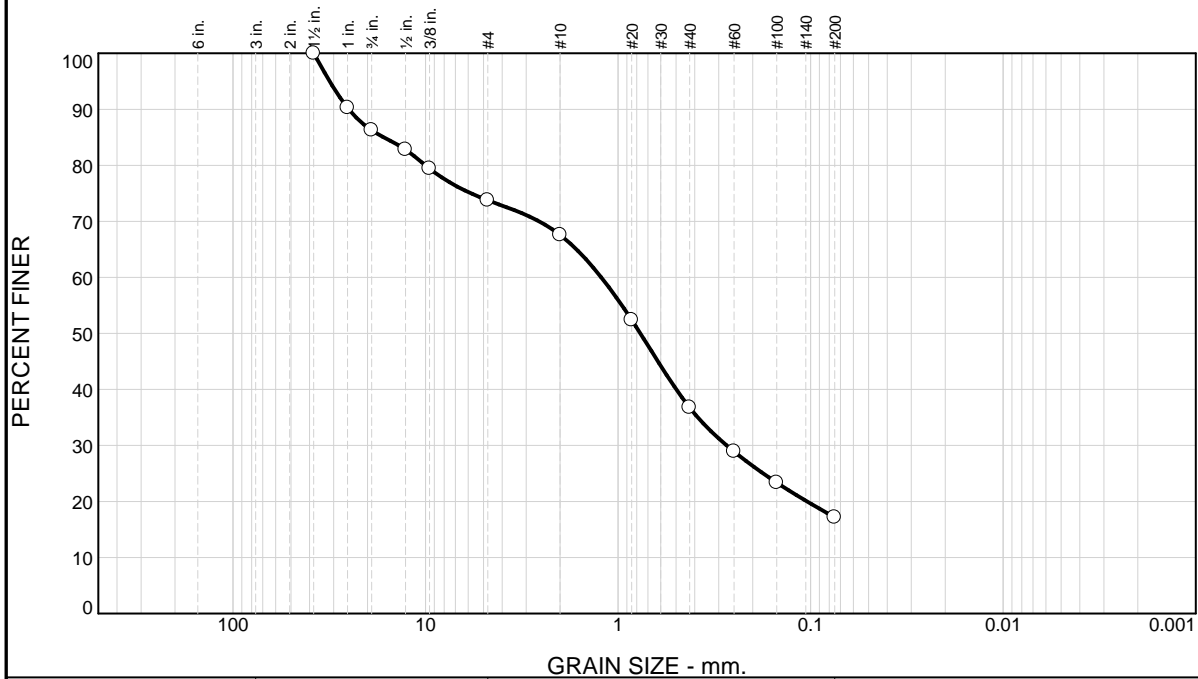
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-8		4-6'		25	30	5	SM

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---	---

Figure

Tested By: NKG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.7	12.5	6.2	30.8	19.6	17.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	90.3		
.75	86.3		
.5	82.8		
.375	79.4		
#4	73.8		
#10	67.6		
#20	62.4		
#40	36.8		
#60	28.9		
#100	23.4		
#200	17.2		

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D₉₀= 25.0261 D₈₅= 16.4730 D₆₀= 1.2222
D₅₀= 0.7663 D₃₀= 0.2730 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: Date Tested:

Tested By: _____

Checked By: _____

Title: _____

* (no specification provided)

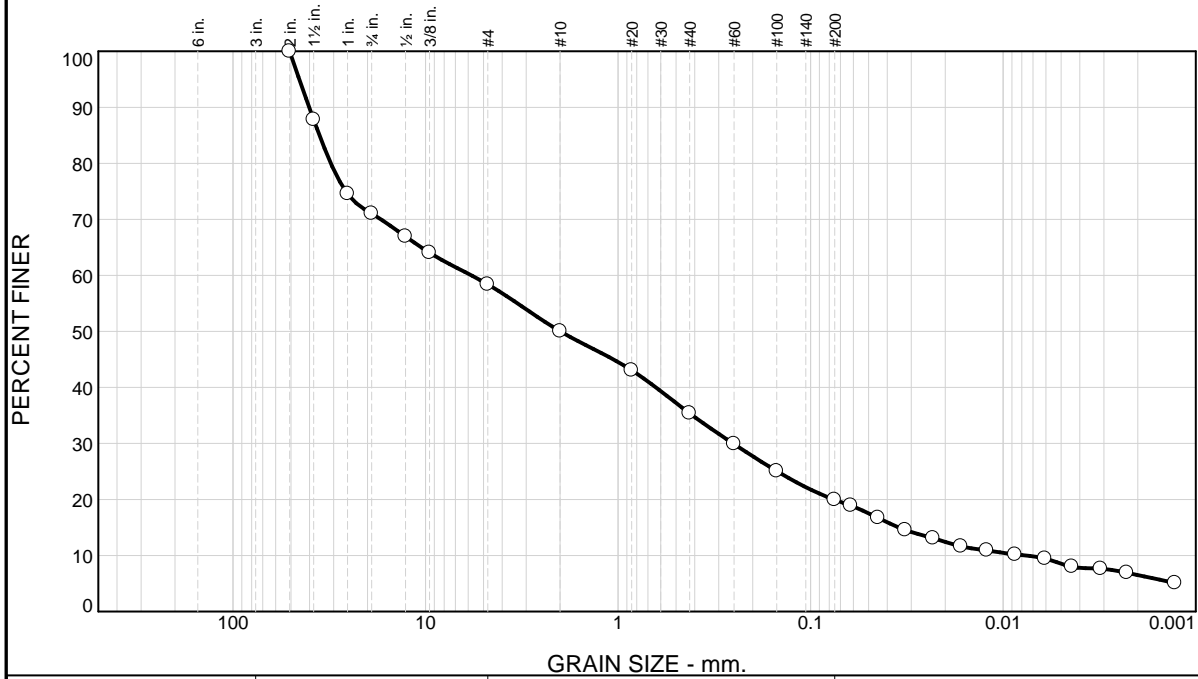
Source of Sample: 09-PMBH-8

Depth: 8-10'

Date Sampled:

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.0	12.6	8.4	14.6	15.5	11.4	8.5

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	87.8		
1	74.5		
.75	71.0		
.5	66.9		
.375	64.0		
#4	58.4		
#10	50.0		
#20	43.1		
#40	35.4		
#60	29.9		
#100	25.1		
#200	19.9		
0.0618 mm.	18.9		
0.0447 mm.	16.7		
0.0322 mm.	14.5		
0.0231 mm.	13.1		
0.0166 mm.	11.6		
0.0122 mm.	10.9		
0.0087 mm.	10.2		
0.0061 mm.	9.5		
0.0044 mm.	8.0		
0.0031 mm.	7.6		
0.0023 mm.	6.9		
0.0013 mm.	5.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D₉₀= 40.2028 D₈₅= 35.5395 D₆₀= 5.7780
D₅₀= 1.9935 D₃₀= 0.2527 D₁₅= 0.0349
D₁₀= 0.0077 C_u= 753.16 C_c= 1.44

Remarks

Date Received: Date Tested:

Tested By: _____

Checked By: _____

Title: _____

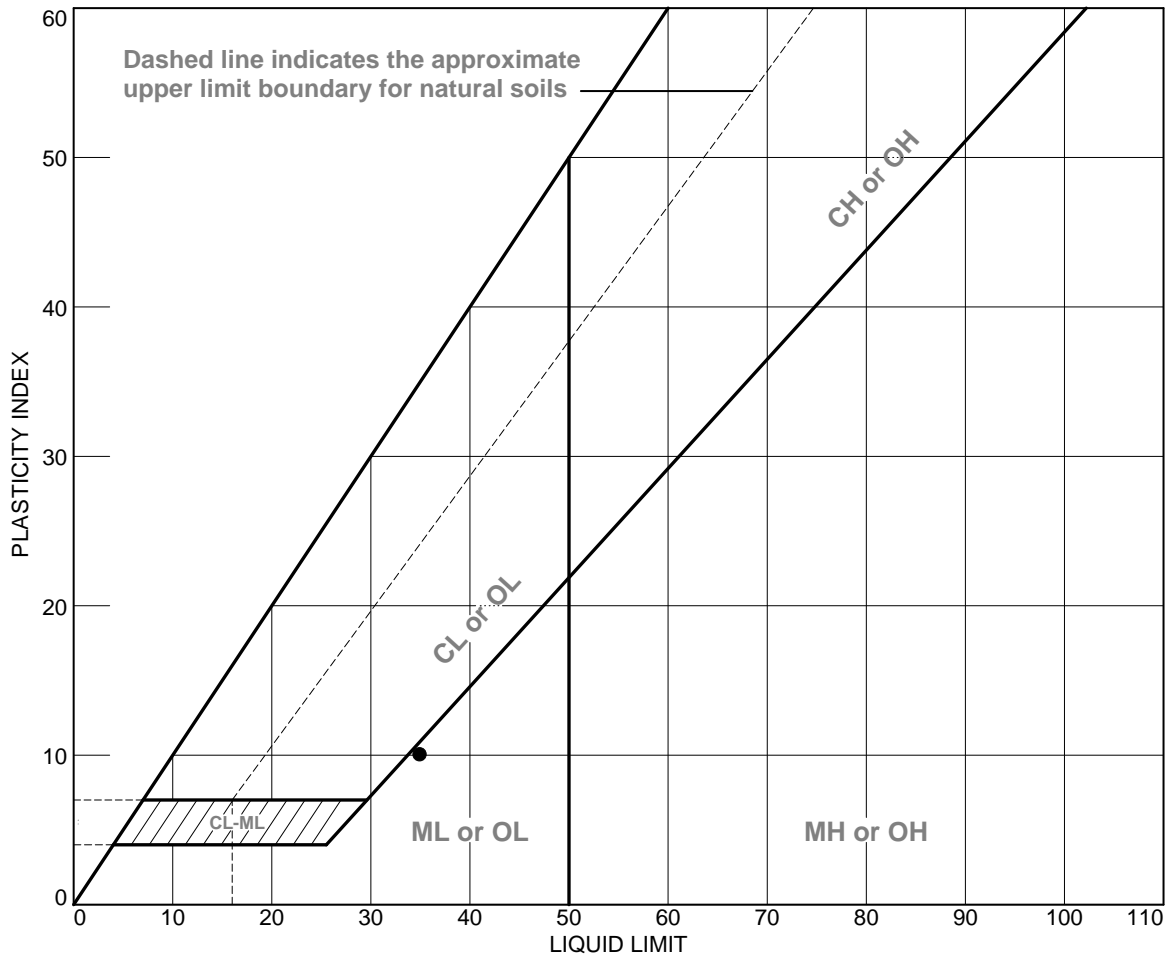
Source of Sample: 09-PMBH-9

Depth: 4-6'

Date Sampled:

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT



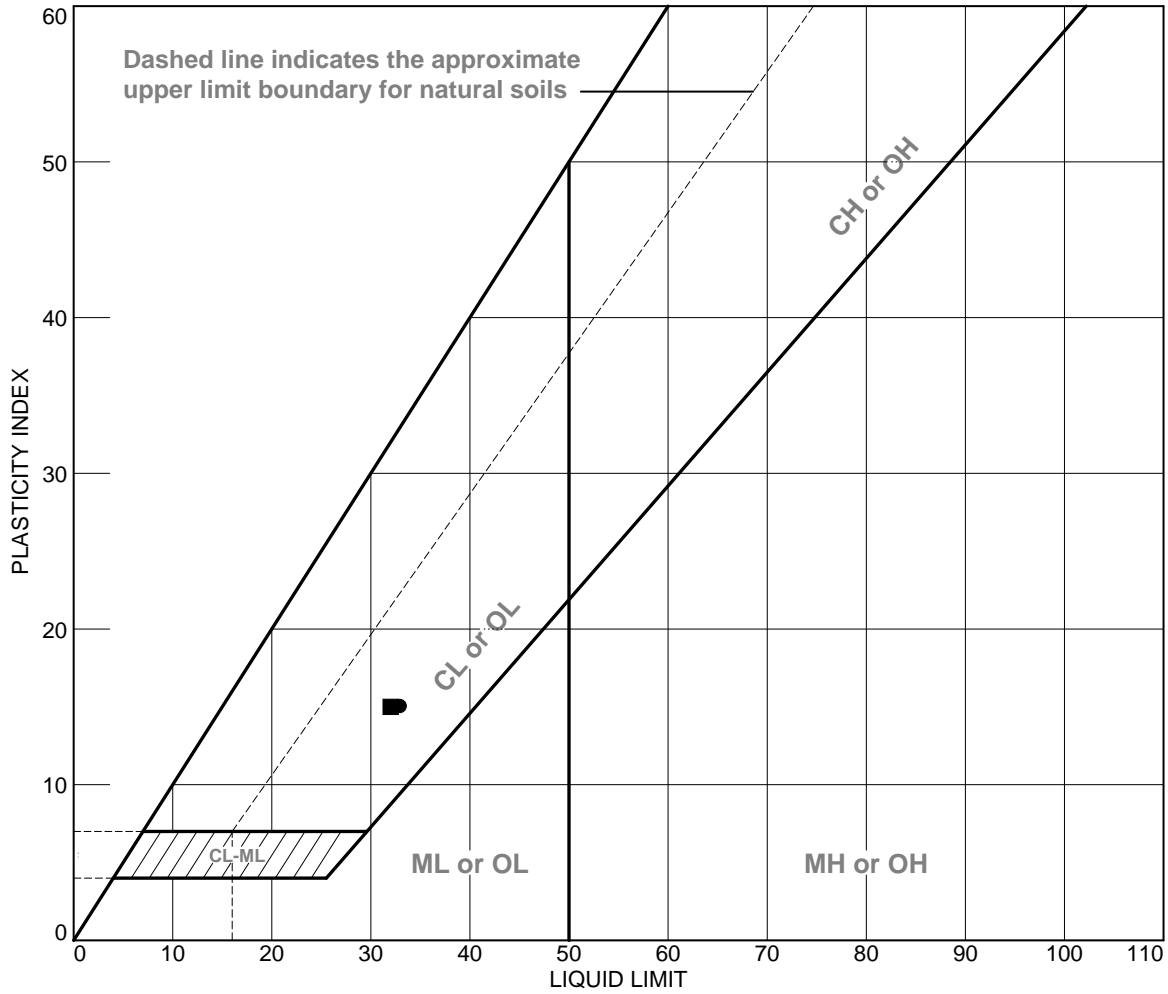
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-9		2-4'		25	35	10	

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____
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Figure

Tested By: NKG

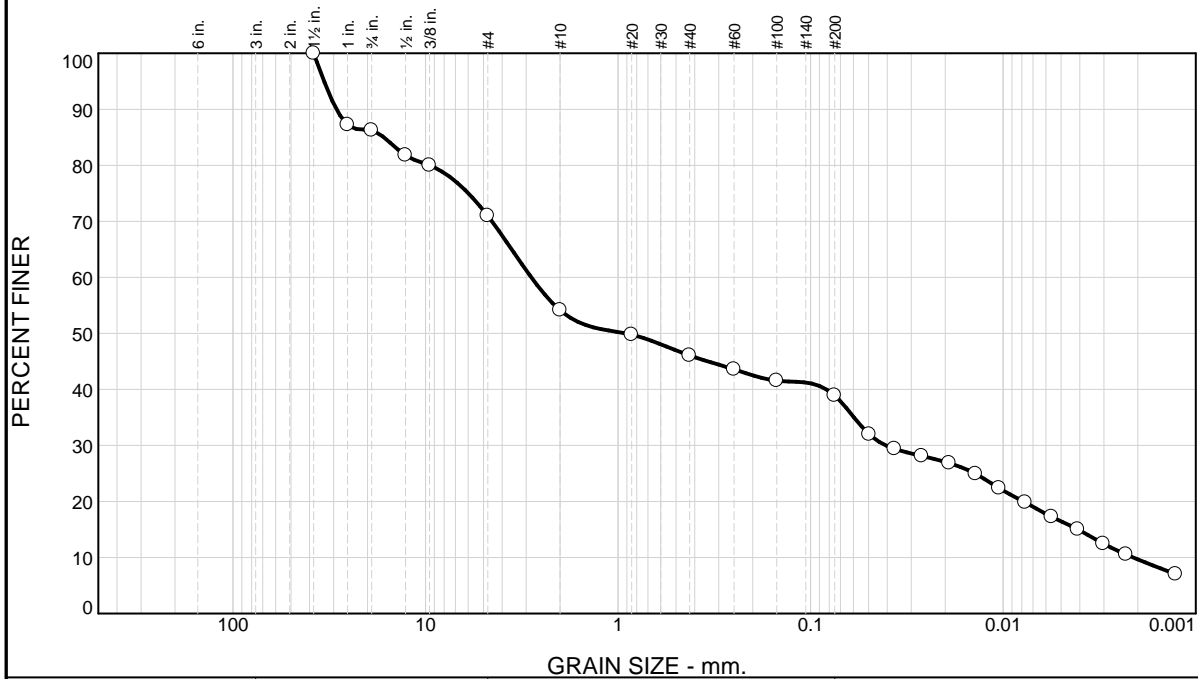
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-PMBH-10		14-16'		18	33	15	
■	09-PMBH-10		6-8'		17	32	15	

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.7	15.3	16.9	8.0	7.2	22.5	16.4

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	87.2		
.75	86.3		
.5	81.8		
.375	80.0		
#4	71.0		
#10	54.1		
#20	49.8		
#40	46.1		
#60	43.6		
#100	41.6		
#200	38.9		
0.0496 mm.	32.0		
0.0366 mm.	29.4		
0.0264 mm.	28.1		
0.0191 mm.	26.8		
0.0139 mm.	24.9		
0.0105 mm.	22.4		
0.0077 mm.	19.8		
0.0056 mm.	17.3		
0.0041 mm.	15.0		
0.0030 mm.	12.5		
0.0023 mm.	10.5		
0.0013 mm.	7.0		

* (no specification provided)

Material Description

clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 31 PI= 10

Classification

USCS (D 2487)= SC AASHTO (M 145)= A-4(1)

Coefficients

D₉₀= 28.9864 D₈₅= 16.4400 D₆₀= 2.8219
D₅₀= 0.9136 D₃₀= 0.0406 D₁₅= 0.0041
D₁₀= 0.0021 C_u= 1335.21 C_c= 0.28

Remarks

Date Received: _____ Date Tested: _____
Tested By: NKG
Checked By: _____
Title: _____

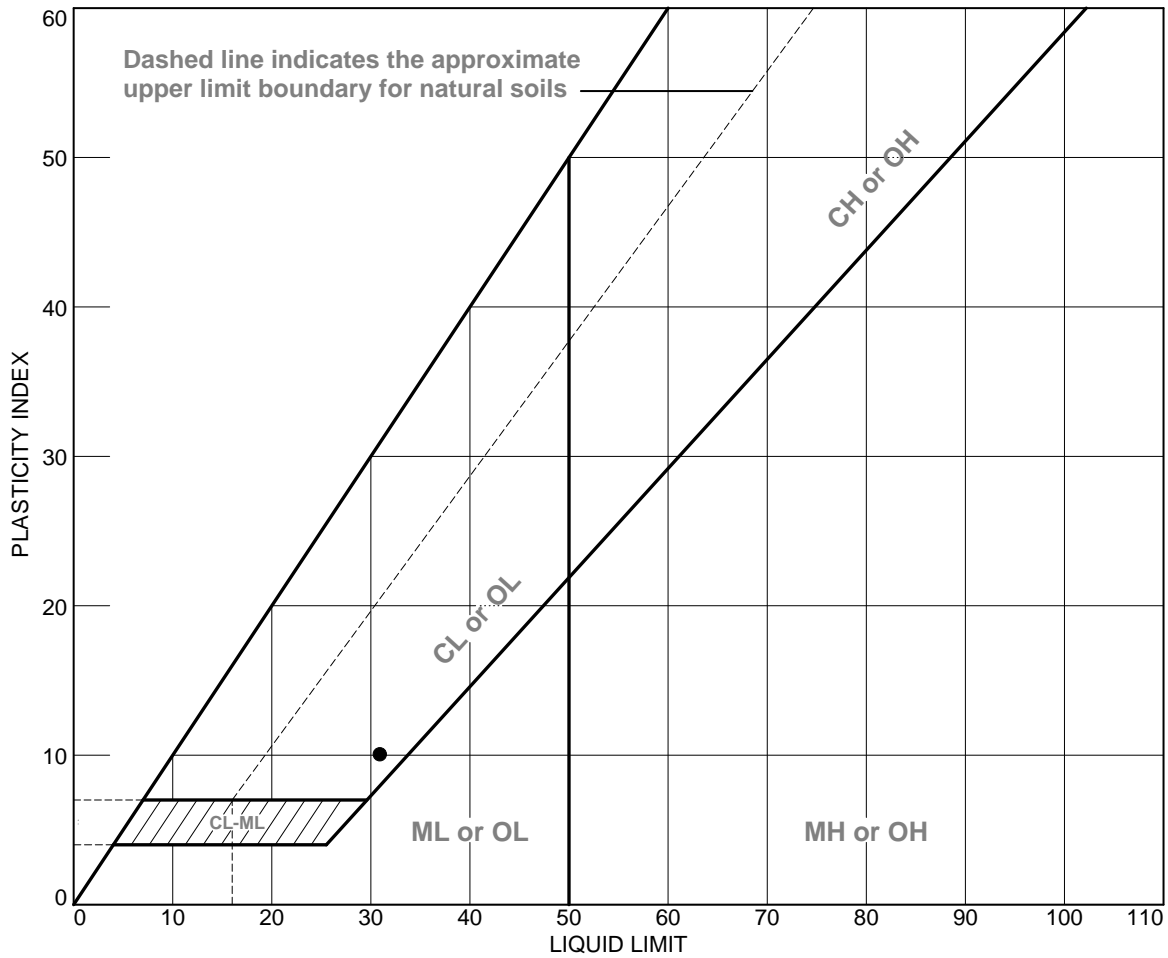
Source of Sample: 09-SBGH-1

Depth: 8-10'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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LIQUID AND PLASTIC LIMITS TEST REPORT

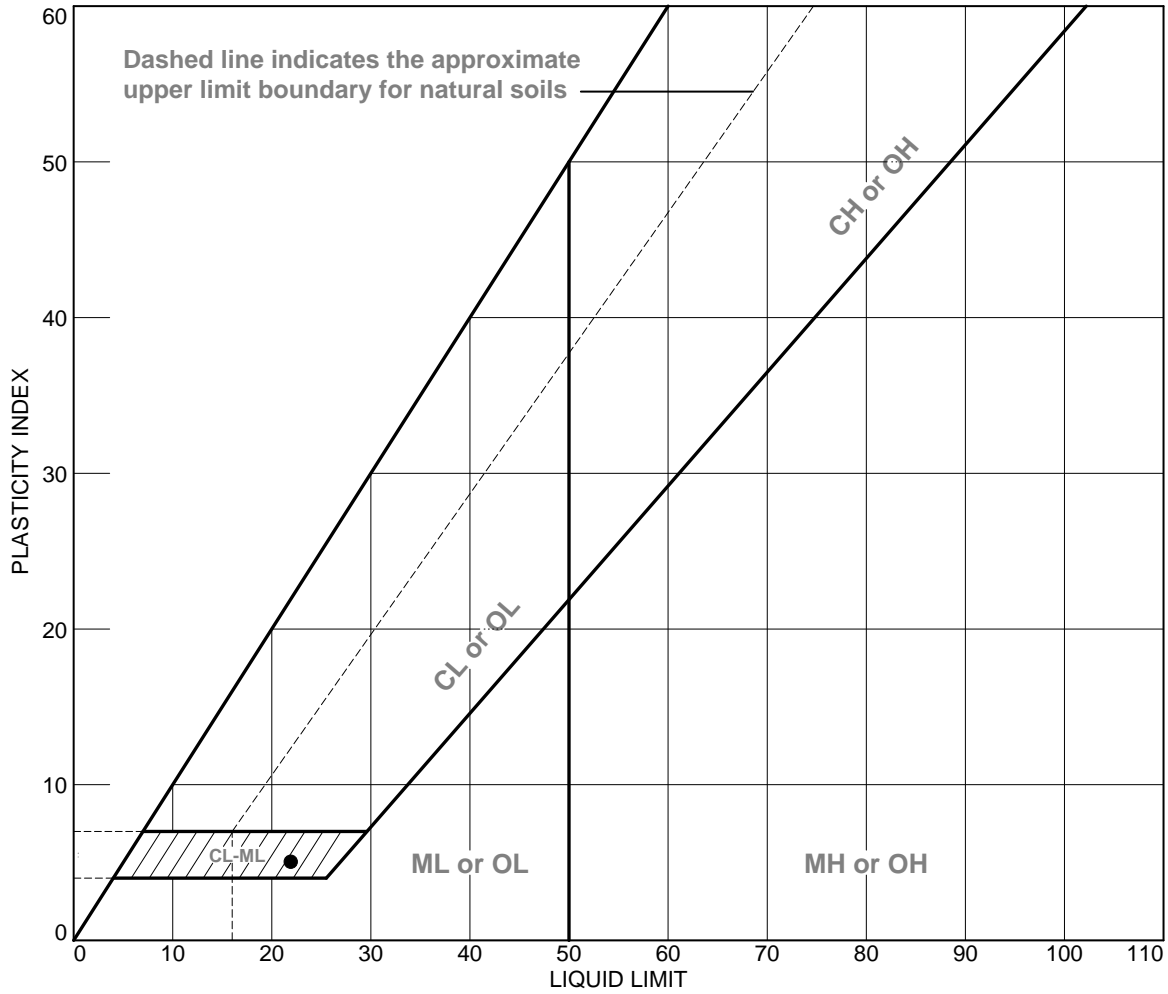


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-SBGH-1		8-10'		21	31	10	SC

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____ Figure
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Tested By: NKG

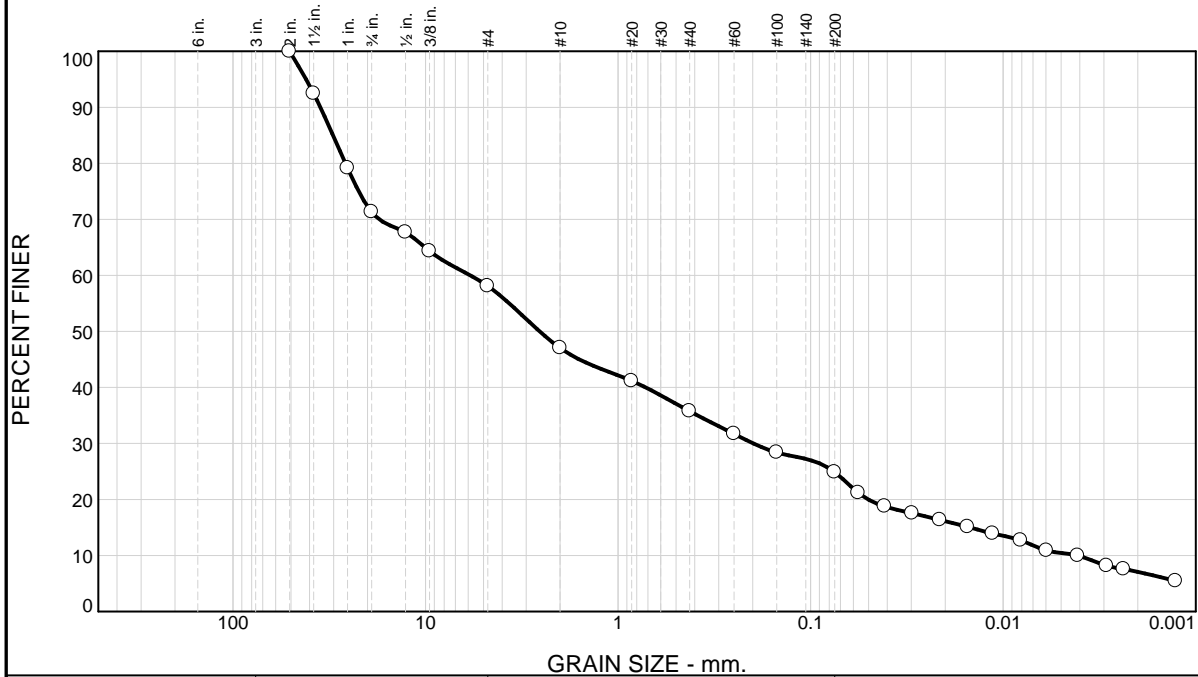
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	09-SGBH-2		0-2'		17	22	5	

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No.: _____ Figure
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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.7	13.2	11.1	11.2	10.9	14.5	10.4

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	92.4		
1	79.2		
.75	71.3		
.5	67.7		
.375	64.3		
#4	58.1		
#10	47.0		
#20	41.2		
#40	35.8		
#60	31.7		
#100	28.4		
#200	24.9		
0.0565 mm.	21.2		
0.0413 mm.	18.8		
0.0296 mm.	17.5		
0.0213 mm.	16.3		
0.0153 mm.	15.1		
0.0113 mm.	13.9		
0.0081 mm.	12.7		
0.0060 mm.	10.9		
0.0041 mm.	10.0		
0.0029 mm.	8.2		
0.0024 mm.	7.6		
0.0013 mm.	5.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= _____ AASHTO (M 145)= _____

Coefficients

D₉₀= 35.1703 D₈₅= 30.2122 D₆₀= 5.8496
D₅₀= 2.5547 D₃₀= 0.1984 D₁₅= 0.0148
D₁₀= 0.0041 C_u= 1419.36 C_c= 1.63

Remarks

Date Received: _____ Date Tested: _____

Tested By: _____

Checked By: _____

Title: _____

Source of Sample: 09-SGBH-2

Depth: 2-4'

Date Sampled: _____

PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714 Ph. 406-388-8578 - Fax 406-388-8579	Client: Terragraphics Project: UBMC Project No: _____ Figure _____
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MOISTURE DENSITY TEST DATA

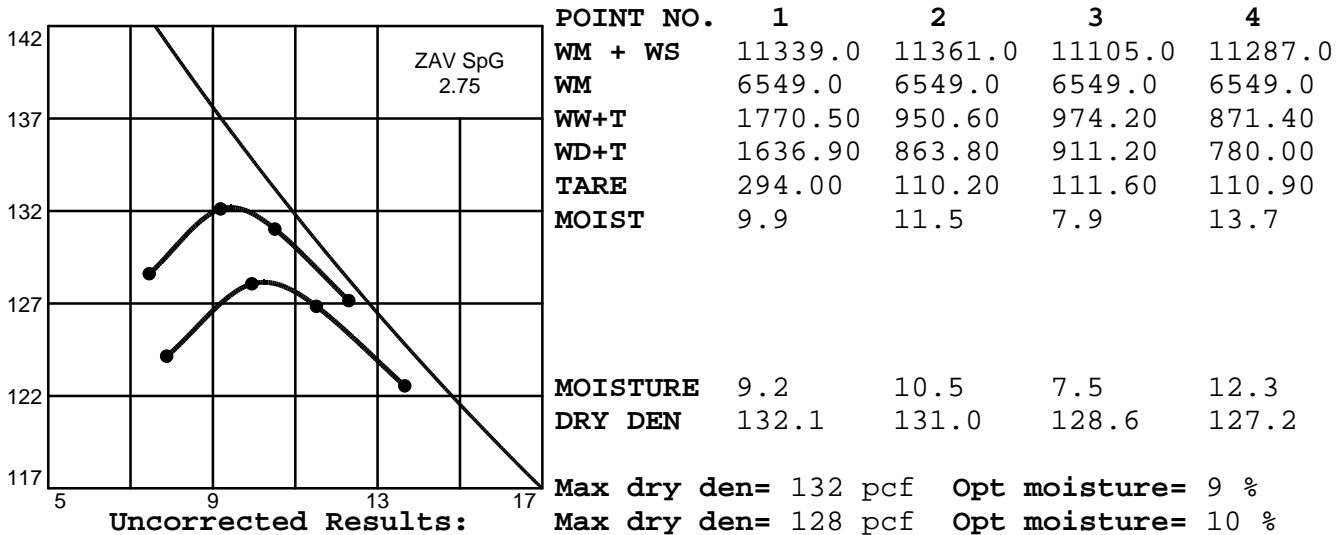
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: PMTP-4,5,6 @2-3' and PMTP-7 @2.0'
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 16.2
Percent passing No. 200 sieve: **Specific gravity:** 2.75

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.53
Moisture of Oversize Material = 5.3 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

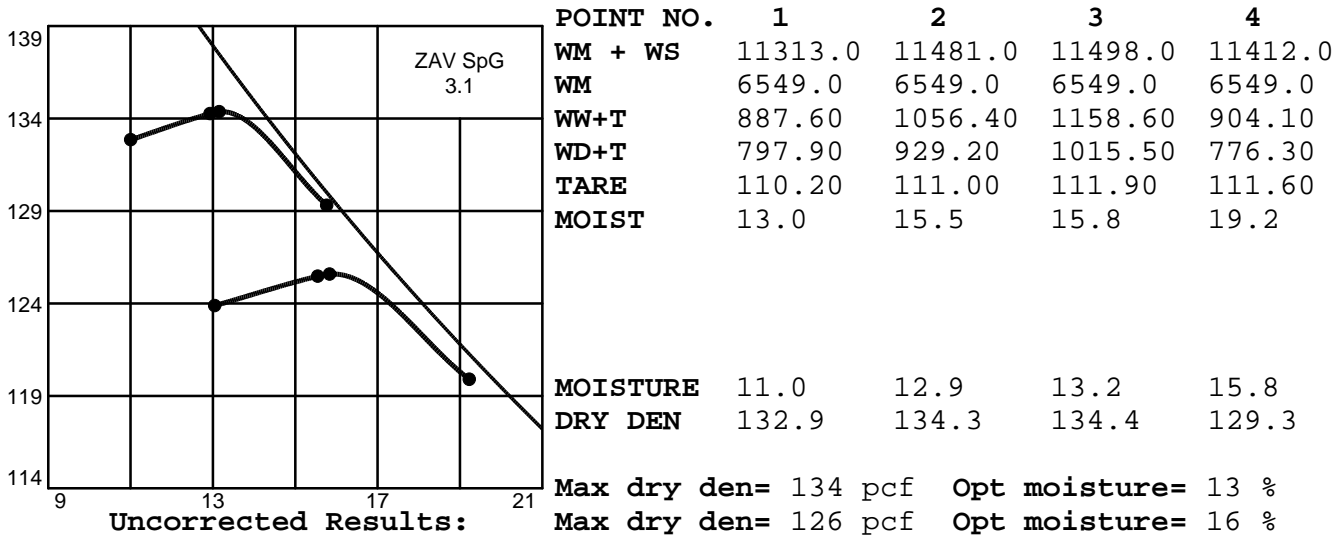
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: PMTP-11 @9-10' and PMTP-1 @8.0' mixed
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 23.0
Percent passing No. 200 sieve: **Specific gravity:** 3.1

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.81
Moisture of Oversize Material = 4.2 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

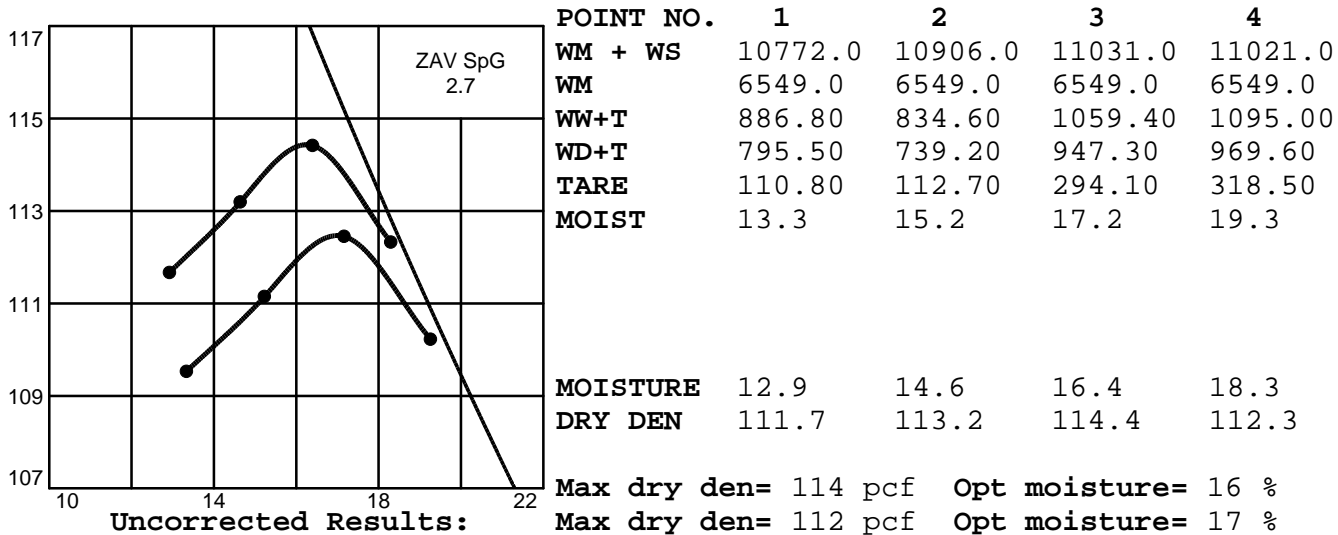
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: PMTP-7 @6.0' and PMTP-4 @4.0'
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 9.3
Percent passing No. 200 sieve: **Specific gravity:** 2.7

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.21
Moisture of Oversize Material = 8.9 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

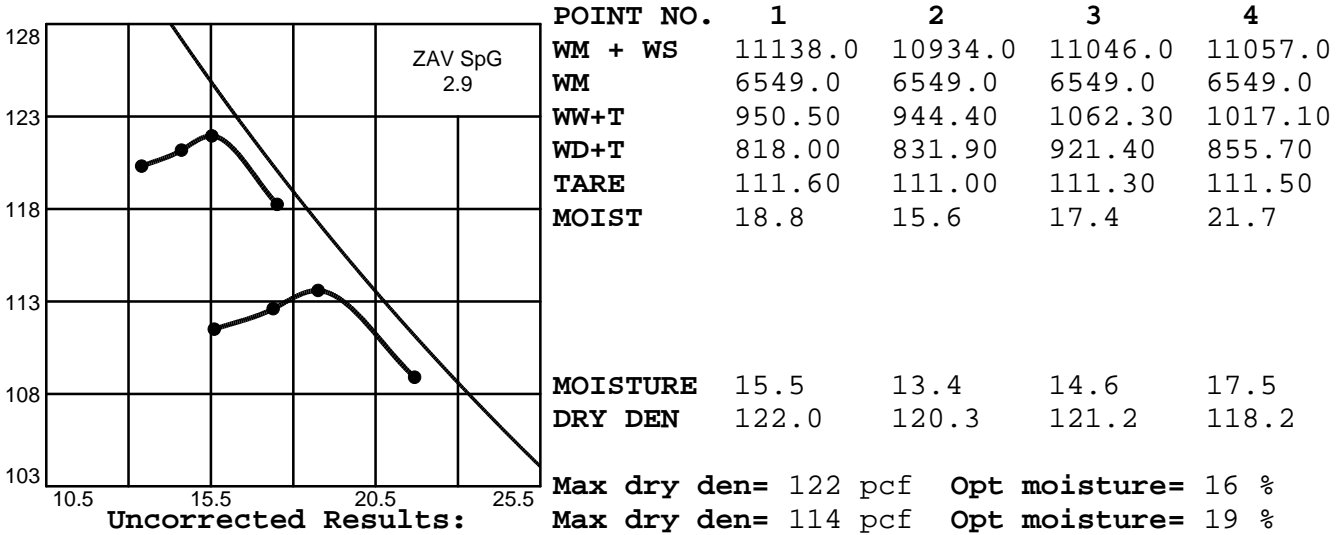
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: PMTP9 @8.0-9.5' and PMTP-10 @3-4'
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV curve is assumed
Percent retained on 3/4 in. sieve: 32.3
Percent passing No. 200 sieve: **Specific gravity:** 2.9

