MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

Permittee:	Saddleback Ridge Homeowners Association, Inc.
Permit Number:	MTX000143
Facility Name:	Saddleback Ridge Water Treatment System
Facility Location:	Southeast of Section 06, Township 02 South, Range 24 East Latitude: 45.68443º North; Longitude: 108.80569 West; Yellowstone County
Facility Address:	2070 Ranch Trail Road, Laurel, MT
Facility Contact:	Jon Rutt, Operator
Receiving Water:	Class III Ground Water
Number of Outfalls:	One
Outfall/Type:	001 – Industrial

I. PERMIT STATUS AND CHANGES

The following fact sheet outlines the basis for renewing the existing MGWPCS wastewater discharge permit to Saddleback Ridge Homeowners Association, Inc. for the Saddleback Ridge Water System located near Laurel. The 2010 administrative record along with the updated MGWPCS permit provide the basis for the development of the effluent limits and the monitoring requirements outlined within this fact sheet. The scope of this permitting action is for the operation and maintenance of an existing drinking water treatment and disposal system.

The Montana Ground Water Pollution Control System (MGWPCS) permit was first issued to Saddleback Ridge, Inc. in May of 2004. The permit was modified in January of 2009 to reflect the current permittee. The permit was renewed in September of 2010. DEQ received a permit renewal application to renew the permit on April 20, 2015.

The permittee maintains a DEQ public water supply (PWSID: MT0004408) for this water treatment and distribution system.

Permit Changes

Permit effluent limitations (Section IV) and sampling requirements (Section V) have been updated to reflect effluent characteristics (Section II) reported over the past permit cycle.

Permit effluent sampling requirements (Section V) have also been updated to reflect best management practices and site-specifics operations.

II.FACILITY INFORMATION

A. Facility Location

The facility is located approximately 1.5 miles northwest of Laurel within the Saddleback Ridge Estates Subdivision. The subdivision is bounded by the Laurel Golf Club to the south and Golf Course Road to the east.

B. Facility and Operations

The Saddleback Ridge Estates Subdivision's domestic water supply originates from two onsite public water supply wells (Figure 2). The raw ground water is first treated with an antiscalant agent (Avista Vitec 3000) that contains phosphonic acid compounds used to precipitate out calcium sulfate. The water is then sent through one of two (2) sand filters (5 micron), then through one of three (3) reverse osmosis units (Figure 3). The treated drinking water is then blended with a small amount of raw water and is distributed to individual homes for consumption and disposal.

The reject water from the water treatment system is sent in sequence through two (2) individual 500 gallon settling (precipitate) tanks (Figure 3). The water is then pumped to an infiltration pit (Outfall 001) located approximately 1,100 feet to the north east of the treatment building (Figure 2).

At full capacity, the facility is able to treat up to 50,000 gallons per day (gpd) of raw ground water. Optimum treatment conditions produce treated domestic water at approximately half (50%) of the raw water volume (25,000 gpd maximum). The facility reject water (25,000 gpd) will contain most of the ground water minerals and pollutants. The applicant has reported that the system is currently operating at a 45% recovery rate in order to meet the 2010 permit effluent limit for specific conductivity (Appendix I).

All waters (both produced and reject waters) are eventually disposed of on-site through individual household septic systems or the treatment system's infiltration pit. The water may eventually infiltrate back to the ground water aquifer where it originated from (public water supply wells). Some water may be lost due to evaporation.

This permit authorizes the operation and disposal of the reject water (wastewater).

Table 1: Collection, Treatment, and Disposal System Summary
Outfall 001 - Industrial Wastewater
Method of Disposal: Infiltration into the ground
Disposal Structure: Infiltration pit (Outfall 001) Southeast of Section 06, Township 02 South, Range 24 East Latitude: 45.68724º North; Longitude: 108.80771º West
Contributing Sources of Wastewater (Standard Industrial Code): Water treatment (4941)
Disposal System Design Flows: Average Daily (gpd): 25,000 Daily Maximum (gpd): 25,000
Effluent Sampling Location, EFF-001: Second stage settling tank, just prior to infiltration pit pump within the water plant building.
Flow Monitoring Location: Located in a riser just prior to infiltration pit. Flow Monitoring Equipment, FM-001: Neptune T-10
Treatment: Sand filters, and three (3) reverse osmosis units.

C. Effluent Characteristics

Pursuant to ARM 17.30.1023, DEQ requires the applicant disclose the quality of the effluent to be discharged such that the potential pollutants are identified, and the proposed discharge can be analyzed with terms and conditions incorporated within the permit to prevent pollution of state water consistent with the Montana Water Quality Act, 75-5-101, et. seq., Montana Code Annotated (MCA). The permittee has collected and reported wastewater samples throughout this permit cycle. A summary of the effluent quality data for Outfall 001 can be found in Appendix I.

D. Hydrogeologic Characteristics

Authorization for discharge from Outfall 001 is to ground water. The Department's project records do not include a site specific hydrogeologic characterization for the first (shallow) groundwater underlying the infiltration pit. Therefore, little information regarding local hydrogeology is known.

Regional hydrogeology characteristics can be obtained from the Montana Bureau of Mines and Geology (MBMG) investigation report titled: Hydrogeology of the West Billings Area (Olson, 2002). Supplemental materials from this investigation were submitted to the Department as part of application materials (DEQ, 2010). The ground water flow direction map indicates a generalized regional flow to the southeast. The report characterizes the regional hydrogeology as being an unconfined to semi-confined aquifer system. Ground water is primarily produced from relatively thin gravel sheets underlying the alluvial terrace surfaces. The gravel sheets are overlain by fine grained alluvial and colluvial sediment, and is underlain by shale.

The on-site public water supply well logs (GWIC: 181029, 187150) indicate a sand and gravel water bearing zone 94 to 104 feet below ground surface (ft-bgs) overlying a shale. This is similar to other water well logs in the area (GWIC: 161097).

No monitoring wells have been established to monitor the receiving water in the immediate vicinity of outfall 001 (infiltration pit). The nearby public water-supply wells however are believed to be installed in the first ground water and will be representative of the background water quality of the receiving water.

E. Ground Water Quality Characteristics

Class of use for the receiving ground water was established in a previous statement of basis (DEQ, 2004) as Class III. ARM 17.30.1006(3) defines Class III ground waters as those having a natural specific conductance that is greater than 2,500 and less than or equal to 15,000 µS/cm (at 25°C). Class III ground water is not a high quality state water body and provides fewer beneficial uses (Section IV). 2015 samples collected from the public water-supply wells confirm this classification with an average specific conductivity of 4,805 µS/cm. A table summarizing ambient ground water quality data is provided within Appendix II.

The shallow ground water quality is shown to have elevated levels of total dissolved solids (TDS), sulfate, and selenium. These elevated levels may generally affect the beneficial uses of the aquifer. A summary of these parameters is as follows:

- TDS in the shallow ground water aquifer is 4,515 mg/L (Appendix II). TDS is generally considered to be an indicator of the overall water quality of ground water.
- Sulfate in the shallow ground water aquifer is 2,578 mg/L. Elevated sulfate levels are known to cause undesirable aesthetic effect such as causing a salty taste.

- Selenium in the shallow ground water aquifer (0.062 mg/L) is greater than the respective Montana DEQ Ground Water Human Health Standard (0.050 mg/L). Selenium is listed as a toxic with potential health effects.

III.MIXING ZONE

The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. A ground water mixing zone has not been authorized by DEQ to date. The applicant has not requested a ground water mixing zone for this permit renewal. DEQ has not authorize a ground water mixing zone for this permit renewal.

IV.PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715. The bases for deriving and establishing effluent limitations are further discussed in Appendix III. Based on the information and analyses presented in Sections III and IV, pursuant to ARM 17.30.1031, DEQ proposes to maintain the following numerical effluent limitations:

Table 2: Final Effluent Limits – Outfall 001

Parameter	Units	Daily Maximum(1)	Rationale
Nitrogen, Nitrite+Nitrate (as N)	mg/L	10.0	Beneficial Uses
Specific conductance	µS/cm	7,000	Beneficial Uses

Footnotes:
Beneficial Uses: ARM 17.30.1006
(1) See definition in Part V of permit.

V.RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and therefore water quality standards. Effluent monitoring will be maintained as a condition of this permit. Monitoring requirements and respective rationale are summarized in Appendix IV.

VI.SPECIAL CONDITIONS

Special conditions have not been established. Information in regards to the Effluent Sampling Standard Operating Procedure (SOP) Plan is located in Appendix IV.

VII.COMPLIANCE SCHEDULE

A compliance schedule is included to allow a reasonable opportunity for the permittee to attain or maintain compliance with permit requirements. The action listed in the table below must be completed on or before the listed scheduled completion date. A report documenting the action must be received by DEQ on or before the scheduled reporting date. Completion of all actions or deliverables must be reported to DEQ in accordance with Part II.D and Part IV.G of the permit.

