



*Transmitted Via Federal Express*

September 29, 2014

Ms. Laura Alvey  
Remediation Division  
Montana Department of Environmental Quality  
1100 N. Last Chance Gulch  
P.O. Box 200901  
Helena, MT 59620-0901

Re: Submittal of Final Natural Attenuation Monitoring Report  
Docket No. WQA-12-08  
Silvertip Pipeline Incident Response  
Laurel, Montana

Dear Ms. Alvey:

Enclosed, please find three hardcopies of the referenced report that is being submitted to the Montana Department of Environmental Quality (MDEQ) on behalf of ExxonMobil Pipeline Company (EMPCo). A modifiable electronic version is also included with this submittal per your request. The submittal of this report satisfies the remaining Natural Attenuation Monitoring requirements of the MDEQ's letter to ExxonMobil Environmental Services Company dated February 10, 2014.

If there are any questions, please feel free to contact me at 225.384.3131 or via E-mail at tom.s.henson@exxonmobil.com.

Sincerely,

A handwritten signature in blue ink that reads "Tom S. Henson/jec".

Tom S. Henson, P.E.  
Major Projects Manager

cc: Katherine Haque-Hausrath, MDEQ (w/out enclosure)  
Kevin Vaughan, Exxon Mobil Corporation (w/out enclosure)  
Bill Mercer, Holland & Hart, LLP (w/out enclosure)  
Stephen Barrick, ARCADIS (w/out enclosure)

**ExxonMobil Pipeline Company**

**Final Natural Attenuation  
Monitoring Report**

Silvertip Pipeline Incident Response  
Laurel, Montana

September 2014



**Final Natural Attenuation  
Monitoring Report**

Silvertip Pipeline Incident  
Response  
Laurel, Montana

Prepared for:  
ExxonMobil Pipeline Company

Prepared by:  
ARCADIS US, Inc.  
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Our Ref.:  
B0085581.1401

Date:  
September 2014

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## **Acronyms and Abbreviations**

AOC	Administrative Order on Consent
ATMs	Approved Treatment Methods
CTRs	Complied Treatment Recommendations
EMES	ExxonMobil Environmental Services Company
EMPCo	ExxonMobil Pipeline Company
GPS	Global Positioning System
MDEQ	Montana Department of Environmental Quality
NAM	Natural Attenuation Monitoring
SCAT	Shoreline Cleanup Assessment Technique
USGS	United States Geological Survey



## Final Natural Attenuation Monitoring Report

Silvertip Pipeline Incident  
Response  
Laurel, Montana

### 1. Introduction

This Natural Attenuation Monitoring (NAM) Report has been prepared for ExxonMobil Environmental Services Company (EMES) on behalf of ExxonMobil Pipeline Company (EMPCo) and describes the methods and results of final NAM activities conducted September 8 - 10, 2014 in accordance with the Montana Department of Environmental Quality's (MDEQ's) letter to EMES dated February 10, 2014 and the *NAM Work Plan* (ARCADIS, 2012a). The work plan was approved by the Montana Department of Environmental Quality (MDEQ) on April 24, 2012, pursuant to the Administrative Order on Consent (AOC), Attachment A, Item 7 for the EMPCo Silvertip Pipeline Incident that occurred near Laurel, Montana (Docket No. WQA-12-08). Specifically, the NAM program was developed to monitor and document degradation of residual crude oil left on vegetation and debris.

The location of the Silvertip Pipeline is presented on a portion of the U.S. Geological Survey (USGS) 7.5 minute topographic map for Laurel and Mossmain, Montana, presented on Figure 1.



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### **2. Background**

On July 1, 2011 there was a release of crude oil from the Silvertip Pipeline located near Laurel, Montana. EMPCo activated its Emergency Response Plan and provided a rapid and comprehensive cleanup response to the incident. As part of the assessment and cleanup process, incident-specific Approved Treatment Methods (ATMs) and location-specific Compiled Treatment Recommendations (CTRs) were developed. The CTRs were subsequently implemented to clean up affected areas. In some instances where implementation of active treatment could result in more harm than benefit to the environment, monitored natural attenuation was chosen as the treatment method for the affected area. The MDEQ AOC scope of work included a requirement to implement the above-referenced NAM program to document natural attenuation of residual oil over time.