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.31
Moisture of Oversize Material = 8.8 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

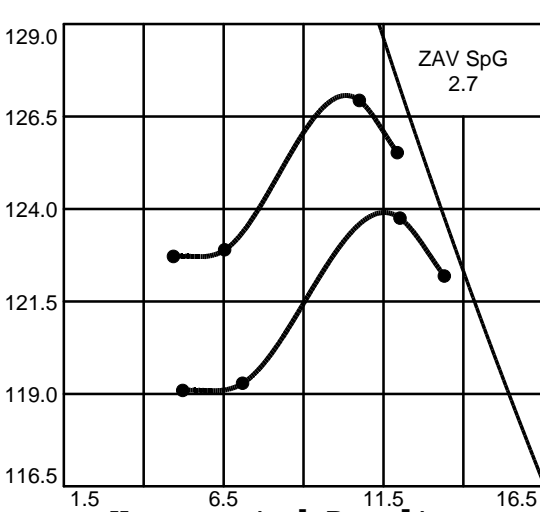
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: SGTP-3,4,5,6 2-3' composite
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for the ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 14.4
Percent passing No. 200 sieve: **Specific gravity:** 2.7

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



	1	2	3	4
WM + WS	11263.0	10895.0	10812.0	11265.0
WM	6549.0	6549.0	6549.0	6549.0
WW+T	290.30	900.70	936.50	899.20
WD+T	260.00	848.40	895.50	814.80
TARE	34.00	111.40	110.60	112.60
MOIST	13.4	7.1	5.2	12.0
MOISTURE	11.9	6.5	4.9	10.7
DRY DEN	125.5	122.9	122.7	126.9

Max dry den= 127 pcf **Opt moisture=** 10 %
Max dry den= 124 pcf **Opt moisture=** 12 %

ASTM D 4718 Correction Data:

Bulk Specific Gravity of Oversize Material = 2.4
Moisture of Oversize Material = 3.2 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

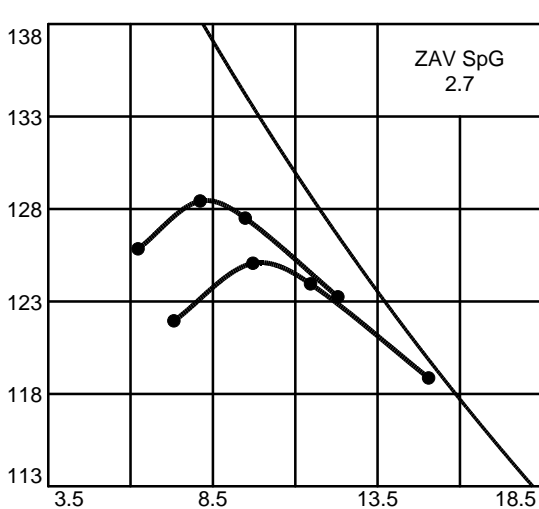
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: SGTP-2, SGTP-7, and SGTP-9 @ 2.0' composite
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 21.6
Percent passing No. 200 sieve: **Specific gravity:** 2.7

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



	1	2	3	4
POINT NO.				
WM + WS	11249.0	11217.0	11201.0	11001.0
WM	6549.0	6549.0	6549.0	6549.0
WW+T	1089.70	816.70	967.40	242.20
WD+T	989.00	754.30	855.40	227.93
TARE	110.60	112.10	111.30	32.90
MOIST	11.5	9.7	15.1	7.3
MOISTURE	9.5	8.1	12.3	6.2
DRY DEN	127.5	128.4	123.2	125.8

Max dry den= 128 pcf **Opt moisture=** 8 %
Max dry den= 125 pcf **Opt moisture=** 10 %

ASTM D 4718 Correction Data:

Bulk Specific Gravity of Oversize Material = 2.28
Moisture of Oversize Material = 2.3 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

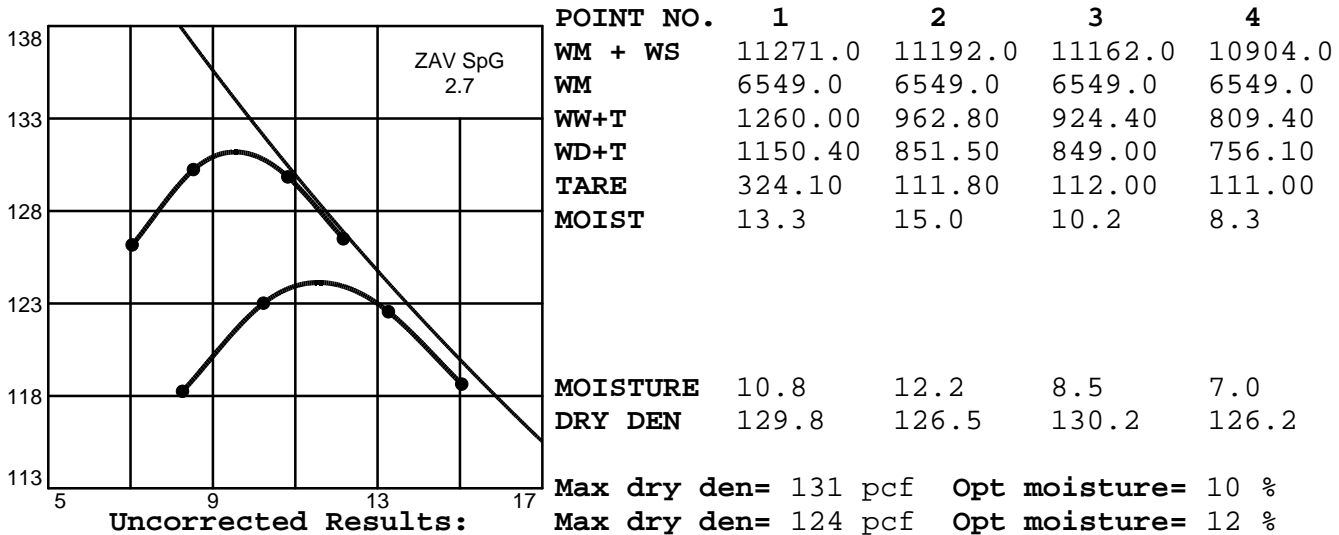
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: SGTP-1 @ 12.0' and SGTP-2 @ 6.0'
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 24.4
Percent passing No. 200 sieve: **Specific gravity:** 2.7

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



Uncorrected Results:
ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.55
Moisture of Oversize Material = 3.3 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

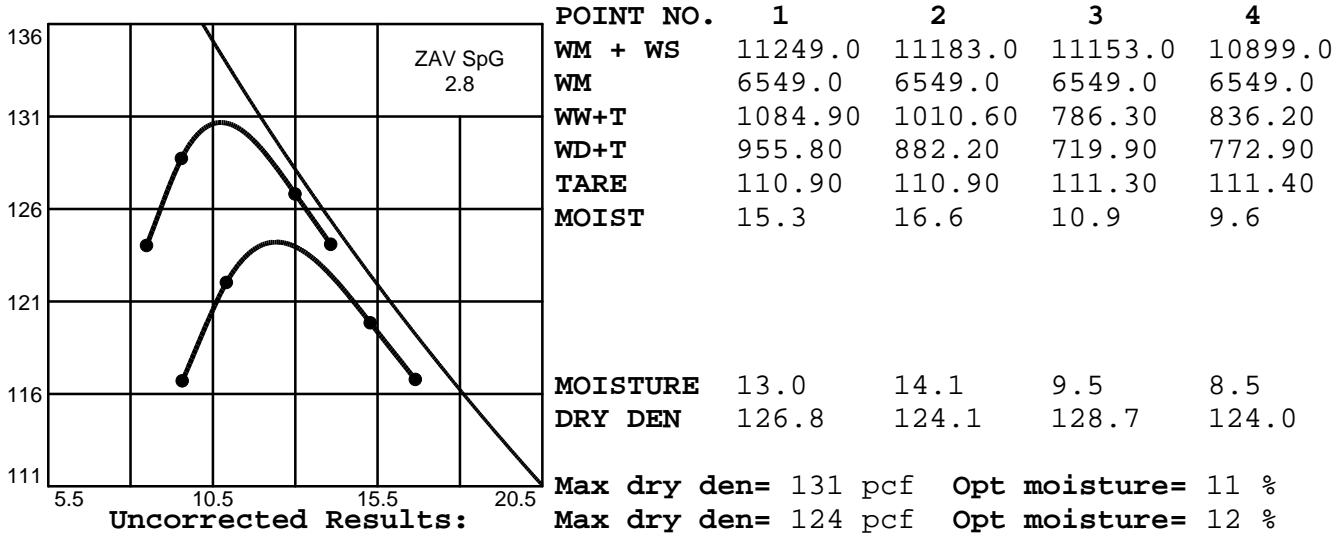
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: SGTP-4 @6.0', SGTP-3 @6.0', and SGTP-5 @9.0' mixed composite
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 21.0
Percent passing No. 200 sieve: **Specific gravity:** 2.8

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.6
Moisture of Oversize Material = 4.4 %
Corrections Applied to Every Test Point

MOISTURE DENSITY TEST DATA

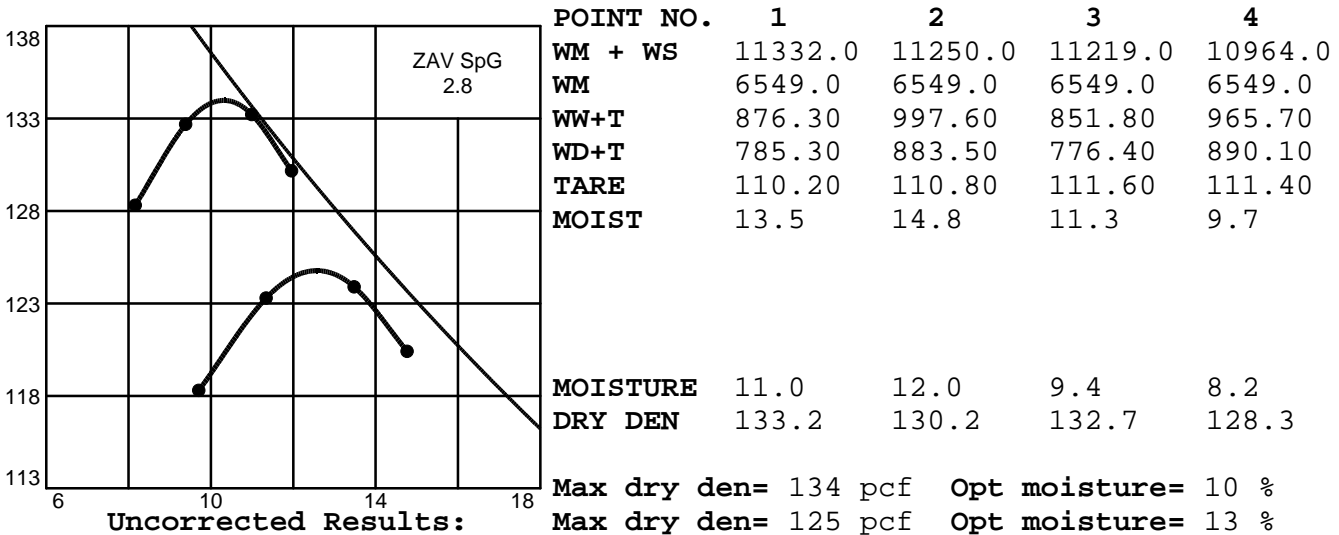
Client: Terragraphics
Project: UBMC
Project Number:

Specimen Data

Source: SGTP-9 @9.0' and SGTP-7 @12.0'
Sample No.:
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description:
USCS Classification: **AASHTO Classification:**
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks: Specific Gravity for ZAV Curve is assumed
Percent retained on 3/4 in. sieve: 24.9
Percent passing No. 200 sieve: **Specific gravity:** 2.8

Test Data And Results

Type of test: ASTM D 698-91 Procedure C Standard
Mold Dia.: 6.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 56



ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.76
Moisture of Oversize Material = 3.5 %
Corrections Applied to Every Test Point

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: PMTP-4,5,6 & PMTP-7 @2.0'					
Date of Testing: 10/13/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	6625.4				
(B) Saturated Surface Dry + Tare	6974.4				
(C) Submerged + Tare	4351				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.53				
Absorption = [100 x (B-A)]/A	5.27				
Comments					

Piedmont Engineering, Inc.
1215 Apple's Way
Belgrade, MT 59714
406-388-8578

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: PMTP-11 @9-10' and PMTP-1 @8'					
Date of Testing: 10/14/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	11600.5				
(B) Saturated Surface Dry + Tare	12085.5				
(C) Submerged + Tare	7955				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.81				
Absorption = [100 x (B-A)]/A	4.18				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: PMTP-7 @ 6.0' and PMTP-4 @4'					
Date of Testing: 10/13/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	3305.4				
(B) Saturated Surface Dry + Tare	3600.4				
(C) Submerged + Tare	2102				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.21				
Absorption = [100 x (B-A)]/A	8.92				
Comments					

**Piedmont Engineering, Inc.
1215 Apple's Way
Belgrade, MT 59714
406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: PMTP-9 @8-9.5' and PMTP-10 @ 3-4'					
Date of Testing: 10/14/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	13912.6				
(B) Saturated Surface Dry + Tare	15133.4				
(C) Submerged + Tare	9118				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.31				
Absorption = [100 x (B-A)]/A	8.77				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: SGTP-3,4,5,6 2-3' composite					
Date of Testing: 10/13/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	3414.6				
(B) Saturated Surface Dry + Tare	3524				
(C) Submerged + Tare	2102				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.40				
Absorption = [100 x (B-A)]/A	3.20				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: SGTP-2,7,9 @ 2.0'					
Date of Testing: 10/13/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	5983.7				
(B) Saturated Surface Dry + Tare	6120.7				
(C) Submerged + Tare	3499				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.28				
Absorption = [100 x (B-A)]/A	2.29				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: SGTP-1 @12' and SGTP-2 @8'					
Date of Testing: 10/14/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	11043.9				
(B) Saturated Surface Dry + Tare	11403.9				
(C) Submerged + Tare	7076				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.55				
Absorption = [100 x (B-A)]/A	3.26				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: SGTP-3 @6.0', SGTP-4 @6.0', and SGTP-5 @9.0'					
Date of Testing: 10/13/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	11372.5				
(B) Saturated Surface Dry + Tare	11874.5				
(C) Submerged + Tare	7508				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.60				
Absorption = [100 x (B-A)]/A	4.41				
Comments					

**Piedmont Engineering, Inc.
 1215 Apple's Way
 Belgrade, MT 59714
 406-388-8578**

Specific Gravity of (+) 3/4" Fraction

Project: Shave Gulch/Paymaster		Client: Terragraphics			
Sample ID: SGTP-9 @9' and SGTP-7 @12.0'					
Date of Testing: 10/14/2009			Tested By: NKG		
Trial Number					
Tare Number					
(A) Oven Dry + Tare	10908.5				
(B) Saturated Surface Dry + Tare	11290.5				
(C) Submerged + Tare	7342				
Tare	0				
Bulk Specific Gravity = A/(B-C)	2.76				
Absorption = [100 x (B-A)]/A	3.50				
Comments					

HYDRAULIC CONDUCTIVITY FOR FLEXIBLE-WALLED TEST SAMPLES
FALLING HEAD APPARATUS

Client:		Terragraphics				Project:		Paymaster				
Sample Description:		09-PMBH-10 14-16'										
Plasticity Index:				Liquid Limit:				Plastic Limit:		Specific Gravity:		
% Gravel:				% Sand:				% Fines:				
Final Void Ratio:				Initial Saturation:				Final Saturation:		Final Porosity:		
Dry Density (pcf):				% Max. ASTM D-698:								
Specimen Length (cm):		5.102		Specimen Diameter (cm):		2.43		Area of Standpipe (cm²):		0.899		
Height Inlet Above Floor (cm):				Height Outlet Above Bench (cm):		21.9						
Increment Number	Initial Reading	Initial Reading	Final Reading	Final Reading	Time Increment	Applied Pressure Differential	Initial Head	Final Head	Average Hydraulic Gradient	Hydraulic Conductivity	Hydraulic Conductivity at 20 C	
	(cm ²)	(cm ²)	(cm ²)	(cm ²)	(min.)	(psi)	(cm)	(cm)	(cm/cm)	(cm/sec)	(cm/sec)	
1	0.7	23.5	0.7	23.4	347	4.0	306.35	306.24	60.03	1.7E-08	1.7E-08	
2	1.2	23.3	2.6	22.2	1614	4.0	305.58	302.80	59.62	9.3E-08	9.3E-08	
3	2.6	22.2	4.8	20.3	2822	4.0	302.80	298.24	58.90	8.9E-08	8.9E-08	
4	4.8	20.3	6.8	18.3	2832	4.0	298.24	293.79	58.02	8.7E-08	8.7E-08	
5	6.8	18.3	8.2	17.1	1914	4.0	293.79	290.90	57.30	8.5E-08	8.5E-08	
6	8.2	17.1	10.2	15.2	2778	4.0	290.90	286.56	56.59	8.9E-08	8.9E-08	
7	10.2	15.2	12.3	13.2	2854	4.0	286.56	282.00	55.72	9.3E-08	9.3E-08	
8	12.3	13.2	15	10.6	3894	4.0	282.00	276.11	54.70	8.9E-08	8.9E-08	
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20	Average Hydraulic Conductivity of Last Four Test Increments =							8.9E-08	cm/sec			
21												
22												
23												
24												
25												
k = (aL/At) ln (h1/h2)												

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Specific Gravity of (-) #10 Fraction

Project: PAYMASTER/SHAVE GULCH
Sample ID: PMBH-1

Client: TERRAGRAPHICS
Date:
Tested by: NKG

Depth of sample ID	0-2'					
Volume of flask	250ml					
Method of air removal	vacuum					
Weight of the flask + water + soil	433.5					
Temperature, °C	21					
Weight of the flask + water	362.6					
Evaporation dish #						
Weight of evaporation dish	110.54					
Weight of evaporation dish + dry soil	218.62					
Weight of dry soil	108.08					
alpha	0.9998					
Weight of the water	37.18					
Specific Gravity	2.906					

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Specific Gravity of (-) #10 Fraction

Project: PAYMASTER/SHAVE GULCH
Sample ID: 09-PMBH-2

Client: TERRAGRAPHICS
Date:
Tested by: NKG

Depth of sample ID	0-2'					
Volume of flask	250ml					
Method of air removal	vacuum					
Weight of the flask + water + soil	416.7					
Temperature, °C	20					
Weight of the flask + water	365.15					
Evaporation dish #						
Weight of evaporation dish	110.86					
Weight of evaporation dish + dry soil	191.13					
Weight of dry soil	80.27					
alpha	1					
Weight of the water	28.72					
Specific Gravity	2.795					

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Specific Gravity of (-) #10 Fraction

Project: PAYMASTER/SHAVE GULCH
Sample ID: 09-PMBH-6

Client: TERRAGRAPHICS
Date:
Tested by: NKG

Depth of sample ID	2-4'					
Volume of flask	250ml					
Method of air removal	vacuum					
Weight of the flask + water + soil	426.7					
Temperature, °C	20					
Weight of the flask + water	362.7					
Evaporation dish #						
Weight of evaporation dish	110.16					
Weight of evaporation dish + dry soil	205.02					
Weight of dry soil	94.86					
alpha	1					
Weight of the water	30.86					
Specific Gravity	3.074					

**Piedmont Engineering, Inc.
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Specific Gravity of (-) #10 Fraction

Project: PAYMASTER/SHAVE GULCH
Sample ID: 09-PMBH-7

Client: TERRAGRAPHICS
Date:
Tested by: NKG

Depth of sample ID	0-2'					
Volume of flask	250ml					
Method of air removal	vacuum					
Weight of the flask + water + soil	433.1					
Temperature, °C	21					
Weight of the flask + water	365.1					
Evaporation dish #						
Weight of evaporation dish	111.38					
Weight of evaporation dish + dry soil	215.8					
Weight of dry soil	104.42					
alpha	0.9998					
Weight of the water	36.42					
Specific Gravity	2.867					

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Specific Gravity of (-) #10 Fraction

Project: PAYMASTER/SHAVE GULCH
Sample ID: SGBH-2

Client: TERRAGRAPHICS
Date:
Tested by: NKG

Depth of sample ID	2-4'					
Volume of flask	250ml					
Method of air removal	vacuum					
Weight of the flask + water + soil	429.5					
Temperature, °C	21					
Weight of the flask + water	365.1					
Evaporation dish #						
Weight of evaporation dish	110.52					
Weight of evaporation dish + dry soil	209.39					
Weight of dry soil	98.87					
alpha	0.9998					
Weight of the water	34.47					
Specific Gravity	2.868					

Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	PMBH-9 6-6.5'	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	4.48	Weight (grams)	772	Sample Diameter (in.):	2.43
Area (in. ²):	4.64	Volume (in. ³):	20.80	Wet Density (pcf):	141.4
Water Content (%):	18.79			Dry Density (pcf):	119.1

Water Content Determination	
Tare #	
Wet Soil + Tare	772.00
Dry Soil + Tare	667.49
Tare Weight	111.35
Water Content	18.79

Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	09-PMBH-9 6.5-7'	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	5.59	Weight (grams)	882.7	Sample Diameter (in.):	2.43
Area (in. ²):	4.64	Volume (in. ³):	25.90	Wet Density (pcf):	129.8
Water Content (%):	14.52			Dry Density (pcf):	113.4

Water Content Determination	
Tare #	
Wet Soil + Tare	882.70
Dry Soil + Tare	770.80
Tare Weight	0.00
Water Content	14.52

Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	PMBH-10 6-8'	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	4.54	Weight (grams)	772.8	Sample Diameter (in.):	2.43
Area (in. ²):	4.64	Volume (in ³):	21.04	Wet Density (pcf):	139.9
Water Content (%):	16.99			Dry Density (pcf):	119.6

Water Content Determination	
Tare #	
Wet Soil + Tare	448.60
Dry Soil + Tare	399.62
Tare Weight	111.35
Water Content	16.99

Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	PMBH-10 14-16'	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	5.10	Weight (grams)	861.1	Sample Diameter (in.):	2.43
Area (in. ²):	4.64	Volume (in. ³):	23.66	Wet Density (pcf):	138.6
Water Content (%):	16.10			Dry Density (pcf):	119.4

Water Content Determination	
Tare #	
Wet Soil + Tare	505.60
Dry Soil + Tare	450.80
Tare Weight	110.50
Water Content	16.10

Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	PMTP-11 & PMTP-1	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	6.00	Weight (grams)	1365.3	Sample Diameter (in.):	2.8
Area (in. ²):	6.16	Volume (in. ³):	36.95	Wet Density (pcf):	140.8
Water Content (%):	17.21			Dry Density (pcf):	120.1

Water Content Determination	
Tare #	
Wet Soil + Tare	1365.30
Dry Soil + Tare	1164.80
Tare Weight	0.00
Water Content	17.21

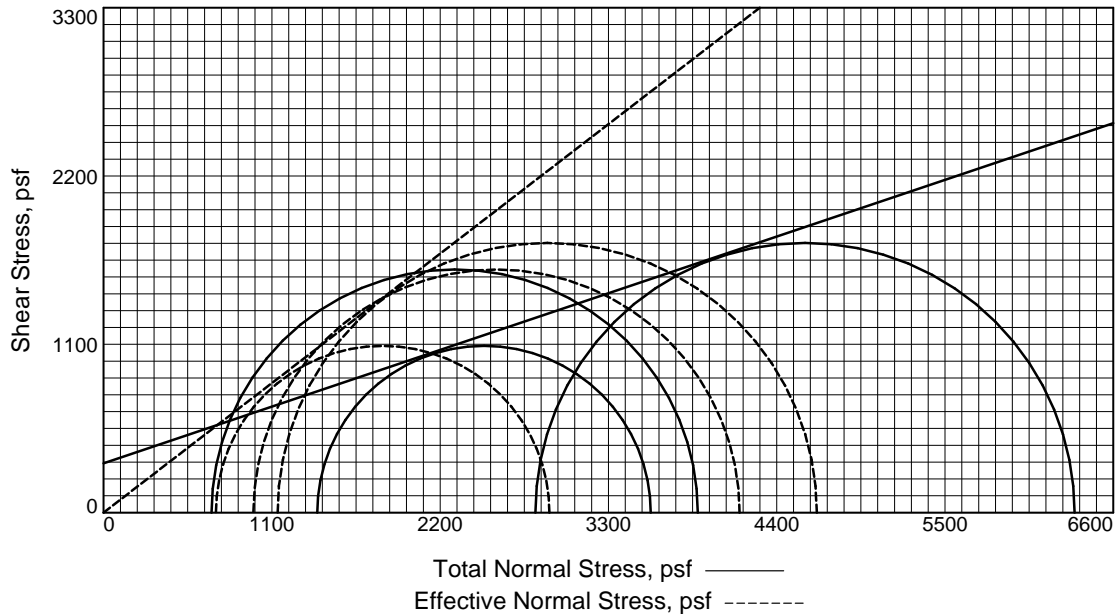
Soil Density from Liner Sample

**Piedmont Engineering
1215 Apple's Way
Belgrade, MT 59714**

Project:	Paymaster	Client:	Terragraphics		
Sample ID:	SGTP-3,4,5	Visual:			
Date of Testing:		Tested By:			
Sample Length (in.):	6.00	Weight (grams)	1298.2	Sample Diameter (in.):	2.8
Area (in. ²):	6.16	Volume (in ³):	36.95	Wet Density (pcf):	133.9
Water Content (%):	13.64			Dry Density (pcf):	117.8

Water Content Determination	
Tare #	
Wet Soil + Tare	1298.20
Dry Soil + Tare	1142.36
Tare Weight	0.00
Water Content	13.64

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	12269	11563	3178	-274			4157	979
2	11606	10210	2180	662			2914	734
3	15307	12485	3525	1685			4662	1138

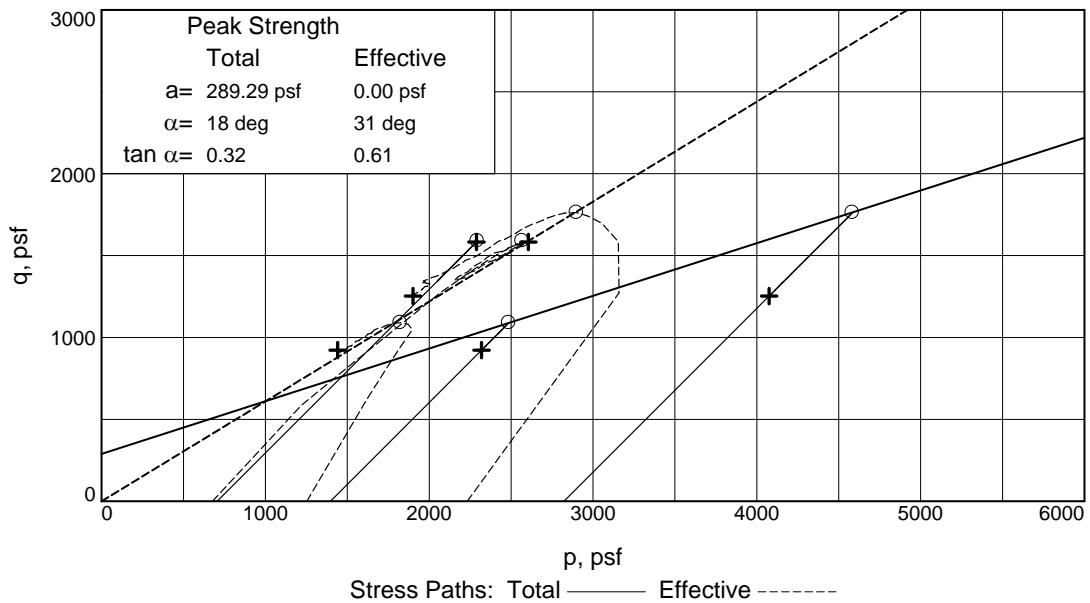
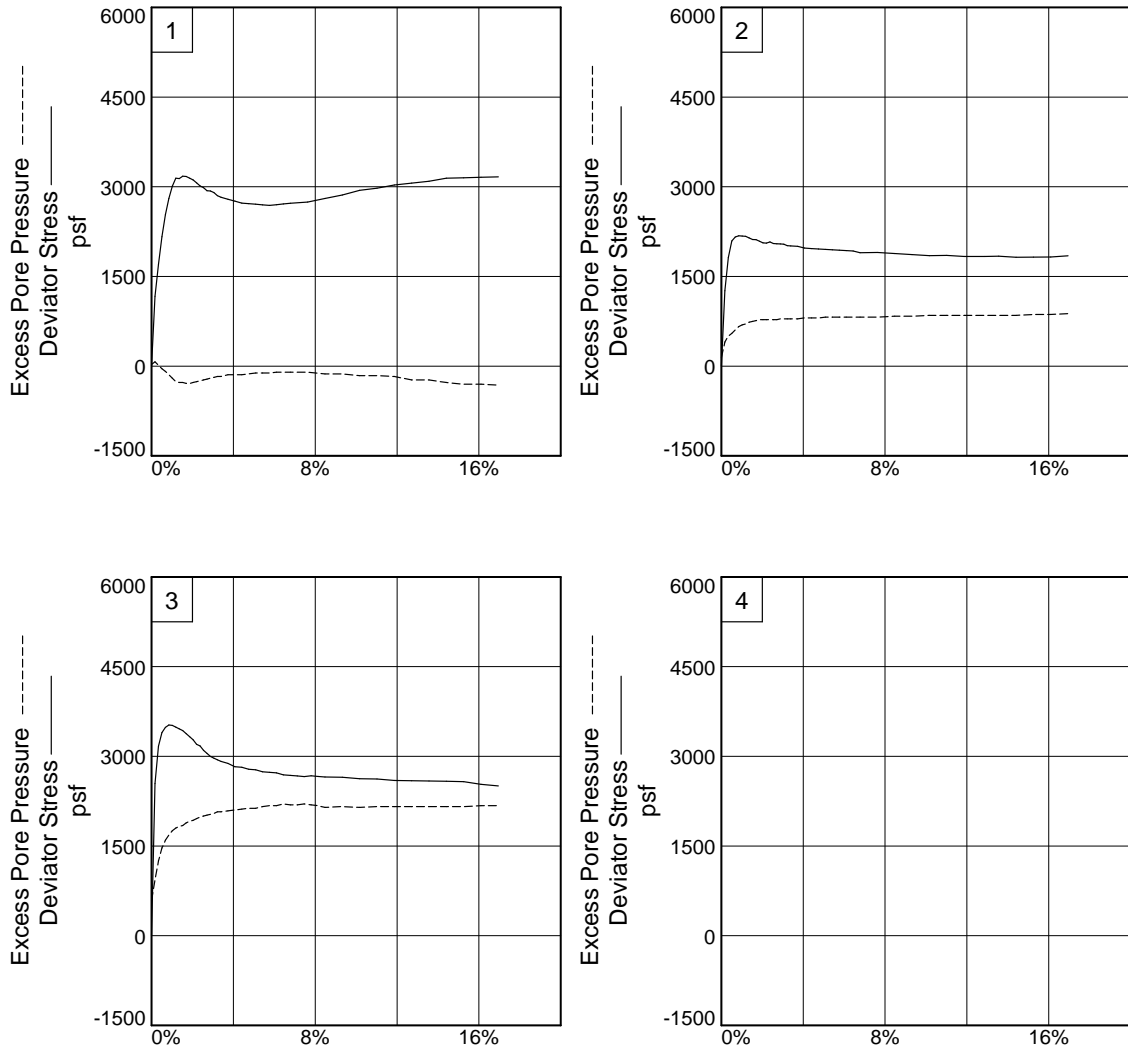
No.	Consolidated Sample Parameters						
	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	15.0	117.8	99.7%	0.3986	2.80	5.90	0.01
2	15.5	117.3	99.4%	0.4153	2.80	5.90	0.01
3	16.0	116.8	99.8%	0.4276	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters			Material Description
	Total	Effective	
Strength intercept, c=	322 psf	0 psf	
Friction angle, ϕ =	19 deg	38 deg	
Tangent, ϕ =	0.34	0.77	

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: PMTP-4,5,6 @2-3' and PMTP-7 @2.0'</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

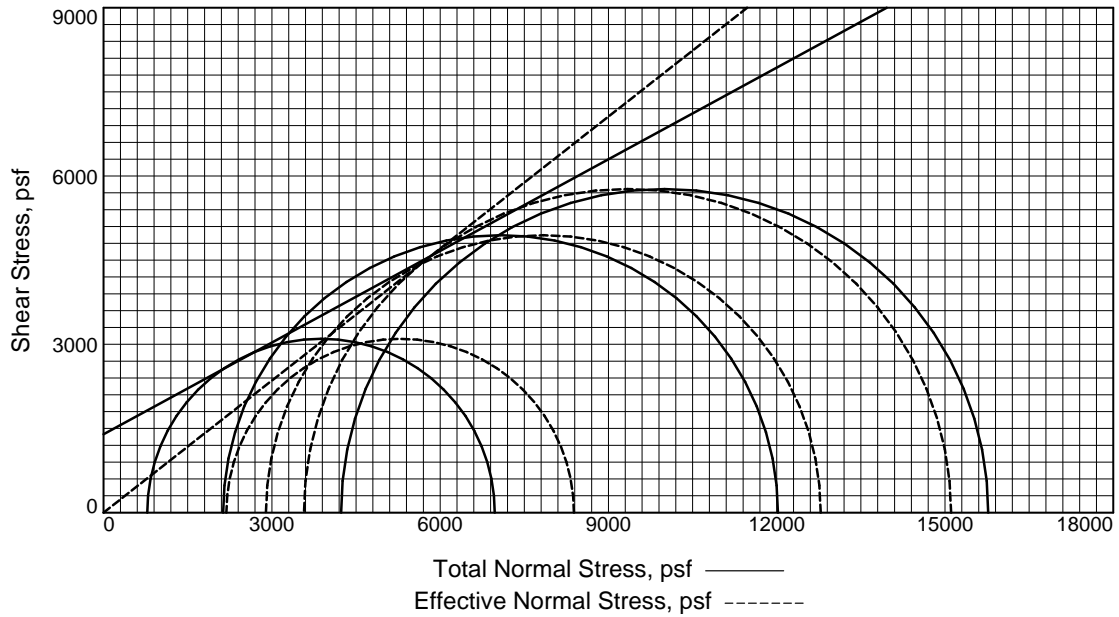
Specific Gravity is Assumed



Client: Terragraphics
Project: UBMC
Source of Sample: PMTP-4,5,6 @2-3' and PMTP-7 @2.0'
Project No.: _____ **Figure** _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	14530	10296	11537	662			15108	3571
2	12413	10282	9890	-763			12784	2894
3	11002	10224	6196	-1411			8385	2189

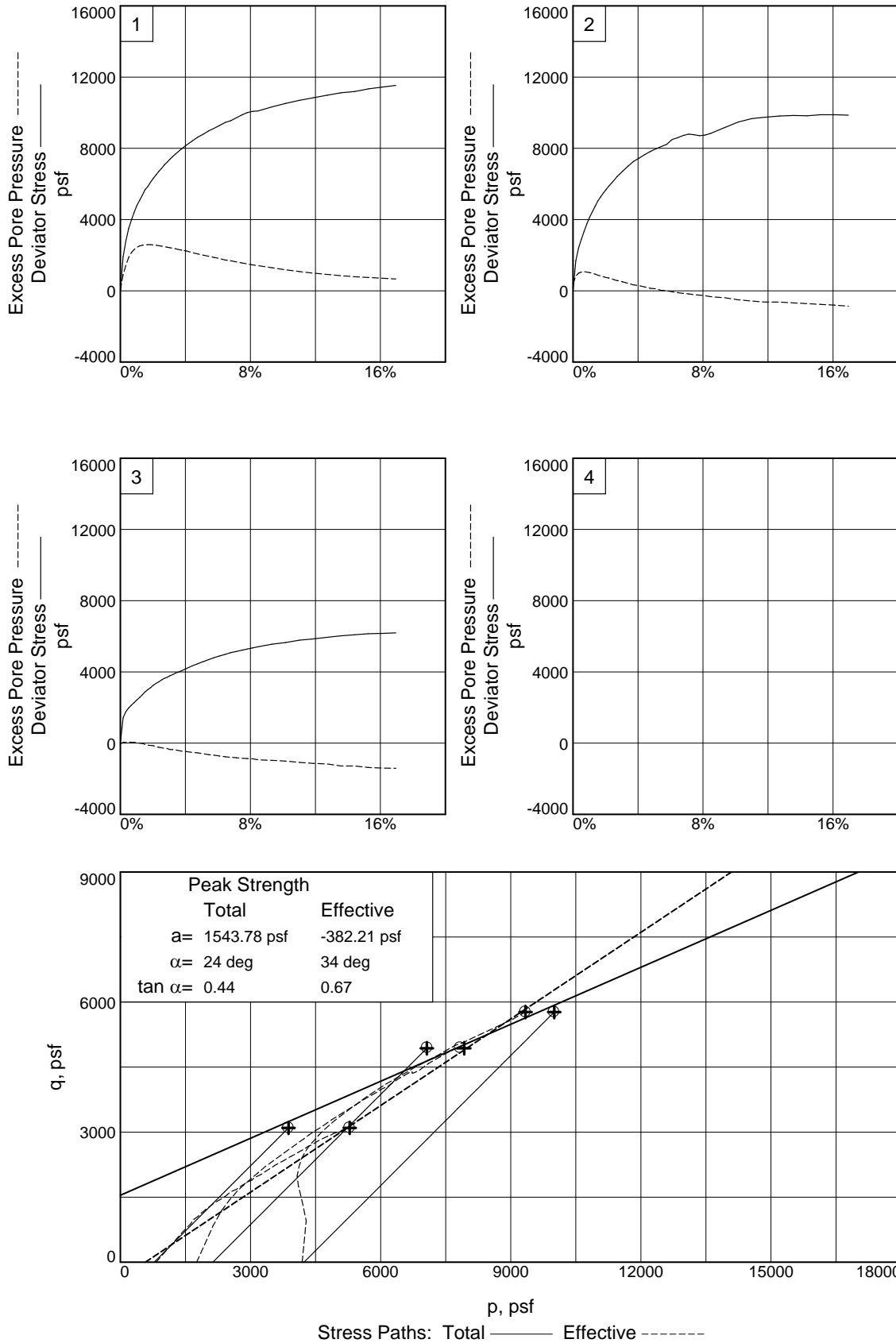
Consolidated Sample Parameters							
No.	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	17.1	122.9	99.5%	0.5092	2.80	5.90	0.01
2	18.1	122.2	99.4%	0.5531	2.80	5.90	0.01
3	18.0	122.4	99.3%	0.5510	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters	Material Description												
<table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: center;">Total</td> <td style="text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">1397 psf</td> <td style="text-align: center;">0 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">29 deg</td> <td style="text-align: center;">38 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.54</td> <td style="text-align: center;">0.78</td> </tr> </table>		Total	Effective	Strength intercept, c=	1397 psf	0 psf	Friction angle, ϕ =	29 deg	38 deg	Tangent, ϕ =	0.54	0.78	
	Total	Effective											
Strength intercept, c=	1397 psf	0 psf											
Friction angle, ϕ =	29 deg	38 deg											
Tangent, ϕ =	0.54	0.78											