Table 3: Compliance Schedule

Authority	Action	Freq.	Scheduled Completion Date of Action(1)	Scheduled Report Due Date.(2)
ARM 17.30.1031	Develop and implement (or update) a site specific Standard Operating Procedure (SOP) plan for effluent sampling.(3)	Single event	*Within one year of the permit effective date.*	*Due on or before the 28th day of the month following the completion date*

Footnotes:
(1) The actions must be completed on or before the scheduled completion dates.
(2) A report must be received by DEQ on or before the scheduled report due date. The reports must include all information as required in Section V (Appendix IV).
(3) The completed plan (action), in place of a written report, must be received by the DEQ on or before the scheduled "report" due date.

VIII.NONSIGNIFICANT DETERMINATION AND REASONABLE POTENTIAL ANALYSIS

In 2004, DEQ determined that the receiving ground water is Class III and therefore not a high quality water of the state. Recent ground water quality samples confirm this classification. Pursuant to ARM 17.30.1006(3), nondegradation provisions do not apply to Class III ground water. In addition, public water supply systems that are designed to protect the public health may also be considered to be a nonsignificant activity (75-5-317, MCA).

DEQ is therefore not required to conduct a significance determination (ARM 17.30.715). The applicable beneficial uses for Class III ground water are summarized in Appendix III. This permit includes monitoring, reporting, and corrective action requirements to establish, confirm, and maintain compliance with permit limitations.

IX.PUBLIC NOTICE

Legal notice information for water quality discharge permits are listed at the following website: http://deq.mt.gov/Public/notices/wqnotices. Public comments on this proposal are invited any time prior to close of business on **November 08, 2017.** Comments may be directed to:

DEQWPBPublicComments@mt.gov

or at:

Water Protection Bureau
PO Box 200901
Helena, MT 59620

All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit. DEQ will respond to all substantive comments pertinent to this permitting action and may issue a final decision within thirty days of the close of the public comment period.

All persons, including the applicant, who believe any condition of the draft permit is inappropriate, or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing). All public comments received for this draft permit will be included in the administrative record and will be available for public viewing during normal business hours.

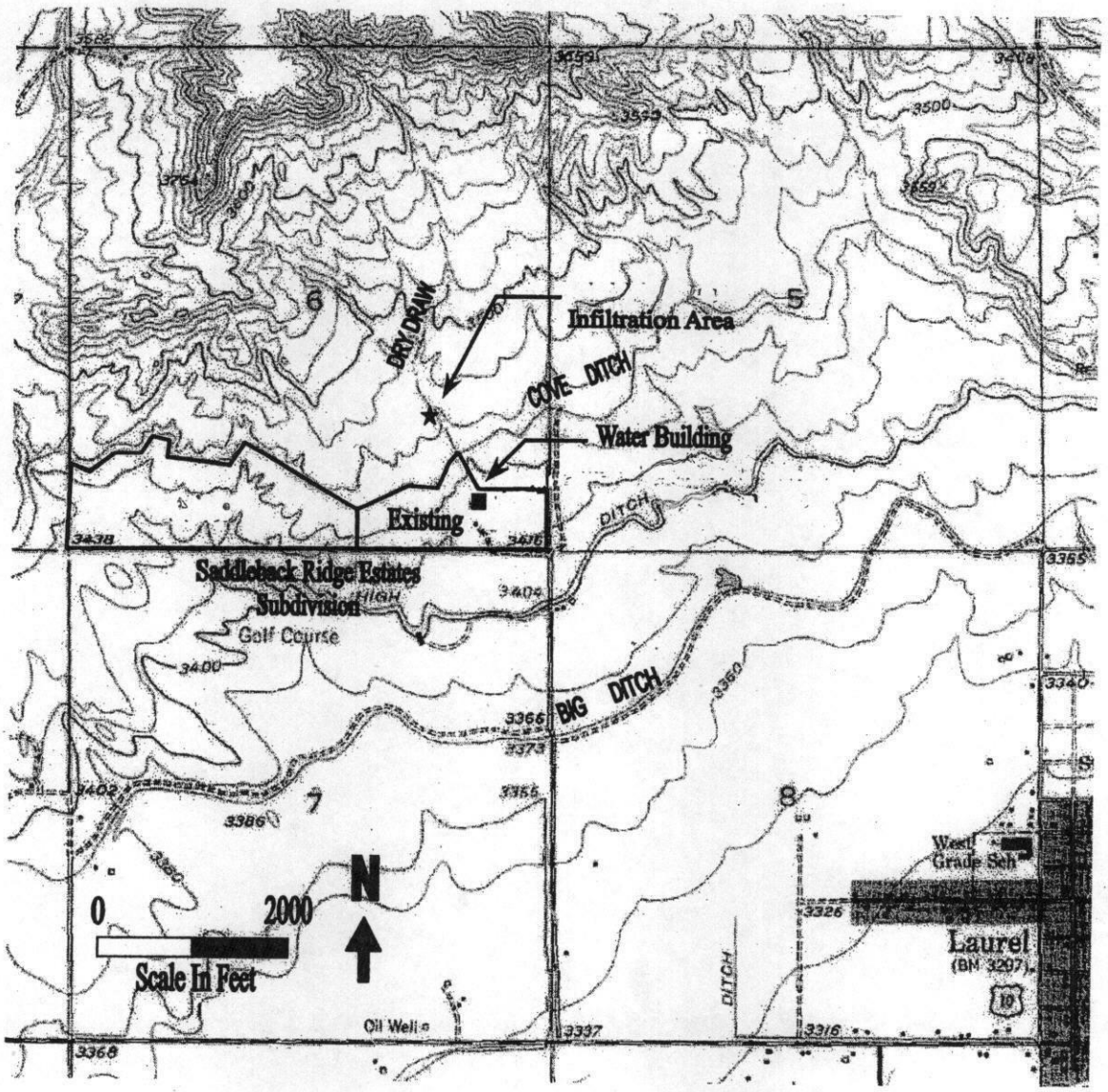
Copies of the public notice were mailed to the applicant, state and federal agencies and interested persons who have expressed interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this draft permit. Electronic copies of the public notice, draft permit, fact sheet, and draft environmental assessment are available at the following website: http://deq.mt.gov/Public/notices/wqnotices.

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000143), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, DEQ will accept requests for a public hearing. A request for a public hearing must be in writing and must state the nature of the issue proposed to be raised in the hearing.

FIGURE 1 – Vicinity Map

Figure 1
MTX000143
Saddleback Ridge
Vicinity Map



Area Map
Saddleback Ridge Estates Subdivsion
Section 6, T.2S., R.24E.
Yellowstone County, MT

FIGURE 2 – Site Map


Flow Meter, FM-001
Infiltration Pit, Outfall 001
Cove Ditch
Public Supply Well, Well 1 (WL002) West, GWIC ID:181029
Public Supply Well, Well 2 (WL003) East, GWIC ID:187150
Water Treatment Plant
Ranch Trail Rd
Ranch Trail Rd
Saddleback Dr
Saddleback Dr
Golf Course Rd
Figure 2
MTX000143
Saddle Back Ridge
Site Map
N
Laurel
1.9 miles via Old
U.S. Hwy 10