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### **3. Purpose and Objectives**

The purpose of the NAM program was to observe and document the degradation over time of residual oil present in River Divisions A, B, and C after the cleanup effort. Monitoring of these locations occurred over five events: an initial monitoring event in Fall 2011 and follow-up monitoring events in Spring 2012, Fall 2012, Fall 2013, and Summer 2014 (the final event). Reports were previously submitted to the MDEQ for the Fall 2011, Spring 2012, Fall 2012, and Fall 2013 monitoring events. This report presents the findings of the final monitoring event that was conducted in accordance with the MDEQ's February 10 letter and under the onsite direction and supervision of the MDEQ's representative, Ms. Laura Alvey.



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### 4. Monitoring Location Selection

Monitoring locations were selected throughout Divisions A, B, and C where residual oil was left on vegetation to naturally attenuate. In Division C, locations were selected between C01 and C55, consistent with Shoreline Cleanup Assessment Technique (SCAT) survey findings of no actionable oil beyond river segment C55 (ARCADIS, 2012a).

CTRs were reviewed to identify locations with an ATM of #7 (Natural Attenuation). Additional locations were selected based on SCAT oiling conditions, access restrictions, potential river conditions during future monitoring events, and varying vegetative and location setting types (ARCADIS, 2012a).



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### **5. NAM Methodology**

In accordance with the AOC requirements, forty-five (45) monitoring locations, 15 each in Divisions A, B, and C, were chosen during the Fall 2011 NAM event to include a variety of vegetation and location setting types in the area (ARCADIS, 2012b). Locations that had residual oiling conditions included a variety of vegetation types (including leaves, bark, stems, willows, and grasses) and setting types (including debris piles, rip-rap, closed canopy areas, open canopy areas, high energy river/cobbles and grassy fields).

## **6. Previous NAM Events**

A *Natural Attenuation Monitoring Spring 2012 Report* (ARCADIS, 2012c) was submitted to the MDEQ in June 2012, summarizing the results of the monitoring event. EMES requested the MDEQ approve the removal of 12 NAM locations from future monitoring events at locations based on monitoring event results. The MDEQ approved the removal of 11 NAM locations in their letter to EMES dated July 11, 2012.

A *Natural Attenuation Monitoring Fall 2012 Report* (ARCADIS, 2012d) was submitted to the MDEQ in December 2012, summarizing the results of the monitoring event. EMES requested the MDEQ approve the removal of 11 NAM locations from future monitoring events based on monitoring event results. The MDEQ approved the removal of 11 NAM locations in their letter to EMES dated January 2, 2013.

A *Natural Attenuation Monitoring Fall 2013 Report* (ARCADIS, 2013a) was submitted to the MDEQ in November 2013, summarizing the results of the monitoring event. EMES requested the MDEQ discontinue further monitoring based on results obtained to date, which indicate that natural attenuation is an effective treatment method for addressing residual oil and oil stains on vegetation. In their February 10 letter, the MDEQ approved the removal of 10 additional NAM locations, based on 2013 monitoring event results, and required that EMES perform a final event during the summer of 2014 to retrieve wooden stakes that were used to mark NAM locations and further document natural attenuation at the 13 remaining NAM locations.

## **7. Final NAM Event**

The final NAM event included the following activities that were conducted under the onsite direction and supervision of the MDEQ:

- Returning to 12 of the 13 remaining NAM locations (B04-LB-1 was not accessible due to private property land access restrictions), using global positioning system (GPS) coordinates.
- Taking a representative digital still image of the location from approximately 4 feet above the ground (unless otherwise noted) facing a specified direction in degrees as logged into the GPS and noted on the field forms.
- Completing a NAM Field Forms which includes the GPS coordinates, direction in degrees of the photo taken, and current residual oiling conditions.
- Returning to former NAM locations to recover wooden stakes or markers, if present.