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: PMTP-11 @9-10' and PMTP-1 @8.0' mixed</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

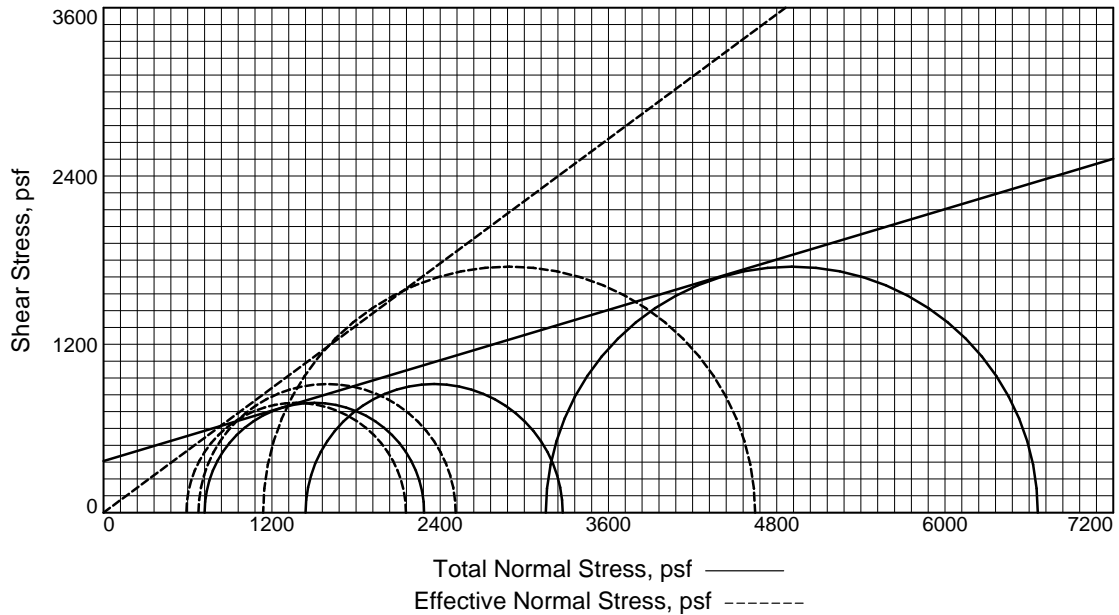
Specific Gravity is Assumed



Client: Terragraphics
Project: UBMC
Source of Sample: PMTP-11 @9-10' and PMTP-1 @8.0' mixed
Project No.: _____ **Figure** _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	18274	15120	3508	2016			4646	1138
2	9518	8798	1566	130			2156	590
3	7258	5818	1834	763			2511	677

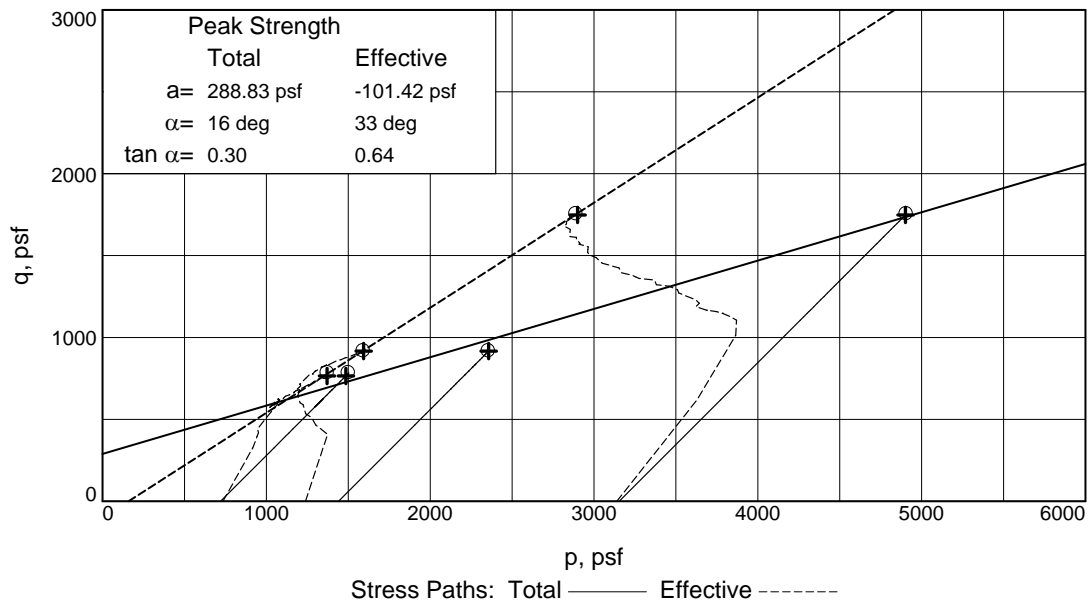
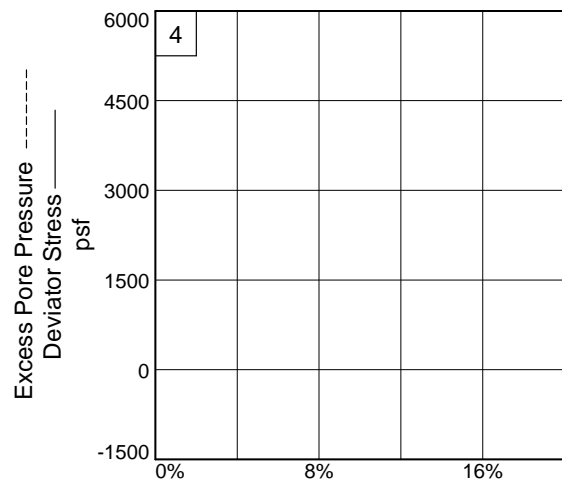
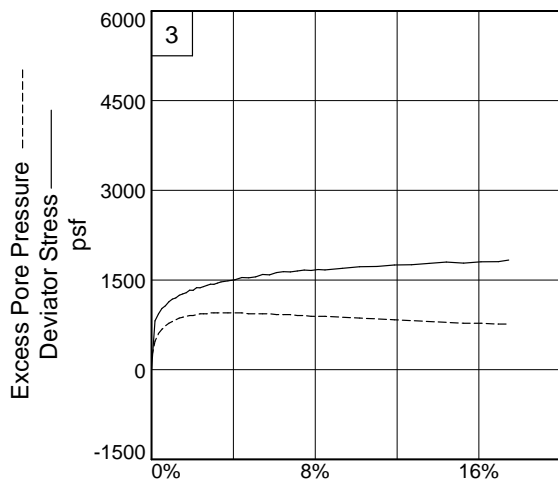
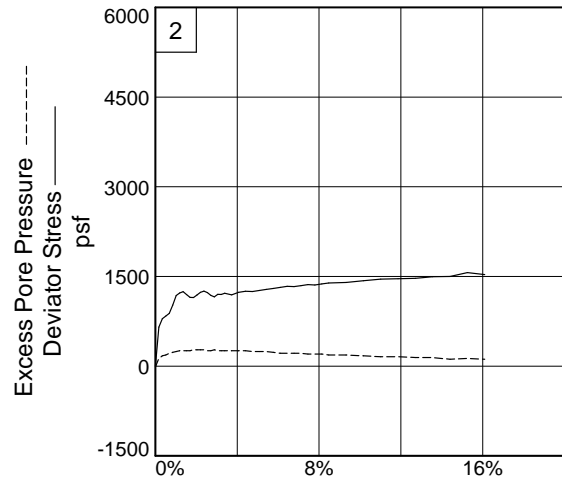
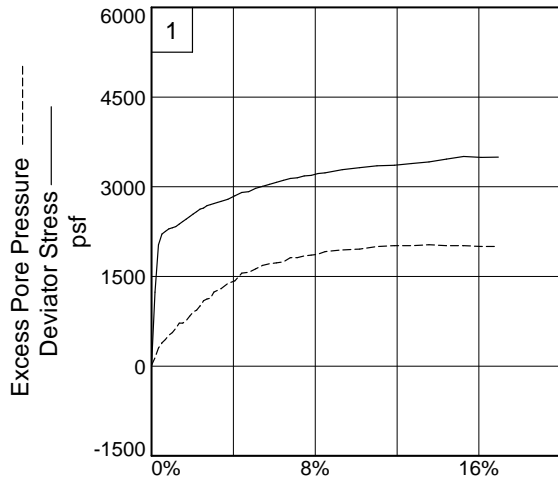
Consolidated Sample Parameters							
No.	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	20.6	102.3	99.4%	0.5135	2.80	5.90	0.01
2	22.7	101.9	99.5%	0.5928	2.80	5.90	0.01
3	22.7	101.6	99.2%	0.5918	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters	Material Description												
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center;">Total</td> <td style="text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">367 psf</td> <td style="text-align: center;">0 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">17 deg</td> <td style="text-align: center;">37 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.30</td> <td style="text-align: center;">0.74</td> </tr> </table>		Total	Effective	Strength intercept, c=	367 psf	0 psf	Friction angle, ϕ =	17 deg	37 deg	Tangent, ϕ =	0.30	0.74	
	Total	Effective											
Strength intercept, c=	367 psf	0 psf											
Friction angle, ϕ =	17 deg	37 deg											
Tangent, ϕ =	0.30	0.74											

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: PMTP-7 @6.0' and PMTP-4 @4.0'</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

Specific Gravity is Assumed



Client: Terragraphics

Project: UBMC

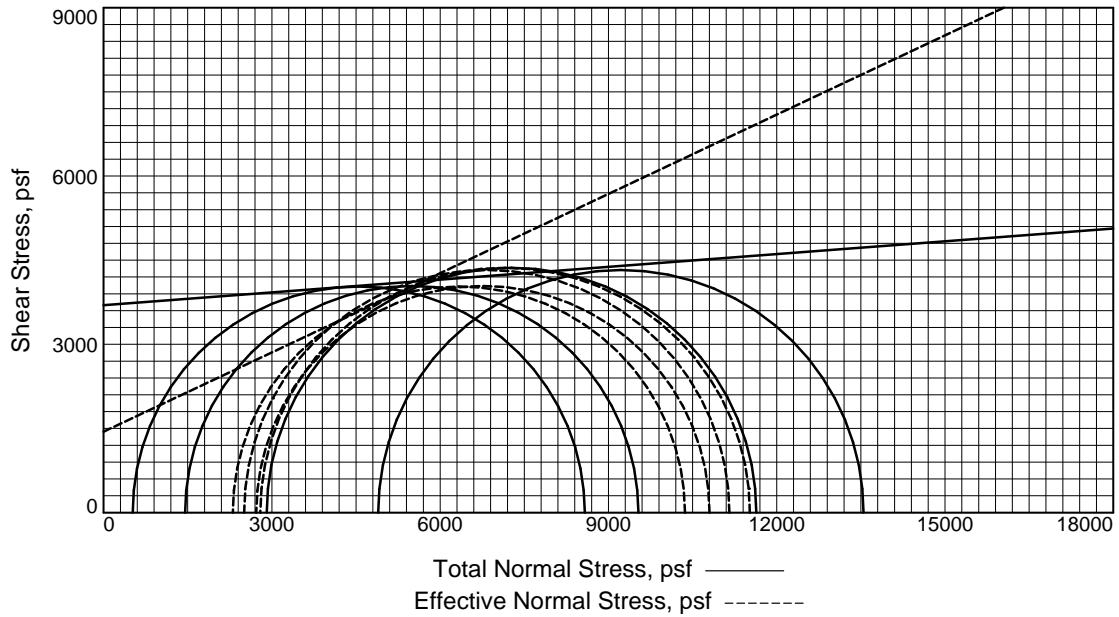
Source of Sample: PMTP-7 @6.0' and PMTP-4 @4.0'

Project No.:

Figure _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	10138	8683	8080	-1267			10801	2722
2	9346	8827	8060	-1786			10364	2304
3	11448	8539	8727	115			11521	2794
4	16661	11765	8650	2390			11156	2506

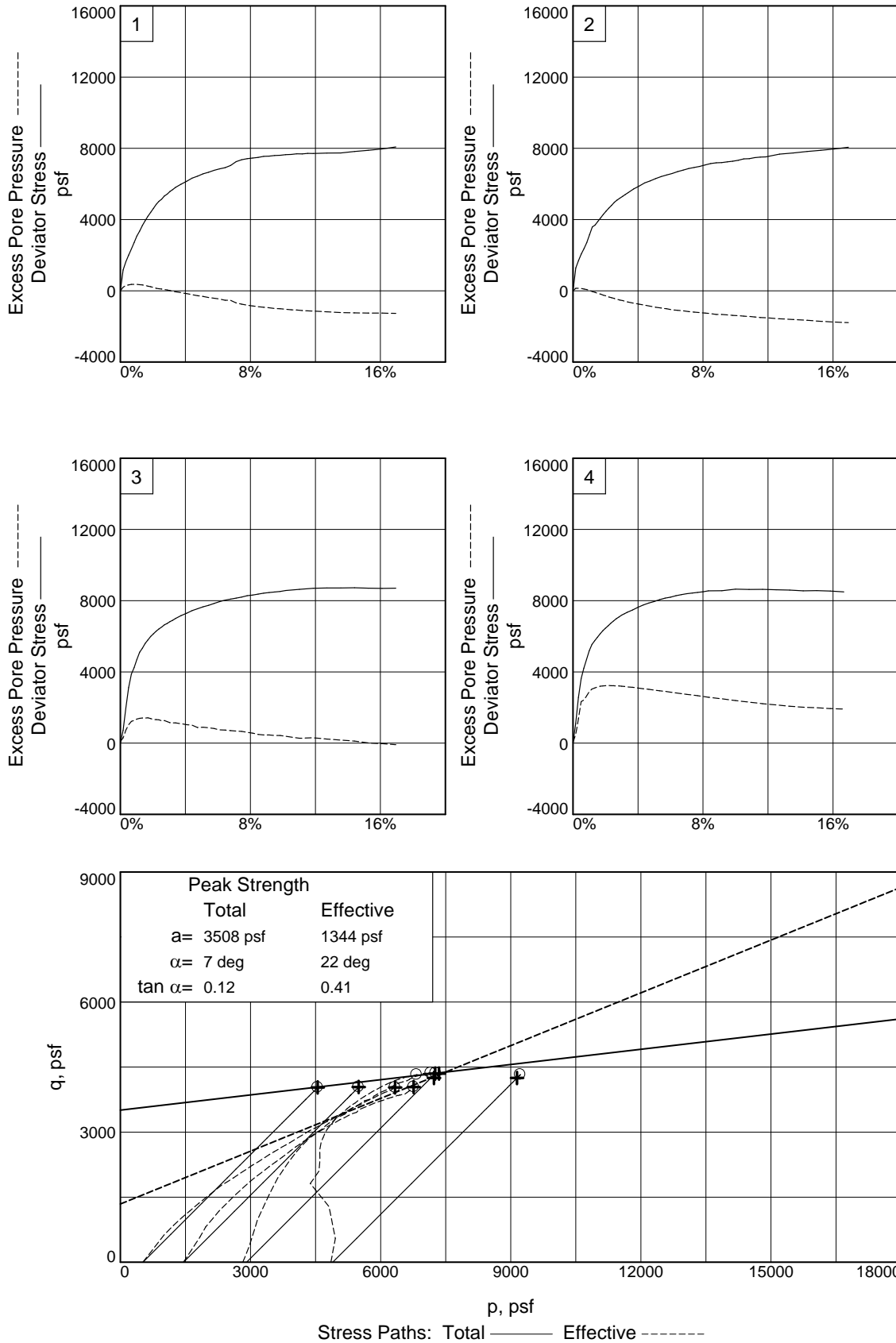
Consolidated Sample Parameters							
No.	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	20.3	111.9	99.4%	0.5792	2.80	5.90	0.01
2	19.4	112.8	99.6%	0.5435	2.80	5.90	0.01
3	19.8	112.8	99.1%	0.5662	2.80	5.90	0.01
4	21.3	109.2	97.7%	0.6178	2.80	6.00	0.01

Mohr-Coulomb Strength Parameters	Material Description												
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center;">Total</td> <td style="text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">3698 psf</td> <td style="text-align: center;">1442 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">4 deg</td> <td style="text-align: center;">25 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.08</td> <td style="text-align: center;">0.47</td> </tr> </table>		Total	Effective	Strength intercept, c=	3698 psf	1442 psf	Friction angle, ϕ =	4 deg	25 deg	Tangent, ϕ =	0.08	0.47	
	Total	Effective											
Strength intercept, c=	3698 psf	1442 psf											
Friction angle, ϕ =	4 deg	25 deg											
Tangent, ϕ =	0.08	0.47											

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: PMTP9 @8.0-9.5' and PMTP-10 @3-4'</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT</p> <p>PIEDMONT ENGINEERING, INC.</p> <p>1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

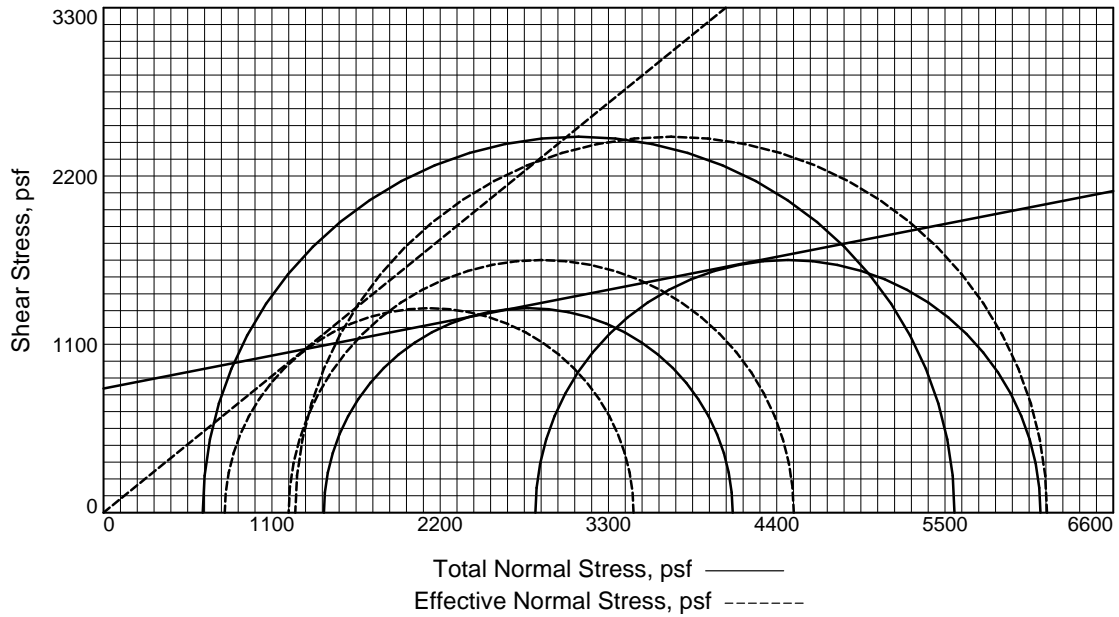
Specific Gravity is Assumed



Client: Terragraphics
Project: UBMC
Source of Sample: PMTP9 @ 8.0-9.5' and PMTP-10 @ 3-4'
Project No.: _____ **Figure** _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	9490	8842	4914	-605			6167	1253
2	14602	13162	2672	648			3464	792
3	12845	10022	3302	1613			4511	1210

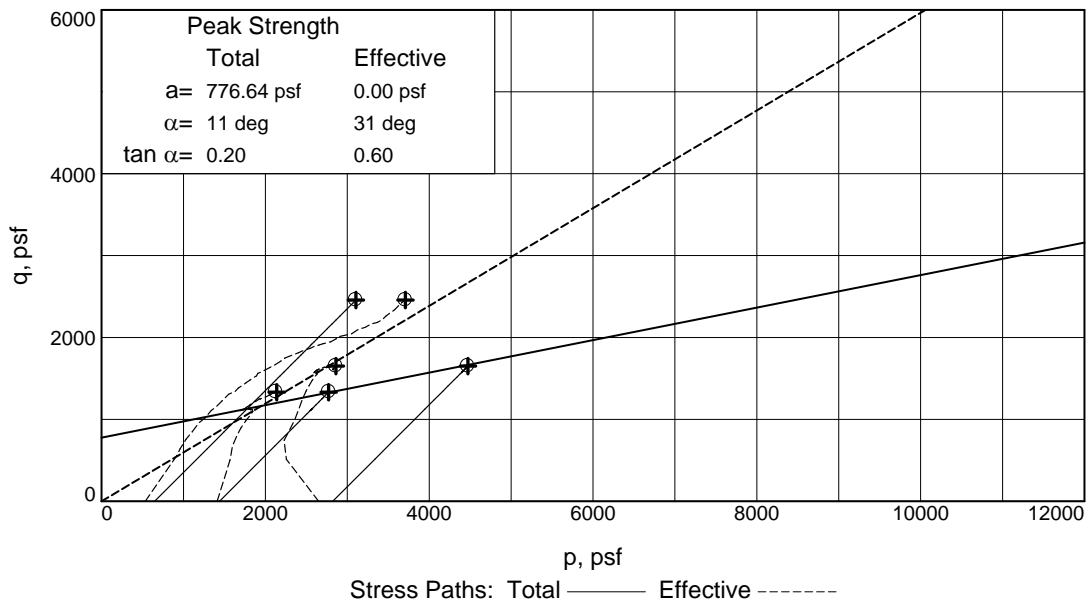
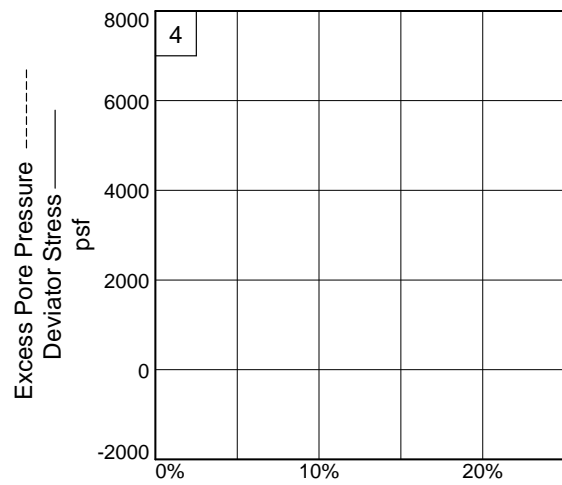
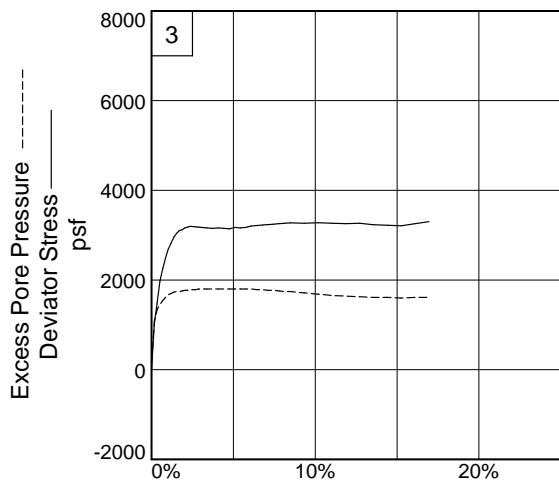
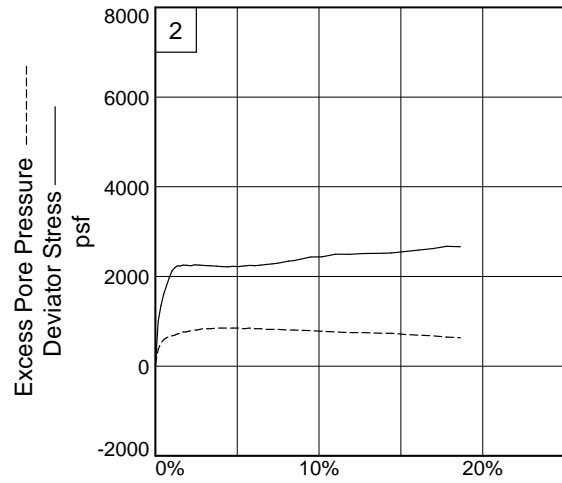
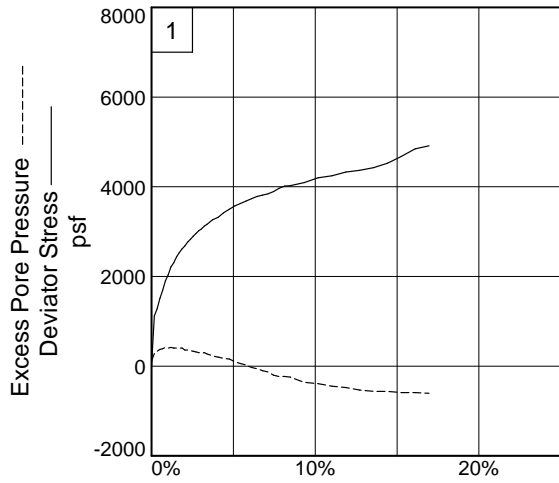
Consolidated Sample Parameters							
No.	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	15.5	115.0	99.9%	0.4001	2.80	5.90	0.01
2	15.7	115.6	99.5%	0.4143	2.80	5.90	0.01
3	14.6	115.6	99.8%	0.3717	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters	Material Description																
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%; text-align: center;">Total</td> <td style="width: 50%;"></td> <td style="width: 50%; text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">811 psf</td> <td>Strength intercept, c=</td> <td style="text-align: center;">0 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">11 deg</td> <td>Friction angle, ϕ =</td> <td style="text-align: center;">39 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.20</td> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.81</td> </tr> </table>		Total		Effective	Strength intercept, c=	811 psf	Strength intercept, c=	0 psf	Friction angle, ϕ =	11 deg	Friction angle, ϕ =	39 deg	Tangent, ϕ =	0.20	Tangent, ϕ =	0.81	
	Total		Effective														
Strength intercept, c=	811 psf	Strength intercept, c=	0 psf														
Friction angle, ϕ =	11 deg	Friction angle, ϕ =	39 deg														
Tangent, ϕ =	0.20	Tangent, ϕ =	0.81														

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: SGTP-3,4,5,6 2-3' composite</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT</p> <p>PIEDMONT ENGINEERING, INC.</p> <p>1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

Specific Gravity is Assumed



Client: Terragraphics

Project: UBMC

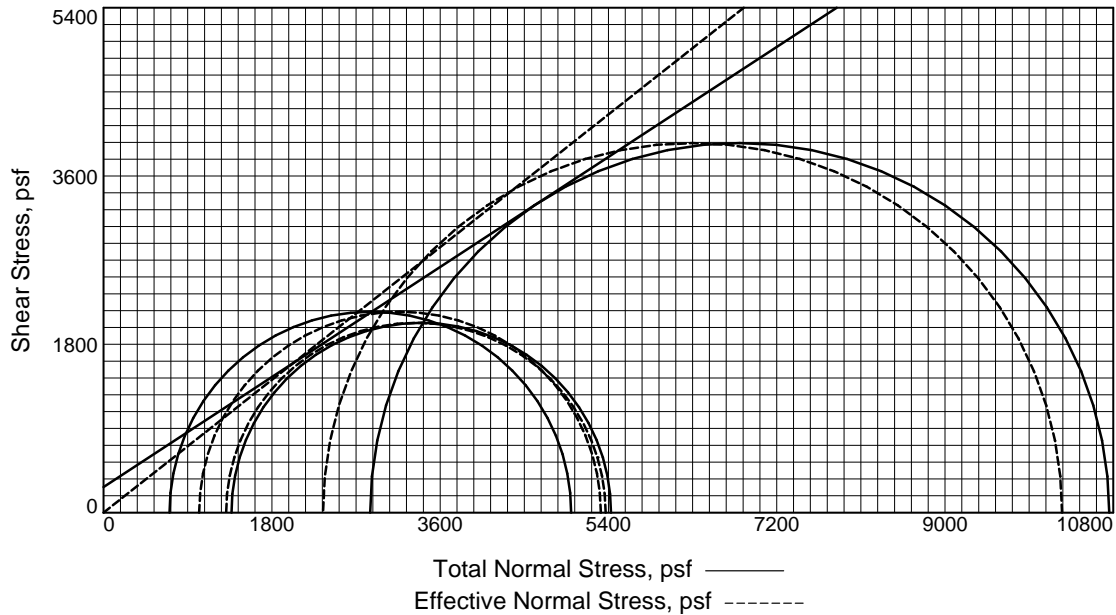
Source of Sample: SGTP-3,4,5,6 2-3' composite

Project No.:

Figure _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	12283	11578	4296	-317			5318	1022
2	10181	8813	4059	58			5370	1310
3	16142	13291	7905	504			10252	2347

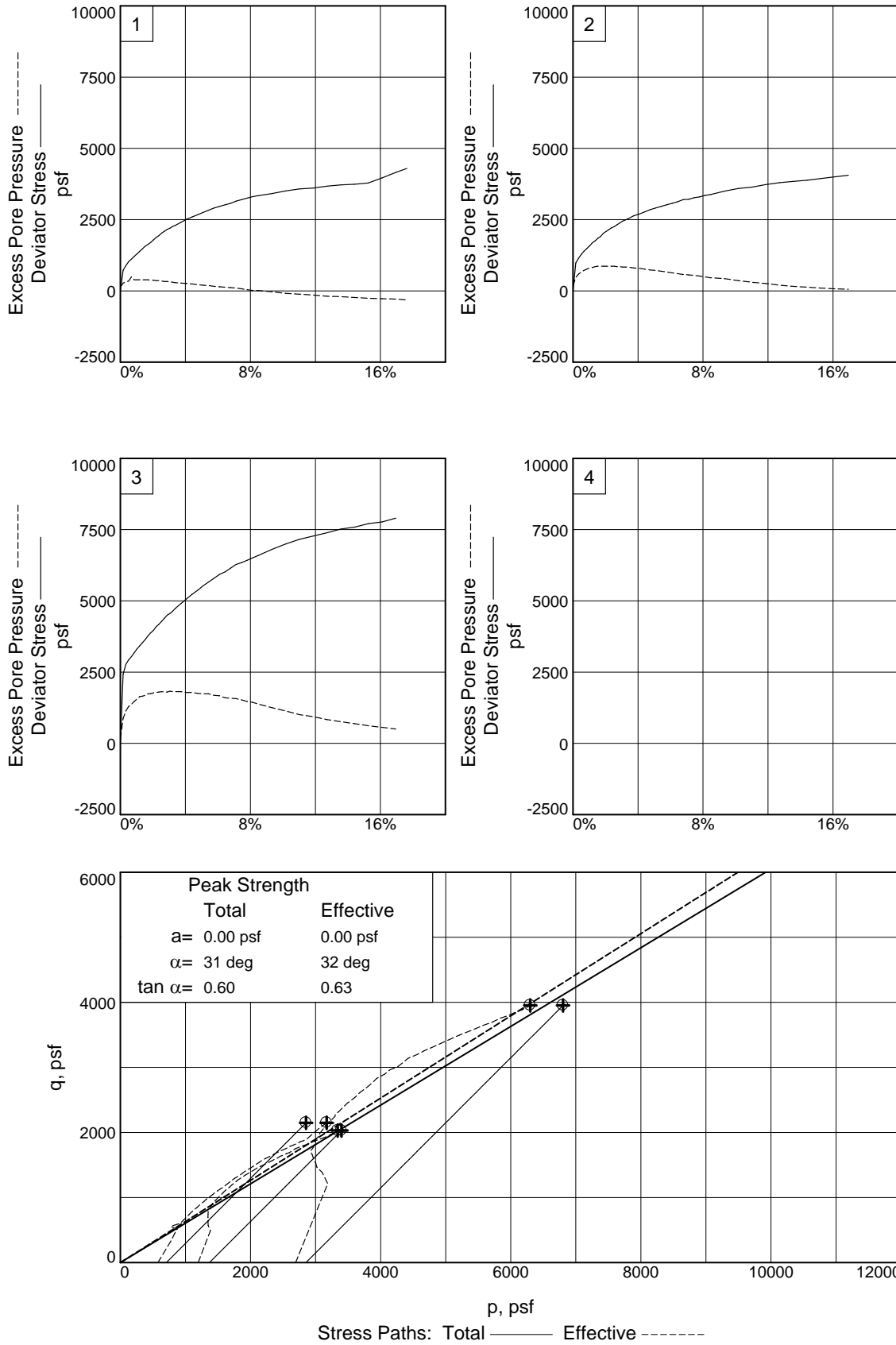
No.	Consolidated Sample Parameters						
	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	14.8	114.0	99.2%	0.3747	2.80	5.90	0.01
2	15.1	113.4	99.4%	0.3813	2.80	5.90	0.01
3	13.9	115.0	99.3%	0.3464	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters	Material Description												
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center;">Total</td> <td style="text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">274 psf</td> <td style="text-align: center;">0 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">33 deg</td> <td style="text-align: center;">38 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.65</td> <td style="text-align: center;">0.79</td> </tr> </table>		Total	Effective	Strength intercept, c=	274 psf	0 psf	Friction angle, ϕ =	33 deg	38 deg	Tangent, ϕ =	0.65	0.79	
	Total	Effective											
Strength intercept, c=	274 psf	0 psf											
Friction angle, ϕ =	33 deg	38 deg											
Tangent, ϕ =	0.65	0.79											

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: SGTP-1 @ 12.0' and SGTP-2 @ 6.0'</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

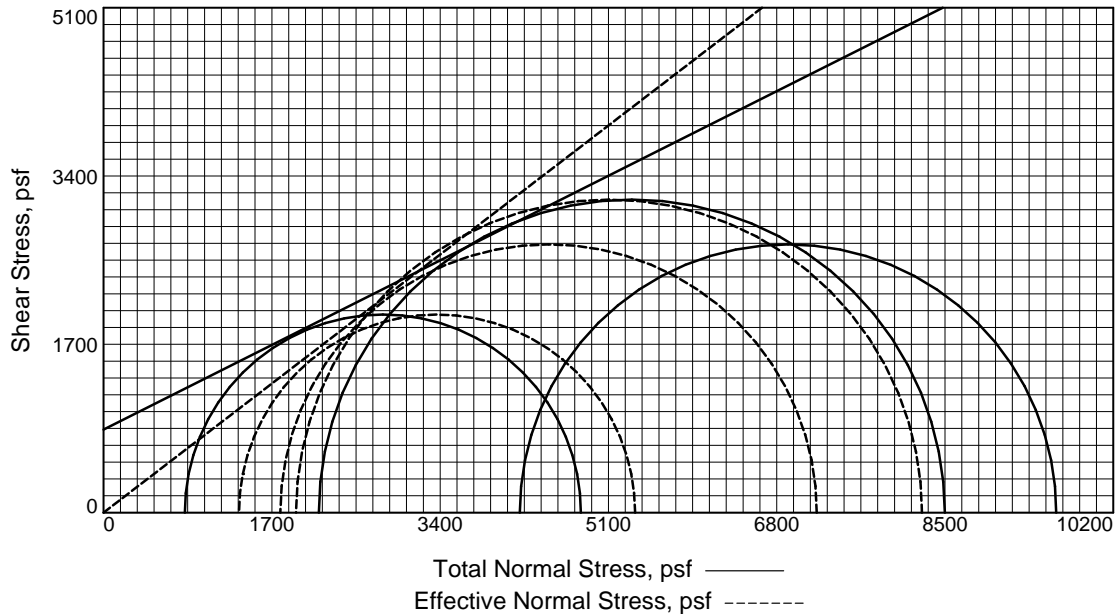
Specific Gravity is Assumed



Client: Terragraphics
Project: UBMC
Source of Sample: SGTP-1 @ 12.0' and SGTP-2 @ 6.0'
Project No.: _____ **Figure** _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	13882	13061	4001	-547			5369	1368
2	13867	11693	6323	230			8267	1944
3	17323	13118	5419	2419			7204	1786

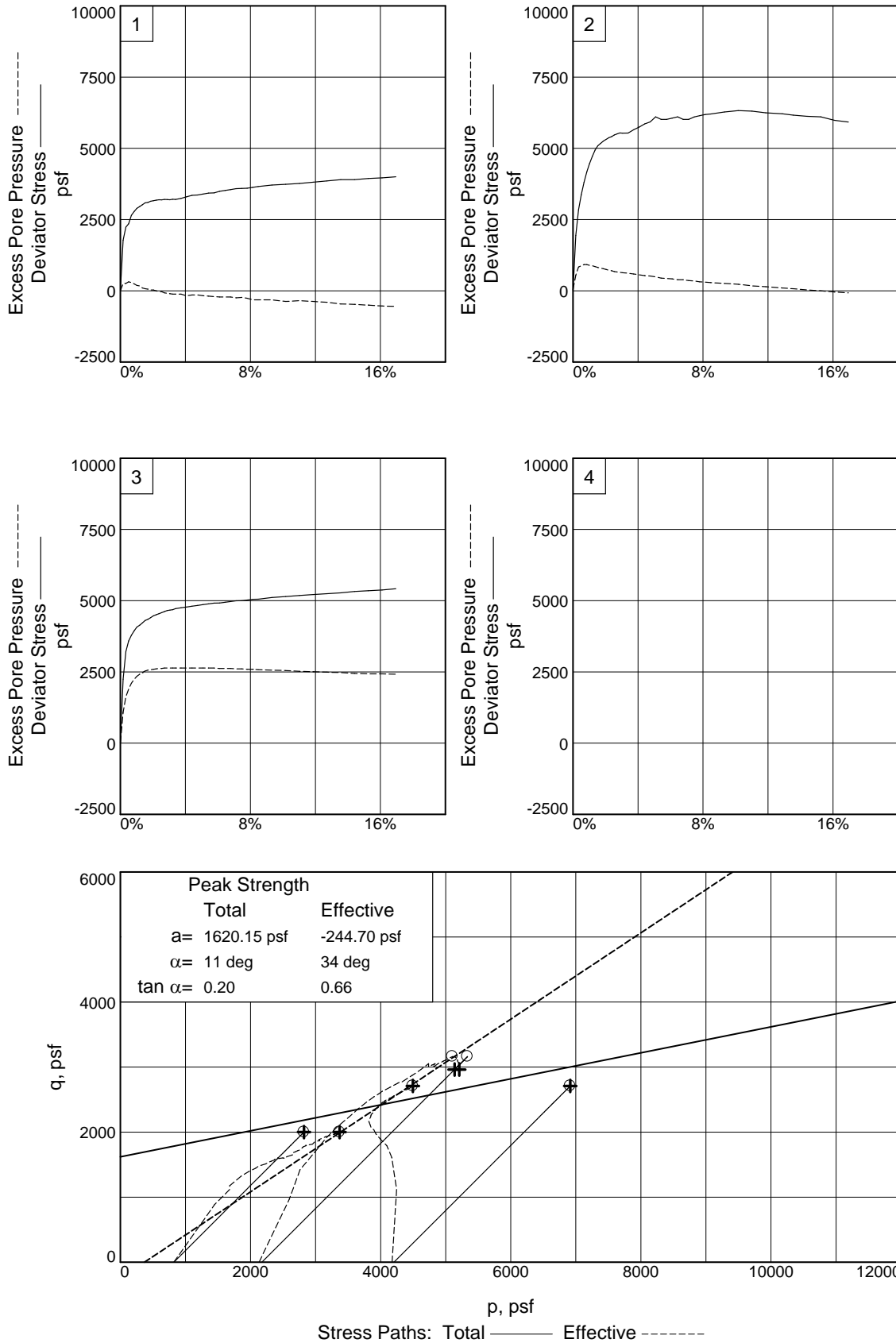
No.	Consolidated Sample Parameters						
	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	17.5	124.2	97.4%	0.5579	2.80	5.90	0.01
2	16.5	120.5	99.4%	0.4714	2.80	5.90	0.01
3	16.2	124.4	99.3%	0.4803	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters			Material Description
	Total	Effective	
Strength intercept, c=	839 psf	0 psf	
Friction angle, ϕ =	27 deg	37 deg	
Tangent, ϕ =	0.50	0.77	

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: SGTP-4 @6.0', SGTP-3 @6.0', and SGTP-5 @9.0' mixed composite</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

Specific Gravity is Assumed



Client: Terragraphics

Project: UBMC

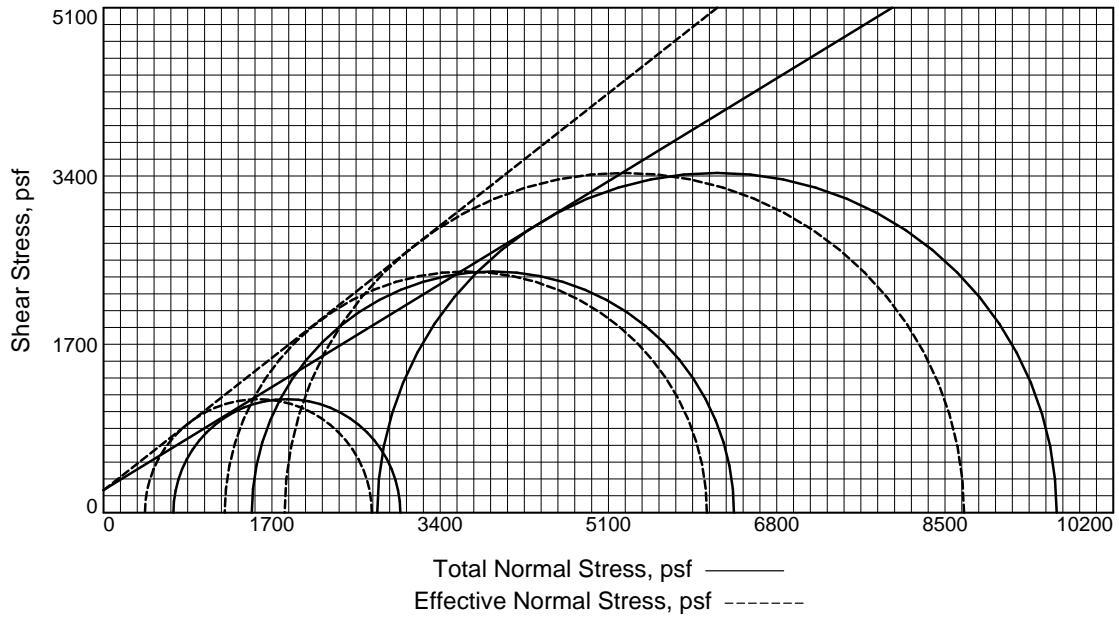
Source of Sample: SGTP-4 @6.0', SGTP-3 @6.0', and SGTP-5 @9.0' mixed composite

Project No.:

Figure _____

Piedmont Engineering, Inc.