FIGURE 3 – Line Diagram

Figure 3

MTX000143

Saddleback Ridge

Water Treatment and Disposal System Line Diagram

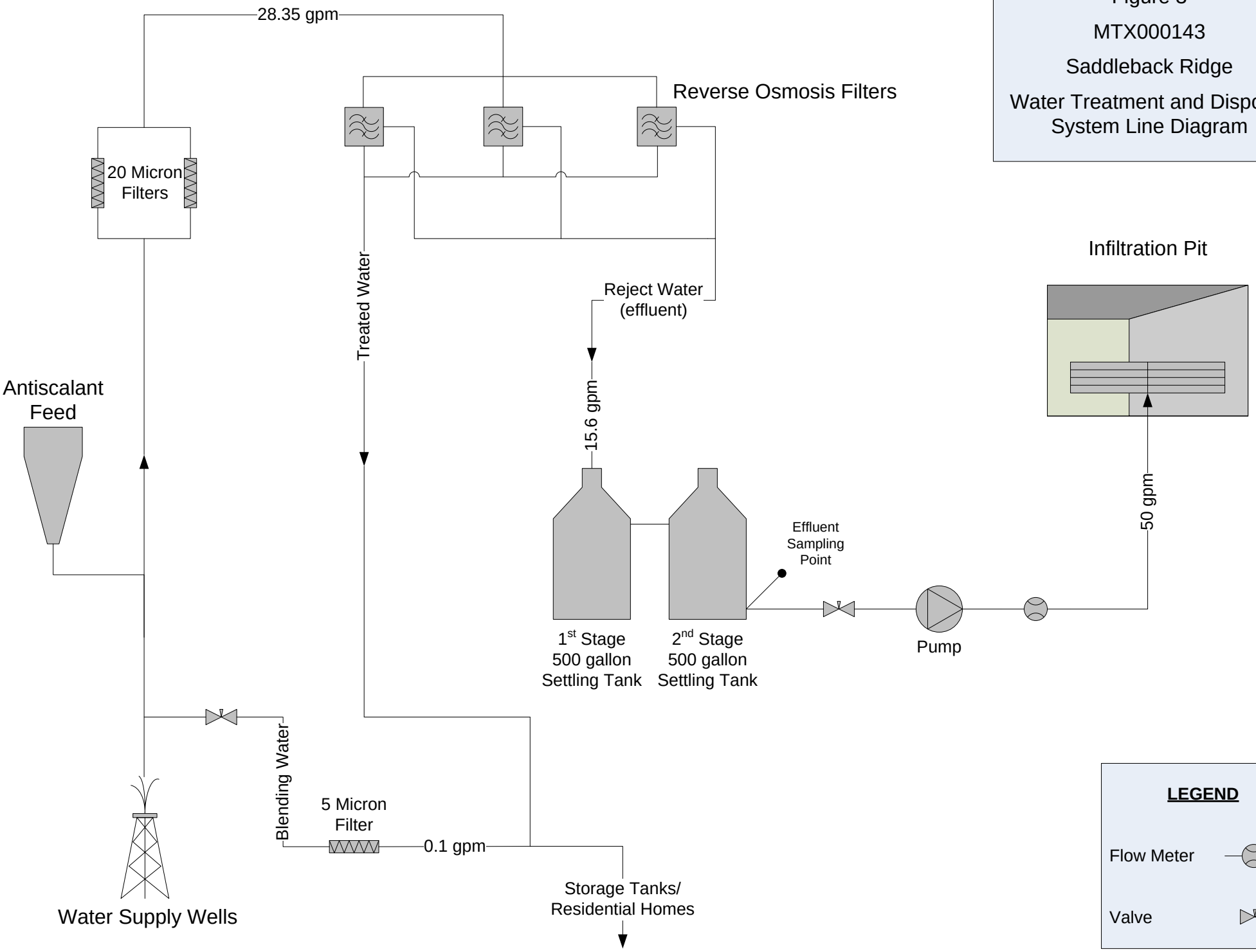


FIGURE 4 – Well Logs

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (6/9/2010 2:20:43 PM)

Site Name: SADDLE BACK RIDGE-PICARD SAM *WELL #2
GWIC Id: 187150

Section 1: Well Owner(s)

1) SADDLE BACK RIDGE-PICARD SAM (MAIL)
PO BOX 21325
BILLINGS MT 59101 [10/12/2000]

Section 2: Location

Township	Range	Section	Quarter Sections
02S	24E	6	NW¼ SE¼

County	Geocode
YELLOWSTONE	

Latitude	Longitude	Geomethod	Datum
45.688297	-108.809952	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot
SADDLE BACK RIDGE		

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, October 12, 2000

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	104	7

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	104	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
104	104	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	

Section 7: Well Test Data

Total Depth: 104
Static Water Level: 65
Water Temperature:

Air Test *

30 gpm with drill stem set at 102 feet for 1 hours.
Time of recovery 0.5 hours.
Recovery water level 65 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	2	TOPSOIL
2	20	BROWN STICKY CLAY
20	94	BROWN CLAY WITH SMALL LAYERS OF GRAVEL
94	104	SAND AND GRAVEL
104	104	BLACK SHALE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: AMERICAN DRILLING & SUPPLY
License No: WWC-344
Date Completed: 10/12/2000

WELL #2 025 24E 06 DB

MONTANA WELL LOG REPORT

Form No. 603 R2-99

Well ID# _____

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with DNRC within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.**

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:
Name SADDLE BACK RIDGE - SAM PICARD
Mailing address P.O. BOX 21325
BILLINGS, MT 59101

2. WELL LOCATION: List ¼ from smallest to largest
___ ¼ ___ ¼ NW ¼ SE ¼, Section 6
Township 2 N/S Range 24 E/W County Yellowstone
Lot ____, Tract/Blk ____ Subdivision Name SADDLEBACK RIDGE
Well Address LAUREL, MT
GPS ☐ Yes ☐ No
Latitude _____ Longitude _____
Error as reported by GPS locator (± feet) _____
Horizontal datum ☐ NAD27 ☐ WGS84

3. PROPOSED USE: ☑ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☐ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:
☑ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☑ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:
Borehole:
Dia. 7 7/8 in. from 0 ft. to 104 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:
Steel: Wall thickness .250 ☐ Threaded ☑ Welded
Dia. 6 in. from +1 ft. to 104 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☐ Threaded ☐ Welded
Dia. _____ in. from _____ ft. to _____ ft.

Perforations/Slotted Pipe:
Type of perforator used open bottom
Size of perforations/slots ____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens: ☐ Yes ☑ No
Material _____
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed: ☐ Yes ☑ No
Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Packer: ☐ Yes ☑ No
Type _____ Depth(s) _____

Grout: Material used Bentonite
Depth from _____ ft. to _____ ft. OR ☑ Continuous feed

6. WELL TEST DATA:
A well test is required for all wells. (*See details on well log report cover.*)
☐ Static water level 65 ft. below top of casing **or**
☐ Closed-in artesian pressure _____ psi.
How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc _____
Yellowstone groundwater closure area only - Water Temperature _____ °F
☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum
Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*
30 gpm with drill stem set at 102 ft. for 1 hours
Time of recovery ½ hrs/min. Recovery water level 65 ft.

OR Bailer test*
_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*
Depth pump set for test _____ ft.
___ gpm pump rate with ____ ft. of drawdown after ___ hrs pumping
Time of recovery _____ hrs/min. Recovery water level ____ ft.

OR Flowing Artesian*
_____ gpm for _____ hours
Flow controlled by _____

**During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the resevoir of the well casing.*

7. WELL LOG: HD

Depth, Feet From	Depth, Feet To	Material: color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	top soil
2	30	brown sticky clay
30	91	brown clay with small layers of gravel
91	104	sand and gravel
104		black shale

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 10-12-00

9. REMARKS: _____

10. DRILLER/CONTRACTOR'S CERTIFICATION:
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.
Name, firm, or corporation (print) American Drilling and Supply
Address 1520 East 1st Blvd MT
Signature _____
Date 10-16-00 License no. 3464

MONTANA WELL LOG REPORT

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Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (6/9/2010 2:19:52 PM)

Site Name: SADDLE BACK RIDGE
GWIC Id: 181029

Section 1: Well Owner(s)

1) SADDLE BACK RIDGE (MAIL)
PO BOX 21325
BILLINGS MT 59104 [11/20/1999]

Section 2: Location

Township	Range	Section	Quarter Sections
02S	24E	6	NW¼ SE¼

County	Geocode
YELLOWSTONE	

Latitude	Longitude	Geomethod	Datum
45.688297	-108.809952	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot
SADDLE BARK RIDGE		

Section 3: Proposed Use of Water

DOMESTIC (1)
PUBLIC WATER SUPPLY (2)

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Saturday, November 20, 1999

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	20	12
20	105	7

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	105	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
105	105	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	80	BENTONITE	

Section 7: Well Test Data

Total Depth: 105
Static Water Level: 54
Water Temperature:

Air Test *

85 gpm with drill stem set at 105 feet for 4 hours.
Time of recovery 1 hours.
Recovery water level 54 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

Lithology Data

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: AMERICAN DRILLING & SUPPLY
License No: WWC-344
Date Completed: 11/20/1999

-82524E06 DB

Form No. 603 R2-99

MONTANA WELL LOG REPORT

142183

Well ID# _____

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with DNRC within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.**

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:
Name Saddle Back Ridge
Mailing address Po Box 21325
Blgs MT 59104

2. WELL LOCATION: List ¼ from smallest to largest
_____ ¼ _____ ¼ NW ¼ SE ¼, Section 6
ok Township 2 N(S) Range 24 E(W) County Yellowstone
Lot _____, Tract/Blk ____ Subdivision Name Saddle Back
Well Address _____ Ridge
GPS ☐ Yes ☐ No
Latitude _____ Longitude _____
Error as reported by GPS locator (± feet) _____
Horizontal datum ☐ NAD27 ☐ WGS84

3. PROPOSED USE: ☒ Domestic ☐ Stock ☐ Irrigation
☒ Public water supply ☐ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:
☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☐ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:
Borehole:
Dia. 12" in. from 0 ft. to 20 ft.
Dia. 7 7/8 in. from 20 ft. to 105 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:
Steel: Wall thickness .280 ☐ Threaded ☒ Welded
Dia. 6 5/8 in. from +2 ft. to 105 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating NA lbs. ☐ Threaded ☐ Welded
Dia. _____ in. from _____ ft. to _____ ft.

Perforations/Slotted Pipe:
Type of perforator used open Bottom
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens: ☐ Yes ☒ No
Material _____
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed: ☐ Yes ☒ No
Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Packer: ☒ Yes ☐ No
Type Bentonite Depth(s) 0-80

Grout: Material used No 8 Bentonite
Depth from 0 ft. to 80 ft. OR ☒ Continuous feed

6. WELL TEST DATA:
A well test is required for all wells. (*See details on well log report cover.*)
☒ Static water level 54 ft. below top of casing **or**
☐ Closed-in artesian pressure _____ psi.
How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone groundwater closure area only - Water Temperature _____ °F
☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum
Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*
85 gpm with drill stem set at 105 ft. for 4 hours
Time of recovery 1 hrs/min. Recovery water level 54 ft.