### **7.1 Summary of NAM Locations**

Table 1 summarizes the 12 locations inspected for NAM and stake/marker recovery, and the additional 14 former NAM locations revisited for stake/marker recovery. The table includes each location's respective river segment, GPS coordinates, wooden location stake recovery, date of monitoring, location setting type, vegetation type and final condition. Complete details of each monitoring location are included on the NAM forms in Appendix A. Figures 2 through 4 shows the NAM locations. Appendix B includes photo-documentation of the selected locations. A summary of the general observations for the locations is presented below:

- Natural attenuation is apparent at all NAM locations based on field observations, and 35 of the original 45 NAM locations no longer have residual oil or staining remaining after nearly three years of monitoring.
- No residual oil was observed at 3 additional NAM locations: B12-LB-1, B30-LB-1, B34-LB-1.
- The remaining 9 NAM locations monitored showed signs of natural attenuation of residual oil (i.e., less noticeable oil presence).



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- Twenty-six total locations were visited to recover any remaining wooden location stakes or other sample location markers, if present. Thirteen wooden location stakes, and approximately 5-10 feet of orange survey flagging was recovered from these locations.



## **Final Natural Attenuation Monitoring Report**

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### **8. Conclusions**

The submittal of this report satisfies the remaining NAM requirements set forth in the MDEQ's February 10, 2014 letter. Therefore, EMES respectfully requests the MDEQ finalize a No Further Action determination for the NAM Program as provided in Item 7 of Attachment A in the AOC.

## 9. References

ARCADIS, 2012a. *Natural Attenuation Monitoring (NAM) Work Plan*. Silvertip Pipeline Incident Response, Laurel, Montana. Prepared by ARCADIS for ExxonMobil Environmental Services Company. Revised February 2012.

ARCADIS, 2012b. *Natural Attenuation Monitoring Fall 2011 Report*. Silvertip Pipeline Incident Response, Laurel, Montana. Prepared by ARCADIS for ExxonMobil Environmental Services Company. Revised February 2012.

ARCADIS, 2012c. *Natural Attenuation Monitoring Spring 2012 Report*. Silvertip Pipeline Incident Response, Laurel, Montana. Prepared by ARCADIS for ExxonMobil Environmental Services Company.

ARCADIS, 2012d. *Natural Attenuation Monitoring Fall 2012 Report*. Silvertip Pipeline Incident Response, Laurel, Montana. Prepared by ARCADIS for ExxonMobil Environmental Services Company.

ARCADIS, 2013a. *Natural Attenuation Monitoring Fall 2013 Report*. Silvertip Pipeline Incident Response, Laurel, Montana. Prepared by ARCADIS for ExxonMobil Environmental Services Company.