TRIAXIAL SHEAR TEST REPORT



Type of Test: CU with Pore Pressures

Sample Type:

No.	Fluid Press. psf		Fail. Stress, psf		Ult. Stress, psf		Principal Stresses at Failure psf	
	Cell	Back	Deviator	Excess Pore Pressure	Deviator	Excess Pore Pressure	$\bar{\sigma}_1$	$\bar{\sigma}_3$
1	13723	13018	2292	288			2709	418
2	14544	11779	6863	936			8692	1829
3	13133	11635	4871	274			6095	1224

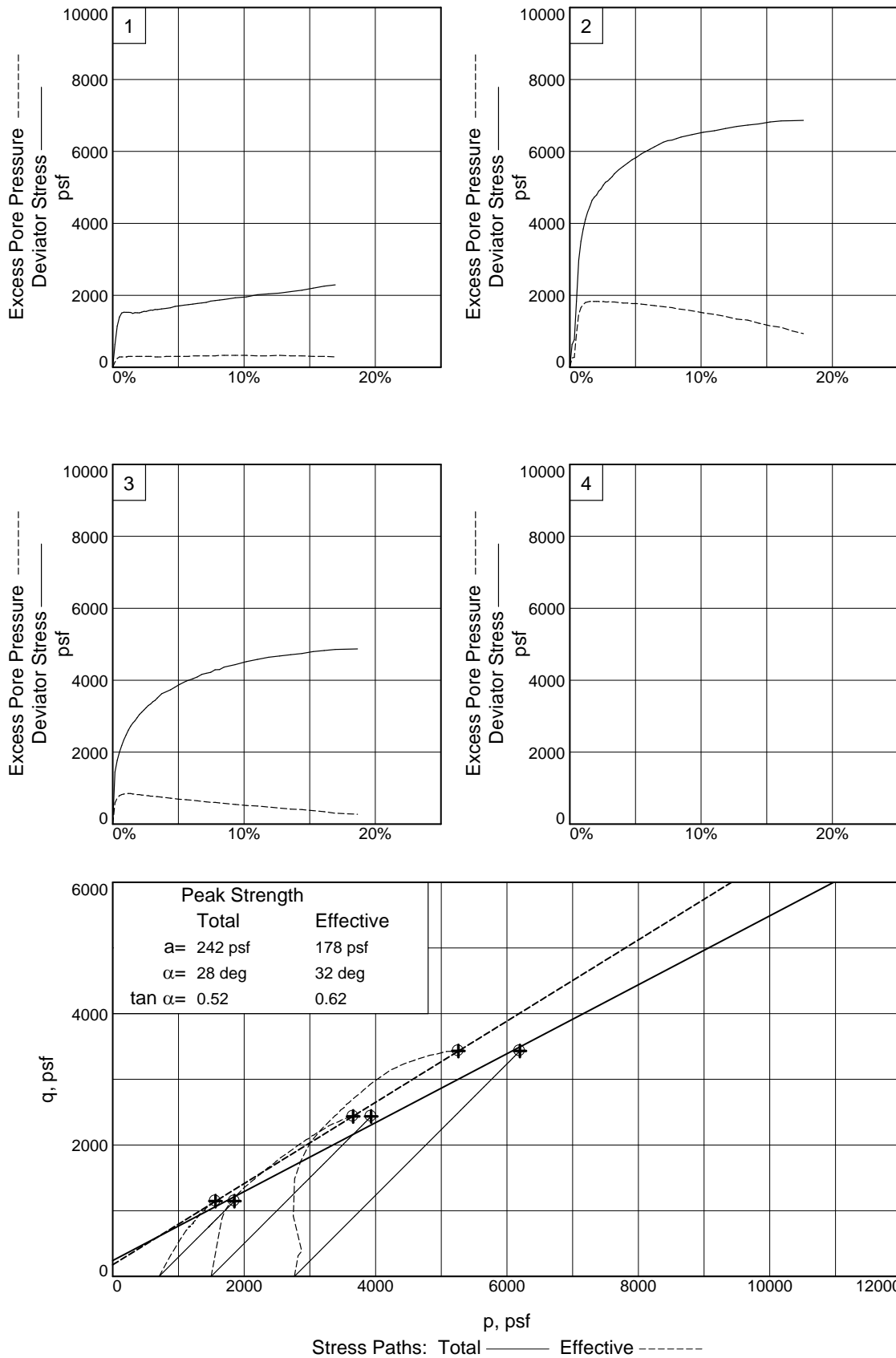
No.	Consolidated Sample Parameters						
	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in.	Height in.	Strain Rate in/min.
1	16.8	119.9	99.9%	0.4783	2.80	5.90	0.01
2	16.8	118.5	99.9%	0.4703	2.80	5.90	0.01
3	17.5	119.7	99.5%	0.5071	2.80	5.90	0.01

Mohr-Coulomb Strength Parameters	Material Description												
<table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: center;">Total</td> <td style="text-align: center;">Effective</td> </tr> <tr> <td>Strength intercept, c=</td> <td style="text-align: center;">228 psf</td> <td style="text-align: center;">226 psf</td> </tr> <tr> <td>Friction angle, ϕ =</td> <td style="text-align: center;">31 deg</td> <td style="text-align: center;">38 deg</td> </tr> <tr> <td>Tangent, ϕ =</td> <td style="text-align: center;">0.61</td> <td style="text-align: center;">0.79</td> </tr> </table>		Total	Effective	Strength intercept, c=	228 psf	226 psf	Friction angle, ϕ =	31 deg	38 deg	Tangent, ϕ =	0.61	0.79	
	Total	Effective											
Strength intercept, c=	228 psf	226 psf											
Friction angle, ϕ =	31 deg	38 deg											
Tangent, ϕ =	0.61	0.79											

<p>Client: Terragraphics</p> <p>Project: UBMC</p> <p>Source of Sample: SGTP-9 @9.0' and SGTP-7 @12.0'</p>	<p>Date Sampled:</p> <p>File: SHAVEG₁</p> <p>Remarks: Specific Gravity Assumed</p>
<p>TRIAXIAL SHEAR TEST REPORT PIEDMONT ENGINEERING, INC. 1215 Apple's Way - Belgrade, MT 59714</p>	<p>Proj. No.:</p> <p>Figure _____</p>

Specific Gravity is Assumed

Specific Gravity is Assumed



Client: Terragraphics
Project: UBMC
Source of Sample: SGTP-9 @9.0' and SGTP-7 @12.0'
Project No.: _____ **Figure** _____

Piedmont Engineering, Inc.

Piedmont Engineering, Inc.
1215 Apple's Way
Belgrade, MT 59714
406-388-8578

Water Content Determination

Project: Shave Gulch/Paymaster

Client: Terragraphics

Tested by: NKG

Sample I.D.	09-SGBH-1	09-SGBH-1	09-SGBH-1	09-SGBH-1	09-SGBH-1	
Sample Interval	0-2'	8-10'	10-12'	14-16'	24-26'	
container no						
wt cup + wet soil (g)	182.96	195.20	259.31	190.28	258.88	
wt cup + dry soil (g)	168.64	168.84	230.56	176.28	237.83	
wt of cup (g)	27.94	27.06	32.86	25.99	33.71	
wt dry soil (g)	140.70	141.78	197.70	150.29	204.12	
wt water (g)	14.32	26.36	28.75	14.00	21.05	
water content %	10.18	18.59	14.54	9.32	10.31	

Sample I.D.	09-SGBH-2	09-SGBH-2	09-SGBH-2	09-SGBH-2	09-SGBH-2	
Sample Interval	0-2'	2-4'	6-8'	10-12'	14-16'	
container no						
wt cup + wet soil (g)	131.04	278.89	231.93	327.35	200.65	
wt cup + dry soil (g)	123.98	258.52	221.58	292.04	184.58	
wt of cup (g)	25.59	34.07	27.76	33.72	28.35	
wt dry soil (g)	98.39	224.45	193.82	258.32	156.23	
wt water (g)	7.06	20.37	10.35	35.31	16.07	
water content %	7.18	9.08	5.34	13.67	10.29	

Sample I.D.	09-PMBH-1	09-PMBH-1				
Sample Interval	0-2'	4-5'				
container no						
wt cup + wet soil	184.42	196.50				
wt cup + dry soil	172.24	180.90				
wt of cup	23.17	32.23				
wt dry soil	149.07	148.67				
wt water	12.18	15.60				
water content %	8.17	10.49				

Sample I.D.	09-PMBH-2	09-PMBH-2	09-PMBH-2	09-PMBH-2		
Sample Interval	0-2'	4-6'	8-10'	14-14.5'		
container no						
wt cup + wet soil	144.33	195.39	183.82	221.74		
wt cup + dry soil	139.21	177.00	162.32	187.68		
wt of cup	27.45	33.83	21.63	33.82		
wt dry soil	111.76	143.17	140.69	153.86		
wt water	5.12	18.39	21.50	34.06		
water content %	4.58	12.84	15.28	22.14		

Piedmont Engineering, Inc.
1215 Apple's Way
Belgrade, MT 59714
406-388-8578

Water Content Determination

Project: Shave Gulch/Paymaster

Client: Terragraphics
 Tested by: NKG

Sample I.D.	09-PMBH-4					
Sample Interval	2-4'					
container no						
wt cup + wet soil (g)	295.22					
wt cup + dry soil (g)	284.05					
wt of cup (g)	33.25					
wt dry soil (g)	250.80					
wt water (g)	11.17					
water content %	4.45					

Sample I.D.	09-PMBH-5	09-PMBH-5				
Sample Interval	14-16'	16-18'				
container no						
wt cup + wet soil (g)	101.86	206.40				
wt cup + dry soil (g)	87.35	166.79				
wt of cup (g)	13.51	33.86				
wt dry soil (g)	73.84	132.93				
wt water (g)	14.51	39.61				
water content %	19.65	29.80				

Sample I.D.	09-PMBH-6					
Sample Interval	2-4'					
container no						
wt cup + wet soil	143.18					
wt cup + dry soil	127.50					
wt of cup	15.19					
wt dry soil	112.31					
wt water	15.68					
water content %	13.96					

Sample I.D.	09-PMBH-7	09-PMBH-7	09-PMBH-7	09-PMBH-7		
Sample Interval	12-12.75'	0-2'	4-6'	8-10'		
container no						
wt cup + wet soil	116.20	146.59	171.97	152.84		
wt cup + dry soil	99.68	139.28	151.80	123.48		
wt of cup	18.85	27.85	27.76	27.44		
wt dry soil	80.83	111.43	124.04	96.04		
wt water	16.52	7.31	20.17	29.36		
water content %	20.44	6.56	16.26	30.57		

Piedmont Engineering, Inc.
1215 Apple's Way
Belgrade, MT 59714
406-388-8578

Water Content Determination

Project: Shave Gulch/Paymaster

Client: Terragraphics
 Tested by: NKG

Sample I.D.	09-PMBH-8	09-PMBH-8	09-PMBH-8			
Sample Interval	4-6'	8-10'	12-14'			
container no						
wt cup + wet soil (g)	250.69	199.78	94.76			
wt cup + dry soil (g)	230.01	181.07	88.41			
wt of cup (g)	34.05	27.14	15.86			
wt dry soil (g)	195.96	153.93	72.55			
wt water (g)	20.68	18.71	6.35			
water content %	10.55	12.15	8.75			
Sample I.D.	09-PMBH-9	09-PMBH-9				
Sample Interval	2-4'	4-6'				
container no						
wt cup + wet soil (g)	102.47	153.18				
wt cup + dry soil (g)	86.11	132.16				
wt of cup (g)	14.44	22.97				
wt dry soil (g)	71.67	109.19				
wt water (g)	16.36	21.02				
water content %	22.83	19.25				

Tom Smith
TerraGraphics Environmental Engineering
302 N Last Chance Gulch Ste 409
Helena, MT 59601

Project: 13715 - Upper Blackfoot Density Testing
Inspector: S Whitford
Inspection Date: 9-18-09


As requested, Pioneer Technical Services performed on-site density testing in accordance with current applicable standards. Minimum compaction is **not required**. The results obtained are as follows:

Test	Location	Wet Density	Percent Moisture	Dry Density
1	09-SG-TP-7	103.6	7.2	96.6
2	09-SG-TP-7	111.8	14.7	97.4
3	09-SG-TP-3	105.6	13.9	92.7
4	09-SG-TP-3	109.9	20.6	91.1
5	09-SG-TP1	115.7	13.2	102.2
6	09-SG-TP-1	100.0	22.0	82.0
7	09-PM-TP-7	114.9	8.1	106.3
8	09-PM-TP-7	112.1	25.3	89.5
9	09-PM-TP-8	115.8	9.9	105.3
10	09-PM-TP-1	112.9	11.5	101.1
11	09-PM-TP-10	109.6	11.9	97.9
12	09-PM-TP-10	106.6	10.0	96.9
13	09-PM-TP-9	123.1	11.5	110.4
14	09-PM-TP-9	113.3	7.0	105.9


Contractor requested Pioneer Technical Services (PTS) take in-place density tests on native soil at a variety of test locations. PTS arrived on site and met with Contractor. PTS conducted tests at locations specified by Contractor. Percent compaction results were not required.

If you have any questions concerning this report (13715 001n 9-18), please call us at (406) 443-6053.

Respectfully submitted,
PIONEER TECHNICAL SERVICES



Patrick Henry
Construction Field Testing Supervisor



Todd Lorenzen, P.E.
Sr. Geotechnical Engineer

ANACONDA

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Fax (406) 442-1158



201 East Broadway, Suite C
Helena, Montana 59601
Phone (406)157 8252 Fax (406)442 1158
www.pioneer-technical.com

FAX

To: Tom Smith From: Steve Whelford
Company: _____ Pages w/cover: 3
Fax #: 441 5443 Date: 9-24-09

Urgent For Review Please Comment For Your Action Hard copy to follow by mail

*In place density results
Typed results will be sent later*



IN-PLACE NUCLEAR DENSITY
 TEST REPORT

1062

Date: 9-18-09 Job Number: 13715 Project Name: Make House
 Contractor Name: _____ Permit Number: _____
 Inspector Name: Steve Whitford Weather: _____
 % Compaction Req'd: N/A Gauge #: _____
 Mat'l Source: Nature Subgrade Mat'l Description: Nature

Test Number	Probe Depth	Wet Density	Percent Moisture	Dry Density	Maximum Density	Optimum Moisture	Percent Compaction
# -1		103.6	7.2	96.6			
Location:	<u>09-SG-TP-7</u>						<u>2' Below Grade</u>
# -2		111.8	14.7	97.4			
Location:	<u>09-SG-TP-7</u>						<u>6' " "</u>
# -3		105.6	13.9	92.7			
Location:	<u>09-SG-TP-3</u>						<u>3' " "</u>
# -4		109.9	20.6	91.1			
Location:	<u>09-SG-TP-3</u>						<u>6' " "</u>
# 5		115.7	13.2	102.2			
Location:	<u>09-SG-TP-1</u>						<u>3' " "</u>
# -6		100.0	22.0	82.0			
Location:	<u>09-SG-TP-1</u>						<u>6' " "</u>
# -7		114.9	8.1	106.3			
Location:	<u>09-PM-TP-7</u>						<u>2' " "</u>
# -8		112.1	25.3	89.5			
Location:	<u>09-PM-TP-7</u>						<u>6' " "</u>
# -9		115.8	9.9	105.3			
Location:	<u>09-PM-TP-8</u>						<u>1 1/2' " "</u>
# -10		112.9	11.5	101.1			
Location:	<u>09-PM-TP-1</u>						<u>3' " "</u>



IN-PLACE NUCLEAR DENSITY
 TEST REPORT

202

Date: 9-18-09 Job Number: 13715 Project Name: Make House
 Contractor Name: _____ Permit Number: _____
 Inspector Name: Steve Whitford Weather: _____
 % Compaction Req'd: N/A Gauge #: _____
 Mat'l Source: Nature Subgrade Mat'l Description: _____

Test Number	Probe Depth	Wet Density	Percent Moisture	Dry Density	Maximum Density	Optimum Moisture	Percent Compaction
# <u>-11</u>		<u>109.6</u>	<u>11.9</u>	<u>97.9</u>			
Location:	<u>09-PM-TP-10</u>						<u>4' Below Grade</u>
#		<u>106.6</u>	<u>10.0</u>	<u>96.9</u>			
Location:	<u>09-PM-TP-10</u>						<u>1 1/2' " "</u>
#		<u>123.1</u>	<u>11.5</u>	<u>110.4</u>			
Location:	<u>09-PM-TP-9</u>						<u>5' " "</u>
#		<u>113.3</u>	<u>7.0</u>	<u>105.9</u>			
Location:	<u>09-PM-TP-9</u>						<u>2' " "</u>
#							
Location:							
#							
Location:							
#							
Location:							
#							
Location:							
#							
Location:							

Appendix G: Data Validation Report

APPENDIX G - SAMPLE DATA VALIDATION REPORT

1. Introduction

- This validation applies to the following number of samples collected and analyses conducted for the Upper Blackfoot Mining Complex project that occurred in August - November 2009:
 - Seventy-five (75) soil samples and 35 water samples were analyzed for the analytes listed in Tables 1 and 2. The analytical methods used for each analyte are also presented in Tables 1 and 2. Table 3 provides a list of laboratory report numbers and the number of samples in each report. All samples were analyzed by Pace Analytical Services (Pace Analytical).

Table 1 Soil Sample Analytes and Analytical Methods

Analyte	Analytical Method
Acid Potential	Modified Sobek 7
Acid/Base Potential	Modified Sobek 7
Aluminum	EPA 6010; 6020
Arsenic	EPA 6010; 6020
Cadmium	EPA 6010; 6020
Copper	EPA 6010; 6020
Iron	EPA 6010; 6020
Lead	EPA 6010; 6020
Lime Requirement	Modified Sobek 7
Manganese	EPA 6010; 6020
Mean Total Organic Carbon	EPA 9060 Modified
Neutralization Potential	Modified Sobek 7
pH, Saturated Paste	ASA 103.2
SMP Buffer pH	Modified Sobek 7
SMP Lime Requirement	Modified Sobek 7
Sp.Conductance Saturated Paste	ASA 10-3.3
Sulfur	LECO
Sulfur, HCl Extractable	Modified Sobek 7
Sulfur, HNO3 Extractable	Modified Sobek 7
Sulfur, Hot Water Extractable	Modified Sobek 7
Sulfur, Residual	Modified Sobek 7
Total Organic Carbon	EPA 9060 Modified
Zinc	EPA 6010; 6020
Total Inorganic Carbon	EPA 9060 Modified

Table 2 Water Sample Analytes and Analytical Methods

Analyte	Analytical Method
Aluminum	EPA 200.8
Aluminum, Dissolved	EPA 200.8
Arsenic	EPA 200.8
Arsenic, Dissolved	EPA 200.8
Cadmium	EPA 200.8
Cadmium, Dissolved	EPA 200.8

Calcium, Dissolved	EPA 200.8
Copper	EPA 200.8
Copper, Dissolved	EPA 200.8
Iron	EPA 200.8
Iron, Dissolved	EPA 200.8
Lead	EPA 200.8
Lead, Dissolved	EPA 200.8
Magnesium, Dissolved	EPA 200.8
Manganese	EPA 200.8
Manganese, Dissolved	EPA 200.8
Potassium, Dissolved	EPA 200.8
Sodium, Dissolved	EPA 200.8
Total Hardness by 2340B, Dissolved	EPA 200.8
Zinc	EPA 200.8
Zinc, Dissolved	EPA 200.8
Chloride	EPA 300.0
Sulfate	EPA 300.0
Acidity	SM 2310
Alkalinity, Carbonate (CaCO3)	SM 2320B
Alkalinity, Total as CaCO3	SM 2320B
Alkalinity, Bicarbonate (CaCO3)	SM 2320B
Specific Conductance	SM 2510B
Total Dissolved Solids	SM 2540C
Total Suspended Solids	SM 2540D
pH at 25 Degrees C	SM 4500-H+B

Table 3 Samples Evaluated in this Report

Pace Project No.	Sites Tested	No. of Samples	Matrix
10111520	Mike Horse	10	Surface water
10111632	Mike Horse	8	Groundwater
10112793	Mike Horse & Paymaster	20	Soil
10112795	Mike Horse & Paymaster	21	Soil
10113726	Mike Horse, Paymaster, & Shave Gulch	20	Soil
10113729	Shave Gulch	9	Soil
10116045	Mike Horse & Paymaster	5	Soil
10117717	Mike Horse	9	Surface water
10117719	Mike Horse	8	Groundwater

There were three field soil duplicates collected, one for each site tested. There were no rinsate blanks, but four field blanks and four water duplicates were collected for the two groundwater and surface water events.

- Validation procedures used are consistent with USEPA CLP National Functional Guidelines for Inorganic Data Review (USEPA 2004) and the *Final Sampling and Analysis Plan / Project Assurance Plan for the Groundwater and Surface Water*

Monitoring and Soil and Tailings Sampling at the Upper Blackfoot Mining Complex (SAP/QAPP) (MDEQ 2009).

- Overall level of validation:
 Contract Laboratory Program (CLP)
 Standard
 Visual
Data were reviewed in accordance with the SAP/QAPP.

2. Deliverables

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), USEPA 2007b, and/or the project contract.
 Yes
 No
- All documentation of field procedures was provided as required.
 Yes
 No

3. Condition of Samples Upon Receipt

- There were no concerns with the condition of samples upon receipt, except for the following:
 - Pace Analytical noted that improper containers/bottles were used in soil sample projects 10112795, 10113726, and 10113729, and noted that plastic bags were used; however, the SAP/QAPP states that heavy-duty polyethylene bags may be used for soil samples. Pace Analytical also supplied polyethylene sample bags.
 - The laboratory noted that in project report 10111520 the sample time on the chain of custody (COC) did not match those on the bottles, and in project report 10117717, a sample date differed between the COC and a sample bottle. The dates and times were reconciled in the project's data set and checked with field personnel.
 - Sample 09-MHTP5-51/2 was not received in project report 10112793, as stated on the COC. That sample had been removed from the cooler due to size and weight restrictions and was delivered to the laboratory with another shipment.

4. Field Quality Control Samples

Blanks: Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

DI, trip, rinsate, or any other field blanks have been carried out at the proper frequency.

Yes for water samples.

No for field blanks or rinsate blanks for soil samples.

___ NA

Field blanks have been carried out at the proper frequency for water samples. No field blanks were collected for soil samples, as required in the SAP/QAPP. No rinsate blanks were collected for either water or soil samples, although they were not specified in the SAP/QAPP. The lack of field and rinsate blanks makes it difficult to evaluate whether samples may have been affected by contaminants from other sources (i.e., water used for decontamination or cross-contamination); however, no action was taken to qualify data.

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.

___ Yes

X No

The field blank in report 10111520 was above the reporting limit of 7.0 mg/L for alkalinity, bicarbonate and total hardness as CaCO₃ (7.6 mg/L). The associated samples were not qualified as their results were more than five times the value of the field blank.

The field blank in report 10111632 was above the laboratory reporting limits of 1.0 mg/L for dissolved sodium (2.5 mg/L), 1.0 mg/L for total hardness by 2340B (1.3 mg/L), and 5.0mg/L for alkalinity, bicarbonate and total hardness as CaCO₃ (5.6 mg/L). All samples in that report were qualified for dissolved sodium, as they were less than five times the concentration detected in the field blank. Those that were less than the CRQL of 5.0 mg/L were changed to 5.0 mg/L and qualified as below detection; one sample was above the CRQL, but below the blank action level; it was qualified as below detection. Samples were not qualified for the other analytes detected in the field blank, as results were more than five times the concentrations detected in the field blank or were below detection limits.

The field blank result for total dissolved solids in report 10117717 was above the reporting limit of 22.0 mg/L (86.0 mg/L). Seven results were qualified as estimates because they were less than five times the field blank concentration. The field blank also had a result for total suspended solids of 1.4 mg/L (reporting limit 0.97 mg/L); three results were less than five times the field blank concentration and were qualified as estimates.

The field blank in report 10117719 was above the reporting limit of 7.0 mg/L for alkalinity, bicarbonate and total hardness as CaCO₃ (7.3 mg/L). The associated samples were not qualified as their results were more than five times the value of the field blank.

- **Field duplicates**

Field duplicates have been collected at the proper frequency.

- Yes
- No
- NA

Field duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less).

- Yes
- No
- NA

In report 10117719, the field duplicate RPD for copper was greater than 20%; associated samples were qualified as estimates. In report 10117717, the field duplicate RPD for dissolved manganese was greater than 20%; associated samples were qualified as estimates. In report 1011520, the field duplicate RPD was greater than 20% for dissolved lead, and samples were qualified as estimates. The duplicate samples for soil matrices were evaluated; however, results were not qualified due to the likelihood of field variability.

5. Laboratory Procedures

- **Laboratory procedures followed**

- CLP-SOW
- SW-846
- Methods for Chemical Analysis of Water and Wastes
- XRF Standard Operating Procedures
- Other

Tables 1 and 2 detail the analytical methods used.

- **Holding times met**

- Yes
- No

All holding times were met except for SM4500-H+B in reports 10111520, 10111632, 10117717, and 10117719. Analysis was initiated more than 15 minutes after sample collection. A comparison to the measurements recorded in the field indicated that the results were not affected, and no data were qualified.

- **Consistency with project requirements**

Analyses were carried out as requested.

- Yes
- No

Project specified methods were used.

- Yes
- No
- NA

As agreed upon in an email from Shellie Haaland to Chris Norman at Pace Analytical on 9/9/2009, the following changes were made to the reporting limits and analyses specified in the SAP/QAPP:

Groundwater analytical requirements:

- PQL for manganese was changed from 0.000001 mg/L to 0.005 mg/L.
- Method for alkalinity, carbonate and bicarbonate was changed from USEPA 310.1 to 300.0
- PQL for sulfate was changed from 1.0 mg/L to 5.0 mg/L.
- Method for cations was changed from USEPA 200.7 to 200.8.
- Method for hardness (total as CaCO₃) was changed from SM 2340B to 2320B.

Surface water analytical requirements:

- Method for pH was changed from USEPA 150.0 to 4500-pH-H
- Method for total suspended solids was changed from USEPA 160.2 to SM 2540D.
- Method for acidity was changed from USEPA 305.1 to SM 2310.
- Method for sulfate was changed from USEPA 375.2 to 300.0.

Soil analytical requirements:

- USEPA 9060 modified was used for total organic/inorganic carbon instead of ASA 29-3.3.

6. Detection Limits

- Reporting detection limits met project required detection limits (PRDLs).
 - Yes
 - No
 - NA

7. Laboratory Blanks

- **Preparation blanks**
 - Preparation blanks were prepared and analyzed at the required frequency.
 - Yes
 - No
 - All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).
 - Yes
 - No

The following analytes were detected in a method blank, and results were evaluated as follows. The blank action level is defined as five times the

highest concentration detected in a blank. When a project detection limit was not specified in the SAP/QAPP, the CRQL from USEPA CLP-SOW was used (USEPA 2007).

Report 10113726:

Method 6010, zinc: four results were less than the blank action level, but were greater than the CRQL. Those results were qualified as below detection.

Report 10112795:

Method 6010, lead: twelve sample results were less than the blank action level and less than the CRQL; these results were changed to 0.01 mg/L (the CRQL) and qualified as below detection. Zinc: two sample results were less than the blank action level and greater than the CRQL; these were qualified as non-detects. One sample result was less than the blank action level and less than the CRQL; this result was reported as the 0.06 mg/L (the CRQL) and qualified as below detection limit. Manganese: all sample results were greater than the blank action level and were not qualified.

Method 6020, lead: all sample results were greater than the blank action level and were not qualified. Zinc: the blank action level (39.5 mg/kg) was greater than the CRQL (6 mg/kg). Re-digestion and reanalysis was not done, as suggested in USEPA guidance (USEPA 2004). All sample results were greater than 39.5, so the samples were qualified as estimates. Reported results may be higher than actual results.

Report 10113729:

Method 6010, arsenic and zinc: all sample results were greater than the blank action level and were accepted. Manganese: the blank result of 0.31 mg/L is greater than the CRQL of 0.015 mg/L. All sample results were qualified as estimates, and results may be high.

Method 6020, lead and manganese: all sample results were greater than the blank action level and were accepted.

Report 10116045:

Method 6010, arsenic: two samples were below the reporting limit; those results are reported as 0.0089 mg/L (the concentration detected in the blank) and are qualified as below detection. The three other samples were less than the blank action level and were qualified as below detection. Manganese: one sample result was below the blank action level and below the CRQL; its result was raised to the CRQL and reported as below detection. Zinc: two results were less than the blank action level, but greater than the CRQL; these samples were qualified as below detection.

Method 6020, lead: no samples were qualified as their results are all greater than the blank action level.

Report 10117717

Total dissolved solids; all sample results were greater than the blank action level, except for the field blank, which was qualified as an estimate.

8. Laboratory Matrix Spikes

- A matrix spike sample (pre-digestion) was prepared and analyzed at the required frequency.

Yes
 No

The frequency requirements for laboratory quality control samples (one per sample event) were generally met, with the exception of analytical reports 10111520 and 10111632. According to the SAP/QAPP, “all QC measurements and data assessment for this project will be conducted on samples from and within batches of samples from this project alone; in other words, no ‘other project’ samples will be used with samples from this project for assessment of data quality” (MDEQ 2009).

In report 10111520, method 2540C, no MS/MSD samples were prepared with a sample from the batch. In batch 10111632, method USEPA 200.8, no MS/MSD samples were prepared with a sample from the batch. Sample results for these analyses and batches were evaluated by using other available QC measurements; quality control data reported using “other project” samples was not used during data verification and validation.

The laboratory was informed of the requirement and samples analyzed after these first two were consistent with the SAP/QAPP requirements, with the exception of report 10116045, method 6020, which did not have a MS sample prepared from a sample from this project. Sample results for this batch were evaluated by using other available QC measurements.

- Samples were spiked at levels appropriate to the sample concentrations.

Yes
 No

In general, samples were spiked at levels appropriate to the sample concentrations. Table 4 shows the analyses and reports where a matrix spike or MSD sample was out of required control limits, but was not spiked with appropriate levels (where parent sample concentration is more than four times the spiked concentration added.)

Table 4 Analytical Reports with MS/MSD Spiked at Inappropriate Levels

Method	Analyte	Analytical Report			
6020	Aluminum	10113726	10112795	10112793	10113729
	Cadmium	10113726			
	Copper	10113726			10113729
	Iron	10113726	10112795	10112793	10113729
	Lead	10113726			10113729
	Manganese	10113726	10112795	10112793	10113729
	Zinc	10113726	10112795	10112793	10113729
6010	Iron	10113729			
200.8	Aluminum	10117719			
	Iron	10117719			
	Manganese	10117719	10111520		
200.8 dissolved	Calcium	10117719	10117717	10111632	10111520
	Magnesium	10117719	10111520		

- Matrix spike recoveries were within the required control limits (75-125%).

Yes
 No

Matrix spike recoveries were within the required control limits for all analyses and batch numbers, except the following:

- 10112795: results were qualified due to high and low percent recoveries; method 9060, results were qualified as estimates due to high percent recoveries for method 6020 (As, Cu, Pb) and method 6010 (Al).
- 10113726: results were qualified as estimates due to low percent recovery for method 9060; results were qualified as estimates due to high percent recoveries for method 6020 (As), and method 6010 (Al).
- 10113729: results are considered estimates due to low percent recovery for method 9060; results are considered estimates due to high percent recovery with method 6010 (As)
- 10112793: results were qualified due to low recoveries with method 9060 and results were qualified due to high recoveries with method 6020 (As, Cu); and
- 10111520: results were qualified due to high recovery with method 200.8 (Al, Fe).

9. Laboratory Duplicates

- Laboratory duplicate samples were analyzed at the proper frequency.

Yes
 No

The frequency requirements for laboratory quality control samples (one per sample event) were generally met, with the following exceptions:

- In report 10111520, no MSD or duplicate samples were prepared with a sample from the batch for the following analyses: 2540C, USEPA 200.8, USEPA 200.8 dissolved, and SM2320B.
- In report 10111632, no MSD samples were prepared with a sample from the batch for USEPA 200.8 or USEPA 200.8, dissolved. There was no duplicate sample from the batch analyzed for 2510B, and the duplicate analyzed for 300.0 ICAnions was the field blank.
- In report 10116045, no MSD or duplicate samples were prepared from a sample within the batch and analyzed with method USEPA 6020.
- In report 10117717, no MSD or duplicate samples were prepared from within the batch and analyzed with method USEPA 200.8.

Sample results for these analyses and batches were evaluated by using other available QC measurements; quality control data reported using “other project” samples was not used during data verification and validation.

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less).

Yes
 No

Laboratory duplicate RPDs exceeded required control limits in the following reports and analyses:

10112795: method 9060, method ASA 10-3.3
10113726: method 9060
10113729: method ASA 10-3.3
10112793: method ASA 10-3.3
10111520: method SM 2540D

All associated samples were qualified following current USEPA guidance (USEPA 2004).

10. Laboratory Control Standards

- The reference material used was of the correct matrix and concentration, according to Pace Analytical.

Yes
 No

- Laboratory control samples (LCSs) were prepared and analyzed at the proper frequency.

Yes
 No

- LCSs were prepared in the same way as the associated samples, according to Pace Analytical.

Yes

No

- LCS recoveries were within the required control limits.

Yes

No

11. Additional Data Evaluation

The following samples were qualified in report 10113726 for the reasons described:

- 10113726002 and 10113726016, method 6020: aluminum, iron, and manganese were considered estimates because an internal recovery standard was out of range.
- 10113726008, method 6020: manganese, lead, and zinc were considered estimates because their results were above calibration range.
- 10113726004, method 6020: manganese exceeded the calibration range and was considered an estimate.

12. Data Quality Objectives

- Project data quality objectives (DQO's) met.

Yes

No

NA

QC criteria for precision and accuracy were used to assess and qualify data. Based on this assessment, no results were rejected, meeting the target goal of 95% completeness for the project.

DATA VALIDATION REPORT

Prepared by: Mara Moscato

Reviewed by: Susan Spalinger

References

Montana Department of Environmental Quality (MDEQ). Final Sampling and Analysis Plan/Quality Assurance Project Plan for Groundwater and Surface Water Monitoring and Soil and Tailings Sampling at the Upper Blackfoot Mining Complex Lewis and Clark County, Montana. Prepared by TerraGraphics Environmental Engineering, August 10, 2009.

USEPA. 2004. Final USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. USEPA 540-R-04-004. October 2004.

USEPA. 2007. USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis: Multi-Media, Multi-Concentration (ILM05.4). USEPA 540-FS-07-004. January.

USEPA. 2007b. Third Edition of SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, as amended by Final Updates I, II, IIA, IIB, III, IIIA, IIIB, and IV; February.