OR Bailer test*
_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*
Depth pump set for test _____ ft.
____ gpm pump rate with ____ ft. of drawdown after ____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*
_____ gpm for _____ hours
Flow controlled by _____

**During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the resevoir of the well casing.*

7. WELL LOG: HD

Depth, Feet From	Depth, Feet To	Material: color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	Top Soil
2	19	clay small gravel
19	37	Brown sticky clay
37	42	washed gravel
42	86	Clay Brown
86	90	washed gravel sand
90	94	clay Hard
94	105	gravel sand mixed

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 11-20 99

9. REMARKS: _____

10. DRILLER/CONTRACTOR'S CERTIFICATION:
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) American Drilling
Address 1520 East Lyna Billings MT
Signature Curtis Shelle
Date 12-1 99 License no. 344WF

Links

Water System Facilities

Sample Schedules

Coliform/Microbial Sample Results

Coliform Sample Summary Results

Lead And Copper Sample Summary Results

Chem/Rad Samples/Results

Chem/Rad Samples/Results by Analyte

Violations/Enforcement Actions

Site Visits

Milestones

Return Links

Water Systems

Water System Search

County Map

Glossary

Drinking Water Branch

Water System Details

Water System No. :	MT0004408	**Federal Type :**	C
Water System Name :	SADDLEBACK RIDGE ESTATES	**State Type :**	C
Principal County Served :	YELLOWSTONE	**Primary Source :**	GW
Status :	A	**Activity Date :**	10-26-2004

Points of Contact

Name	Job Title	Type	Phone	Address	Email
RUTT, JON F	ADMINISTRATOR/OWNER	FC	406-628-6059	603 W MAIN ST, LAUREL, MT-59044	Not Available
RUTT, JON F	ADMINISTRATOR/OWNER	AC	406-628-6059	603 W MAIN ST, LAUREL, MT-59044	Not Available
RUTT, JON F	OPERATOR	OP	406-628-6059	AQUA SYSTEMS OF MT, 603 W MAIN ST, LAUREL, MT-59044	jrutt@aquasysmt.com

Annual Operating Periods & Population Served

Start Month	Start Day	End Month	End Day	Population Type	Population Served
1	1	12	31	R	150

Service Connections

Type	Count	Meter Type	Meter Size Measure
RS	86	ME	0

Sources of Water

Name	Type Code	Status
WELL 1 GWIC 181029	WL	A
WELL 2 GWIC 187150	WL	A
NON PIPED FROM 03473 RUTTS	NP	I

Service Areas

Code	Name
R	SUBDIVISION

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (6/9/2010 2:21:52 PM)

Site Name: VENTLING LEN
GWIC Id: 161097

Section 1: Well Owner(s)

1) VENTLING, LEN (MAIL)
3144 17TH ST WEST BILLINGS 59102
N/A N/A N/A [09/20/1995]

Section 2: Location

Township	Range	Section	Quarter Sections
02S	24E	6	SW¼ SE¼ SE¼

County	Geocode
YELLOWSTONE	

Latitude	Longitude	Geomethod	Datum
45.683751	-108.806188	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, September 20, 1995

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2.6	103.8	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
103.8	103.8	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	45	BENTONITE	

Section 7: Well Test Data

Total Depth: 103.8
Static Water Level: 62
Water Temperature:

Air Test *

86 gpm with drill stem set at _ feet for 3.5 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	1	TOPSOIL
1	17	CLAY WITH COBBLES
17	21	ALMOST A SANDSTONE LAYER
21	55	CLAY WITH SANDY MIXED
55	59	QUICKSAND
59	92	CLAY
92	105	COARSE GRAVEL WITH SANDS
105	105.5	CLAY
105.5	105.5	SHALE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: PRO PUMP & EQUIPMENT INC
License No: WWC-532
Date Completed: 9/20/1995

Form No. 603 (R 2-89)

025 24E06DPC

WELL LOG REPORT

File No. 121893

State law requires that the Bureau's copy be filed by the water well driller within 60 days after completion of the well.

1. WELL OWNER
Name Len Ventling.

2. CURRENT MAILING ADDRESS
3114 17th St. West
Bigs mT 59102

3. WELL LOCATION
SW 1/4 SE 1/4 SE 1/4 Section 6
Township 2S N/S Range 24E E/W County YLSTN.
Govn't Lot _____, or Lot _____, Block _____
Subdivision Name _____
Tract Number _____

4. PROPOSED USE: Domestic ☒ Stock ☐ Irrigation ☐
Other ☐ specify _____

5. TYPE OF WORK:
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

6. DIMENSIONS: Diameter of Hole
Dia. 6 in. from 0 ft. to 105 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

7. CONSTRUCTION DETAILS:
Casing; Steel Dia. 6 5/8 from 12'7" ft. to 103'9" ft.
Threaded ☐ Welded ☒ Dia. _____ from _____ ft. to _____ ft.
Type A53B Wall Thickness .250
Casing; Plastic Dia. _____ from _____ ft. to _____ ft.
Weight _____ Dia. _____ from _____ ft. to _____ ft.
PERFORATIONS: Yes ☐ No ☒
Type of perforator used _____
Size of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
SCREENS: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
GRAVEL PACKED: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.
GROUTED: To what depth? 45 ft.
Material used in grouting Bentonite

8. WELL HEAD COMPLETION:
Pitless Adapter ☐ Yes ☒ No

9. PUMP (if installed)
Manufacturer's name _____
Type _____ Model No. _____ HP. _____

10. WELL TEST DATA
The information requested in this section is required for all wells. All depth measurements shall be from the top of the well casing.
All wells under 100 gpm must be tested for a minimum of one hour and provide the following information:
a) Air X Pump _____ Bailer _____
b) Static water level immediately before testing 62' ft. If flowing; closed-in pressure _____ psi. _____ gpm.
Flow controlled by: _____ valve, _____ reducers, _____ other, (specify) _____.
c) Depth at which pump is set for test 103'9"
d) The pumping rate: 86 gpm.
e) Pumping water level UNK ft. at _____ hrs. after pumping began.
f) Duration of test: Pumping time 3.50 hrs.
g) Recovery time .75 hrs.
h) Recovery water level 62' ft. at .75 hrs. after pumping stopped.

Wells intended to yield 100 gpm or more shall be tested for a period of 8 hours or more. The test shall follow the development of the well, and shall be conducted continuously at a constant discharge at least as great as the intended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form.

NOTE: All wells shall be equipped with an access port ½ inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Removable caps are acceptable as access ports.

11. WAS WELL PLUGGED OR ABANDONED? _____ Yes X No
If yes, how? _____

12. WELL LOG

Depth (ft.) From	To	Formation
0	1	Topsoil
1	17	Clay w/ Cobbles
17	21	Almost a Sandstone layer
21	55	Clay w/ Sandy mixed
55	59	Quick Sand
59	92	Clay
92	105	Coarse Gravel w/ Sand
105	105'6"	Clay
105'6"		Shale

ATTACH ADDITIONAL SHEETS IF NECESSARY

13. DATE COMPLETED 9/20/95

14. DRILLER/CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

9/21/95
Date

Pro Pump & Equip / ADT
Firm Name

2621 S. Ramshorn, Laurel, MT. 59044
Address

Marvin W. Lewis Marvin #537
Signature License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
1520 EAST SIXTH AVENUE HELENA, MONTANA 59620-2301 444-6610

DNRC

RECEIVED
JAN 24 1996
DEPT. OF NATURAL RESOURCES AND CONSERVATION BILLINGS OFFICE

DEPARTMENT—BUREAU COPY

M:1/61097

APPENDIX I - ESTIMATED EFFLUENT QUALITY

Estimated Effluent Quality – Outfall 001.

Parameter	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum[(1)] Value	# of Samples	Source of Data	2010 Permit Limit
Flow Rate, Effluent	FM-001	gpd	11,230	14,982	23,550	25	DMR	
pH	EFF-001	s.u.	7.3	7.4	7.5	25	DMR	
Specific conductance	EFF-001	µS/cm	6,326	6,716	6,898	25	DMR	7,000
Total dissolved solids [TDS]	EFF-001	mg/L	5,213	5,462	5,673	25	DMR	
Alkalinity, total [as CaCO3]	EFF-001	mg/L		545		1	APP	
Chloride	EFF-001	mg/L		59		1	APP	
Cyanide, Total	EFF-001	mg/L		<0.005		1	APP	
Escherichia coli Bacteria	EFF-001	CFU/100ml		<1		1	APP	
Sulfate	EFF-001	mg/L	3,995	4,687	5,160	25	DMR	
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	2.52	4.60	5.12	25	DMR	10.0
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L		0.05		1	APP	
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L		0.5		1	APP	
Phosphorus, Total (as P)	EFF-001	mg/L		0.61		1	APP	
Antimony, total recoverable [as Sb]	EFF-001	mg/L		<0.0005		1	APP	
Arsenic, total recoverable [as As]	EFF-001	mg/L		0.003		1	APP	
Beryllium, total recoverable [as Be]	EFF-001	mg/L		<0.0008		1	APP	
Cadmium, dissolved [as Cd]	EFF-001	mg/L	<0.00005	0.00007	0.00007	25	DMR	
Chromium, total recoverable [as Cr]	EFF-001	mg/L		<0.01		1	APP	
Copper, total recoverable [as Cu]	EFF-001	mg/L		0.005		1	APP	
Lead, total recoverable [as Pb]	EFF-001	mg/L		0.0004		1	APP	
Manganese, total recoverable [as Mn]	EFF-001	mg/L		0.003		1	APP	
Mercury, total recoverable [as Hg]	EFF-001	mg/L		<0.000005		1	APP	
Nickel, total recoverable [as Ni]	EFF-001	mg/L		0.002		1	APP	
Selenium, dissolved [as Se]	EFF-001	mg/L	0.091	0.113	0.160	25	DMR	
Silver, total recoverable [as Ag]	EFF-001	mg/L		<0.0002		1	APP	
Thallium, total recoverable [as Tl]	EFF-001	mg/L		<0.0002		1	APP	
Zinc, total recoverable [as Zn]	EFF-001	mg/L		0.013		1	APP	
Volatile Organic Compounds Group[(2)]	EFF-001	The reported sample came back as non-detect for all group parameters.				1	APP	
Semi-Volatile Organic Compounds Group	EFF-001	The reported sample came back as non-detect for all group parameters.				1	APP	

Footnotes:

APP = Application Form GW-2 and supplemental materials.