**Table**

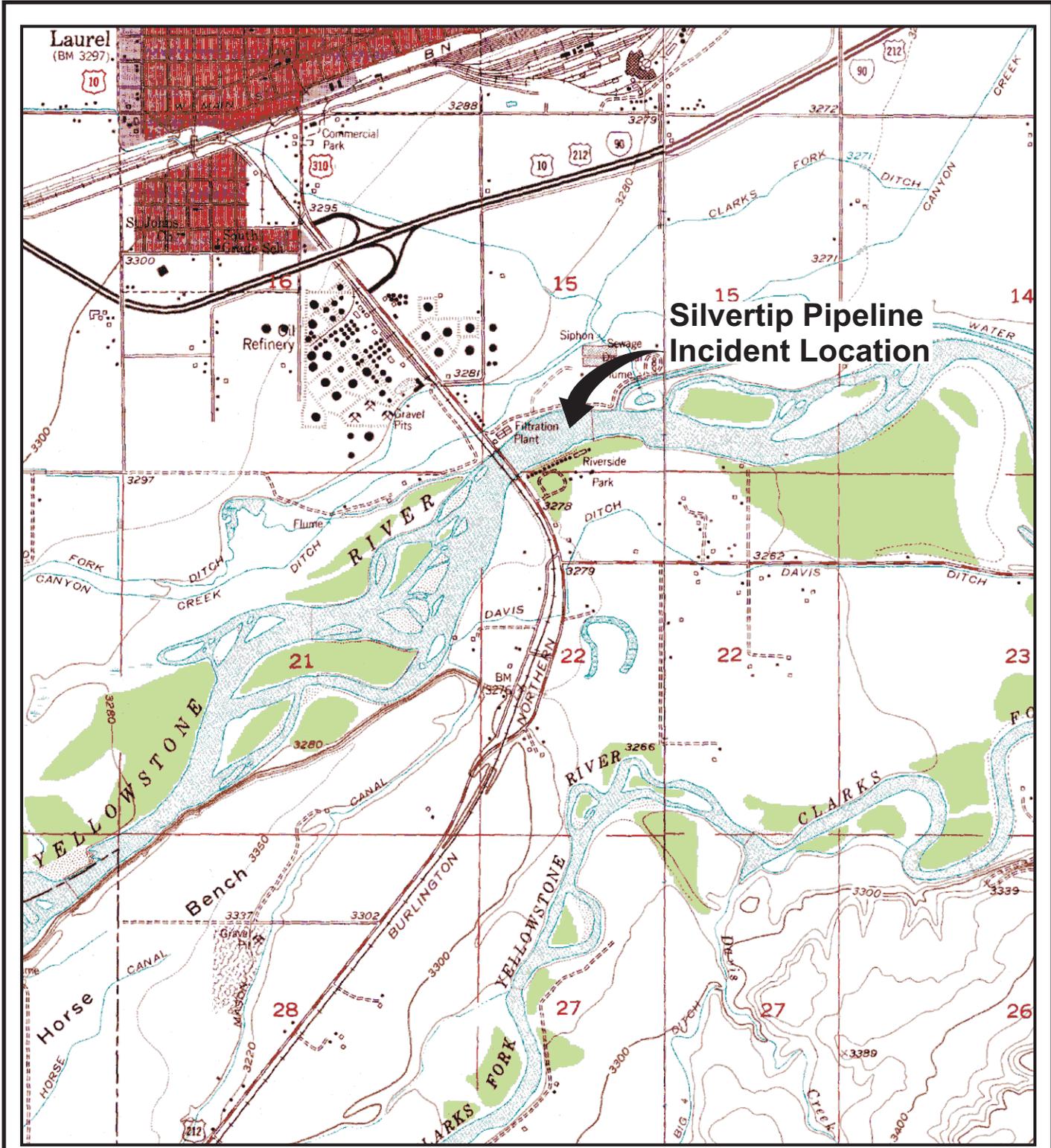
Table 1  
 NAM Habitat and Vegetation Type Summary  
 Silvertip Pipeline Incident  
 Laurel, Montana