Appendix H: Field Notes

Surface Water Field Sampling Notes (Aug & Nov 09)

Groundwater Field Sampling Notes (Aug & Nov 09)

Mike Horse Dam Toe Test Pitting Field Notes

Mike Horse Road Test Pitting Field Notes

Paymaster Test Pitting Field Notes

Shave Gulch Test Pitting Field Notes

Paymaster & Shave Gulch Drilling Field Notes

Impoundment & Drainage Test Pitting Field Notes

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Moscow --- Kellogg --- Boise --- Spokane --- Helena ~~X~~

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-22 & 22A (DUP)</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION: <u>MIKE HORSE CREEK</u>	WEATHER: <u>SUNNY ~80 BREEZY</u>
DATE: <u>8/28/09</u> TIME: <u>4:55</u>	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>7.98</u>	<u>17.75</u>	<u>323.3</u>	<u>1.50</u>		<u>169</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-22&22A</u>			<u>BRSW-22&22A</u>	<u>BRSW-22&22A</u>
Time	<u>5:07 5:10</u>			<u>5:07 5:10</u>	<u>5:30 5:31</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>250 L Poly</u>	<u>250 L Poly</u>

Other Analytes*:

	<u>SO4, Cl, pH, EC, ACIDITY</u>	<u>ACIDITY</u>			
Sample ID	<u>BRSW-22&22A</u>	<u>BRSW-22&22A</u>			
Time	<u>5:07 5:10</u>	<u>5:07 5:10</u>			
Preservative	<u>NONE</u>	<u>NONE</u>			
Filtered?	<u>Yes / (No)</u>	<u>Yes / (No)</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container					

Streambank Description: GRAVEL, SANDS, COBBLES, BOULDERS - STEEP
 Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):
 Stream-bed Description: GRAVEL & COBBLES W/ BROWN FE FLOCCULANT COATINGS
 Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):
 Velocity (ft/sec):
 Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: UBMC
BRSW-22

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: 5:14

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	4"						
1	6"	SLOPED ROCK	CANT MEASURE V				
2	8"	.	0.2		0.45		
3	10"		0.2		0.26		
4	12"		.2		0.23		
5	14"		.2		0.2		
6	16"		.2		.16		
7	18"		.2		.02 rock		
8	20"		.1		.08		
9	22"		.1		.03 .03		
10	24"		<0.1				
11	26"		<0.1				
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	27"						

Total Flow:

Comments:

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena ~~X~~

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: BRSW-38
PROJECT NUMBER: 09208	SAMPLE NUMBER: 38A IS FIELD BLANK
LOCATION: UBMC	WEATHER: SUNNY LOW 80's LT BREEZE
DATE: 8/28/09 TIME: 6:25	SAMPLERS: Tom Smith

7:00

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
7.45	13.12	275.8	1.65		152

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-38			BRSW-38	BRSW-38
Time	6:20			6:20	6:52
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	1 L Poly	1 L Poly

Other Analytes*:

	SO ₄ , Cl, PH, etc, AL, B, Cu, Fe, Mn, Ni, Pb, Zn				
Sample ID	BRSW-38	BRSW-38			
Time	6:20	6:20			
Preservative	NONE	NONE			
Filtered?	Yes / (No)	Yes / (No)	Yes / No	Yes / No	Yes / No
Container	250 mL	250 mL			

Streambank Description: STEEP GRAVEL & TAILINGS CUT

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: GVL & COBBLES, DK ORANGE Fe FLOCCULANT COATINGS

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: UBMC BRSW-30

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: 6:26

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	8 12"						
1	17.5		.15		0.13		
2	23"		.35		.05		
3	28.5"		.4		.31		
4	34"		.3		.35		
5	39.5"		.4		.6		
6	45"		.3		1.59		
7	50.5"		.2		1.78		
8	56"		.2		1.48		
9	61.5"		.2		1.26		
10	67"		.15		.74		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	67"						

Total Flow:

Comments:

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena --- X

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: BRSW-2
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION:	WEATHER: SUNNY 80's
DATE: 8/28/09 TIME:	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
8.5	19.31	405.9	1.14		140

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-2			BRSW-2	BRSW-2
Time	11:57			11:57	12:10
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250ml L Poly	250ml L Poly

Other Analytes*:

	SO ₄ , Cl, PH, EC ACIDITY	ALKALINITY TDS			
Sample ID	BRSW-2	BRSW-2			
Time	11:57	11:57			
Preservative	NONE	NONE			
Filtered?	Yes / <u>No</u>	Yes / <u>No</u>	Yes / No	Yes / No	Yes / No
Container	250ml	250ml			

Streambank Description: _____

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe): _____

Stream-bed Description: TAILINGS

Water Quality Description (i.e. cloudy, odor, etc.): MOSTLY CLEAR, SLIGHT TAN HUE

FLOW MEASUREMENTS: - NO FLOW IN IMPOUNDMENT, WATER IS STAGNANT

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena X

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: BRSW-1
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION: BRSW-1 IN DIVISION DITCH	WEATHER: SUNNY LT BREEZE 70°
DATE: 8/28/09 TIME: 10:12	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
8.01 8.01	6.98	202.8	1.94		102

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-1			BRSW-1	BRSW-1
Time	10:12			10:12	10:58
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250 L Poly	250 L Poly

Other Analytes*:

	ACIDITY SO ₄ , Cl, H ₂ O	ALKALINITY TDS	TSS		
Sample ID	BRSW-1	BRSW-1			
Time	10:12	10:12			
Preservative	NONE	NONE			
Filtered?	Yes / <u>No</u>	Yes / <u>No</u>	Yes / <u>No</u>	Yes / No	Yes / No
Container	250 mL	250 mL			

Streambank Description: IN DIVISION DITCH AS CR NOT FLOWING BELOW BERM
Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):
Stream-bed Description: LINED CHANNEL
Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):
 Velocity (ft/sec):
 Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
ENVIRONMENTAL ENGINEERING, INC.

Site: MH DIVERSION DISCH BRSW-1 Gage Reading: 0.38' @ BERM Gage Time: 10:14

Levellogger: Yes / No (circle one) Download Time: _____

Date: 8/28/09 Discharge Time: 10:25

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	29"						
1	26		0.1		0.41		
2	23		0.15		1.21		
3	20		0.2		1.07		
4	17		0.27		1.60		
5	14		0.25		1.66		
6	11		0.2		1.39		
7	9		0.2		1.07		
8	6		0.05		---		
9	3						
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	5"						

Total Flow:

Comments:

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-48</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION: <u>UBMC</u>	WEATHER: <u>SUNNY</u>
DATE: <u>8/28/09</u> TIME:	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>7.82</u>	<u>15.52</u>	<u>255.4</u>	<u>1.68</u>		<u>44</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-48</u>			<u>BRSW-48</u>	<u>BRSW-48</u>
Time	<u>1:02</u>			<u>1:02</u>	<u>1:36</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>250 L Poly</u>	<u>250 L Poly</u>

Other Analytes*:

	<u>SO₄, Cl, PH, EC, ACIDITY</u>	<u>ALKALINITY TDS</u>			
Sample ID	<u>BRSW-48</u>	<u>BRSW-48</u>			
Time	<u>1:02</u>	<u>1:02</u>			
Preservative	<u>NONE</u>	<u>NONE</u>			
Filtered?	<u>Yes / (No)</u>	<u>Yes / (No)</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container	<u>250mL</u>	<u>250mL</u>			

Streambank Description: ROCKY GRAVELS TO BOULDERS

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: SAME AS BANK, COVERED IN ORANGE FE FLOCCULANT

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: BRSW - 48

Gage Reading: _____ Gage Time: 1:10

Levellogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: _____

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft) ₁₀	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	9 ⁰						
1	12"		0.3		0.22		
2	15"		0.3		0.08		
3	18"		.5		1.72		
4	21"		.45		1.2		
5	24		.45		1.12		
6	27		.3		1.6		
7	30		.3		0.6		
8	33		.3		0.67		
9	36		0.3		0.93		
10	39		0.25		1.11		
11	42		0.25		1.62		
12	45		0.1		0.06		
13							
14							
15							
16							
17							
18							
19							
20							
RWE	45"						

Total Flow:

Comments:

TerraGraphics Environmental Engineering, Inc.

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME:
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION: BRSW-23	WEATHER: SUNNY MID 80'S LT BREEZE
DATE: 8/28/09 TIME:	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
8.06	15.05	246.4	1.73		107

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-23			BRSW-23	BRSW-23
Time	2:15			2:15	2:15 48
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250 L Poly	250 L Poly

Other Analytes*:

	SO ₄ , Cl, PH, EC, ALKALINITY, NEGATIVITY	TKN/P/ nitrate+nitrite TDS			
Sample ID	BRSW-23	BRSW-23			
Time	2:15	2:15			
Preservative	NONE	NONE			
Filtered?	Yes / <u>No</u>	Yes / <u>No</u>	Yes / No	Yes / No	Yes / No
Container	250ml	250 ml			

Streambank Description: ~40' DOWNSTREAM OF MH & BT CR CONFLUENCE IN POOLING AREA

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: GVL & COBBLES, DK ORANGE Fe FLOCCULANT COVER ROCKS

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: UBMC BRSW-23

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: 2:27

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	7"						
1	9"		0.15		0.35		
2	14		.2		.17		
3	19		.2		.11		
4	24		.2		.14		
5	29		.3		0.183		
6	34		.4		1.26		
7	39		.3		1.32		
8	44		.3		0.59		
9	49		.25		0.34		
10	54		.2		0.08		
11	59		.1		0.02		
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	5'						

Total Flow:

Comments:

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-3B</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION:	WEATHER: <u>SUNNY MID 80'S BREEZY</u>
DATE: <u>8/28/09</u> TIME: <u>3:48</u>	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>7.20</u>	<u>8.64</u>	<u>280.2</u>	<u>0.86</u>		<u>133</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-3B</u>			<u>BRSW-3B</u>	<u>BRSW-3B</u>
Time	<u>4:01</u>			<u>4:01</u>	<u>4:17</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>250 mL Poly</u>	<u>250 mL Poly</u>

Other Analytes*:

	<u>SO₄, Cl, PH, EC ACIDITY</u>	<u>ALKALINITY, TDS</u>			
Sample ID	<u>BRSW-3B</u>	<u>BRSW-3B</u>			
Time	<u>4:01</u>	<u>4:01</u>			
Preservative	<u>NONE</u>	<u>NONE</u>			
Filtered?	<u>Yes / (No)</u>	<u>Yes / (No)</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container	<u>250 mL</u>	<u>250 mL</u>			

Streambank Description: CANT SEE THE STREAM, IS BELOW THICK GRASS & MOSS
Water Flow Type (circle one): Laminar ~~Stagnant~~ ~~Turbulent~~ Other(describe):
Stream-bed Description: SLIMY VEG COVERED
Water Quality Description (i.e. cloudy, odor, etc.): CLEAR WHEN YOU FIND IT

FLOW MEASUREMENTS:

Area (ft²):
 Velocity (ft/sec):
 Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: BRSW-3B

Gage Reading: _____ Gage Time: _____

Levellogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: 4:29

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE							
1							
2	10" wide	cleared grass & moss to sample measured at center	0.6		0.44		
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE							

Total Flow:

Comments: 3 channels covered by grass & moss
 can hear water running but cannot see it
 site is where alluvium is exposed below Mike Horse Dam
 can only measure 1 channel

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-3A</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER:
LOCATION:	WEATHER: <u>SUNNY MID 80'S LT BREEZE</u>
DATE: <u>8/28/09</u> TIME: <u>2:51</u>	SAMPLERS: Tom Smith

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>7.25</u>	<u>10.24</u>	<u>289.4</u>	<u>1.08</u>		<u>107</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-3A</u>			<u>BRSW-3A</u>	<u>BRSW-3A</u>
Time	<u>3:15</u>			<u>3:15</u>	<u>3:39</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>1L Poly</u>	<u>1L Poly</u>

Other Analytes*:

	<u>SO₄, Cl, PH, EC, ACIDITY</u>	<u>ALKALINITY TDS</u>			
Sample ID	<u>BRSW-3A</u>	<u>BRSW-3A</u>			
Time	<u>3:15</u>	<u>3:15</u>			
Preservative	<u>NONE</u>	<u>NONE</u>			
Filtered?	<u>Yes / (No)</u>	<u>Yes / (No)</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container					

Streambank Description: COARSE TAILINGS GRAVELS

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe): ALMOST STAGNANT LOTS OF VEGETATION

Stream-bed Description: FINES & VEGETATED, PROBE SINKS IN FINES

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: LOW FLOW OUT SET CHANNEL

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: UBMC
BRSW-3A

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 8/28/09

Discharge Time: 3:28

Field Crew: _____ Tom Smith

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	12"						
1	14		0.1		0		
2	21		12		0.14		
3	26		14.5		0.2		
4	30		14.5		1.25		
5	33	EDGE OF VEGET	14.5		1.27		
6	36		14		1.15		
7	39						
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	39" 39"						

SLIMY

Total Flow:

Comments: HEAVILY VEGETATED, SLIMY BOTTOM, LOW FLOW

8/31/09 UBMC 09208 1/5

DEPTH TO GW TIME TD
 TDMW-1 17.27' 11:50 34.88'

SKY PARTLY CLOUDY, MID 80'S PUMP SET AT ~ 30'

$$V = 0.041 (4")^2 (34.88' - 17.27') = 11.55 \text{ gal}$$

$$3 \text{ WV} = 34.5 \text{ gal}$$

$$V_{\text{PURGED}} = 36 \text{ gal}$$

SKY PARTLY CLOUDY, MID 80'S PUMP SET TO 30'

TEMP	PH	SC	µS/cm	DO mg/L	TURB	ORP
8.45	6.91			1.92	0.6	
9.2	7.4			1.11		
8.39	7.2			0.98		
8.37	7.1	463		0.87		
8.31	7.05	462.5		0.88		
8.31	7.05	462		0.88		
8.31	7.05	462.5		0.88		12:34

PARAMETERS STABILIZED

TOTAL METALS 250 mL UNFILTERED HNO_3

DISSOLVED METALS & CATIONS 250 mL FILTERED HNO_3

SO_4, Cl FILTERED UNPRES

ALKALINITY UNFILTERED UNPRES



8/31/09 CONT'D

2/5

TDMW-2D 12.83 @ 1:00 PULSED UP LEVEL LOGGER

$$TD = 37.50'$$

$$V = 0.041 (4")^2 (37.50 - 12.83) = 16.2 \text{ gal}$$

$$3 \text{ WV} = 48.3 \text{ gal}$$

STORM CLOUDS ROLLING IN FROM W, LT BREEZE

PUMP SET @ $\sim 29\frac{1}{2}'$

WATER STARTED CLEAR THEN GOT TAN CLOUDY COLOR

T °C	pH	SC $\frac{\mu\text{S}}{\text{cm}}$	DO $\frac{\text{mg}}{\text{L}}$	TURB
8.41	7.24	227.0	1.08	25.7
8.43	7.26	226.9	0.98	21.8
8.39	7.24	227.0	0.97	37.6
8.37 ✓	7.23 ✓	227.7	0.97	29.5

227.8
227.8

SAMPLED @ 2:07

PURGED
71 GAL

DTGW TD

TDMW-2S 12.86 20.46 1:38

$$V = 0.041 (2")^2 (20.46 - 12.86) = 1.25 \text{ gal}$$

$$3 \text{ WV} = 3.74 \text{ gal}$$

PURGED $\sim 7 \text{ gal}$

T °C	pH	SC $\frac{\mu\text{S}}{\text{cm}}$	DO $\frac{\text{mg}}{\text{L}}$	TURB
9.61	6.74	222.5	0.3	4.0 @ 5cm
9.11	6.83	519.3	0.35	2.2 @ $\sim 6\frac{1}{2}$ cm
9.6	6.89	509.2	0.33	1.8 @ ~ 7 cm

SAMPLED AT 2:57

RETURNED LEVEL LOGGER AT 2:10 & DTGW 13.4'

8/31/09 CONT'D

3/5

DTGW TD

TDMW-3D 49.49' 70.7' @ 3:30

$$V = 0.041 (6")^2 (70.7 - 49.49) = 31.3 \text{ gal}$$

$$\Rightarrow \text{WN} = 93.92 \text{ gal}$$

PUMP SET @ ~ 60', WATER IS CLEAR THEN CLOUDY AFTER 30'MOSTLY CLOUDY ~ 80° < 10 mph 4:20 START TO SPRINKLE

T °C	pH	SC $\mu\text{S/cm}$	DO mg/L	Turb NTU
7.66	7.48	449.9	1.36	5.5
7.56	7.46	505.9	1.49	147.5
7.62	7.48	490.2	1.50	429.4
7.85	7.53	435.6	1.35	2390.7
7.85	7.53	435.5	1.35	2388.8
8.25	7.46	405.5	1.49	383.5
8.43	7.45	404.3	1.50	372.7
8.50	7.46	403.9	1.36	336.6
8.51	7.45	404.0	1.28	353.9
8.5	7.45	404.1	1.29	333.2

V PURGED ~ 101 gallons SAMPLED @ 5:48

DUPLICATE SAMPLE TDMW-3DA 5:50

DTGW TD
TDMW-35 32.12 32.6 @ 4:35

NOT ENOUGH WATER TO SAMPLE

NO SAMPLE TAKEN - TUBING PUT IN MW

* SAMPLE SUBMITTED IS THE FIELD BLANK
5:06 PM

TDMW-4D 41.42 @ 7:06 61.2 TD

PULLED LOGGER @ 6:59

PULLED AS LOGGER @ 7 PM

$$V = 0.041 (2")^2 (61.2 - 41.42) = 3.24 \text{ gal}$$

$$3WV = 9.73 \text{ GALLONS}$$

OVERCAST 70° LT BREEZE → RAINING @ 7:41

CLOUDY BROWN WATER

T	PH	SC	DO	TURB	
6.91	7.83	270.4	0.87	172.1	3 GALLONS
6.20	7.64	216.8	1.58	6.6	7 GALLONS
6.23	7.61	215.6	1.57	5.1	9 GALLONS

PUT LOGGER BACK IN AT 8:03 PM

TDMW-4S DRY TD 22.45¹ PUT LOGGER BACK
IN @ 7:41

UBMC
CONTINUOUS

9/1/09

5:5

OTGW

TD

TDMW-5

74.56'

11:53

106.5

$$V = 0.041 (6")^2 (106.5 - 74.56)$$

$$= 47.1 \text{ GAL}$$

$$3WN = 141.4 \text{ GAL}$$

T	pH	SE	DO	TURB
7:45	7.78	295.8	1.60	17.5 @ 10 GAL
SET PUMP AT 90', PUMPED LOWER DRY - 10 GAL				
DROPPED TO ~ 102' ^{103'} , PUMPED AGAIN				
7:04	7.94	303.0	1.59	22.9 @ 12 GAL
7:29	7.94	302.0	1.79	30.0 @ 16 GAL
7:23	7.89	302.4	1.75	45.0 @ 20 GAL
7:48	7.95	301.8	1.50	74.3 @ 27 GAL
8:18	7.96	301.8	1.53	62.6 @ 28 GAL
PUMPED DRY - LET RECHARGE 11:20				
SAMPLED AT 2:43				
7:42	8.04	307.5	1.33	40.4 @ 2:48
WATER COVER @ 90.7'				

≠

90.7

11/18/09

UBMC-09208

11

1152 - Arrive on-site to begin quarterly monitoring of GW monitoring wells
 - Jamie Mergerson & Jeremy Mickey to perform sampling beginning w/ TDMW-2D

Weather - Partly Cloudy, 30°F, Wind 10-15 mph

TDMW-2D

Depth to GW	Total Depth	Time
12.05'	37.50'	12:17

$$V = 0.041 (4")^2 (37.50 - 12.05)$$

$$V = 0.041 (16) (25.45)$$

$$V = 16.7 \text{ gal}$$

$$\text{Purge Volume} = 3 \times 16.7 \text{ gal} = 50 \text{ gal}$$

Pump set @ 29.5' below top of casing

T °C	pH	SC ^{mg/L}	DO ^{mg/L}	Time	Gal.
7.73	7.23	252.0	142.4	12:19	5
7.34	7.25	252.0	141.6	21:5	15
7.79	7.22	252.0	157.3	30:3	20
7.90	7.23	252.6	152.7	38:5	30
7.74	7.21	252.9	149.8	46:4	35
7.77	7.21	253.2	146.2	39:4	40
7.79	7.21	253.2	144.2	38:3	45
7.79	7.21	253.2	144.1	38:1	50

11/18/09

WBMC

2/

TDMW-2D cont.

- 1257 - obtained samples from TDMW-2D
after purging 50 gal from well
- pump set @ end of existing tubing

1317 - Begin measuring water level in TDMW-25

TDMW-25

Depth to GW	Total Depth	Time
11.90'	20.46'	1320

$$V = 0.041 (2")^2 (20.46 - 11.90)$$

$$V = 0.041 (4) (8.56)$$

$$V = 1.40 \text{ gal}$$

$$\text{Purge Volume} = 3 \times 1.40 \text{ gal} = 4.2 \text{ gal}$$

T ^o C	pH	SG ^{mg/L}	DO mg/L	Turb.	Cond
6.98	6.80	933.7	179.2	12.2	2
6.98	6.80	913.5	175.3	9.7	3
6.99	6.80	871.9	167.1	6.6	5
6.99	6.80	882.3	168.2	5.7	5.5

1340 - obtained samples from TDMW-25

- pump set @ end of existing tubing
- tubing left in well as found

11/18/09

WBMC

3/

TDMW-1

1422 Begin measuring water level & calculating
purge volume from TDMW-1

Depth to GW	Total Depth	Time
16.66'	34.88'	14:24

$$V = 0.041 (4")^2 (34.88 - 16.66)$$

$$V = 0.041 (16) (18.22)$$

$$V = 11.95$$

$$\text{Purge Volume} = 3 \times 11.95 = 36 \text{ gal.}$$

14:29 - pump set @ end of existing tubing
left in well

T ^o C	pH	SG ^{mg/L}	DO mg/L	Turb	Cond
8.00	6.87	520.2	142.6	1.1	5
7.97	6.84	519.4	140.0	1.4	10
7.99	6.83	517.1	138.3	0.7	15
9.02	6.84	514.9	218.1	0.5	20
9.00	6.83	514.9	213.0	0.5	25
9.00	6.83	514.9	209.1	0.5	30
9.00	6.83	513.4	205.5	0.5	35
9.00	6.83	513.7	204.7	0.5	38

1450 - obtained samples from TDMW-1

- tubing left in well as found

11/17/09 W/BML 4/

1454 - Collected field blanks for total metals, dissolved metals/activity, dissolved anions and alkalinity/hardness.

TDMW-35

1515 - Begin measuring water levels @ TDMW-35

Depth to GW	Total Depth	Time
32.12'	32.4'	15:18

$j = 0.044 \text{ f.u.}$

- Not enough water to sample. Moved to TDMW-3D.

1523 - Begin measuring water level and calculating purge volume for TDMW-3D

TDMW-3D

Depth to GW	Total Depth	Time
47.74	1' 41.20 70.70	15:24

$V = 0.041(4')^2 (\frac{70.7}{47.74} - 47.74)$

$V = 0.041(34) (\frac{22.96}{13.46})$

$V = 14.87 \text{ gal} \times 33.9 \text{ gal}$

Purge Volume = $3 \times 14.87 \text{ gal} = 44.61 \text{ gal} \approx 102 \text{ gal}$

- Pump set @ end of existing tubing
- water very silty through 50 gal of purging
- silt decreasing after purging 75 gal
- Purge water still silty after pumping 100 gal, but physical parameters stable

11/18/09 W/BML 5/

TDMW-3D

T°C	pH	SC ^m /L	DO mg/L	Turb	Gal
7.00	7.64	419.1	155.4	214.4	20
6.82	7.62	429.4	153.8	469.1	30
6.82	7.55	547.2	153.4	648	40
6.81	7.50	614.9	152.7	352.8	50
6.82	7.48	478.6	151.9	332.7	60
6.85	7.48	482.9	150.9	204.9	70
6.82	7.44	697.5	149.3	205.2	80
6.87	7.50	487.0	148.0	194.2	90
6.96	7.52	455.3	148.0	272.2	95
6.90	7.52	450.2	148.0	287.6	100
6.90	7.52	450.1	148.0	288.7	105

$j = 0.044 \text{ f.u.}$

17:31 obtained samples from TDMW-3D

17:45 - off-site

19:09 - Arrive back in Adena

11/19/09

UBMC-09208

61

9:12 - Arrive on-site to continue quarterly monitoring of wells and begin surface water sampling

- Jamie Mangoson & Jeremy Mickey to perform sampling beginning with TDMW-5

Weather - partly cloudy, 26°F, 5-10 mph wind

TDMW-5

Depth to Gnd	Total Depth	Time
74.02'	106.5'	9:22

$$V = 0.041 (in)^2 (106.5 - 74.02)$$

$$V = 0.041 (36) (32.48)$$

$$V = 47.94 \text{ gal}$$

$$\text{Purge Volume} = 3 \times 47.94 \text{ gal} = 144 \text{ gal.}$$

9:32 - Begin purging well

- Pump set at end of existing tubing found in well (approx. 100' b/c)

- water pumping clear @ start

- water slightly silty after 25 gallons of purging

- left tubing in well as found

11/19/09

UBMC

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TDMW-5

T°C	pH	SC ^{-1/2} /cm	DO mg/L	Turb	Qual
6.05	8.14	271.3	63.8	55.3	10
6.05	8.14	271.3	63.5	60.7	15
6.05	8.14	271.3	63.5	60.7	20
6.05	8.14	271.3	63.5	60.7	25

10:01 - Pumped well dry after purging 27 gallons, let well recharge to collect samples.

10:29 - Begin collecting samples

10:31 - Collected duplicate samples (555)

from TDMW-5

10:40 - Clean-up & Decon

11:25 - Arrive @ TDMW-40 & TDMW-45

Weather: 26°F, clear skies, slight breeze

TDMW-40

Depth to Gnd	Total Depth	Time
39.64'	61.2'	11:30

$$V = 0.041 (2")^2 (61.2 - 39.64)$$

$$V = 0.041 (4) (21.56)$$

$$= 3.54 \text{ gal}$$

$$\text{Purge Volume} = 3 \times 3.54 \text{ gal} = 10.62 \text{ gal}$$

11/19/09

W3MC

8/

TDMW-4D cont.

11:35 - Begin purging well

- pump set @ end of existing tubing

- water silty @ start of pumping

- water remains silty @ end of purging

T ^o C	pH	SC ^{mg/l}	DOM ₁₆	Turb	Gral.
5.74	7.80	290.2	43.1	2579.5	5
4.64	7.66	239.2	45.1	2518.5	6 _{pm.}
5.77	7.64	235.0	53.6	1725.2	7
5.79	7.61	234.5	55.5	1632.3	8
5.77	7.61	234.5	55.5	1485.5	9
5.80	7.61	234.5	55.7	1571.2	10
5.80	7.61	234.5	55.6	457.2	11

11:55 - Begin obtaining samples from TDMW-4D

11:59 - TDMW-4S

- Well is dry, No samples taken

11/19/09

W3MC

9/

12:45 - Arrive @ BRSW-1 and prepare to measure discharge / collect samples

14:14 - Arrive @ BRSW-2

- Ice covers area to be sampled

- Use an axe to chop through ice to attempt sampling

- 4" of ice cover 4" of standing water

14:30 Begin collecting samples through ice-hole

14:51 - Arrive @ BRSW-22

- Creek is frozen solid

- No data obtained

15:07 - Arrive @ BRSW-38 and prepare to measure discharge & collect samples

15:28 - Collect samples from BRSW-38

15:56 - Arrive @ BRSW-48 and prepare to measure discharge & collect samples

16:25 - Collect sample from BRSW-48 ~~23~~ ²³ ~~Jan~~

16:44 - Leave site

11/20/09

10/

8:35 ARRIVED ON SITE TO CONTINUE QUARTERLY

SAMPLING OF SURFACE WATER & MONITORING WELLS

JAMIE MUNKHOVEN IS SAMPLER

WEATHER: CLOUDY, WINDY 35° F

4:45 SAMPLED BLSW - 48 ACTUAL

10:48^{5th} ~~B~~ BEGAN SAMPLING BLSW - ~~3A~~ 3B & 3A

11:10 RECORDED H₂O QUALITY

11:38 BEGAN SAMPLING DUPLICATE

12:45 END SAMPLING

1:10 LEFT SITE

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-2</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER: <u>BRSW-2-111909</u>
LOCATION: <u>N SIDE OF IMPOUNDMENT</u>	WEATHER: <u>27° Partly Cloudy, 10 mph wind</u>
DATE: <u>11/19/09</u> TIME: <u>14:30</u>	SAMPLERS: <u>Jeremy Mickey & Jamie Mongoven</u>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>6.39</u>	<u>2.30</u>	<u>2778</u>	<u>42.5</u>	 	<u>206</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-2-111909</u>	 	 	<u>BRSW-2-111909</u>	<u>BRSW-2-111909</u>
Time	<u>14:30</u>	 	 	<u>14:30</u>	<u>14:30</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>250mL Poly</u>	<u>250mL Poly</u>

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<u>BRSW-2-111909</u>	<u>BRSW-2-111909</u>			
Time	<u>14:30</u>	<u>14:30</u>			
Preservative	<u>none</u>	<u>none</u>			
Filtered?	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container	<u>250mL Poly</u>	<u>250mL Poly</u>			

Streambank Description: NA

Water Flow Type (circle one): Laminar Stagnant Turbulent ~~Other~~(describe): standing water under 4" of ice

Stream-bed Description: NA

Water Quality Description (i.e. cloudy, odor, etc.): clear

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: 5 LF of Master Flex tubing used

*Fill in prior to field work

TerraGraphics Environmental Engineering, Inc.

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <i>BRSW-3A</i> (DUP) FIELD BLANK
PROJECT NUMBER: 09208	SAMPLE NUMBER: <i>BRSW-3A-11202009</i>
LOCATION: <i>Below W. H. DAM</i>	WEATHER: <i>Cloudy WINDY 38°</i>
DATE: <i>11/20/09</i> TIME: <i>11:19</i>	SAMPLERS: <i>Jeremy Mickey & Jamie Mongoven</i>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)

SAMPLES

	TSS	TKN/P/nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<i>BRSW-3A-11202009</i>			<i>BRSW-3A-11202009</i>	<i>BRSW-3A-11202009</i>
Time					
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<i>BRSW-3A-11202009</i>	<i>BRSW-3A-11202009</i>			
Time					
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: _____

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe): _____

Stream-bed Description: _____

Water Quality Description (i.e. cloudy, odor, etc.): _____

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: FIELD BLANK (DUP)

*Fill in prior to field work

TerraGraphics Environmental Engineering, Inc.

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: BRSW-1
PROJECT NUMBER: 09208	SAMPLE NUMBER: BRSW-1-111909
LOCATION:	WEATHER: 26° C clear 10 mph wind
DATE: 11/19/09 TIME: 13:35	SAMPLERS: Jeremy Mickey & Jamie Mongoven

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
7.94	1.27	177.4	59.5		244

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-1-111909			BRSW-1-111909	BRSW-1-111909
Time	13:50			13:50	13:50
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	BRSW-1-111909	BRSW-1-111909			
Time	13:50	13:50			
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: Lined Ditch

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: Rocks w/ small amount of organic debris (leaves/ twigs)

Water Quality Description (i.e. cloudy, odor, etc.): Clear

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: 6 LF of MasterFlex tubing used

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: MH Diversion Ditch BR5W-1

Gage Reading: 0.37'

Gage Time: 13:03

Levellogger: Yes / (circle one)

Download Time: _____

Date: 11/19/09

Discharge Time: _____

Field Crew: _____ Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft) inch	Width (ft)	Depth (ft) inch	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	52"						
1	49.7		0.5		0		
2	45.1		0.75		0.49		
3	40.5		1.25		0.73		
4	35.9		2.0		0.88		
5	31.3		3.1		0.91		
6	24.7		1.25		0.30		
7	22.1		1.75		0.44		
8	17.5		2.25		0.67		
9	12.9		2.0		0.19		
10	8.3		1.75		0.03		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	6"						

Total Flow:

Comments:

LWE - RWE = 46" (width)
 Increment = 46 ÷ 10 = 4.6"
 LWE = 52"
 - 1/2 increment = 2.3"
 1st measuring point = 49.7"

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena -X-

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: BRSW-38
PROJECT NUMBER: 09208	SAMPLE NUMBER: BRSW-38-11909
LOCATION:	WEATHER: 40°F, Cloudy, slight breeze
DATE: 11/19/09 TIME: 15:28	SAMPLERS: Jeremy Mickey & Jamie Mongoven

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
7.26	1.52	357.8	42.1		170

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	BRSW-38-11909			BRSW-38-11909	BRSW-38-11909
Time	15:28			15:28	15:28
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	BRSW-38-11909	BRSW-38-11909			
Time	15:28	15:28			
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: 4' high cut bank, relatively steep
 Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):
 Stream-bed Description: rocks, sands, red iron-oxide staining
 Water Quality Description (i.e. cloudy, odor, etc.): clear

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: 3 LF of Master-Flex Tubing used

*Fill in prior to field work

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena -X-

SURFACE WATER SAMPLING RECORD

FIELD BLANK

PROJECT: UBMC	STATION NAME: <u>BRSW-38A</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER: <u>BRSW-38A-112009</u>
LOCATION: <u>M.H. Dam</u>	WEATHER: <u>Cloudy windy 38°F</u>
DATE: <u>11/20/09</u> TIME: <u>2:39</u>	SAMPLERS: <u>Jeremy Mickey & Jamie Mongoven</u>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)

SAMPLES

	TSS	TKN/P/nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-38A-112009</u>			<u>BRSW-38A-112009</u>	<u>BRSW-38A-112009</u>
Time	<u>2:39</u>			<u>2:39</u>	<u>2:39</u>
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<u>BRSW-38A-112009</u>	<u>BRSW-38A-112009</u>			
Time	<u>2:39</u>	<u>2:39</u>			
Preservative	none	none			
Filtered?	Yes / <u>(No)</u>	Yes / <u>(No)</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: DRY

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: ?

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: FIELD BLANK

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: B335W-38 ↗

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 11/19/09

Discharge Time: _____

Field Crew: _____ Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft) <small>inches</small>	Width (ft)	Depth (ft) <small>inches</small>	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	43						
1	60.4		1.0		0.17		
2	55.2		2.5		0.14		
3	50.0		4.0		0.29		
4	44.8		3.25		0.29		
5	39.6		3.90		0.40		
6	34.4		2.5		0.67		
7	29.2		2.0		0.56		
8	24.0		2.75		0.77		
9	18.8		2.25		1.23		
10	13.6		2.0		0.99		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	10						

Total Flow:

Comments:

LWE - RWE = 52" = width
 increment = 52" ÷ 10 = 5.2"
 LWE = 43"
 - 1/2 increment = 2.6"
 1st measuring point = 60.4"

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena -X-

SURFACE WATER SAMPLING RECORD

ACTUAL SITE
11/20/09

PROJECT: UBMC	STATION NAME:
PROJECT NUMBER: 09208	SAMPLE NUMBER: <i>B2SW-48-11202009</i>
LOCATION: <i>B2SW-48</i>	WEATHER: <i>Cloudy: 36°F, WIND</i>
DATE: <i>11/20/09</i> TIME: <i>9:45</i>	SAMPLERS: <i>Jeremy Mickey & Jamie Mongoven</i>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<i>7.38</i>	<i>2.07</i>	<i>2,585</i>	<i>57.9</i>		<i>133</i>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<i>B2SW-48-11202009</i>			<i>B2SW-48-11202009</i>	<i>B2SW-48-11202009</i>
Time	<i>9:45</i>			<i>9:45</i>	<i>9:45</i>
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<i>B2SW-48-11202009</i>	<i>B2SW-48-11202009</i>			
Time	<i>9:45</i>	<i>9:45</i>			
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: _____

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: Rocky

Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: USED 4" MASTER FLEX TUBING

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
ENVIRONMENTAL ENGINEERING, INC.

ACTUAL

Site: BQSW-48

Gage Reading: _____ Gage Time: _____

Levellogger: Yes / No (circle one)

Download Time: _____

Date: 11/20/09

Discharge Time: _____

Field Crew: Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	37						
1	35.4		0.25		-		
2	32.2		0.5		-		
3	29.0 29.0		1"		0.52		
4	25.8 25.8		1.25"		1.64		
5	22.6		1.75"		1.73		
6	19.4		2.0"		1.10		
7	16.2		2.25"		1.62		
8	13.0		3.0"		1.23		
9	9.8		1.5"		1.10		
10	6.6		1.0"		0.59		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	5						

Total Flow:

Comments:

$37 - 5 = 32 / 10 = 3.2$

LWE = 37

- 1/2 INCREMENT 3.2

1st MEASUREMENT $37 - 1.6 = 35.4$

TerraGraphics Environmental Engineering, Inc.

Moscow --- Kellogg --- Boise --- Spokane --- Helena -X-

ACTUALLY
 B.R.S.W - 23

SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <u>BRSW-48</u>
PROJECT NUMBER: 09208	SAMPLE NUMBER: <u>BRSW-48-111909</u>
LOCATION:	WEATHER: <u>cloudy, 38°F, slight breeze</u>
DATE: <u>11/19/09</u> TIME: <u>16:25</u>	SAMPLERS: <u>Jeremy Mickey & Jamie Mongoven</u>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<u>7.67</u>	<u>1.85</u>	<u>312.9</u>	<u>56.3</u>		<u>172</u>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<u>BRSW-48-111909</u>			<u>BRSW-48-111909</u>	<u>BRSW-48-111909</u>
Time	<u>16:25</u>			<u>16:25</u>	<u>16:25</u>
Preservative	<u>None</u>	<u>Sulfuric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>	<u>Nitric Acid</u>
Filtered?	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Container	<u>1L Poly</u>	<u>1 L Poly</u>	<u>1 L Poly</u>	<u>250mL Poly</u>	<u>250mL Poly</u>

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<u>BRSW-48-111909</u>	<u>BRSW-48-111909</u>			
Time	<u>16:25</u>	<u>16:25</u>			
Preservative	<u>none</u>	<u>none</u>			
Filtered?	<u>Yes / (No)</u>	<u>Yes / (No)</u>	<u>Yes / No</u>	<u>Yes / No</u>	<u>Yes / No</u>
Container	<u>250mL Poly</u>	<u>250mL Poly</u>			

Streambank Description: steep, 6' cut bank on east side, gradual slope on west
Water Flow Type (circle one): ~~Laminar~~ **Stagnant** ~~Turbulent~~ **Other(describe):**
Stream-bed Description: Rocks & sand, iron-oxide coating
Water Quality Description (i.e. cloudy, odor, etc.): clear

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES: 3 LF of MasterFlex tubing used

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: BBSW-47

*50
BBSW-23
Actual*

Gage Reading: _____ Gage Time: 16:11

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 11/19/09

Discharge Time: _____

Field Crew: _____ Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	50						
1	48.1		1.0		0.03		
2	44.3		1.0		0.38		
3	40.5		2.0		0.53		
4	34.7		0.5		1.05		
5	32.9		0.5		1.01		
6	29.1		2.0		1.25		
7	25.3		1.9		1.37		
8	21.5		2.0		0.76		
9	17.7		1.5		0.37		
10	13.9		1.0		0.75		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	12						

Total Flow:

Comments: $LWE - RWE = 38"$
 $Increment = 38" \div 10 = 3.8$
 $LWE = 50$
 $-1/2 increment = 1.9$
1st measuring point = 48.1 (50" - 1.9")

TerraGraphics Environmental Engineering, Inc.

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <i>BRSW-3B</i>
PROJECT NUMBER: 09208	SAMPLE NUMBER: <i>BRSW-3B-12009</i>
LOCATION: <i>MIKE HARRIS CREEK</i>	WEATHER: <i>CLOUDY WINDY 38°F</i>
DATE: <i>11/20/09</i> TIME:	SAMPLERS: <i>Jeremy Mickey & Jamie Mongoven</i>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<i>7.18</i>	<i>6.83</i>	<i>359.3</i>	<i>59.3</i>		<i>87</i>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<i>BRSW-3B-12009</i>			<i>BRSW-3B-12009</i>	<i>BRSW-3B-12009</i>
Time					
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<i>BRSW-3B-12009</i>	<i>BRSW-3B-12009</i>			
Time					
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: *MOSSY SWAMPY VEGETATION COVERS MOST OF STREAM*

Water Flow Type (circle one): *Laminar* Stagnant Turbulent Other(describe):

Stream-bed Description: *TOE OF DAM SEEP DISCHARGE*

Water Quality Description (i.e. cloudy, odor, etc.): *CLEAR*

FLOW MEASUREMENTS: *Low*

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
 ENVIRONMENTAL ENGINEERING, INC.

Site: BZSW-3B

Gage Reading: _____ Gage Time: _____

Levelogger: Yes No (circle one)

Download Time: _____

Date: 11/20/09

Discharge Time: _____

Field Crew: Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE							
1							
2	11" WIDE	CENTER	0.5"		0.50		
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE							

Total Flow:

Comments:

TerraGraphics Environmental Engineering, Inc.