CFU = Colony Forming Unit

DMR = Self Reported Discharge Monitoring Reports

EFF-001: Refer to Table 1

FM-001: Refer to Table 1

Period of Record: 03/2011 through 06/2017.

s.u. = standard units

(1) DMR entries: Average value listed for all quarterly reported Daily Maximum Values.

(2) List of analyzed parameters listed in MGWPCS Form GW-2, Section N, Version 1.1.

APPENDIX II – AMBIENT GROUND WATER QUALITY MONITORING RESULTS

Ambient Ground Water Quality			
Parameter	**Units**	**Estimated Value**	**Source of Data**
pH	s.u.	7.4	APP-PWS
Specific conductance	µS/cm	4,805	APP-PWS
Total dissolved solids [TDS]	mg/L	4,515	APP-PWS
Alkalinity, total [as CaCO3]	mg/L	300	APP-EFF
Chloride	mg/L	36	APP-PWS
Cyanide, Total	mg/L	<0.005	APP-EFF
Escherichia coli Bacteria	CFU/100ml	<1	APP-PWS
Sulfate	mg/L	2,578	APP-EFF
Nitrogen, Nitrite+Nitrate (as N)	mg/L	4.99	APP-PWS
Nitrogen, Total Ammonia (as N)	mg/L	0.028	APP-EFF
Nitrogen, Total Kjeldahl (TKN)(as N)	mg/L	<0.5	APP-PWS
Phosphorus, Total (as P)	mg/L	0.34	APP-EFF
Antimony, total recoverable [as Sb]	mg/L	<0.0005	APP-EFF
Arsenic, total recoverable [as As]	mg/L	0.002	APP-EFF
Beryllium, total recoverable [as Be]	mg/L	<0.0008	APP-EFF
Cadmium, dissolved [as Cd]	mg/L	0.00004	APP-EFF
Chromium, total recoverable [as Cr]	mg/L	<0.01	APP-EFF
Copper, total recoverable [as Cu]	mg/L	0.003	APP-EFF
Lead, total recoverable [as Pb]	mg/L	0.0002	APP-EFF
Manganese, total recoverable [as Mn]	mg/L	0.002	APP-EFF
Mercury, total recoverable [as Hg]	mg/L	<0.000005	APP-EFF
Nickel, total recoverable [as Ni]	mg/L	0.001	APP-EFF
Selenium, dissolved [as Se]	mg/L	0.062	APP-EFF
Silver, total recoverable [as Ag]	mg/L	<0.0002	APP-EFF
Thallium, total recoverable [as Tl]	mg/L	<0.0002	APP-EFF
Zinc, total recoverable [as Zn]	mg/L	0.007	APP-EFF

Footnotes:

APP-PWS = Average of two samples individually collected from both Public Water Supply wells (Well #1 and Well #2).

APP-EFF = Derived from Appendix I (Effluent Characteristics) and the current water treatment recovery rate (Section II.B.). This estimate may be conservative if PWS-Well #2 (better water quality) was used more often than Well #1.

CFU = Colony Forming Unit

s.u. = standard units

APPENDIX III - RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715.

A. Water Use Classification & Applicable Water Quality Standards

The receiving water is Class III ground water and not high quality waters of the state (75-5-103, MCA). The quality of Class III ground water must be maintained so that these waters are at least marginally suitable for the following beneficial uses (ARM 17.30.1006):

- Irrigation of some salt tolerant crops;
- Some commercial and industrial purposes;
- Drinking water for some livestock and wildlife; and,
- Drinking, culinary, and food processing purposes where the specific conductance is less than 7,000 µS/cm @ 25°C.

Persons may not cause a violation of the following specific water quality standards in Class III ground water:

- The human health standards for ground water listed in Circular DEQ-7; except that the nitrate nitrogen and nitrate plus nitrite nitrogen standards listed in DEQ-7 do not apply to ground waters with a specific conductance equal to or greater than 7,000 µS/cm at 25ºC.
- For concentrations of parameters for which human health standards are not listed in DEQ-7, no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III water. DEQ may use any pertinent credible information to determine these levels.

The beneficial uses listed above may be impaired due to existing elevated TDS, sulfate, and selenium of the shallow ground water (Section II).

The applicable ground water standards and beneficial use criteria for the parameters of interest are summarized in the table below. These standards were first established within the 2010 permit.

Applicable Ground Water Quality Standards.			
Parameter	**Units**	**17.30.1006(3)(b)(i) Human Health Standards - Ground Water**	**17.30.1006(3)(b)(ii) Beneficial Uses - Ground Water**
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	-
Specific conductance @ 25ºC	µS/cm	-	7,000
Footnotes: These standards establish the maximum allowable changes in ground water quality and are the basis for limiting discharges to ground water, ARM 17.30.1005(1); Circular DEQ-7 (2012), Footnote 16.			

B. Parameters of Interest

The 2010 permit identified the following as parameters of interest (POI): nitrate + nitrite, specific conductance, sulfate, total dissolved solids (TDS), cadmium, and selenium. Self-reported effluent quality data (Appendix I) submitted during the past permit cycle shows that cadmium is below the respective ground water human health standard (Section II.E.) and therefore is no longer categorized as a POI.

Effluent quality and application data shows that sulfate, TDS, and selenium in the shallow receiving ground water already exceeds their respective ground water human health standard or beneficial use criteria. The permittee is not required to treat wastewater to below ambient ground water quality conditions (ARM 17.30.1005). In addition, these elevated ambient levels may have already impacted the available beneficial uses for this Class III ground water. DEQ therefore will no longer categorize these parameters as POIs.

The beneficial use rules includes criteria and standards for both nitrate +nitrite and specific conductance. Effluent characteristics show elevated levels of both parameters (Appendix I). The ambient ground water quality (Appendix II) for the receiving ground water is below the respective standard of each parameter, therefore, DEQ will maintain these parameters as POIs. Effluent limitations are discussed in the section below.

C. Development of Effluent Limits

ARM 17.30.1006 sets forth the basis for developing effluent limitations that will protect water quality. The ground water quality standards establish the maximum allowable changes to ground water quality; are the basis for limiting discharges to ground water; and may only be exceeded within a mixing zone authorized by DEQ.

1) Nitrate+nitrite

The 2010 permit established an effluent limitation for nitrate + nitrite based on the DEQ-Circular 7 Ground Water Human Health Standard. The standard (10.0 mg/L) was established as an end-of-pipe effluent limit as a mixing zone (dilution) has not been authorized by DEQ.

2) Specific conductance

The 2010 permit established an effluent limitation for specific conductance based on the beneficial use criteria (Appendix III.A.). The beneficial uses for Class III ground water change when the receiving ground water quality exceeds 7,000 µS/cm. These beneficial uses need to be maintained as the ambient ground water quality (Appendix II) is below this criteria. The criteria was established as an end-of-pipe effluent limit as a mixing zone (dilution) has not been authorized by DEQ.

D. Final Effluent Limitations

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402, MCA and ARM 17.30.1031, DEQ will maintain the existing numerical effluent limitations. These limitations are the most stringent applicable limitations for each individual parameter as developed above. Effluent limits based on water quality standards are expressed as a daily maximum concentration. The proposed final effluent limits are listed in Section IV.

APPENDIX IV – RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and the water quality standards. Effluent monitoring requirements will be maintained as conditions of this permit.

A. Effluent Monitoring - Compliance

Final numeric effluent limitations are maintained in this permit with specific magnitudes and durations based on site-specific conditions that ensure the discharge will not cause loss of beneficial uses. Accordingly, the permittee will be required to monitor and report monitoring results at a specified frequency in order to demonstrate compliance with the applicable effluent limitations. Effluent monitoring and reporting requirements are summarized in the table below.