NAM Location ID	Latitude	Longitude	Date	Stake Recovered	Open Canopy	Closed Canopy	Grassy Field	Debris Pile	High Energy/ Cobbles	Leaves	Bark	Stems	Willows	Logs	Grasses
A02-RB-1	45.65479	-108.75378	9/8/14	Yes		X					X				
A07-LB-1	45.65097	-108.72948	9/10/14	No	X						X				
A07-RB-1	45.64964	-108.72331	9/8/14	Yes	X		X								X
A12-RB-1	45.65081	-108.71566	N/A	N/A	X		X						X		
A13-LB-1	45.65198	-108.71074	9/10/14	Yes		X								X	
A14-LB-1	45.65600	-108.70822	9/10/14	Yes		X					X				
A14-RB-1	45.65678	-108.70574	N/A	N/A	X										X
A19-RB-1	45.66510	-108.70221	N/A	N/A	X						X				
A22-IS-1	45.67199	-108.68022	9/10/14	No	X						X				
A24-LB-1	45.67699	-108.67151	9/10/14	Yes	X			X						X	
A26-IS-1	45.68532	-108.66645	N/A	N/A	X								X		
A28-LB-1	45.69130	-108.64809	N/A	N/A		X				X		X			X
A28-RB-1	45.68702	-108.64369	9/8/14	No		X					X				
A28-RB-2	45.68652	-108.64515	N/A	N/A	X						X				
A29-IS-1	45.69243	-108.64275	N/A	N/A	X				X					X	
B04-LB-1	45.69505	-108.64069	N/A	N/A		X					X	X			X
B08-LB-1	45.70500	-108.60805	N/A	N/A		X					X		X		
B10-LB-1	45.70653	-108.60228	9/10/14	Yes	X				X					X	
B12-LB-1	45.71426	-108.59853	9/10/14	No		X					X				
B14-LB-1	45.72251	-108.58917	9/8/14	No	X				X		X				X
B17-RB-1	45.72487	-108.56871	9/10/14	Yes		X					X				
B27-RB-1	45.73773	-108.53898	N/A	N/A		X					X				
B30-LB-1	45.73987	-108.52372	9/8/14	No	X				X		X	X			
B31-LB-1	45.74494	-108.51817	9/10/14	No	X		X								X
B34-LB-1	45.74747	-108.50457	9/8/14	Yes	X				X		X	X			
B35-IS-1	45.74873	-108.49686	9/10/14	No	X				X		X				
B43-IS-1	45.78641	-108.47674	N/A	N/A	X								X		
B45-RB-1	45.79343	-108.47007	9/8/14	No	X										X
B46-RB-1	45.71841	-108.58531	9/8/14	No	X			X		X	X	X			
B47-RB-1	45.70992	-108.59326	9/8/14	Yes	X						X				
C03-LB-1	45.81322	-108.45822	9/8/14	Yes		X				X	X	X			
C05-RB-1	45.81456	-108.44551	N/A	N/A	X					X		X			
C08-LB-1	45.82556	-108.42677	N/A	N/A	X						X	X			
C09-LB-1	45.83426	-108.42541	N/A	N/A	X										X
C11-LB-1	45.84367	-108.42186	9/9/14	Yes		X						X		X	
C23-RB-1	45.89966	-108.31186	N/A	N/A	X					X	X	X			
C25-LB-1	45.91795	-108.31787	N/A	N/A	X				X				X		
C27-LB-1	45.93221	-108.30459	N/A	N/A											
C34-RB-1	45.96657	-108.25218	N/A	N/A	X		X								X
C36-RB-1	45.97396	-108.23713	9/9/14	Yes	X						X	X			
C44-RB-1	45.99969	-108.15283	9/9/14	No		X					X	X			X
C45-RB-1	45.99862	-108.13025	N/A	N/A	X				X				X		
C50-LB-1	46.00265	-108.06488	9/9/14	No	X		X			X	X	X			
C50-RB-1	45.99496	-108.04580	9/9/14	No	X			X		X					X
C54-RB-1	45.99517	-107.98527	9/9/14	Yes		X					X				

**Notes:**

1. The 32 locations previously approved by the MDEQ where monitoring is not required are italicized and highlighted in gray
2. The 3 locations where no residual staining was observed during this monitoring event are highlighted in green
3. Coordinates collected using a Trimble GPS unit in the WGS-1984 datum

## Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., LAUREL, AND MOSSMAIN MONT, 1956, PHOTOREVISED 1969.