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SURFACE WATER SAMPLING RECORD

PROJECT: UBMC	STATION NAME: <i>B2SW-3A</i>
PROJECT NUMBER: 09208	SAMPLE NUMBER: <i>B2SW-3A-112009</i>
LOCATION: <i>MIKE HOUSE CREEK</i>	WEATHER: <i>cloudy, windy, 37°F</i>
DATE: <i>11/20/09</i> TIME: <i>10:48</i>	SAMPLERS: Jeremy Mickey & Jamie Mongoven

WATER QUALITY PARAMETERS

pH	Temperature (°C)	Conductivity (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)
<i>7.31</i>	<i>5.51</i>	<i>356.7</i>	<i>60.4</i>		<i>72</i>

SAMPLES

	TSS	TKN/P/ nitrate+nitrite	Hardness	Total Metals	Dissolved Metals
Sample ID	<i>B2SW-3A-112009</i>			<i>B2SW-3A-112009</i>	<i>B2SW-3A-112009</i>
Time					
Preservative	None	Sulfuric Acid	Nitric Acid	Nitric Acid	Nitric Acid
Filtered?	No	No	No	No	Yes
Container	1L Poly	1 L Poly	1 L Poly	250mL Poly	250mL Poly

Other Analytes*:

	SO ₄ , Cl, pH, EC, acidity	Alkalinity, TDS			
Sample ID	<i>B2SW-2A-112009</i>	<i>B2SW-2A-112009</i>			
Time					
Preservative	none	none			
Filtered?	Yes / <u>NO</u>	Yes / <u>NO</u>	Yes / No	Yes / No	Yes / No
Container	250mL Poly	250mL Poly			

Streambank Description: *summy w/ organics*

Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):

Stream-bed Description: *MOSSY*

Water Quality Description (i.e. cloudy, odor, etc.): *CLEAR*

FLOW MEASUREMENTS:

Area (ft²):

Velocity (ft/sec):

Discharge (Q) (cfs):

NOTES:

*Fill in prior to field work

TerraGraphics
Stream Discharge Form



TerraGraphics
ENVIRONMENTAL ENGINEERING, INC.

Site: BRSW - 3A

Gage Reading: _____ Gage Time: _____

Levelogger: Yes / No (circle one)

Download Time: _____

Date: 11/20/09

Discharge Time: _____

Field Crew: _____ Jeremy Mickey & Jamie Mongoven

Discharge Measurements

	Tape (ft)	Width (ft)	Depth (ft)	Area (ft ²)	Velocity (ft/sec)	Velocity (ft/sec)	Discharge (cfs)
LWE	28"						
1	26.9		6.5		0.12		
2	24.7		6.0		0.11		
3	22.5		6.0		0.12		
4	20.3		5.75		0.14		
5	18.1		6.0		0.11		
6	15.9		5.5		0.11		
7	13.7		5.0		0.13		
8	11.5		6.0		0.13		
9	9.3		5.0		0.12		
10	7.1		3.0		0.14		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
RWE	6"						

Total Flow:

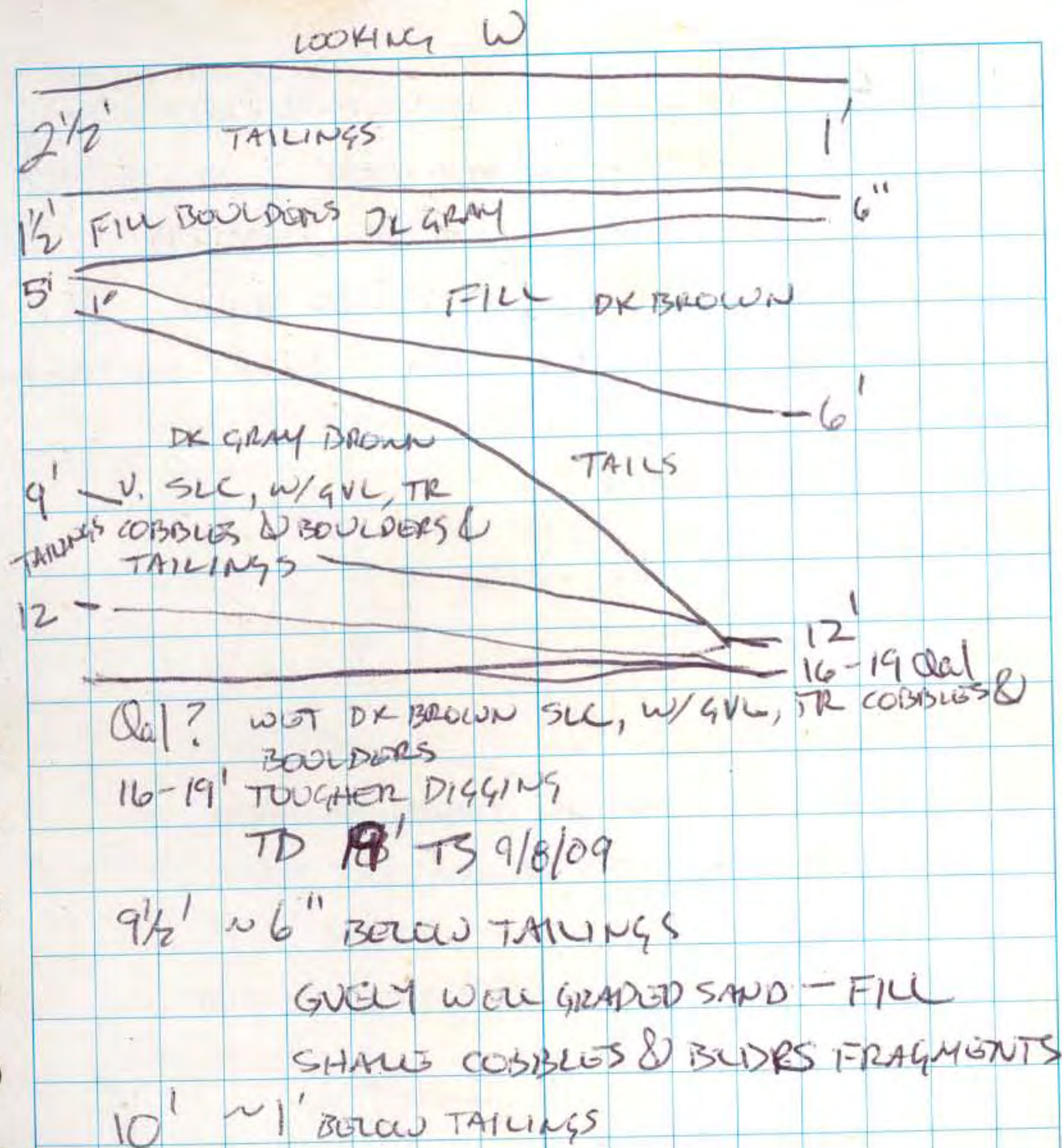
Comments: *LOTS OF VEGETATION MOSS & GRASS COVERS MOST OF CHANNEL, SLIMY BOTTOM LOW LAMINAR FLOW*

22"/10 = 2.2"

UBMC TEST PITTING
9/8/09

MHTP-1 0-2 1/2 TAILINGS, DK YELLOWISH BRN, SAND,
2 1/2-4' GRAVELS & COBBLES
2 1/2-4' FILL DK BROWNISH GRAY SILTS, SANDS, GVL, COBBLES
4-5 TAILINGS SAND, GVL, COBBLES, TR BOULDERS
YELLOWISH BROWN
5-9 SILT, w/ GVL, TR COBBLES & BOULDERS
DK GRAY BROWN
9-12 TAILINGS
12-16 FILL V. SILT w/ GVL TR COBS, BUDS
16-19 TD Qal? WGT DK BROWN SILT w/ GVL,
TR COBBLES & BOULDERS - WAS TOUGH,
DIGGING

9 1/2, 10, 16



9/8/09

09-MHP-02

0-4 TAILINGS SANDS ^{DK YELLOWISH BROWN} & GRAVELS, ACID GEAR
 4- FILL - WELL GRADED SAND W/ GVL, TR SILT
 DK BROWN - APPEARS IMPACTED

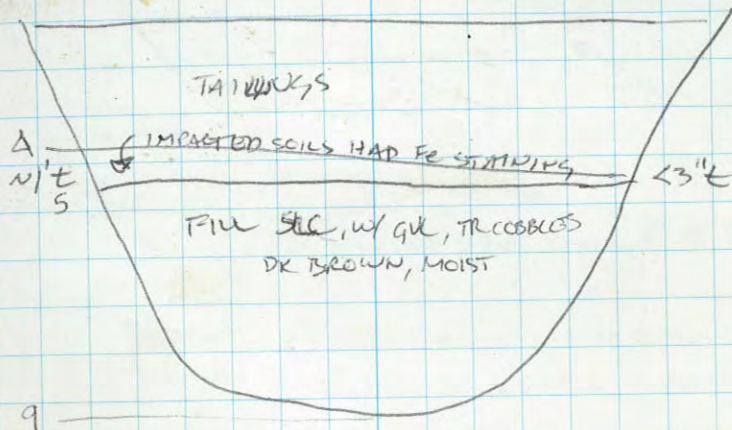
5 BASE OF TAILINGS & IMPACTED SOILS
 FILL SILTY SAND W/ GVL TR COBBLES DK BROWN
 -- W/ SILT @ ~ 7'
 TD @ 9'

• 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 7 1/2, 8

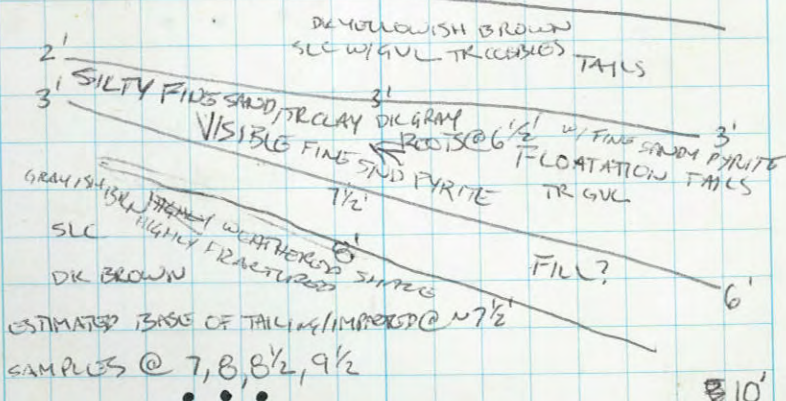
09-MHP-03

0- TAILINGS SAND, GVL, COBBLES, TR WOOD
 DK YELLOWISH BROWN
 FLOTATION TAILINGS - DK GRAY
 SILT, TR SAND & GVL, PYRITE VISIBLE

PHOTOS 1, 2, 3 1 N END; 2 SEND; 3 MIDDLE
 LOOKING W

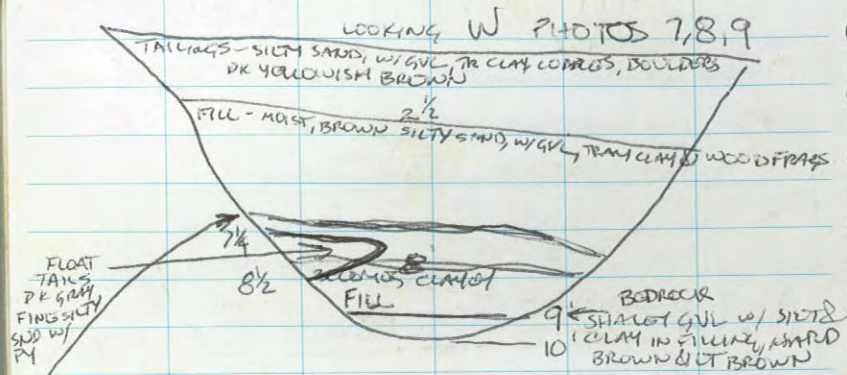


LOOKING W PHOTOS 4, 5, 6



• 10'
 TD
 T 9/8/09

09-MHTP-4 9/9/09



@ 7' TR MANGANESE & FE STAINING LENS

ESTIMATED BASE OF TAILINGS & IMPACT TOP SOILS @ ~~7 1/2~~ 8' ?

SAMPLES @ ~~2, 3, 3 1/2, 4 1/2, 5 1/2, 6 1/2~~ TS 9/9/09

WHILE OBTAINING 6 1/2' SAMPLE, FOUND FABRIC FRAGMENT, FLOTATION TAILINGS LENSSES, & ON E BANK A LENS OF FLOT TAILS 7 1/4' - 8 1/2'

SAMPLES OBTAINED @ 6 1/2', 9 1/2', 7 1/2', 8 1/2', 9 1/2', 4 1/2', 5 1/2'

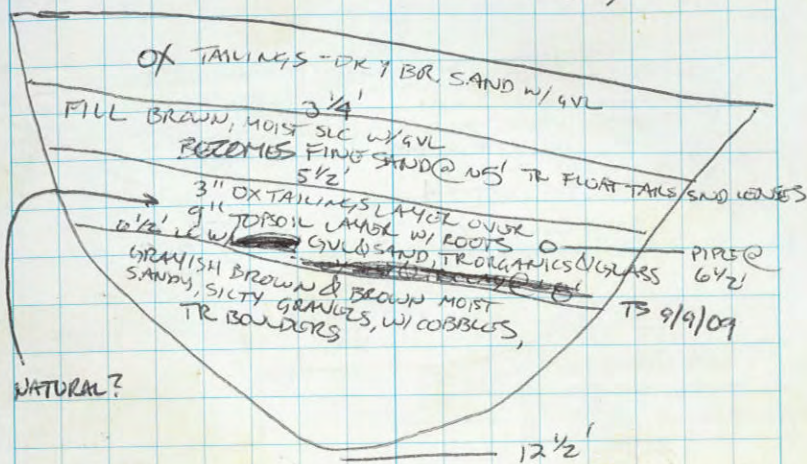
BASE OF FILL 9'?

↓

DUPLICATE SAMPLES
09-MHTP-4A 7 1/2'

09-MHTP-5 LOOKING W 9/9/09

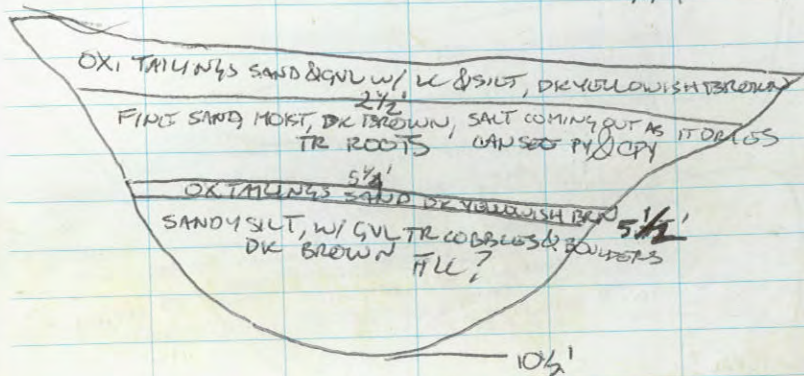
PHOTOS 10, 11, 12



ESTIMATED BASE OF TAILS & IN. SOILS 6'

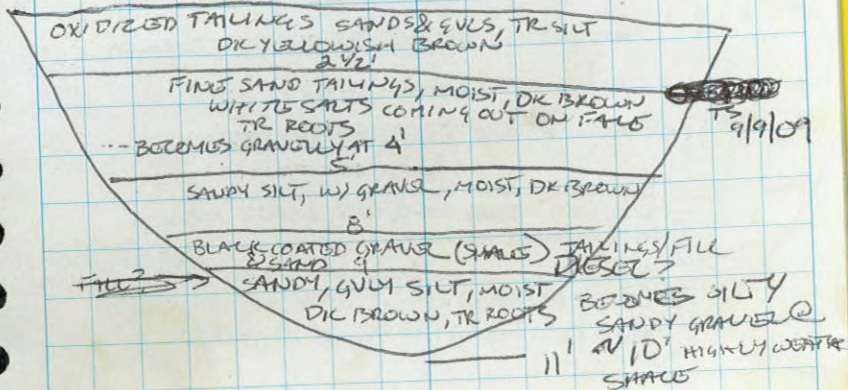
SAMPLES @ 5 1/2', 6 1/2', 7, 8, 9, 4 1/2'

09-MHTP-6 9/9/09

LOOKING W PHOTOS ~~13, 14, 15~~ 13, 14, 15
TS 9/9/09

ESTIMATED BASE OF TAILINGS & IMPACTED SOILS ~~NE~~ 5 1/2'
TS 9/9/09

SAMPLED AT 5', 6', 6 1/2', 7 1/2', 8 1/2'

09-MHTP-8 LOOKING W PHOTOS ~~13, 14, 15~~ 13, 14, 15
TS 9/9/09

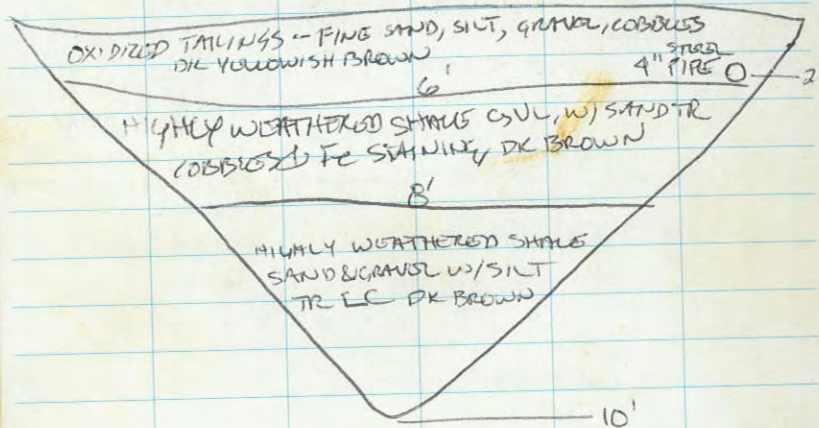
ESTIMATED BASE OF TAILINGS 9'
SAMPLED AT 8 1/2', 9 1/2', 10', 11'

HIGHLY WEATHERED SHALES @ 9'

16, 17, 18

09-MHTP-7 LOOKING W PHOTOS ~~22, 23, 24~~~~OXIDIZED TAILINGS (FINE SAND/SILT/PT)~~

TS 9/9/09

~~NO SHALES GRAVEL, COBBLES & Boulders~~~~SUBTLY OXIDIZED IN UPPER 2', THEN GRAY~~~~OXIDIZED TAILINGS DISCREET~~~~PT PLAT, DISCREET & V DK BROWN~~

BASE OF TAILINGS & IMPACTED SOILS ~ 8'

SAMPLING AT 7½, 8½, 9, ~~6~~ 6½

TS 9/9/09

09-MHTP-9 LOOKING W PHOTOS 22, 23, 24

0-1' PLAT DK BROWN & V DK BROWN

1-6' FINE SANDY SILT W/ PY TMS IN SHALES GRAVEL,
COBBLES, & Boulders. Slightly ox in upper 2'
THEN ARE DK GRAY FLUTATION TAILINGS

09-MHTP-10 LOOKING W PHOTOS 25, 26, 27

0-½' PLAT DK BROWN & V DK BROWN

½'- FINE SANDY SILT W/ PY TMS IN SHALES GRAVEL,
COBBLES & Boulders

Location WBMCDate 9/16/09Project / Client DEO SRS09-MHTP-09

#19 NEAR TOE OF DAM

PREVIOUS EXCAVATION TO 10'

ADDITIONAL EX. TO 19'

See 9/16/09

SIX PHOTOS

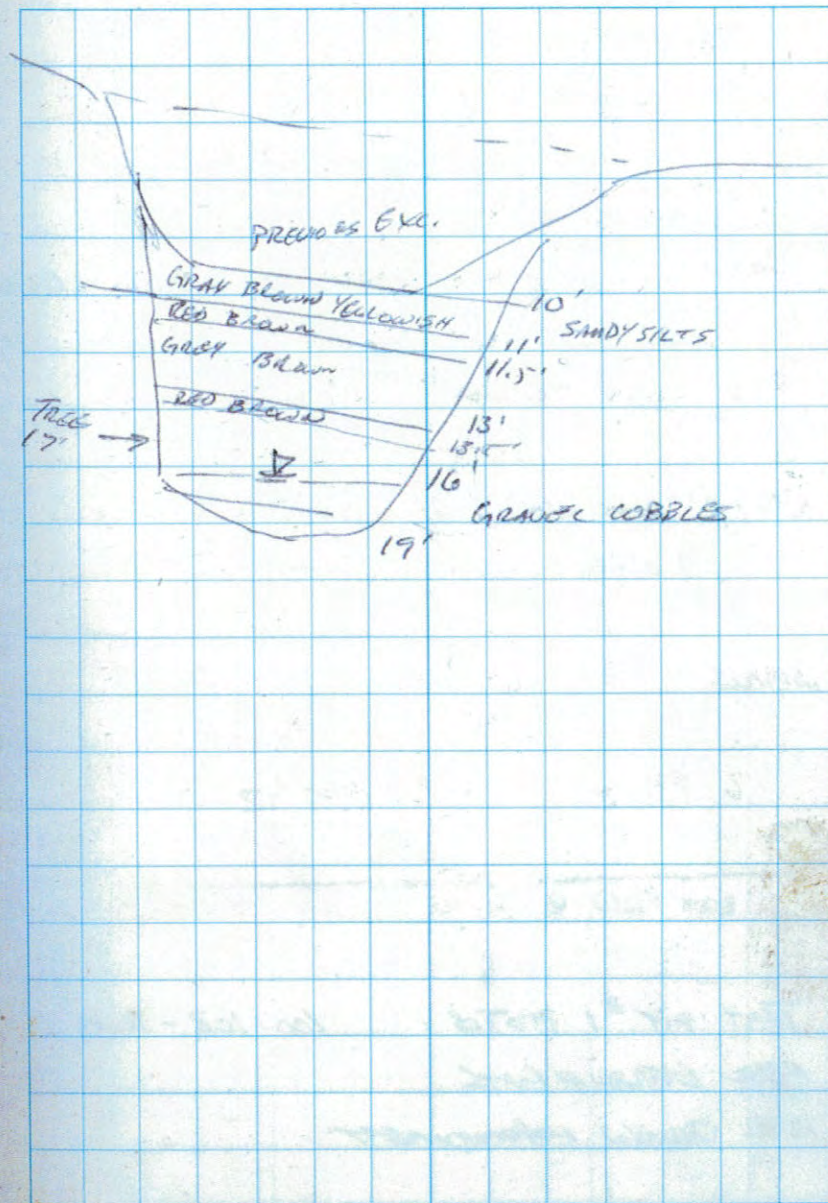
2 SAMPLES 10' 16'

100-094 100-096

Location _____

Date _____

Project / Client _____



Location

WZMPC

Date

9/16/09

Project / Client

DEQ SRS

#10

09-MHP-10

TEST PIT #10

DEEPEN PIT TO 19'

EXISTING EV @ 7'

9'-9' LIGHT BROWN SAND / SILT w/ GRAVEL COBBLES

9'-10' DARK BROWN SANDY GRAVEL

10'-19' DARK BROWN w/ GRAVEL w/ TAILINGS
& ORGANICS

SAMPLES 8', 16'

6 PHOTOS 100-097-100-100

BACK FILLED @ 11:16

TEST PIT #1 PHOTOS 100-103-1005

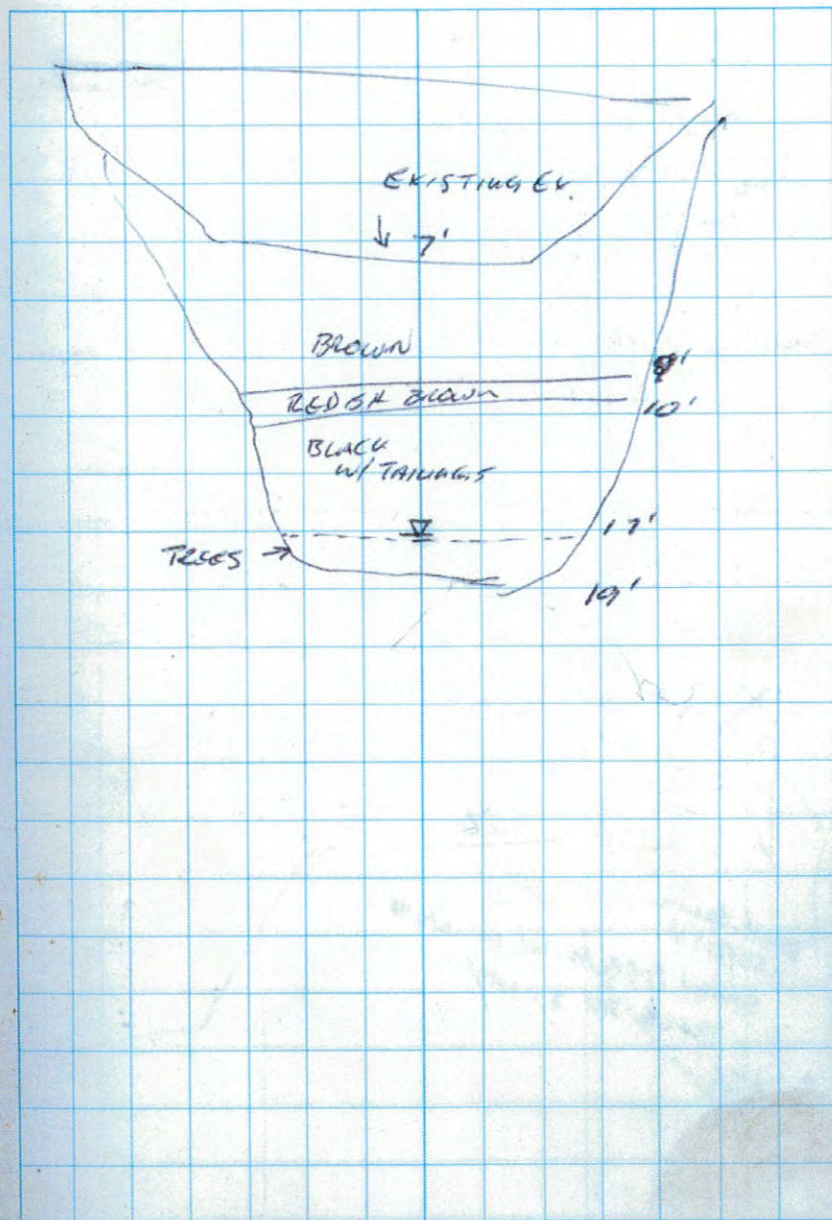
NEAR ENTRANCE GATE

NEAR TRAILING IMPROVEMENT

Location

Date

Project / Client



MIKE Location UBMCDate 9/16/09

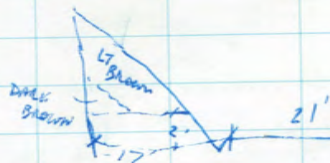
HORSES

Project / Client DER-SRS

ROAD PIT #1

2 PICTURES

09-MHRDTP-1

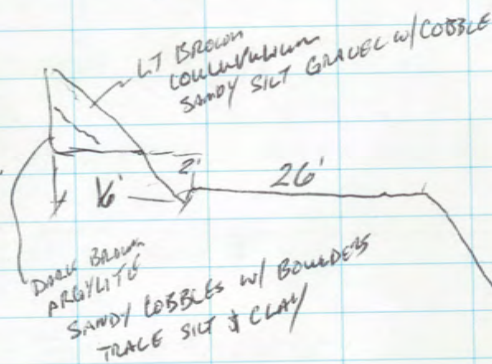


Colluvium SANDY SILT COBBLES w/ TRACE
GRAVEL

2 PHOTOS

ROAD PIT #2

09-MHRDTP-2



3 PHOTOS

Location _____

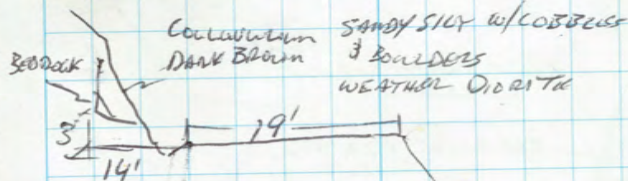
Date 9/16/09

Project / Client _____

Cont.

ROAD PIT #3

09-MHRDTP-3



TEST PIT #4

09-MHRDTP-4

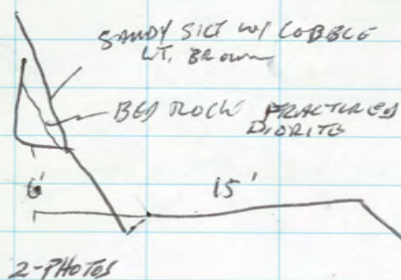
BED ROCK
DORITE

Diagram of Test Pit #4 showing a cross-section with a soil layer labeled 'BED ROCK DORITE'.

Location WBMLDate 7/16/09Project / Client DEQ - SRS

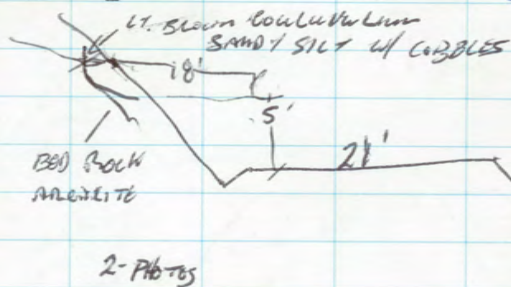
ROAD PIT #5

09-MHRDTP-5



PIT #6

09-MHRDTP-6



Location _____

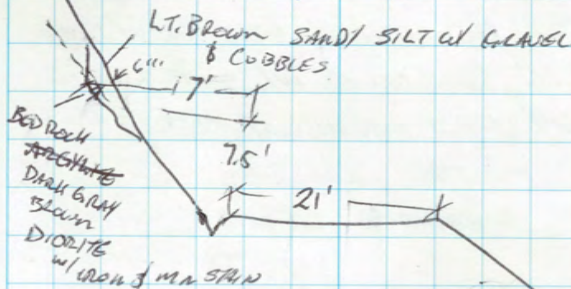
Date _____

Project / Client _____

CONT.

ROAD PIT #7

09-MHRDTP-7



4 Location PRYMASTER Date 9/10/09
Project / Client DEQ

TEST PIT

09-PM TP-1

DEPTH 15'

LOOKING S

0 ~~BLACK~~ EXISTING GROUND
w/ ORGANICS GRAY TOPSOIL SANDY SILT
TRACE GRAVEL COBBLE
1 1/2 LIGHT BROWN SANDY SILT w/ GRAVEL
TRACE COBBLE
3' YELLOWISH BROWN SANDY LC
OXIDIZED CLAY ZONE
HIGHLY WEATHERED
DIORITE
APPEARS MINERALIZED
(OXIDIZED) TO ~ 11 1/2'
1' GRAY
GRAY BROWN
7 1/2' YELLOWISH BROWN LENSES OF LIGHT
YELLOWISH BROWN
11' -- COLOR BECOMES DIL
BLuish GRAY

5 Location PRYMASTER TEST PIT Date 9/10/09
Project / Client DEQ

BULK SAMPLES OBTAINED AT 3' & 8'

BAG SAMPLES OBTAINED AT 8, 9, 12

PHOTOS 1 & 2 - OR 100-0043
100-0044

Location PAY MASTERDate 7/11/09

Project / Client _____

09-PM TP-02

0-6" ORGANICS DK BROWN
 ← SILTY SANDS w/
 COLUMBIA GRAVEL & COBBLE
 GRAVEL & COBBLES

HIGHLY WEATHERED
 DIORITE

3'

WEATHERED DIORITE, MN COATING

V DK BROWN

COLOR BECOMES DK GRAYISH BROWN
 @ 4'

2 - PHOTOS

4' EXCAVATOR REFUSAL

Location _____

Date _____

Project / Client _____

HIGHLY WEATHERED DIORITE, DK REDDISH BROWN
 1'-3' Fe STAINING/COATING

ALL MATERIALS WERE DRY

Location PM MASTER TEST PIT Date 9/11/09Project / Client DEQ

09-PMTP-03

TOPSOIL	0' ————— DARK BROWN	SILT W/ SAND TRACE GRAVEL W/ ORGANICS
	1' ————— BROWN	SILTY SANDY GRAVEL COLLUMIN
HIGHLY WEATHERED DIORITE	6' ————— DARK YELOWISH BROWN	IRON CONTENT INCREASE SAND SILT GRAVEL W/ COBBLES SIMILAR TO CLAY LAYER IN TP-1 WAS NOT WEATHERED TO CLAY
	8' —————	EXCAVATOR HIT REFUSAL

SOFT ROCKS AT DEPTH

SAMPLES 4' - 7'

2- PHOTOS ONE OF PIT &
ONE OF BUCKET

Location _____ Date _____

Project / Client _____

CONTINUED

DRY MATERIALS W/ S

DUE TO HEAVY ROCK CONTENT
NO BULK SAMPLES WERE TAKEN
OF MATERIAL AT DEPTH

2' LEVEL BULK SAMPLE WAS TAKEN

Location _____ Date _____

Project / Client _____

09-PMTP-4

0-6" TOPSOIL, w/ ORGANICS, V DK BROWN, DRY

6"-2 1/2' COLLUVIUM SILTY SANDY GRAVEL, TR

COBBLES & BOULDERS DRY

2 1/2'-3' -- COLOR BECOMES YELLOWISH BROWN
SLIGHTLY MOIST

3' HIGHLY WEATHERED DIORITE

SILTY SANDY GRAVEL & COBBLES, TR BLDGS

YELLOWISH BROWN Fe STAINED

5' WEATHERED DIORITE, DK GRAY SLIGHTLY
MOIST

COBBLES EASILY BROKEN w/ ROCK HAMMER

Mn STAINING

8-10' -- Fe STAINING INCREASING & BANDING AT

7 1/2-8 & 9 1/2-10

@ 12' DIORITE HAS RED STAINING, TOO

BOP - 16'

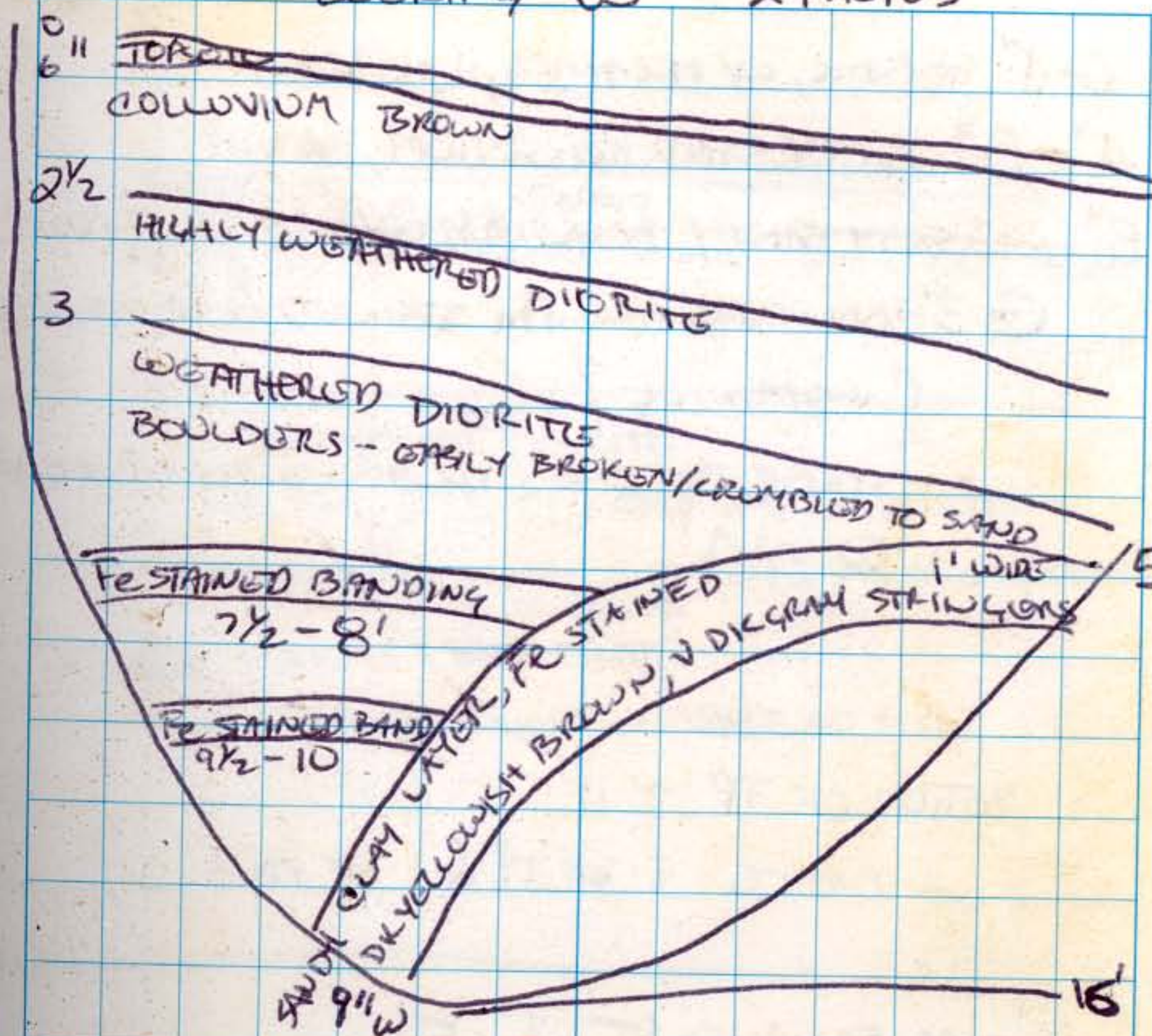
CLAY LAYER Fe & Mn STAINED COMING UP FROM BOTTOM

& CURVES AROUND TO N

Location _____ Date 9/11/09

Project / Client _____

LOOKING W 2 PHOTOS



DAY SAMPLES 4; 8-9' IN CLAY LAYER
BUCKET SAMPLES 2'; 4'

Location _____

Date 9/11/09

Project / Client _____

09-PMTP-5

0-4" TOPSOIL, w/ ORGANICS, V DK BROWN

4" - 8" SILTY SAND COLLUVIUM, BROWN

8" SILTY SANDY ^{DIORITE} BOULDERS, w/ ^{COBBLES} GRAVEL, BROWN

@ 3' BOULDERS ARE Mn STAINED & Fe STAINED

Cu STAINING?