The 2010 permit requires composite samples; the standard definition (Permit Part V) of which is as follows:

> ***"Composite Sample"*** *means a sample that consists of two or more discrete aliquots. Composite samples must be flow proportioned. The composite sample must, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample must not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:*
>
> *a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;*
> *b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;*
> *c. Constant sample volume, time interval between samples proportional to flow (i.e. sample taken every "X" gallons of flow); and,*
> *d. Continuous collection of sample, with sample collection rate proportional to flow rate.*

The permittee in the past has informed DEQ that composite sampling requirements may not be a good fit for their facility operations and has therefore requested a deviation.

DEQ does recognize that the current composite sample requirement is very conservative for the current water treatment and disposal operations. Therefore, DEQ will instead require the permittee to create and implement a site-specific Effluent Sampling Standard Operation Procedure (SOP) plan. The permittee will develop best management practices for sampling in a method that best represents the nature of the daily monitored discharge (Permit Part II.A.).

The plan must address:

- Equipment calibration methods and record keeping procedures;
- Sample collection, field measurement methods, equipment to be used, and record keeping procedures;
- Effluent flow measurement methods, equipment to be used, and record keeping procedures (Appendix IV.B.);
- Equipment decontamination and storage procedures; and,
- Sample preservation, storage, and lab transportation methods.

The plan at minimum must include:

- A template log for equipment calibration events; and,
- A template log for sampling and field measurement events.

A copy of the plan must be provided to DEQ **within one year of the permit effective date**. The SOP document must be kept on-site (at the facility) at all times. The permittee must keep copies of all completed calibration and sampling logs on-site at all times.

All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter. Effluent sampling and reporting requirements are summarized in the table below.

B. Effluent Monitoring - Sampling Location

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). As listed in Table 1, the effluent sample location (EFF-001) will be maintained at the second stage settling tank just prior to being pumped to the infiltration pit (Figure 3).

C. Discharge Monitoring

Flow measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant will be required to maintain and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow (Permit Part II.B.). As listed in Table 1, a flow measuring device (FM-001) was installed by the permittee in 2010 (Figure 3). Flow monitoring and reporting requirements are summarized in the table below.

Effluent Monitoring and Reporting Requirements – Outfall 001

Parameter/Method	Monitor Location	Units	Sample Type	Minimum Sample Frequency	Reporting Requirements[1][2]	Report Freq	Rationale
Flow Rate, Effluent[3]	FM-001	gpd	SOP	Contin-uous	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
pH	EFF-001	s.u.	SOP	1/Quarter	Daily Minimum Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Specific conductance @ 25ºC	EFF-001	µS/cm	SOP	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Total dissolved solids [TDS]	EFF-001	mg/L	SOP	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	SOP	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance

Footnotes:

EFF-001: Refer to Table 1.

FM-001: Refer to Table 1.

SOP: The Sample Type will be determined by the Effluent Sampling Standard Operating Procedure (SOP) Plan as discussed in Appendix IV and Section VII.

If no discharge occurs during the reporting period, "no discharge" shall be recorded on the effluent Discharge Monitoring Report (DMR) report forms.

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.

(1) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.

(2) Daily Minimum: Report lowest measured daily value for the reporting period on Discharge Monitoring Report (DMR).

(3) Requires recording device or totalizing meter, must record daily effluent volume.

APPENDIX V – TREATMENT SYSTEM AMENDMENTS

Chemical Used in Process

Vitec® 3000

NSF Certified
Antiscalant and Dispersant

avista® technologies

Performance:

Vitec® 3000 antiscalant offers a variety of critical performance and application benefits:

* Powerful inhibitor against a variety of carbonate and sulfate scale:

  Calcium Carbonate ($CaCO_3$)
  Langlier Saturation Index (LSI) >2.5

  Calcium Sulfate ($CaSO_4$)
  3.5 times saturation

  Barium Sulfate ($BaSO_4$)
  105 times saturation

  Strontium Sulfate ($SrSO_4$)
  20 times saturation

  Calcium Fluoride (CaF)
  1000 times saturation

  Silica (SiO_2)
  Silica scale is controlled up to 120 ppm in the concentrate stream

* Highly effective in a wide range of feedwater types and pH ranges.
* Crystal modification property distorts inorganic salt crystal growth, reducing system fouling.
* Compatible with polyelectrolyte coagulants
* Threshold scale inhibition at low dosage rates allows economical system operation.

Avista Technologies Inc.
133 North Pacific Street
San Marcos, CA 92069 USA
Phone: 760 744-0536
Fax: 760 744-0619
www.avistatech.com

Vitec® 3000 is a proprietary liquid antiscalant/dispersant designed to inhibit scale and disperse colloidal particles in cellulose acetate and thinfilm membrane separation systems. The formulation has been certified by the National Sanitation Foundation (NSF) under ANSI/NSF Standard 60 for use in producing potable water.

A unique quality of this formulation is its compatibility with organic coagulants. Coagulants may be indirectly present in municipal feed waters or directly present as a result of coagulation or flocculation treatments upstream of the reverse osmosis system.

Vitec 3000 can be injected neat or diluted and can be used in a wide array of feedwater sources.

Application:

Optimum Vitec 3000 performance is achieved when the chemical is injected downstream of multimedia filters and upstream of cartridge filters. In systems using sulfuric acid (H_2SO_4), the best results are obtained when the acid is injected far enough upstream to ensure it is adequately mixed prior to the Vitec 3000 injection point.

Dilution:

Vitec 3000 should be diluted with demineralized water or RO permeate. If neither of these water sources is available, softened water may be substituted. The dilution for Vitec 3000 should not exceed 1% by weight (dilutions below 10% by weight must use DI quality water). This guideline will protect the effectiveness of the internal bacteriostat, which inhibits bacterial growth within the drum and feed tank.

Dosing Guidelines:

The typical dosage range is between 2 to 5 ppm. A site-specific dose can be determined using the Avista Advisor computer program. Like any injected chemical, over or underdosing may cause unnecessary membrane system fouling. Please contact the Avista customer service department for customized dosing instructions.

Packaging and Storage:

Vitec 3000 is available in 45-pound (20 kg) pails, 500 pound (227 kg) plastic drums, 2500 pound (1136 kg) tote bins and bulk tanker.

This product should be protected from freezing during storage as the active ingredients may separate under extreme temperatures. If freezing occurs, warm the chemical until it returns to the liquid state and stir to recombine

Properties

Appearance:	Clear, amber-colored liquid.
pH:	10.7 – 11.8
Odor:	Light, disinfectant odor
Specific Gravity:	1.2 – 1.3

NSF Certified to NSF/ANSI 60

DRINKING WATER TREATMENT ADDITIVES CLASSIFIED BY NSF INTERNATIONAL TO NSF/ANSI 60 ON SEPTEMBER 2004 AS STANDARD DRINKING WATER TREATMENT CHEMICAL FOR USE IN REVERSE OSMOSIS SYSTEMS AT A MAXIMUM LEVEL OF 7 mg/l

VITEC® 3000 NSF
MATERIAL SAFETY DATA SHEET

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**VITEC® 3000**
CHEMICAL NAME/CLASS:	Not Applicable
SYNONYM:	Not Applicable
PRODUCT USE:	Water Treatment
SUPPLIER/MANUFACTURER'S NAME:	AVISTA TECHNOLOGIES
ADDRESS:	133 North Pacific Street San Marcos, CA 92069
24 HOUR EMERGENCY NO.:	1-800-424-9300 (United States)** 1-202-483-7616 (International Collect)
BUSINESS PHONE:	(760) 744-0536
DATE OF PREPARATION:	Revised January 30, 2006

This product is sold for commercial use. This MSDS has been developed to address safety concerns of those individuals working with bulk quantities of this material, as well as those of potential users of this product in industrial /occupational settings. All pertinent health, safety and environmental information has been presented based on ANSI Z400.1-2003, the US Federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and Canadian Workplace Hazardous Materials Information System (WHMIS) and Controlled Products Regulations (CPR).

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL DESCRIPTION: This product is a clear, amber colored, solution with a light, disinfectant odor. This product is neither reactive nor flammable.

WARNINGS (per ANSI Z129.1

WARNING! MAY CAUSE SKIN AND EYE IRRITATION OR BURNS. MAY BE IRRITATING IF INHALED. HARMFUL IF SWALLOWED.

PRECAUTIONS (per ANSI Z129.1):

Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing mists or sprays. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, and suitable body protection if necessary.

NSF Certified to NSF/ANSI 60

DRINKING WATER TREATMENT ADDITIVES CLASSIFIED BY NATIONAL SANTATION FOUNDATION.® TO ANSI/NSF 60 IN SEPTEMBER, 2004 AS STANDARD DRINKING WATER TREATMENT CHEMICAL FOR USE IN REVERSE OSMOSIS SYSTEMS AT A MAXIMUM LEVEL OF 7 mg/l.

2. HAZARDS IDENTIFICATION (continued)

HAZARD SYMBOLS:

HMIS HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

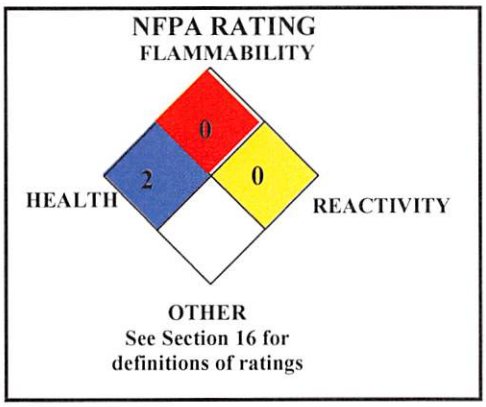
Health	2
Flammability	0
Physical Hazard	0
Protective Equipment	C

HMIS PERSONAL PROTECTIVE EQUIPMENT RATING: Industrial Use situations C; Safety glasses, gloves and body protection

CANADIAN WHMIS SYMBOLS:

D2B - Poisonous and infectious material - Other effects – Toxic

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.



OSHA REGULATORY STATUS

This material is classified as not hazardous under OSHA regulations

POTENTIAL HEALTH EFFECTS

The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

CONTACT WITH SKIN or EYES: Contact can cause eye or skin irritation. Prolonged skin contact can result in dermatitis. Prolonged eye exposure may include redness, pain, and tearing

SKIN ABSORPTION: No component of this product is reported to be absorbed through intact skin

INGESTION: If the product is swallowed, irritation of the mouth, throat, and other tissues of the gastro-intestinal system can occur.

INHALATION: Overexposure to vapors, mists, sprays, or dusts of this product can cause irritation to the respiratory tract.

2. HAZARDS IDENTIFICATION (continued)

INJECTION: Accidental injection of this product can cause burning, reddening, and swelling in addition to the wound. Symptoms of such exposure can include those described under "Inhalation", "Contact with Skin or Eyes," and "Ingestion".

CHRONIC EFFECTS: Long-term skin or eye contact can result in dermatitis or eye irritation.

SIGNS AND SYMPTOMS OF OVEREXPOSURE: Eye and skin irritation (redness or swelling). See Section 11: TOXICOLOGICAL INFORMATION.

POTENTIAL ENVIRONMENTAL EFFECTS

This product does not normally present a significant hazard to aquatic or terrestrial life in small quantities. Do not discharge effluent containing this product into streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. See Section 12: ECOLOGICAL INFORMATION.

3. MATERIAL IDENTIFICATION

CHEMICAL NAME	CAS #	% w/w
Deflocculant & Sequestrant	Proprietary	27.4
Phosphonic Acid Derivative Compound	Proprietary	15.6
pH Adjustment	Proprietary	21.8
Water and ingredients present in concentrations of less than 1% (or less than 0.1% if carcinogens)		Balance
The ingredients in the balance of this product do not contribute significant hazards beyond those described in this document.		

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention if any adverse effects occur. Take a copy of label and MSDS to physician or health professional with victim.

FIRST AID PROCEDURES

SKIN EXPOSURE: If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention if any adverse exposure symptoms develop.

EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek medical attention if any adverse exposure symptoms develop.

INHALATION: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. Victim must seek immediate medical attention if any adverse exposure symptoms develop. If necessary, use artificial respiration to support vital functions.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directed by medical personnel. Have victim rinse mouth with water, if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Preexisting dermatitis, other skin conditions, and respiratory conditions may be aggravated by exposures to this product.

4. FIRST-AID MEASURES (continued)

NOTE TO PHYSICIANS

Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

This product is non-combustible. Not sensitive to mechanical impact under normal conditions. Not sensitive to static discharge under normal conditions.

EXTINGUISHING MEDIA

SUITABLE EXTINGUISHING MEDIA:

Water Spray:	OK	Carbon Dioxide:	OK
Foam:	OK	Dry Chemical:	OK
Halon:	OK	Other	Any "ABC" Class

UNSUITABLE EXTINGUISHING MEDIA:
None.

PROTECTION OF FIREFIGHTERS

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL:
When involved in a fire, this product may decompose and produce irritating fumes and toxic gases (e.g., carbon monoxide, carbon dioxide, phosphorous oxides, phosphine and sodium oxide).

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:
Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS

Responders should wear the level of protection appropriate to the type of chemical released, the volume of the material spilled, and the location where the incident has occurred.

ENVIRONMENTAL PRECAUTIONS

Minimize use of water to prevent environmental contamination. Prevent spill or rinsate from contamination of storm drains, sewers, soil or groundwater. Place all spill residues in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada (see Section 13, Disposal Considerations)

METHODS FOR CONTAINMENT

SPILL AND LEAK RESPONSE: Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people.

RESPONSE TO INCIDENTAL RELEASES: Personnel who have received basic chemical safety training can generally handle small-scale releases, such as 1 container of this product. Respond to incidental chemical releases by wearing gloves, goggles, and appropriate body protection.

RESPONSE TO NON-INCIDENTAL RELEASES: Respond to non-incidental chemical releases of this product, such as the simultaneous puncturing of several containers, by clearing the impacted area and contacting appropriate emergency personnel. Clean up should only be done by qualified personnel.

METHODS FOR CLEAN-UP

Prevent spill or rinsate from contaminating storm drains, sewers, soil or groundwater. Absorb spilled liquid with polypads or other suitable absorbent materials. DO NOT use combustible materials, such as sawdust.

6. ACCIDENTAL RELEASE MEASURES (continued)

OTHER INFORMATION

US regulations require reporting spills reach any surface waters. The toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

HANDLING

As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after using this product. Do not eat or drink while using this material. Avoid generating dusts, mists or sprays of this product. Remove contaminated clothing immediately. Do not breathe (dust, vapor, mist, gas). Avoid contact with skin, eyes or clothing. In the event of a spill, follow practices indicated in Section 6 (Accidental Release Measures). During maintenance activities make certain that application equipment is locked and tagged-out safely if necessary. Collect any rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or appropriate Canadian standards.

STORAGE

This product is stable under ordinary conditions of handling, use and storage. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Keep container tightly closed when not in use. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE GUIDELINES:

CHEMICAL NAME	CAS #	Guideline	Value
Deflocculant & Sequestrant	Proprietary	NE	NE
Phosphonic Acid Derivative Compound	Proprietary	NE	NE
pH Adjustment	Proprietary	TLV-TWA (ACGIH)	NE
		TLV-STEL (ACGIH)	2 mg/m^3 C
		PEL- TWA (OSHA)	2 mg/m^3
		REL-TWA (NIOSH)	2 mg/m^3 C
		IDLH (NIOSH)	10 mg/m^3

NE = Not Established. See Section 16 for Definitions of Terms Used.

ENGINEERING CONTROLS

Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

EYE/FACE PROTECTION

For specific industrial applications, enhanced eye protection can be necessary. Use approved safety goggles or safety glasses, as described in OSHA 29 CFR 1910.133. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or appropriate Canadian standards.

SKIN PROTECTION

For specific industrial applications, wear chemical impervious gloves (e.g., Neoprene or Nitrile). If necessary, refer to U.S. OSHA 29 CFR 1910.138 or the appropriate standards of Canada. For consumer use, no specific body protection is normally needed.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (continued)

BODY PROTECTION
For general industrial applications, chemically protective clothing is not normally needed. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects can pierce the soles of the feet or where employee's feet can be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

RESPIRATORY PROTECTION
None needed under normal conditions of use or handling. Use NIOSH approved respirators if ventilation is inadequate to control dusts, mists, fumes or vapors. Maintain airborne contaminate concentrations below guidelines listed above. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres use of a full-face-piece pressure/demand SCBA or a full face-piece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (29 CFR 1910.134).

General Hygiene Considerations
There are no known hygiene hazards associated with this material when used or handled as recommended.

9. PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1):	>1	EVAPORATION RATE (BuAc =1):	Similar to water
SPECIFIC GRAVITY:	1.2 – 1.3	MELTING/FREEZING POINT:	0°C (32°F)
SOLUBILITY IN WATER:	Soluble	BOILING POINT:	100°C (212°F)
VAPOR PRESSURE, mm Hg @ 20°C:	18	pH:	10.7 – 11.8
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT)			Not Available
PHYSICAL STATE, APPEARANCE AND COLOR	This product is a clear, amber liquid with a light disinfectant odor.		

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance and odor of this product can act as warning properties in the event of an accidental release

CHEMICAL PROPERTIES

ODOR THRESHOLD:	Not Available		
VOC, less water and exempt:	None		
Weight % VOC:	None		
FLASH POINT:	Not ignitable	AUTOIGNITION TEMPERATURE:	Not ignitable

FLAMMABLE LIMITS (in air by volume, %):

Lower: NA Upper: NA

10. STABILITY and REACTIVITY

CHEMICAL STABILITY
Stable under normal circumstances of use and handling.

CONDITIONS TO AVOID
Avoid contact with incompatible chemicals and exposure to extreme temperatures.

INCOMPATIBLE MATERIALS
This product is not compatible with strong bases, strong acids, and powerful oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Thermal decomposition of this product can generate dusts, irritating fumes, and toxic gases (e.g., Carbon monoxide, Carbon dioxide).

POSSIBILITY OF HAZARDOUS REACTIONS
This product is not expected to undergo hazardous polymerization, decomposition, condensation or self-reactivity.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: There are currently no toxicity data available for this product; the following toxicology information is available for components greater than 1% in concentration.