-- COLOR BECOMES DK YELLOWISH BROWN

@ ~ 4'

BOTTOM OF TP ~ 11'

2 PHOTOS 1 OF TP & 1 OF PILE

3 BAG SAMPLES AT 2', 5',

BULK SAMPLES AT

ROCK SAMPLE OF PY VEINING

SAMPLES

2'-6' - 9-10' BAG

3'

COMPOSITE

Location _____

Date _____

Project / Client _____

CONTINUED

~~4" TOPSOIL~~~~8" SILTY SAND COLLUVIUM~~~~8" SILTY SANDY DIORITE BOULDERS w/ GVL, COBBLES~~

3'

WEATHERED DIORITE

Fe, Mn, & Cu (?) STAINING ON DIORITE

WEATHERED MATERIAL IS CLAYEY & DK YELLOWISH BROWN
AROUND THE BOULDERS~~5'~~ 5' FINE PY IN DIORITE

SATURATED CLAYS → FRACTURE FLOW

11'

Location _____

Date

9/11/09

Project / Client _____

09 - PMTP - 6

0-6" TOPSOIL w/ ORGANICS DARK BROWN

6"-2' GRAY BROWN

2'-~~2'0"~~ DARK BROWN GRAY3m
9/11/09

SAMPLES

2', 6' GEOCHEMICAL

2' COMPOSITE

4 PHOTOS LOOKING EAST

Location _____

Date _____

Project / Client _____

CONTINUED

0'

6"

TOPSOIL

SANDY SILTY COLLUVIUM

2'

3' @ BOULDERS

SANDY SILTY GRAVEL w/ COBBLES & BOULDERS

IRON, MANGANESE, CU, STAINING w/

COBBLES & BOULDERS NOT SAND

9/11/09

3m 9/11/09

10'

HIT REFUSAL

BENIGN LOOKING TEST PIT AS FAR AS

MINERALIZATION

2'

PAD LEFT FOR NUC FIELD DENSITY TEST

Location _____

Date

9/11/09

Project / Client _____

09-PMTP-7

0-6 TOPSOIL DARK BROWN w/ ORCHARD S

6"-3' SILTY SAND CONVULSION

w/ CARAMEL COBBLE

SAMPLES 6'-2' - COMPOSITE

2'-6' - GEOCHEMICAL

5- PHOTOS 3

LAST PHOTO
100-0061FINE SANDY
CLAY IS LT YELLOWISH BROWN MOTTLED w/

DK YELLOWISH BROWN (APPEARS TO BE OXIDIZING)

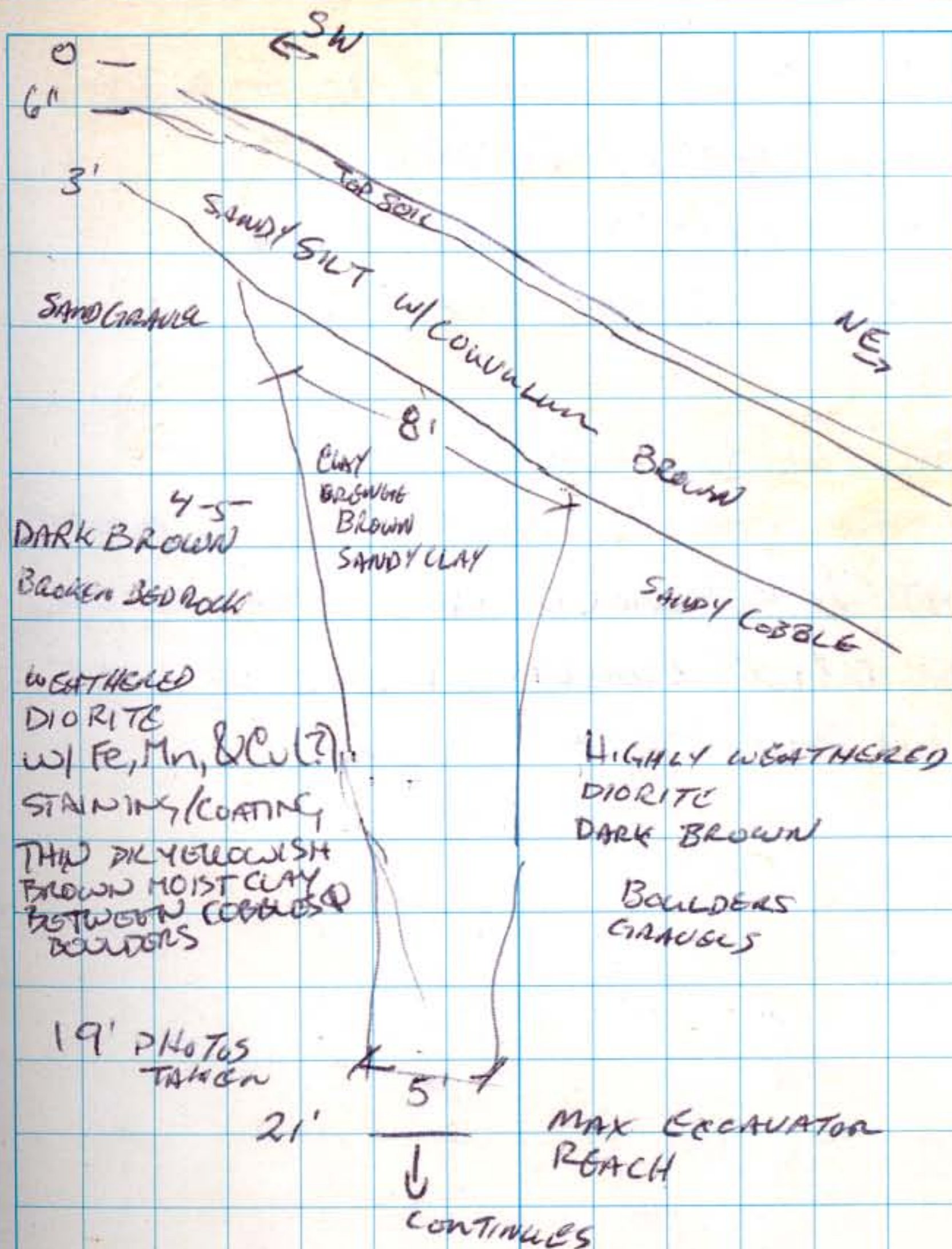
CL-ML? 1.0-1.5 TONS/SF FROM ROCKST PEN
IN THE CLAY.

Location _____

Date _____

Project / Client _____

COWT



Location _____

Date 9/11/09

Project / Client _____

09-PMTP-8

0-3" TOPSOIL - SANDY SILT W/ ORGANICS, DK BROWN

3"-1' SILTY SAND, W/ GRAVEL COLLOVIUM, DK BROWN

1'-1.8' SILTY SANDY GRAVEL & COBBLES, DK BROWN

1.8'-5' DIORITE GRAVEL & COBBLES

B.O.P. @ 5' ROCK MORE COMPACT

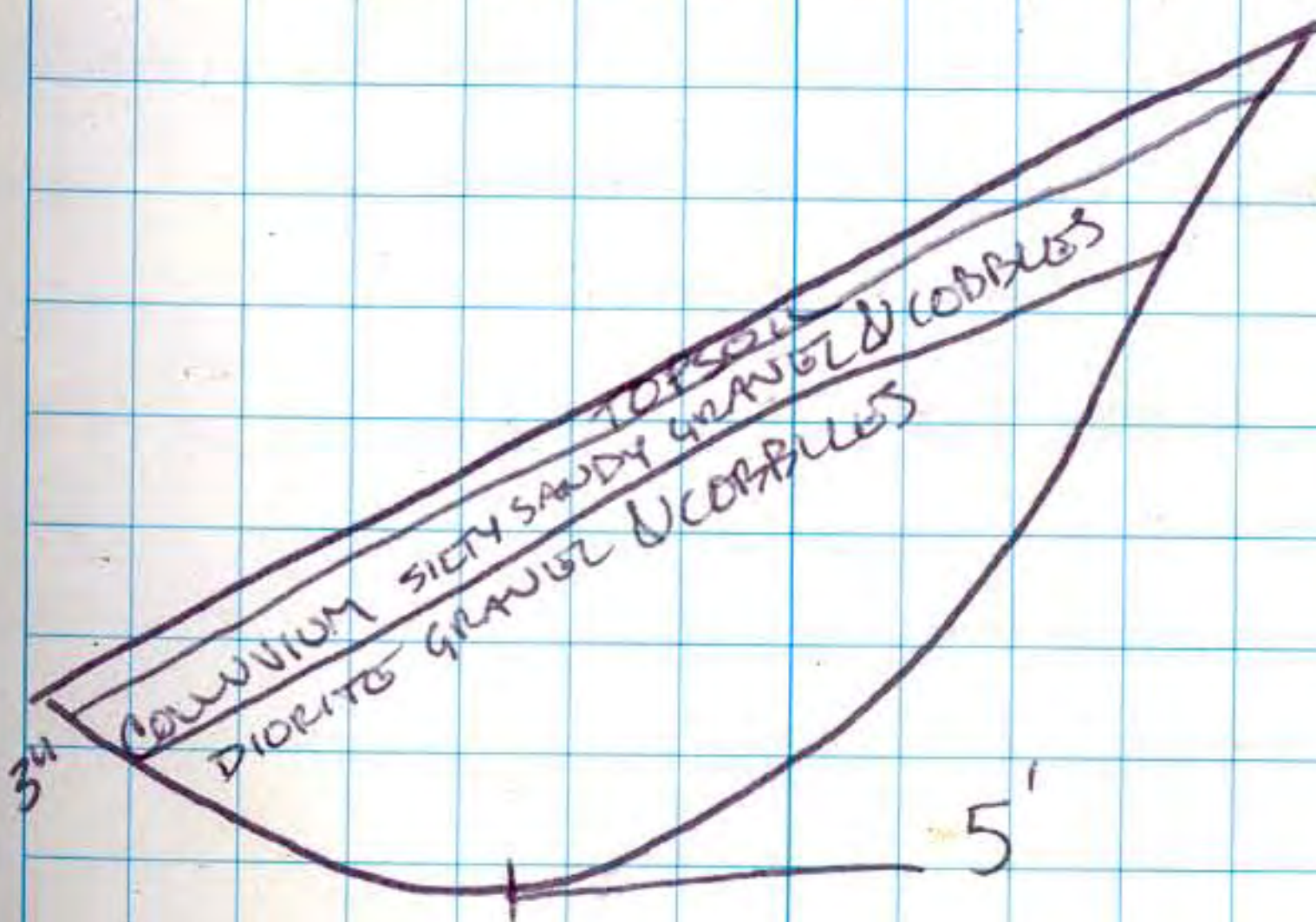
DIORITE GUL & COBBLES COATED W/ Mn
& TR OF Fe COATING

Location _____

Date _____

Project / Client _____

NW END OF SITE BY DIORITE OUTCROP



BAG SAMPLE 1.5

COMPOSITE SAMPLE 1'-1/2'

T.P. LEFT OPEN TO MONITOR WATER IN THE
ROCK

Location _____

Date 9/11/09

Project / Client _____

09-PMTP-9

0-4" TOPSOIL

4"-4' COLLUVIUM - GRAVELLY SANDY SILT, LT BROWN

4'-8' HIGHLY WEATHERED DIORITE

8-9 1/2' GRAVELLY SAND → OXIDIZED

9 1/2'-14' WEATHERED DIORITE

14-16 1/2' CLAY ZONES

16 1/2'-17' WEATHERED DIORITE

2, 8-9 1/2', 17 BAYS

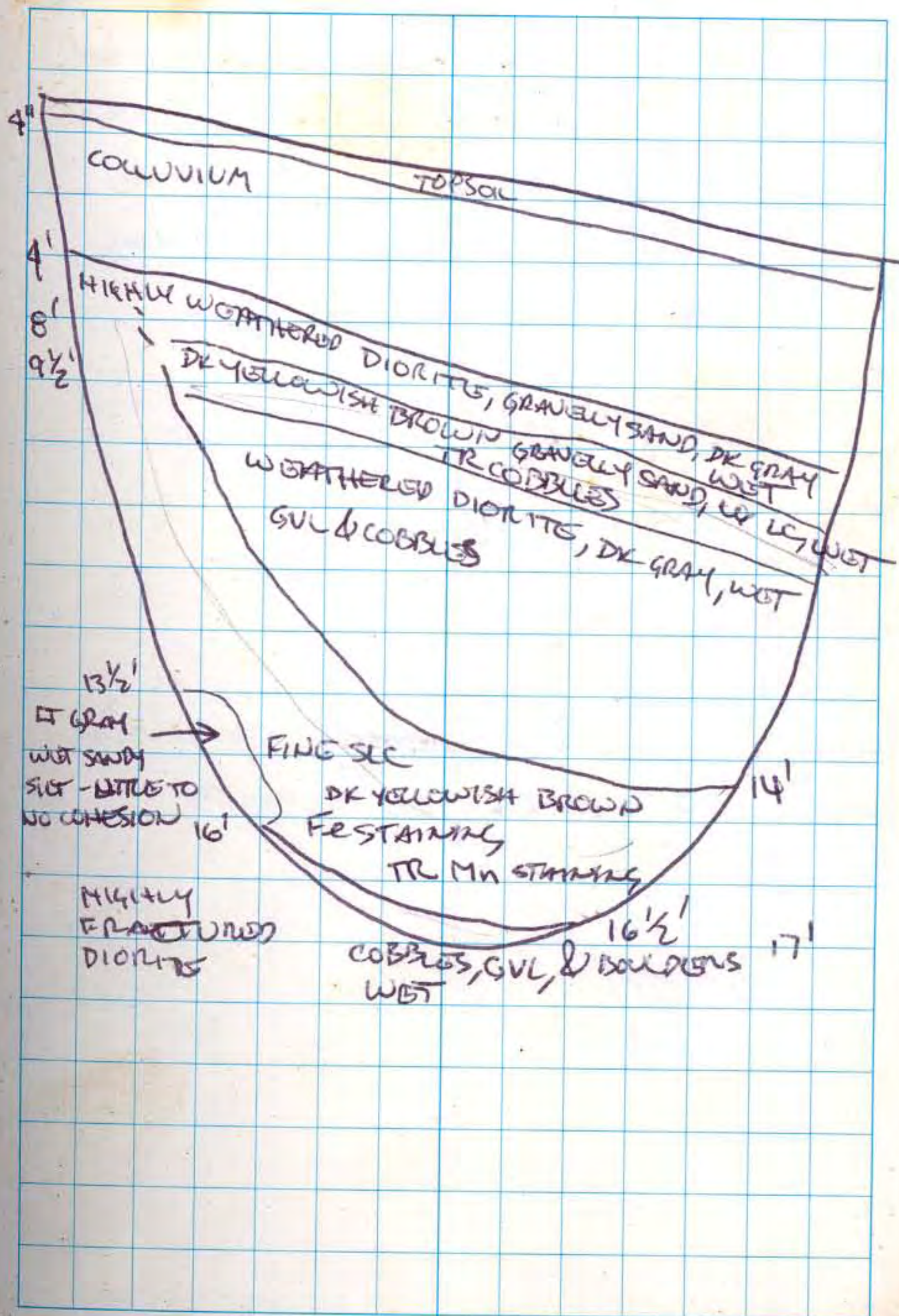
BUCKET 2', 8-9 1/2', 4-6'

PHOTOS (2) #1 LOOKING SOUTH
 #2 LOOKING WEST

Location _____

Date _____

Project / Client _____



Location _____

Date

9/14/09

Project / Client _____

C91-PMTP-10

0"-6" TOPSOIL w/ ORGANICS, V DK BROWN

6"-COLLOVIUM SILTY SAND w/ GVL BROWN

1 1/2' WEATHERED DIORITE, DK YELLOWISH BROWN

2 1/2' DIORITE, DK GRAY w/ Mn STAINING

TR Fe STAINING

BOTTOM OF PIT 6'

BUCKET SAMPLE 1'

BAR SAMPLE

SAMPLES 1/2-2 1/2, 3' ~~COMPOSITE~~ GEOCHEMICAL3-4, 1/2-2 1/2 ^{5m 9/14/09} ~~BAR~~ COMPOSITE

Location _____

Date _____

Project / Client _____

CONTINUED

0"
6" TOPSOIL w/ ORGANICS DARK BROWN
COLLOVIUM1 1/2'
WEATHERED DIORITE SANDY GRAVELS TR COBBLES
DK YELLOWISH BROWN2 1/2'
DIORITE BOULDERS, COBBLES, GVL, TR SAND
DK GRAY6'
EXCAVATOR HIT
REFUSAL BEDROCK LAYER

Location _____

Date

9/14/09

Project / Client _____

09-PMTP-11

0-4" TOPSOIL

4"-2' COLLOVIUM - SANDY SILT W/ GRAVEL, BROWN

2'-10' HIGHLY WEATHERED DIORITE SAND & GVL,
Mn & Fe STAINING
OXIDIZED, DK GRAY & DK YELLOWISH BROWN
(0.7-1.2 TONS/SF POCKET PEN)7"-9" SLC SEAM LT GRAY & DK YELLOWISH BROWN
TRCLAY WGT10'-16' SILT, LT GRAY MOTTLED W/ DK YELLOWISH
BROWN ~ 2 TONS/SF POCKET PEN (9/14/09)16-17' WEATHERED DIORITE SANDY GVL & COBBLES
DK GRAY

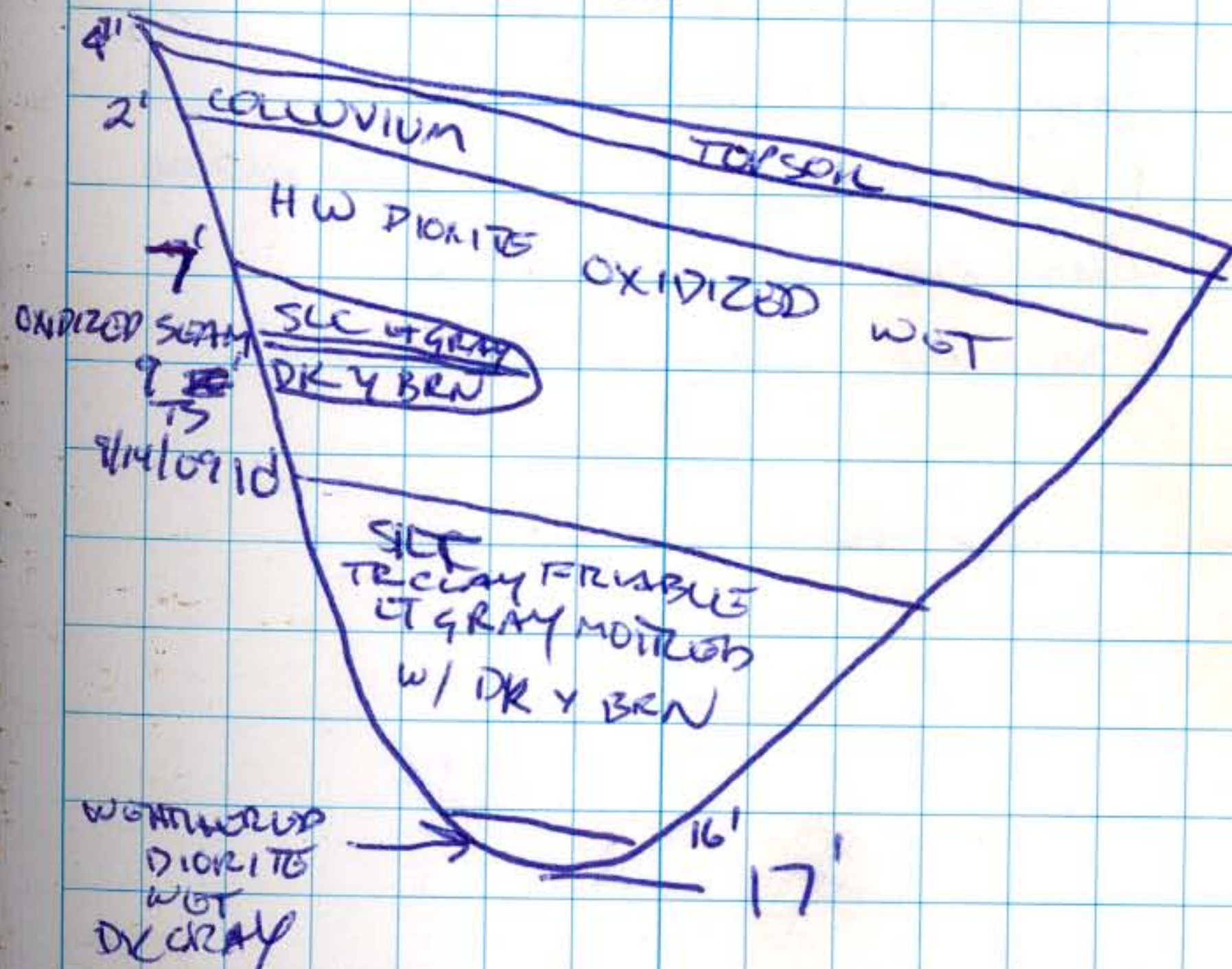
BULK 2, 9-10', 12'

BAG

Location _____

Date _____

Project / Client _____



Location _____

Date

9/14/09

Project / Client _____

09 SGTP 1

2:30 P.M.

- 0["]-4["] TOPSOIL w/ ORGANICS V DARK BROWN
 4["]-6["] COLLUVIUM w/ SAND/SILT w/ COBBLES
 & GRAVEL DARK BROWN
 6["]-> SANDY SILT w/ BOULDERS DARK
 BROWN SATURATED
 IRON STAINING w/ MG
 12' CLAY w/ SAND SILT COBBLE & BOULDERS
 BROWN w/ RED STAIN. IRON & TRACE MG

SAMPLES

COMPOSITE 2' - 12' ✓
 GEOCHEMICAL 2' @ 1' 12'
 SM 9/14/09

Location _____

Date _____

Project / Client _____

CONTINUED

0["] _____
 4["] TOPSOIL _____
 COLLUVIUM
 COBBLES

6["] _____
 SATURATION OF
 COBBLES & BOULDERS
 HIGHLY WEATHERED DIORITE

-- OCCASIONAL BLuish GRAY ARGILLITE FLOAT (w/ COBBLES)

~~11' EXCAVATOR HIL REFINISH~~
 11' _____
 12' CLAY w/ BOULDERS

Location _____

Date

9/14/09

Project / Client _____

09-SGTP-2

0"-4" TOP SOIL w/ ORGANICS DARK BROWN

4"-3' COLLUVIUM - FINE SANDY SILT, w/ GVL

2 COBBLES, LT BROWN

3- HIGHLY WEATHERED ARGILLITE - SAND & GRAVEL, BROWN
~~COLORED BROWN~~

5'-14' SILTY SAND TR CLAY, w/ Fe STAINING

DK YELLOWISH BROWN MOTTLED w/ LT GRAY
FRIABLE

SAMPLES

BAG

2', 3', 8'

GEOTECHNICAL 2' & 8'

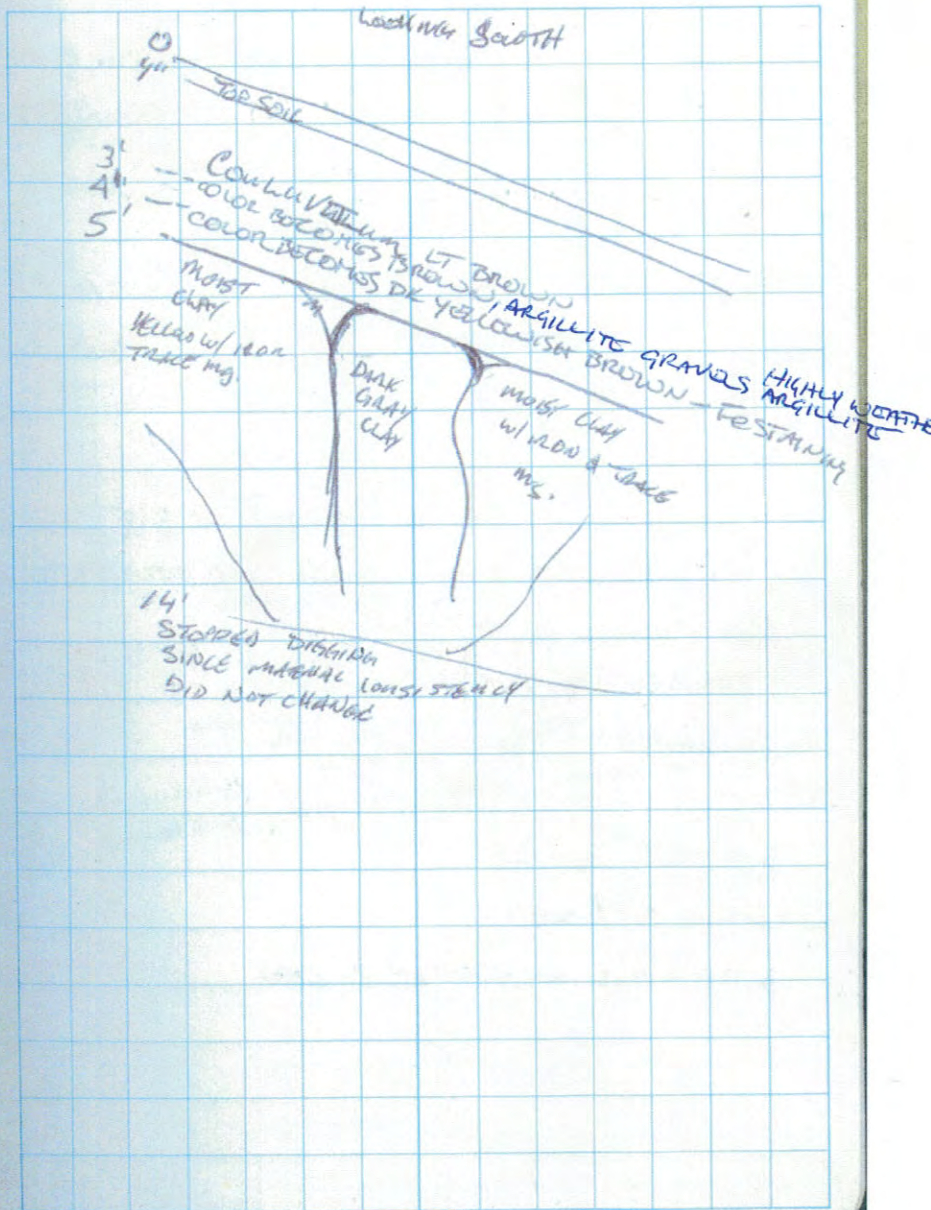
3 PHOTOS

DUPLICATE BAG, SAMPLE
OF 09-SGTP-2 @ 3'Labeled as 5'
09-SGTP-2no 8' sample -
is at 6'.
10/6/09.

Location _____

Date _____

Project / Client _____



UBMC
Location 09-SGTP-3Date 9/15/09Project / Client DEQ

TS 9/15/09

0-7" TOPSOIL - SANDY SILT W/ ORGANICS, DK BROWN

7"-5 1/2' COLLUVIUM - SANDY, GRANULAR SILT W/ COBBLES, BROWN

-- COLOR BECOMES DK YELLOWISH BROWN
5 1/2' - 7' FE STAINED CLAYEY SILT, W/ SAND, GUL & COBBLES
HIGHLY WEATHERED DIORITE, MOIST7' - 20' HIGHLY WEATHERED DIORITE, DK BROWNISH GRAY
SOFT & MOIST

TOPSOIL MATERIAL PILED ON SE END OF PIT

PIT LEFT OPEN FOR NUCLEAR FIELD DENSITY TESTS

& BACKFILLED TO ~10' FOR SAFETY.

BAG SAMPLES 4', 6', 16', 19'

BULK SAMPLES 3', 6'

3 PHOTOS LOOKING N

1 & 2 OF PIT & BOTTOM

3 OF UPPER EXCAVATION ON E SIDE

Location _____

Date _____

Project / Client _____

LOOKING WEST

0 TOPSOIL

7" COLLUVIUM & SURGE? BROWN
↳ SOME ARGILLITE FLOAT
DK GRAY & DK BROWN GRAY5 1/2' CLAYEY SILT, FE STAINED
HIGHLY WEATHERED DIORITE7' HIGHLY WEATHERED DIORITE
SANDY CLAYEY SILT, W/ FRIABLE GUL
SOFT, MOIST, W/ FE & Mn STAINING

@ 10 1/2' COLOR BECOMES DK GRAY

@ 13' COLOR BECOMES DR YELLOWISH & BROWN
MOTTLED W/ DK GRAY@ 15' FE STAINING / CONTENT INCREASING TO BOTTOM
OF PIT, Mn STAINING GULS, Cu SEAMS REDDISH
BROWN?

20'

T.D. MARKED OUT DEPTH OPERATOR CAN REACH

Location UBMCDate 9/15/09Project / Client DEQ - SRS09-SGTP-4

- 0-4" TOPSOIL -- SANDY SILT W/ ORGANICS, DK BROWN
 4"-2' COLLUVIUM -- COBBLY, GRANULARY SANDY SILT, BROWN
 2'-8' WEATHERED DICHLITE --
 SANDY L. CLAYY SILT, W/ GVL & COBBLES, &
 FE STAINING, DK YELLOWISH BROWN
 COBBLES ARE COATED W/ Mn & TR CU VESTIGES
 8' -- COLOR BECOMES DK YELLOWISH BROWN & GRAY

12' POCKET PEN 1.25 T.p. SF

3- PHOTOS 1- Looking EAST, 2- SOUTH 3- WEST

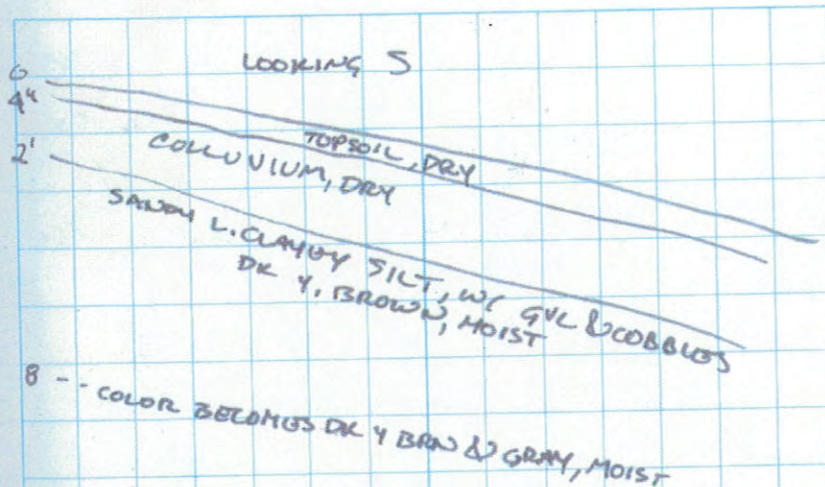
BAG SAMPLES 2', 12', 14', 6'

BULK SAMPLES 2', 6', 14'

Location _____

Date _____

Project / Client _____



Location UBMCDate 9/15/09Project / Client DEQ-SRS09-SGTP-5

0-3" TOPSOIL - SANDY SILT w/ ORGANICS DK BROWN

3"-3' COLLUVIUM - COBBLES, GRAVEL, SANDY SILT

Lt. Brown

3'-10' COBBLES ~~in 9/15/09~~ WEATHERED DIORITE
GRAVEL ~~CLAY~~ SANDY SILT TR CLAY

Fe STAINING, DK YELLOWISH BROWN, MOIST

10' WEATHERED ARGILLITE -- GRAVEL, w/ SANDY SILT, DK
Color change to ~~yellowish brown~~ ^{LEAN TR CLAY} YELLOWISH BROWN
WETTER \rightarrow 9/21/09WEATHERED ARGILLITE LAYER HAS A HIGHER LC CONTENT
THAN THE WEATHERED DIORITE LAYER.

POCKET PEN 12' - 2.0 T/SF

SAMPLES COMPOSITE 2' - 9'

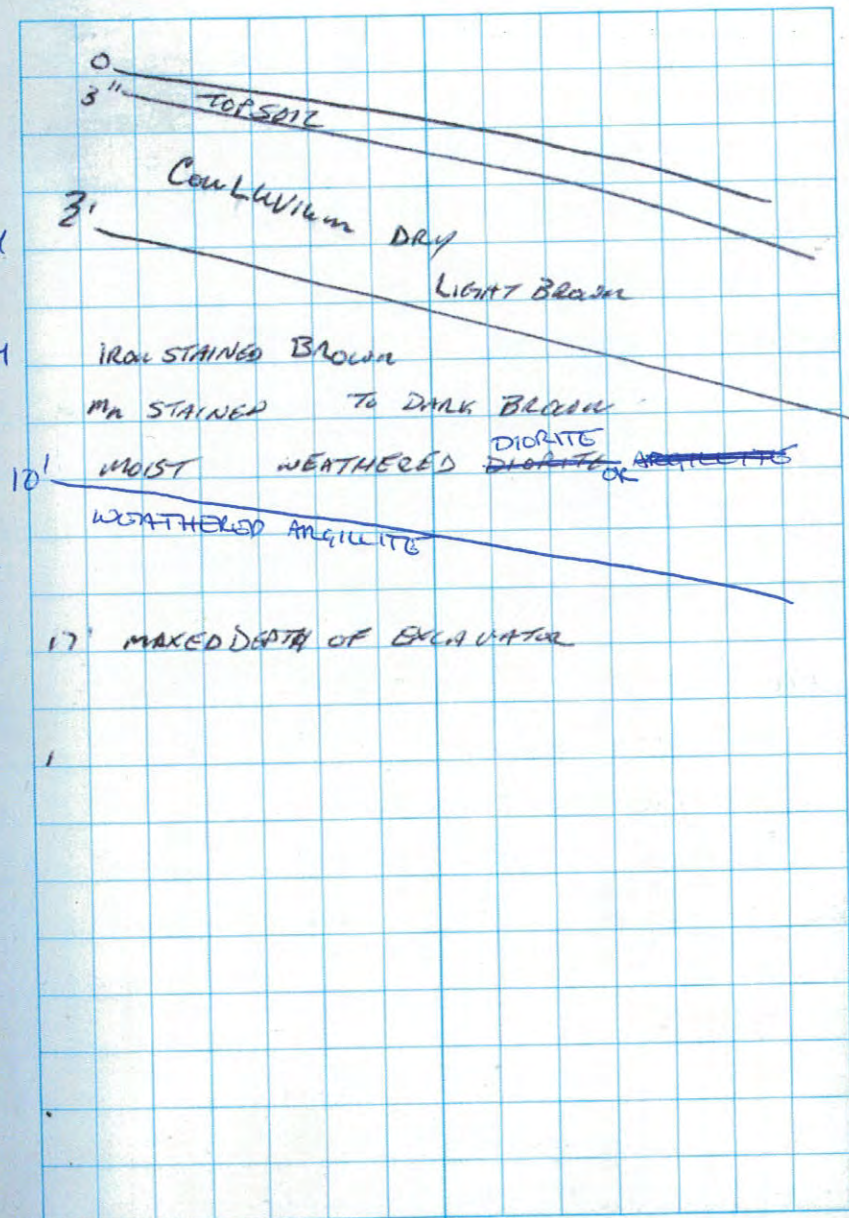
GEOCHEMICAL 2' - 9' - 10'

PIVOT 1 - Looking NORTH 2 - SOUTH 3 - Pile

Location _____

Date _____

Project / Client _____

Cont.

Location U.P.M.C.

Date

9/15/09Project / Client DBQ-SRS09-S6 TP-6

0-3" TOP SOIL - SANDY SILT W/Organics DK. BROWN

3"-2' COLLUVIUM
TO 9/15/09 - SANDY SILT W/COBBLES BROWN2' 3m
9/15/09 W/ COBBLES

2'-5' moist DK BROWN SANDY SILT GRAVELS, TR LEAN CLAY

HIGHLY WEATHERED DIORITE w/ Mn STAIN

\$ IRON STAIN TR/ COPPER STAIN

WEATHERED ARGILLITE, GRAVEL W/ SLC, TR FE STAINING,

5' → 16' ~~ARGILLITE~~ ~~ROCK~~ ~~WATER~~ DK BROWN

WETTER THAN 2'-5' INTERVAL/LAYER

Pocket PCW 12' - 1.0 TSPK

SAMPLES COMPOSITE 2' - 16'

GEOCHEMICAL 2'-6'-16'

PHOTOS 1 - South 2 - EAST 3 - N-EAST (PILE)

Location _____

Date _____

Project / Client _____

CONT.0
3" TOP SOIL
COLLUVIUM2' MOIST
COBBLES

5' → 16' WETTER W/ MORE BOULDERS

16' MAX DEPTH

Location LBMCDate 9/15/09Project / Client DEQ-SRS09-SG TP-7

0-4" TOP SOIL SANDY SILT w/ORGANICS DK. BROWN

4"-2' COULUMMUM SANDY SILT GRAVEL COBBLES
BROWNISH RED GRAVEL IS SOFT & APPEARS TO HAVE A
PORPHYRITIC TEXTURE
OTHER DIOXYD GRANALES ARE HARD, DIORITE

2'-8' SANDY SILT w/ COBBLES & GRAVEL

8'-9' CLAY SILT SAND RED BROWN
HIGHLY WEATHERED DIORITE7' → 18' DARK BROWN SANDY SILT w/ COBBLES
MOIST CLAYS

POCKET PEN 1.0 TON PEN:FI

SAMPLES COMPOSITE 2'-12'

GEOCHEMICAL 2'-8'-12'

PHOTOS

Location _____

Date _____

Project / Client _____

0-4" TOP SOIL

COULUMMUM (?)

DRY LIGHT BROWN
~~RED BROWN~~HAVE NOT SEEN
THIS LAYER ANYWHERE
ELSE ON SITE

2'

YELLOWISH BROWN LARGE COBBLES

Mn STAIN, IRON STAIN

8'

9' RED BROWN

MOIST DARK BROWN w/ COBBLES

WEATHERED DIORITE

MORE MOISTURE AS DEPTH INCREASES

Mn & IRON STAIN

MAX DEPTH 18'

Location UBMCDate 9/15/08Project / Client DEQ-SRS09-SG TP -8

- 0-3" TOP SOIL DARK BROWN VEGETATIVE MAT
ALLUVIUM - - SILTY SAND
- 3"-6" ~~CONTAMINATED~~ SANDY SILT ~~VERY~~ DARK REDDISH
BROWN TRACE COBBLE & GRAVEL
ALLUVIUM CLAY
- 6'-9' YELLOWISH BROWN SANDY GRAVEL w/ COBBLE
~~CLAY/SILT~~ SATURATED
- 9' → 17' GRAY-YELLOWISH BROWN SANDY GRAVEL
w/ COBBLE & LARGE BOULDERS VERY WET
MAKING WATER @ 14'
TR ^{CLAY} CLAY/SILT

PICKET PCN N/A

SAMPLES COMPOSITE

GEOCHEMICAL

13' 6' ✓
4' - 7' - 9' ✓

PHOTOS 4 looking SOUTH (3) EAST (4)

Location _____

Date _____

Project / Client _____

CONT.

- 0' TOP SOIL w. DARK BROWN w/
SILTY SAND REDDISH
SANDY SILT VERY DARK BROWN
TR/ COBBLE & GRAVEL
- 6' YELLOWISH BROWN WET
- 9' COBBLE CLAY
YELLOWISH GRAYISH BROWN VERY WET
MAKING WATER
- 17' EXCAVATION HIT REFUSAL

Location UBMC -- Date 9/16/09Project / Client DEQ-SIS09-SGTP-9

0-4" TOPSOIL Dk BROW w/ CL CLAW'S

4"-2' COLLUVIUM SANDY SILT w/ COBBLES, BROWN
HIGHLY WEATHERED DIORITE --2'-6' SANDY GRAVEL w/ SILT & COBBLES, DRY YELLOWISH
HIGHLY WEATHERED DIORITE BROWN, DRY

6' → 9' SANDY SILT w/ CLAY COBBLES

~~Fe & Mn STAINING, IRON STAINING, DK YELLOWISH BROWN~~~~WEATHERED DIORITE~~✓
PHOTOS 3-

SAMPLES COMPOSIT 2'-9'

GEOCHEMICAL 2', 6', 9'

Location _____ Date _____

Project / Client _____

0-

4" TOPSOIL:

COLLUVIUM

2'

YELLOWISH
DK ~~LT.~~ BROWN DRY

6'

MOIST
YELLOWISH
DK. BROWN

9'

GRAVEL w/ SAND & SILT, TR COBBLES,

Fe & Mn STAINING, DK YELLOWISH BROWN, MOIST

PAYMASTER BORING 09-PM3H03 9/14/09

0-6 COLLOVIUM - SILTY SAND, TL GUL & COBBLES, BROWN
@ 3' CUTTINGS ARE GRAY → GROUND ROCK
HARD DRILLING & SLOW THROUGH THE COBBLES & BLDGS
DRILL IS GRINDING THE ROCK

@ 1 5/2' DRILLING & LITTLE CRACK

6' HIGHLY WEATHERED DIORITE SAND & GRAVEL, GRAY
@ 7 1/2' COLOR BECOMES GRAYISH BROWN

BOX 1

10-11.1 DIORITE, FRACTURED, FRACTURES Fe & Mn STAINED
DK GRAY 10" RECOVERY

11.1-15.7 DIORITE, FRACTURED, Fe & Mn STAINED DARK GRAY
LESS FRACTURES AT DEPTH RECOVERY 40"

15.3-16.4 DIORITE, FRACTURED Fe & Mn STAINED, DARK GRAY
RECOVERY 35"

16.4-20 DIORITE, FRACTURED, Fe STAINED FRACS 31" RECOVERY

20-23 RECOVERY 29" FRACTURED DIORITE

23-25 RECOVERY 16" FRACTURED DIORITE

END OF BORING 1:25 9/15/09

O'KEEFE DRILLING FORD F800 DIESEL RIG 212 HQ3

HSA START DRILLING 4:07

@ 5' @ 4:38

FINISHED W/ 2ND STEM @ 4:46

7 1/2 - 8' EASIER DRILLING, THEN BECAME TOUGHER AGAIN

STOPPED DRILLING @ 5:00 PM.

9/15/09 BEGAN DRILLING @ 7:00 A.M.

C 19.8' RAN OUT OF WATER

NO SS SAMPLES TAKEN IN OVERBURDEN (COLLOVIUM)
AS DRILL WAS CUTTING/CHIPPING THROUGH A BOULDER(S)
& SPOON WOULDN'T COLLECT ANY SAMPLES

09-PMB14-6 3" ϕ SS
 200 HOLE HAMMER
 QUICKWIND FOR
 HAMMERS

1	0-2'	107	FOR 2'	12-18	18-24"	
2	2-4'	29	30	32	43	
	3-4'	24	24	22	22	
4	6-8 1/2'	60	IN 5"	GRANUL FRAGMENT @ END OF SPOON		
5	9-10'	36	50	IN 5"	17" RECOVERY	
6	12-12 1/2'	50	IN 4"	4" RECOVERY		
7	14-15'	44	50	IN 3"	9" RECOVERY	
		50	IN 1"			

HOLE LEFT OPEN

∇ WD NONE
 ∇ AD NONE

∇ NONE 3:06 9/18/09

3" SPLIT SPOONS START OF BORING 1:50
 TOP 4' SCRAPED OFF TO MAKE DRILL PAD
 ↳ COLLOVIUM - SANDY SILT, W/ GUL, BROWN
 0-3' COLLOVIUM
 3- HIGHLY WEATHERED DIORITE SAND. W/OT, DK GRAY
 TR FE STAINING & Mn VEINLETS, & GUL
 @ 5 1/2' → 4" FE STAINED SEAM
 6-6 1/2' FE STAINED & Mn CONTING ON GULS (Cu TOO?)
 DRILLING A LITTLE STIFFER
 9-10 Fe & Mn SEAMS
 12-12 1/2 Fe & Mn SEAMS, DK BRN & DK GRAY, CLAYY GRANULA
 & SAND
 14-15 SAND W/ Fe & Mn SEAMS, TR GUL, DK GRAY, &
 DK YELLOISH BROWN
 15-16.1 DK GRAY W/ FE STAINING, DIORITE SPOCKLED W/ GRAY
 FOB = 16.1'
 DRILLING DEPTHS ARE NOT CORRECTED FOR CUTTINGS
 OF DRILL PAD.

END OF DRILLING 3:50

20	SS BLOW	COUNT	09-PMBH-2		9/16/09
DEPTH	0-6	6-12	12-18	18-24	NOTES
1 0-2	19	50 in 4"			
2 2-4	43	46	50/4"		
3 4-6	36	50/5"			
4 6-8	50 in 5"	DRILLERS NOTICING AN DIFFERENT ODOR IN CUTTINGS & SAMPLES SAID SMELLS LIKE A CYANIDE WORK PAD ODOR			
5 8-10	50 in 3"				
6 10-10½	50 in 5"				
7 12-12½	50 in 4"	ODOR NOT AS STRONG			TS 9/16/09 WET MOIST
8 5-10	DRILL CUTTINGS SAMPLE OF STRANGE ODOR				TS 9/16/09 WET MOIST
9 14-14½	50 in 5"				
10 16-16.1	50 in 1"				WET

T. SMITH 21

DRILLING, DEPTHS NOT CORRECTED FOR DRILL PAD CUT (~1½')

0-5' COLLUVIUM SANDY SILT, W/ GVL, TR COBBLES, BRN

5'-9' HIGHLY WEATHERED DIORITE, GRAVELLY SAND W/
FE STAINING, Mn STAINING GRAVEL, DK GRAY
-- ALL Fe & SOME Mn STAINING @ N 7'

19-11
~~TS~~ CLAY LAYER, Fe STAINING SHOWING UP IN CUTTINGS
TS 9/16/09

13½-15' SANDY SILT W/ CLAY MOTTLED DK YELLOWISH BROWN
& DK GRAY, Fe STAINED LENSES

@ 15' AUGERS STARTED GRINDING & DIORITE GVL IN CUTTINGS.
WEATHERED DIORITE

BOB 16.1' GW @ 16'

START OF DRILLING 7:00

STEVE, KEITH, DON

END OF DRILLING 9:20 HOLE OPEN

O'KEEFE

∇ WD 14½'

∇ 9.3' 2:53 9/18/09

∇ AD 16'

22	SPLIT SPOON	09-PMBH-1			
DEPTH	0-6	6-12	12-18	18-24	
0-2'	21	25	50	50	IN 5" GUL @ END
2-3'	37	50	IN 5"		GUL @ END OF SPOON
4-5'	29	50	IN 5"		
6-6.3'	50	IN 4"			< 1" RECOVERY
7-7.25'	50	IN 3"			

~~9.1-11.3~~ 7/16/09

9.1-11.3 21 1/2" RECOVERY

11.3-16.3 55" RECOVERY

16.3-21.3 53" RECOVERY

21-24.5" 18" RECOVERY - LAST FOOT OF CORING ADVANCED

FAST & WASH WATER COLOR TURNED GREENISH GRAY
 - APPEARS TO BE A CLAYEY SAND, GRAY BASED ON MATL
 RECOVERED FROM BOTTOM OF BIT - THE SAND & CLAY
 WERE WASHED FROM THE CORE BARREL.

CORE BOX 1 9.1-19.7'

CORE BOX 2 19.7-24.4'

START OF DRILLING 9:55
 END OF DRILLING 1:15
 DRILLING DEPTHS NOT COMPLETED FOR DRILL PAD CUT (< 6")
 0-3 1/2' COLLUVIUM -- SANDY GRANULY SILT, TR COBBLES,
 BROWN, DRY

-- Fe STAINED, COLOR BECOMES YELLOWISH BROWN @ 3'

-- GRAVEL IS Fe & Mn COATED, Fe SOAM @ 3'

3 1/2-7' HIGHLY WEATHERED DIORITE SILT & SAND, w/
 GRAVEL (Fe & Mn STAINED) DK YELLOWISH BROWN

-- DRILL GRINDING ROCK AT ~ 7'

-- AXELERD TO ~~7'~~ ^{ITS 9/16/09} & STARTED CORING 11:09

→ TAPE DROPPED DOWN HSA & MEASURED @ 9.1'
 BEART LOG WITH HQ3
 FOR START OF CORING, NEW BIT INSTALLED

7- DIORITE, DK GRAY, Fe, Mn, & Cu(?) COATED
 FRACTURES & JOINTS

11.3-16.3 ALTERNATING STAINS OF Fe STAINING SEEN BY FLUSH

WATER COLOR CHANGING FROM GRAY TO DK Y BRN
 ONDILED, HIGHLY FRACTURED
 @ 11 1/2' 2" Fe STAINS, 12, 14, 14 1/4, 15, 16.3, 17,
 17 1/2, 18.3, 18 1/2, 19 1/2, 20, 20 1/2

SOME STAINS ARE CLAY LINED, DK YELLOWISH BROWN

@ 22' 2" TURNED TO CLAYEY SAND, GRAY

24' 5" BOB HOLE BACKFILLED

STEVE KERR, DON
 O'KEEFE

24

09-PMBH-7

9/16/09

DEPTH	0-6	6-12	12-18	18-24
0-1	26	50 IN 5"		
2-2 1/4	50 IN 3"			
4-5 1/2	19	34	50 IN 5"	
6-8	12	23	22	21
8-9 1/2	+17	37	50 IN 5"	21
10-10 1/4	50 IN 3"			
12-12 3/4	28	50 IN 2"		
14-14 1/2	50 IN 1 1/2"			

25

DRILLING DEPTHS NOT CORRECTED FOR DRILL PAD CUT (1/4")

DRILLING STARTED 1:45 DRY ENDED AT 3:30

0-3' COLLUVIUM SANDY GRAVELLY SILT, TR CODDLES, BROWN

3-7' HIGHLY WEATHERED DIORITE SILTY SAND, TR SUL,
& Fe & Mn STAINING, DK GRAY & DK BROWN,

≡ GVL IS COATED W/ Mn, MOIST

7-14 1/2" SANDY CLAYGY SILT MOTTLED GRAY & DK
YELLOWISH BROWN, W/ Fe STAINED SEAMS &
Mn STAINED SEAMS, MOIST

-- @ 9' Fe & Mn CONTENT INCREASING, COLOR BECOMES
DK YELLOWISH BROWN

BOB 14 1/2"

≡ WD 9'

≡ AD DRY 2:49 9/18/09 ≡ DRY

09-SG BH-1

9/17/09

DEPTH	0-4	6-12	12-18	18-24
0-2		11/25		
2-4	2/50			
4-6	No sample	6/50		
4-8	3/50			
8-10	28	34	37	32
10-12	25	32	40	44
12-14	42	5"/50		
14-16	28	3"/50		
16-18	5/50			
18-20	1/50			
20-22	2/50			
22-24	3/50			
24-26	5/50			
26-28	4/50			
28-30	1/50 sm no sample	(LEFT OVERNIGHT DRY)		
30-32	4/50			
32-34	3/50			
34-36	3/50			
36-38	1/50			
38-40	3/50 no sample			
40-42	2/50			
42-44	3/50 no sample	(BEGAN CORE)		

CONTINUED

DRILLING DEPTH NOT COLLECTED FOR FULL PAD CUT

DRILLING STARTED @ 7:15 AT 30' DEPTH

CORE FROM 44' - 59'

- 0-11' SILT, w/ SAND & ROOTS, DK BROWN, DRY
 -- TR ~~CLAY~~ ^{IS 9/17/09 ARGILLITE} GRAVEL @ 1'
 -- TR CLAY @ ~ 7' ^{TIGHT} MOIST & Fe STAINING
 -- GUL IS Fe & Mn COATED @ ~ 12'
- 11'-25' HIGHLY WEATHERED ARGILLITE, SANDY SILT, TR
 GRAVEL, BROWNISH GRAY, DRY
 -- COLOR BECOMES BROWN @ ~ 17'
 -- COLOR BECOMES GRAY @ ~ 31'
- 25'-27' HIGHLY WEATHERED ARGILLITE
 SILTY SAND, TR GUL, BROWNISH GRAY, DRY
- 29'-
 WEATHERED ARGILLITE, w/ Fe STAINING, GRAY &
 YELLOWISH BROWN, DRY
 -- Fe STAINING CONTENT INCREASING, COLOR BECOMES
 YELLOWISH BROWN @ ~ 31'
 -- Fe CONTENT DECREASES & COLOR BECOMES GRAY
 @ ~ 39'

09-SG BH -2

9/17/09

DEPTH	0-6	6-12	12-18	18-24
0-2	1 8	27	50 IN 3"	
2-4	2 26	47	50 IN 5"	
4-6	3 34	34	23	23
6-8	4 50 IN 5"			
8-10	5 50 IN 2"	NO RECOVERY		
10-12	6 41	34	32	36
12-14	7 50 IN 5"			
14-16	8 50 IN 4"			
16-18	9 50 IN 4"	NO RECOVERY ON GRAVEL/COBBLES		
18-20	10 50 IN 3"			
20-22	11 3"/50			

STARTED CORING AT 22' 9/18/09

22-36' PORPHYRY, W/ Fe ^{9/18/09} & Mn COATINGS OF FRACTURES, FRACTURES ARE MOSTLY HEALED, PORPHYRY IS HIGHLY FRACTURED, GRAY. COATED FRACS ARE DK YELLOWISH BROWN. 22-27' 46" RECOVERY

29' -- STARTED LOSING & RECOVERING WATER CIRC. TRIPPED OUT BARREL. CORE FROM 27-29 20" RECOV
DRILLING AGAIN - NO WATER COMING TO SURFACE

29-32' 31" RECOVERY

32-36' 27" RECOVERY

@ ~33 1/2' IS A SANDY/RUBBLIZED ZONE THAT

MAY HAVE WASHED OUT - NO WATER CIRC IN 32-36' INTERVAL

DRILLING ENDED AT 9:30

DRILLING DEPTHS ARE NOT CORRECTED FOR DRILL PAPER CUT (1)

0-1 1/2' COLLUVIUM SILTY SAND W/ GVL & COBBLES, BROWN ^{DRY}1 1/2' - HIGHLY WEATHERED DIORITE - GRAVEL W/ SILT INFILLING, BROWN, GVL IS COATED W/ Fe & Mn, MOIST ^{DRY}

@ 3 1/2' -- BECOMES SANDY, TR GVL, DK GRAY, MOIST

@ 5 1/2' -- BECOMES GRAVELLY, MOIST, DK GRAY

11 1/2' - 17' SANDY GRAVELLY SILT, TR CLAY, DK GRAY & BROWN, GVL COATED W/ Fe STAINING

@ 17' - PORPHYRY FRAGMENTS MOTTLED GRAY &

36 EOD DK YELLOWISH BROWN W/ Fe STAINING

09-PMBIT-9		9/18/09		
DEPTH	0-6	6-12	12-18	18-24
0-2 ¹	7	14	18	10
2-4 ²	6	12	11	14 WBT
4-6 ³	7	14	14	12 WBT
6-8 ⁴	12	13	26	38 5 BRASS 6-6 1/2 6 LINERS 6 1/2-7
8-10 ⁷	46	50 IN 5"		
10-12 ⁸	46	50 IN 3"		
12-12 1/2 ⁹	50 IN 5"			
14-15 ¹⁰	37	50 IN 3"		
16-16 1/4 ¹¹	50 IN 3"			
18-18.3 ¹²	50 IN 4"			TS 9/18/09 7 1/2" RECOVERY ON GRAVEL
20-20.1 ¹³	50 IN 1 1/2"			
24-24 1/2 ¹⁴	SAMPLE FROM END OF BIT			

(BUILD UP OF ~ 1/2')

DRILLING DEPTHS DO NOT ACCOUNT FOR BOUNDING DRILL PAD

- 0-3 TOPSOIL -- PEAT, DK BROWN, DRY
- 3-7 1/2 VS LC, W/ FE STAINING, TR ROOTS, DK BROWN, WBT
-- R GRAVEL @ ~ 4'
- 7 1/2-9 SANDY GRAVEL, W/ SILT & Fe STAINING, DK BROWN & DK YELLOWISH BROWN
DIORITE (?)
OCCASIONAL SILTY SAND SEAMS
- 9 SILTY SAND, Fe & Mn COATED, V DK YELLOWISH BROWN
WBT, SEAMS OF Fe & Mn STAINING
OCCASIONAL SLIGHTLY OVERCONSOLIDATED
- 10 1/2-19 SILTY FINE SAND, TR GRAVEL, TIGHT, OXIDIZED, DK BROWN
SLIGHTLY OVERCONSOLIDATED
-- BECOMES FINE VS LC @ ~ 12'
-- HEAVIER Mn CONTENT @ ~ 13' w/ Mn SEAMS & Fe SEAMS. Mn NODULES.
- TS 9/18/09
14-15 -- BECOMES GRAVELY @ ~ 14 1/2' TO 15' TS 9/18/09
-- TRACE GRAVEL @ ~ 17'
- 19- CLEAN SAND, TR GRAVEL & Fe SEAMS & Mn NODULES, DK BROWN
- @ 21' RIG WAS BUCKING TO 24 1/2' ADVANCING SLOWLY
WEATHERED DIORITE, W/ Fe SEAMS & Mn & Fe NODULES, DK GRAY.
BOB ~ 24 1/2'

WD 4' STANDING WATER ADJACENT TO DRILL
PAD 4'4" PAD ON NATURAL GROUND

STARTED DRILLING 11:50
FINISHED DRILLING 2:10

09-PMBH-10

09/21/09

DEPTH	0-6	6-12	12-18	18-24	
0-2	7	9	16	19	9:30 A.M.
2-4	50-4" 50-4"	50-4"			
4-6	50-4"				WET
6-8	41	50-5"			BRASS LINER
8-10	13	22	22	26	"
10-12	14	23	19	25	"
12-14	20	14	16	18	"
14-16	7	15	26	50-5"	"
16-18	19	34	50-5"		NO SAMPLE
18-20	33	50-4"			"
20-22	50-3"				"
22-24	50-5"				"
24-26	46	49	50-4"		BRASS LINER
26-28	33	41	50-4"		NO LINER
28-30	2' WINFLOW	REDRILLED 2'			"
28-30.5	50-5"				BRASS LINER
29.5-	50-1"				B.B. @ 1:35 pm.

1/2' OF MATERIAL FOR DRILL P.H.D

0-3" TOPSOIL PETE NOT INCLUDING MATERIAL FOR DRILL P.H.D
 3"- USE OF BRASS LINES @ 6'

29.5 (B.B.) DRILL STARTED BULKING FOR LAST 1.5'

∇ 7'-4" 9/22/09

09-PM BH-5

9/21/09

DEPTH	0-6	6-12	12-18	18-24	
0-1'	11	50-5"			
1- 4 ⁵	50-5"				
4-6'	50-3"				
6-8'	50-3"				
8-10'	50-5"				
10'-12'	50-3"				
12'-14'	34	46	49	50-5"	MUST CLAY
14'-16'	25	19	32	46	
16'-18'	19	20	50-4"		
18-20'	50-3"				
20-22'	50-4"				
22-24'	50-4 1/2"				22' BOB DRY

DRILLING DEPTH DOES NOT INCLUDE 2' OF MATERIAL
REMOVED PRIOR TO DRILLING FOR DRILL PAD.

0-3" TOP SOIL DARK BLANK

3"-21' COALBEDDING W/ FE STAINING

~~2-4~~ ⁵ 4' WHITE GRAY ROCK FLAVOR & LITH'S FROM ABOVE

12' CLAY W/ FE STAIN

18' OUT OF CLAY

22' BOB

09-PM34-4

9/22/09

DEPTH	0-6	6-12	12-18	18-21
0-2	12	33	50 1/5"	
2-4	46	50 1/4"		
4-6	50 1/2			
6-8	50 1/2			NO SAMPLE
8-10		VERY HARD DRILLING TO	9.5'	NO SAMPLE

LO=12
 5m 6/22/09
 12-14

STARTED CORING @ 9.5'

11.6' FE SANDING ON HIGHLY WEATHERED DIORITE HIGHLY FRACTURED GRAY CORE W/ FRACTURES COARSED W/ YELLOWISH BROWN TO DARK BROWN STAINING RECOVERY 19"

16' 6" 60" OF RECOVERY HIGHLY FRACTURED

18' 8" - 21' LOST CIRCULATION PULLED CORE HIGHLY FRACTURED 27" OF RECOVERY

21' B.O.T. LOST BIT IN HOLE
 CORED UIC NWC1 NEAR 20' IS 9/22/09

COLUMN 15 6" BELOW GRADE

0-3' TOP SOIL VERY DK. BROWN DRY W/ ORGANICS
 3'-1.5' DARK BROWN W/ ROOTS SILT SAND W/ COBBLES
 1.5'-6' BROWN W/ DIORITE COBBLES SILT & SAND
 6'-9.5' VERY HARD DRILLING LITTLE MATERIAL
 RECOVERED W/ SPOONS HIGHLY WEATHERED
 DIORITE - ROCK CHIPS & FLOWER GRAY

@ 11.75' HIGHLY FRACTURED & OXIDIZED (Fe & Mn) TO ~ 12'
 DK YELLOWISH BROWN

CU VERTICALLY FROM 12 TO 21' (EOD)

CORE COLOR BECOMES DK GRAYISH GREEN
 FRACTURE FACETS ARE Fe & Mn COATED

09-PMBH-8

9/22/09

DEPTH	0-6	6-12	12-18	18-24
0-2'	3	24	39	21
2'-4'	17.	95	50/5"	
4'-6'	46	50/4"		
6'-8'	37	50/3"		
8'-10'	44	50/4"		
10'-12'	50/5"			
12'-14'	50/2"			
14'-16'	50/1"			

CONT.

DRILL PAD BUILT UP APPROX. 12" NOT INCLUDED

0-3" TOP SOIL ^{VERY} DARK BROWN MOSTLY ORGANICS

3"-4" SILTY SAND W/ COBBLES DARK BROWN

COULUM LIGN

6'→8' FE STAIN DIORITE SANDS YELLOWISH BROWN

STARTING TO GET HARD

8'-16.5' HIGHLY WEATHERED DIORITE SANDY SILT w/ GRAVEL

FE STAIN ON SEAMS & Mn STAIN ON SEAMS

MOST SANDY SILT DARK BROWN

16.5' B.O.B. 4:00

LEFT DEN

9/21/09 - CHECKED FOR WATER DRY

FILLED BORE HOLE

- 10-11-09 Hank Swift 9213 To 15 UBMC
 1220 @ Site 41°F 12k NW Wind, Cloudy
 light rain.
 1232 O'Keefe Drilling GWD1-A observation
 well @ ~ 40' - saturated
 med Gray SILT w/ little f sand,
 1.4% clay.
 1412 Prepping settlement survey area
 Triax T60 over nonwoven
 textile over grade @ 13400
 1538 settlement pad prepped w/
 textile, geogrid, 5 piezometers
 & 8 settlement gauges
 1540 42°F, lt rain, cloudy 15k NW wind
 1548 Initial survey done on settlement
 gauges
 1600 Water levels read on all
 piezometers
 1730 ~ 1/3 of surcharge is placed
 on settlement pad, - 6" rock from
 slope cut NW of pad and across
 road. Hauled w/ kamatsu 330 Truck, spread 1/2 SW
 off site

- 10-15-09 Hank Swift 09213 TO 15 UBMC
 0932 @ site 40°F, cldy, lt rain, 10-15k N wind
 Environ placing surcharge on
 settlement pad.
 O'keef Drilling @ site on GW01-A
 No drilling activity
- 1115 Done drilling on GW01-A
- 1315 Setting up rig on sump north
 piezometer
 discuss leaving south sump
 open over winter. It will be left
 open over winter
- 1348 Start drilling cased hole for north
 sump piezometer //
 0-11 little cuttings
 Med brown sandy & gravel w/ silt
 (fill)
- 11-13 Hard, Angular, dark gray
 rock chips w/ silty f.m
 SAND
- 13-17.5 Harder rock chip & dust
 - lighter gray
- 17.5-18 Fracture - tight
- 18-20 Same as 13-17.5
- 20- OPEN HOLE, 16' Cased

- 10-15-09 Hank Swift 09213 TO 15 UBMC
 2 20-21 Same as 18-20
 21-22 some subangular chips
 (tight Fracture)
 22-23 All hard angular chips
 (small)
- 23 Water, some oxidizing on
 chips (~ 5 ppm)
- 23-26 Same as 22-23
- 26-29 some oxidizing of some
 chip faces. Some sub-
 angular lt red/brown
 3/4" chips
- 29-38 Same as 23-26
- ~~1500 start 3rd sk~~
- 1508 Stop drilling @ 38'
- 1515 TPO East end of settlement pad
 medium lt gray saturated
 cohesive SILT Pocket Pen =
 0.0 TSF 22.8' deep ^{sample} ss gal barrel
 Extend to 8.5' - same PP = 0.0
 Sample ss gal barrel
 Extend to 13' - same
- 1630 47° cldy, 7k N wind
 Piezo installed in N sump Btt
 off site
- 1700

10-16-09 Hank Swift 09213 TO15 UBMC

0945 @ site 33°F Pt cldy, calm

- * O'Keef finished drilling south sump piezometer BH. some water @ 18' ~ 40 gpm @ 45'. Hole to 60'
- set 2 piezometers - 1" w/screen (20') @ bottom, 1" w/screen (20') @ 20'-center
- * Envirocon prep'g area to install 3, 24" CMP culverts @ stream crossing.

- * Pat (Piedmont) sampling in shave creek area

1200 Cldy, intermit, mod - SW wind

- * Drillers off site
- * culverts set & fill rough graded over them.
- * Envirocon pulling back south sump walls to 2:1 from bottom. - some material going to culvert grading

10-19-09 Hank Swift 09213 TO15 UBMC

0800 @ site, 37°F, cldy, calm

- 0811 * Talk to Don Sutton. He does not know when drillers will be @ site.

* Envirocon is grading south sump area.

- 0832 * Talk to Don @ O'Keef drilling. They are loading for site but have questions about materials for production wells. Don told them to add blank between screen sections so that screen would be @ separate levels depending on elevations found.

- 0836 * Talk to Don Sutton about Driller's questions. I observed that we didn't need to separate screens in a production well but have the screens in or spot toward the bottom to maximize extraction. Don will talk to O'Keef about materials actually needed (no blank) and what is needed for last piezo-meter that needs to be installed.

- 10-19-09 Hank Swift 09213 TO13 UBMC
 0935 Pat (Piedmont @ site)
 Talk w/ Pat & Don - sample tailings
 after taking water level and settlement
 readings on surcharge pad.
 1037 start excavating STP 5
 logged by Pat, locate by Don
 0-3.5 silty $\frac{1}{2}$ SAND w/ $\frac{1}{2}$ siltite
 over 18" of veneer fill
 west end, AS crest of dam
 3.5-15 Med gray silty SAND
 w/ siltite SP-SM NP
 orig tailings?
 some $\frac{3}{4}$ " $1\frac{1}{4}$ " sedimentation
 layers observed in blocky
 extraction
 loose to compact
 Beds 30° ~~E~~ down to ~~W~~
 20° N down to S
 3 Photos

- 10-19-09 Hank Swift 09213 TO13 UBMC
 1159 Excavate STP 6
 0-20" Med olive green moist
 silty $\frac{1}{2}$ SAND w/ $\frac{1}{4}$ NP SP-SM
 20"-32" Olive Brown silty $\frac{1}{2}$ SAND
 some elastic silt stringers
 oxidized NP
 32"-15' same as 0-20' w/ finer
 silt layers 2 Photos
 1302 Excavate STP 7
 0-15" Red/Brown silty $\frac{1}{2}$ SAND SM
 15"-14' Med gray silty $\frac{1}{2}$ SAND SM
 w/ clay or elastic silt
 stringers NP, moist
 wetter @ depth & wider
 silt stringers
 Caving
 1336 Drilled @ site Foremost DR-24 HD
 1515 Drill piezometer GW2a (last)
 0-3. Road fill - Easy little cuttings
 3-17 Med Brn sandy subangular
 $\frac{1}{2}$ -c gravel, some silt, little
 clay (Cased)
 Add 20' casing

10-19-09 Hank Swift 09213 TOIS UBMC

17-22 same as 3-17'

22-25 Brn silty S-m SAND

25-28 dk gray angular Rockchips
w/ olive brn silty S-m SAND.

Highly fractured rock

28 Terminate casing

28-32 Hard Rock - fractured

32-33 More fracturing

33-38 ~~More~~ Same as 28-32

38 Muddy water ~ 2 gpm

38-58 Hard Rock, water clears up
and increases w/ depth ~ 4 gpm
(magnetic)

1730 6 Test pits have been excavated and
sampled around the north end
of the impoundment. 2 in dam
fill, 4 in tailings

1745 Off site

10-20-09 Hank Swift 09213 TOIS UBMC

0815 * @ Site after discussing site
activities via email w/ C. Home,
* 30°F, cldy, fog, calm

* O'Keef installing last piezometer
on 58' hole drilled yesterday.

* Environ rebuilding access road
along south side of impoundment
dam - hauling rock from borrow
source.

0925 Hole caved, O'Keef drill out and
set additional casing

1041 Excavate STP 11

0-3" same as 3" oxidized Med Brn

3"-11.5 Med gray saturated
No water elastic silt (MH)

Leave stockpile to monitor
Δ moisture over time. TP sited

in w/ surrounding material.
Small spring entering impoundment
just to SE of TP

1122 STP 12

1134

same as STP 11
9' of add'l casing added
to GW2a. Piezo set, sand pack
and sealed.

same very thin
& sandy layers

10-20-09 Hank Swift 09213 TO15 UBMC

1026	Piezo	stickup	Depth
	Sump-N	1' 11 1/2"	9.90'
	Sump-S Bed Rock	2' 4 1/2"	6.68'
	Sump-S Alluvial	2' 4 1/2"	7.92'

1156 STP 13 in stockpiled material west side, south of Sed pond mixture of material in STP 11 & 12 & Olive Brn f SAND w/ little silt (SP-SM)

1301 Drill GW26 (40°F, calm, cldy)
 0-3 1/2 Soft Road fill
 3-18 soft, wet Med Gray SILT - Tailings MH
 15 No cuttings - smear on drill stem
 18 weld 2nd length of casing to 16' base w/ 4' stick-up
 18-30 same as 3-18'
 30-36 olive brown silty F-C SAND w/ some f gravel (SM) Alluvium
 36-38 color A to Med Ark Brn harder drilling

10-20-09 Hank Swift 09213 TO15 UBMC

38' add 3rd stem - no casing
 water @ restart of drilling (~6 gpm)
 38-50 It brn to med gray angular to subangular rock chips w/ some staining on some faces - weathered rock.

50-57 Hard drilling angular dark gray rock chips (magnetite?) and some angular medium brn and green rock chips & dark dark blue-green chips - small water flow @ ~12 gpm
 Weathered Rock

57-58 same as above w/ quartz in the dark blue-green chips (granite?)
 58' add 4th stem

58'-69 same as above, flow ~27 gpm
 1448 cut off drilling. Don say to drill in 12" TB". production well in this location.

1505 40°F, calm, cldy
 1550 Talk to Craig Horne about well activities. He said sealing casing into 10' of fractured rock is ok

10-21-09 Hank Swift 09213 TOIS UBMC

0830 @ site 31°F, fog, calm

0841 * Don & Pat will be sampling below
Dam to determine continuation
of streambank extent

* O'Keefe removing 8" casing from
GW26

0901... 8" casing removed

1046 Start drilling 12" ϕ w/casing (19")
& hammer bit (7')

1112 Add 7' add'l casing continue drilling

1207 Add 20' add'l casing; 20' drill rod
continue drilling

1245 check TPs below dam.
5 TP excavated. Tailings
randomly observed as to
depth and disposition. No
consistency. Marker may be
black oxide coated rock @
4'-5'. River Group (4) @
TPs.

1430 3rd drill rod & 3rd 20' piece
of casing on and drilling
50' down - no water - hard drilling
dry dust @ exhaust,

10-21-09 Hank Swift 09213 TOIS UBMC

1452 Gravel Pack delivered (3 yd³)
= 3/8" chip rock not rounded
pea gravel.

1622 Hole @ 80' - No water

1645 Depth to water 28.82'
stick up 1' 8.5"
water level in GW2a

1705 @ area in creek below dam
Discuss GW26 well status
w/ Don Sutton.

1745 Off site to make phone calls

1830 Talk to S. Haaland about
GW26. She wants to pump
piezos and observe recovery
prior to drilling GW1. I will
check water level in GW26
in the morning.

1900

Talk to C. Horne about GW26
and discussion w/S. Haaland.
He would like to leave GW26
open for a few days to check levels.
He stresses that GW1 needs to be
placed @ the spring location.

10-22-09 Hank Swift 09213 TO15 UBMC
 0728 @ site, 38°F, Cldy, Rain, Mod Wind^{NW}
 Talk to drillers about leaving casing
 in GWZ6 for a few days. He said that
 they would need to get more casing
 if they leave it in GWZ6 and drill
 Gw1 @ same time. They will remove
 drill steel only for now and wait
 to see what is decided by Don Sutton.

0908

Drill steel tripped out

0918

Sound GWZ6

Depth to TOC 50.80'
 stick up 5'0"
 Depth bgs 45.80'

0939

Depth to TOC 50.0'
 Depth to Bottom 78.0'
 Water Column 28.0'
 Water level bgs 45.0'

0954

blow out water @ 55'

1005

blow hde dry @ 80'

1015

Water level TOC 84.32

1027

Total depth TOC 85.0' after blow

1045

Water level TOC 83.22'

1100

" " " 82.73'

1115

" " " 82.23' 2.09'

10-22-09 Hank Swift 09213 TO15 UBMC
 1030 Waterlevel TOC 83.71

1053

Remove Transducer

Depth TOC = 39.52' TDMW-7D

1057

Replace Transducer

1142

GWZ-A 28.60

PZ1B 10.81

1149

PZ9A Pull Transducer

1151

Place Transducer - 11.68'

1250

GWZ-6 sounding 79.31

Record impoundment piezometers
 w/ Don Sutton - Don recording
 data while I operate level
 meter. (summarize on Page 38)

1320

Meeting w/ T. Smith, S. Kaaland,
 D. Sutton, H. Swift.

Don will analyze current
 data to decide if GWZ-6
 should be abandoned.

10-22-09	Hank Swift '09213	TOIS UBMC
Time	Piezo ID	Depth Top of Pipe
1146	PZ 1B	10.81'
1149	PZ 9A	11.68'
1155	PZ 2C	29.03'
1159	PZ 2B	29.34'
1207	PZ 08	13.31'
1211	PZ BSA	14.44'
1212	B	39.16'
1213	C	39.56'
1216	PZ B6 short	37.21'
1218	tall	38.58'
1219	GN1-A	36.65'
1221	PZ4 tall	11.63'
1222	short	19.99'
1224	PZ B07A	dry
1225	B	30.44'
1226	GN1-C	37.31'
1231	PZ 3-B-D	32.35'
1232	PZ 3-A-A	6.01'
	B5	0°
		0B
	↑	0A

10-26-09 Hank Swift '09213 TOIS UBMC
 1532 Talk to Don Sutter about work @ UBMC
 * Get notes from Larry (O'Keefe)
 * GPS New piezos
 * GPS Sump
 1538 Talk to Larry @ O'Keefe. He said he would be out Tues, between 0800-0930. I told him the well (GN26) would be backfilled to 5-10' below soil/Rock interface and that fill material would be required as well as gravel pack

10-27-09
 0835 @ site, snow. 28°F
 Drillers @ site backfilled well sump. N
 NW-N 47.02402°
 W 112.35244° 28
 SW N47.02405°
 W 112.35231°
 SE N47.02424°
 W 112.35212°
 NE N47.02407°
 W 112.35210°

10-27-09 Hank Swift 09213 7015 UBMC

Pump Pad

SE N 47.02412

(spring) W 112.35201

SW N 47.02409

W 112.35203

Sump Piezo N 47.02407

W 112.35206 201

Sump Piezo N 47.02418

W 112.35277

GW2a N 47.02480

W 112.35356

1005 GW2B Backs. led to a 45' bag

Hang & weld screen to 8" w" 2"

1018 Set 8" Pipe & screen

1048 Weld cover on 8" Pipe

1132 2 55 gal barrels of gravel were placed and 30' of 12" casing removed (20' in gravel)

1146 add 3rd Barrel gravel measure 24' bag to top of screen. 25 bags and 3 bags of 2" diameter chips

10-27-09 Hank Swift 09213 UBMC

1155 N 47.02565

GW2F

W 112.35365

Settlement Pad

NW N 47.02581

W 112.35370

SW N 47.02583

W 112.35362

NE N 47.02585

W 112.35358

SE N 47.02610

W 112.35330

S2 N 47.02596

W 112.35342

S5 N 47.02595 612

W 112.35342 31

S-8 N 47.02606

W 112.35321

S7 N 47.02576

W 112.35352

S1 N 47.02575

W 112.35360

S3 N 47.02565

W 112.35355

S4 N 47.02565

W 112.35371

10-27~~00~~ Hank Swift 09213 TOLS OBM

1214 12' removed - All

1232 28.90' TOP

2.18 stick up

1245 26.72 GWS - WL GW2B

109 Well Cap installed & Pipe backfill
complete

GW1A N 47.027685

W 112.3543243

GW1C N 47.027181

W 112.3538078

1349 Snow 20°F

1432 O'Keefe Demob Drill Rig &
service truck/trailer. Steam
truck parked @ WTP

1433 off site

45
Data Summary Report

Discuss variances from
SAP Analytical Criteria
and others

Appendix I: Hardness Calculations

UBMC- Aquatic Life Standards
Adjusted for Hardness at Mike Horse Site

Analyte	Hardness		Sample ID	Acute	Chronic	Acute	Chronic
	(mg/L)	ln(hardness)		Standard	Standard	Standard	Standard
				(ug/L)	(ug/L)	(mg/L)	(mg/L)
Cadmium	250	5.521460918	TDMW-2S	5.41	0.53	0.005415	0.000534
Cadmium	103	4.634728988	TDMW-4D	2.20	0.28	0.002198	0.000277
Copper	250	5.521460918	TDMW-2S	33.19	20.41	0.033192	0.020411
Copper	103	4.634728988	TDMW-4D	14.39	9.57	0.014394	0.009568
Lead	250	5.521460918	TDMW-2S	262.12	10.21	0.262125	0.010215
Lead	103	4.634728988	TDMW-4D	84.78	3.30	0.084776	0.003304
Zinc	250	5.521460918	TDMW-2S	260.43	260.43	0.26043	0.26043
Zinc	103	4.634728988	TDMW-4D	122.86	122.86	0.122855	0.122855

UBMC- Aquatic Life Standards
Adjusted for Hardness at Paymaster Site

Analyte	Hardness		Sample Site	Acute	Chronic	Acute	Chronic
	(mg/L)	ln(hardness)		Standard (ug/L)	Standard (ug/L)	Standard (mg/L)	Standard (mg/L)
Cadmium	141	4.94875989	PMGW-116	3.02	0.35	0.003025	0.000349
Cadmium	36	3.583518938	PMGW-118	0.76	0.13	0.000755	0.000127
Copper	141	4.94875989	PMGW-116	19.35	12.51	0.019351	0.012512
Copper	36	3.583518938	PMGW-118	5.35	3.90	0.005346	0.003897
Lead	141	4.94875989	PMGW-116	126.44	4.93	0.12644	0.004927
Lead	36	3.583518938	PMGW-118	22.24	0.87	0.022238	0.000867
Zinc	141	4.94875989	PMGW-116	160.31	160.31	0.160306	0.160306
Zinc	36	3.583518938	PMGW-118	50.42	50.42	0.050416	0.050416

UBMC- Aquatic Life Standards
Adjusted for Hardness at Shave Gulch Site

Analyte	Hardness		Sample Site	Acute	Chronic	Acute	Chronic
	(mg/L)	ln(hardness)		Standard (ug/L)	Standard (ug/L)	Standard (mg/L)	Standard (mg/L)
Cadmium	400	5.991464547		8.73	0.76	0.008731	0.000756
Cadmium	25	3.218875825		0.52	0.10	0.000521	9.69E-05
Copper	400	5.991464547		51.68	30.50	0.051684	0.030499
Copper	25	3.218875825		3.79	2.85	0.003792	0.002853
Lead	400	5.991464547		476.82	18.58	0.476818	0.018581
Lead	25	3.218875825		13.98	0.54	0.01398	0.000545
Zinc	400	5.991464547		387.83	387.83	0.38783	0.38783
Zinc	25	3.218875825		37.02	37.02	0.037016	0.037016