The following data are available for Phosphonic acid derivative:

Standard Draize Test (Skin-Rabbit) 500 mg/24 hours
Standard Draize Test (Eye-Rabbit) 100 mg: Moderate
LD_{50} (Oral-Rat) 2100 mg/kg
LD_{50} (Skin-Rabbit) > 6310 mg/kg
LD_{50} (Oral-Quail) > 2510 mg/kg
LD_{50} (Oral-Duck) > 2510 mg/kg
TDLo (Oral-Rat) 1302 mg/kg/31 days-intermittent: Kidney, Urethra, Bladder: other changes in urine composition; Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in sodium.

The following data are available for pH adjustment:

Standard Draize Test (Eye-Monkey) 1%/24 hours: Severe
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Severe
Standard Draize Test (Eye-Rabbit) 400 µg: Mild
Standard Draize Test (Eye-Rabbit) 1%: Severe
Standard Draize Test (Eye-Rabbit) 50 µg/24 hours: Severe
Standard Draize Test (Eye-Rabbit) 1 mg/24 hours: Severe
Rinsed with water (Eye-Rabbit) 1 mg/30 seconds: Severe
LD_{50} (Intraperitoneal-Mouse) 40 mg/kg
LDLo (Oral-Rabbit) 500 mg/kg
Cytogenetic Analysis (Parenteral-Grasshopper) 20 mg
Cytogenetic Analysis (Hamster-Lung) 10 mmol/L
Cytogenetic Analysis (Hamster-Ovary) 16 mmol/L

SUSPECTED CANCER AGENT: The following table summarizes the carcinogenicity listing for the components of this product. "NO" indicates that the substance is not considered to be, or suspected to be, a carcinogen by the listed agency, see section 16 for definition of other ratings.

CHEMICAL	IARC	NTP	NIOSH	ACGIH	OSHA	CA PROP 65
Deflocculant & Sequestrant	No	No	No	No	No	No
Phosphonic Acid Derivative Compound	No	No	No	No	No	No
pH Adjustment	No	No	No	No	No	No

IRRITANCY OF PRODUCT: This product can be irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: The components of this product are not reported to be sensitizers

TOXICOLOGICAL SYNERGISTIC PRODUCTS: None.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: When used as directed, this product is not expected to produce mutagenic effects in humans
Embryotoxicity: When used as directed, this product is not expected to produce embryotoxic effects in humans.

Teratogenicity: When used as directed, this product is not expected to produce teratogenic effects in humans
Reproductive Toxicity: When used as directed, this product is not expected to produce reproductive toxicity in humans.

11. TOXICOLOGICAL INFORMATION (continued)

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURES INDICES (BEIs): There are no BEI's established for any component of this product at this time.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ECOTOXICITY:

This product can be harmful to terrestrial plant and animal life if large volumes of it are released into the environment. Refer to Section 11, "Toxicological Information", for specific animal data. The following aquatic toxicity data is available for components of this product:

pH Adjustment:

Acute Hazard Level:
Lethal pH (goldfish) = 10.9
Lethal pH (bluegill) = 10.5
LC_{100} (*Cyprimus carpio)* 24 hours = 180 ppm/ 25 C
TL_m (mosquito fish) 96 hours = 125 ppm/ fresh water
TL_m (bluegill) 48 hours = 99 mg/L/ tap water

Phosphonic acid derivative

NOEC (*Daphnia magna*) 48 hours = 125 mg/L
NOEC (Rainbow Trout) 96 hours = 180 mg/L
NOEC (*Selenastrum* algae) 96 hours = 5.2 mg/L
EC_{50} (*Selenastrum* algae) 96 hours = 1.9 mg/L
EC_{50} (*Daphnia magna*) 48 hours = 242 mg/L

PERSISTENCE/DEGRADABILITY:

The following environmental data is available for components of this product:

pH Adjustment
Water Solubility = 111 g/100ml @ 20^0C
BOD: None.

BIOACCUMULATION/ACCUMULATION:

pH Adjustment

Octanol/Water Partition Coefficient: SRP4: Too low to be measured (or possibly virtually 0)
Persistence: Can persist for extended periods of time.
Bioconcentration factor (BCF) Not determined.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Recover or recycle if possible. **Industrial Use:** Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada.

EPA WASTE NUMBER: Not applicable to wastes consisting only of this product; however, the specific RCRA codes depend on the exact nature of the discarded material.

14. TRANSPORTATION INFORMATION

BASIC SHIPPING DESCRIPTION

This product is not hazardous per 49 CFR 172.101, the U.S. Department of Transportation.

PROPER SHIPPING NAME:	Not Regulated
HAZARD CLASS NUMBER and DESCRIPTION:	Not Regulated
UN IDENTIFICATION NUMBER:	Not Regulated
DOT LABEL(S) REQUIRED:	Not Regulated
PACKAGING GROUP:	Not Regulated
NORTH AMERICAN RESPONSE GUIDEBOOK NUMBER (2000):	Not Regulated
MARINE POLLUTANT:	No component is designated as a DOT Marine Pollutant.

NATIONAL MOTOR FREIGHT CLASSIFICATION: LTL: 100; T: 70

14. TRANSPORTATION INFORMATION (continued)

ADDITIONAL INFORMATION

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is not considered as dangerous goods, per Transport Canada regulations

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) REGULATIONS
This product is not hazardous per IATA regulations.

INTERNATIONAL MARITIME ORGANIZATION REGULATIONS (IMO)];
This product is not hazardous per IMO regulations.

MARINE POLLUTANT: No component is designated as a Marine Pollutant.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO
This product is not hazardous per ICAO regulations.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS - EPA REPORTING REQUIREMENTS:

The following reporting requirements are applicable to components of this product:

CHEMICAL	SECTION 302 EHS (TPQ) (40 CFR 355, Appendix A)	SECTION 304 RQ (40 CFR Table 302.4)	SECTION 313 TRI (threshold) (40 CFR 372.65)
Deflocculant & Sequestrant	No	No	No
Phosphonic Acid Derivative Compound	No	No	No
pH Adjustment	No	YES, RQ = 1000 lbs.	No

U.S. SARA SECTION 311/312 FOR PRODUCT: None.
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.
OTHER U.S. FEDERAL REGULATIONS: Not applicable.
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
This material is not found on either the Proposition 65 Carcinogen List or the Adverse Reproductive Effects List.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are listed on the DSL Inventory.

16. OTHER INFORMATION

PREPARED BY: ADVANCED CHEMICAL SAFETY, Inc.
7563 Convoy Court
San Diego, CA 92111
(858)-874-5577

DATE OF PRINTING April 24, 2007

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each compound.

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers can be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

OEL – Occupational Exposure Level – In some cases, specific exposure guidelines have been assigned by industry. These are referred to as "Occupational Exposure Levels."

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can cause permanent injury and can be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). An "*" indicates that the health hazard is chronic. Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo, LDLo, LDo, TC, TCo, LCLo,** and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: **EC** is the effect concentration in water.

Data from several sources are used to evaluate the cancer-causing potential of the material. The sources and ratings are: **IARC** - the International Agency for Research on Cancer; 1 = Carcinogenic to humans, 2A, 2B = Probably carcinogenic to humans, 3 = Unclassifiable as to carcinogenicity in humans, and 4 = Probably not carcinogenic to humans. **NTP** - the National Toxicology Program; K =Known to be a human carcinogen, and R = Reasonably anticipated to be a human carcinogen. **RTECS** - the Registry of Toxic Effects of Chemical Substances. **OSHA** - Occupational Safety and Health Administration and **CAL/OSHA** - California's subunit of the Occupational Safety and Health Administration; Ca = Carcinogen defined with no further categorization. **ACGIH** – American Conference of Governmental Industrial Hygienists; A1 = Confirmed human carcinogen, A2 = Suspected human carcinogen, A3 = Confirmed animal carcinogen with unknown relevance to humans, A4 = Not classifiable as a human carcinogen, and A5 = Not suspected as a human carcinogen. **NIOSH** – U.S. National Institute for Occupational Safety and Health; Ca = Potential occupational carcinogen, with no further categorization. **EPA** – U.S. Environmental Protection; A = Human carcinogen, B = Probable human carcinogen, C = Possible human carcinogen, D = Not classifiable as to human carcinogenicity, E = Evidence of Non-carcinogenicity for humans, K = Known human carcinogen, L = Likely to produce cancer in humans, CBD = Cannot be determined, NL = Not likely to be carcinogenic in humans, and I = Data are inadequate for an assessment of human carcinogenic potential.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings that appear on a material's industrial package label.

APPENDIX VI - REFERENCES CITED

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- Subchapter 5 – Mixing Zones in Surface and Ground Water.
- Subchapter 7 – Nondegradation of Water Quality.
- Subchapter 10 – Montana Ground Water Pollution Control System.
- Subchapter 13 – Montana Pollutant Discharge Elimination System.

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- Circular DEQ-2 – Design Standards for Wastewater Facilities.
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- Circular DEQ-7 – Montana Numeric Water Quality Standards, Required Reporting Values, and Trigger Values.

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