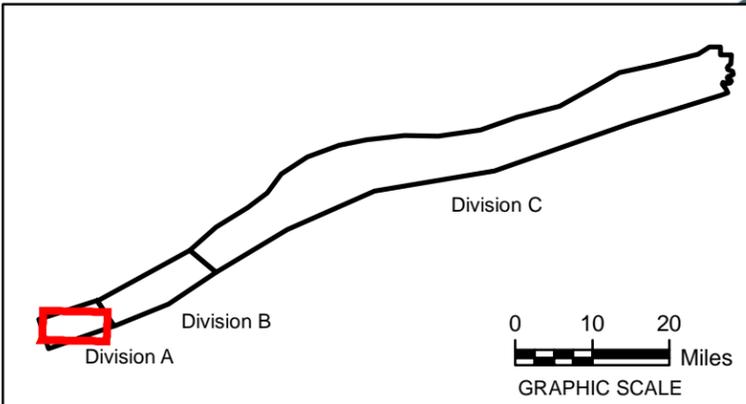
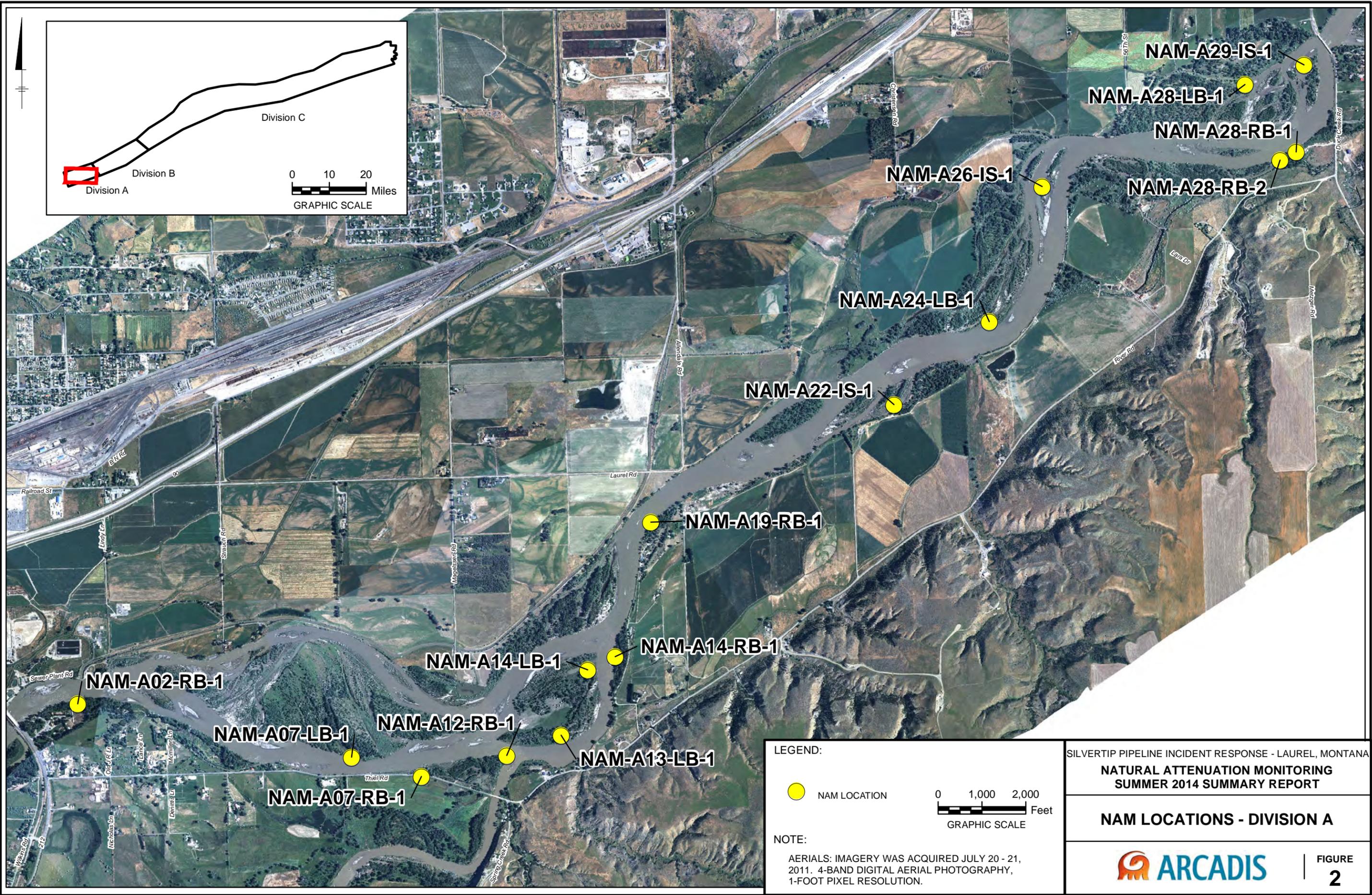
SILVERTIP PIPELINE INCIDENT RESPONSE - LAUREL, MONTANA  
 NATURAL ATTENUATION MONITORING  
 GI AA9F 201( SUMMARY REPORT

**SITE LOCATION MAP**

FIGURE  
**1**

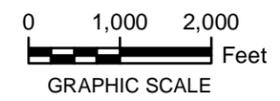
06/13/2012 SYRACUSE, NY:ENV/CAD-141, DJHOWES  
 B0085904/1205/00009/CDR/855904N01.CDR

CITY: MPLS, DIV: GROUP: IM, DB: MG, LD: EL  
SILVERTIP Path: Z:\GIS\PROJECTS\ENV\Laurel\MT\NAM\mxd\Div\_A\_NAM\_Locs\_20140917.mxd



LEGEND:

● NAM LOCATION



NOTE:

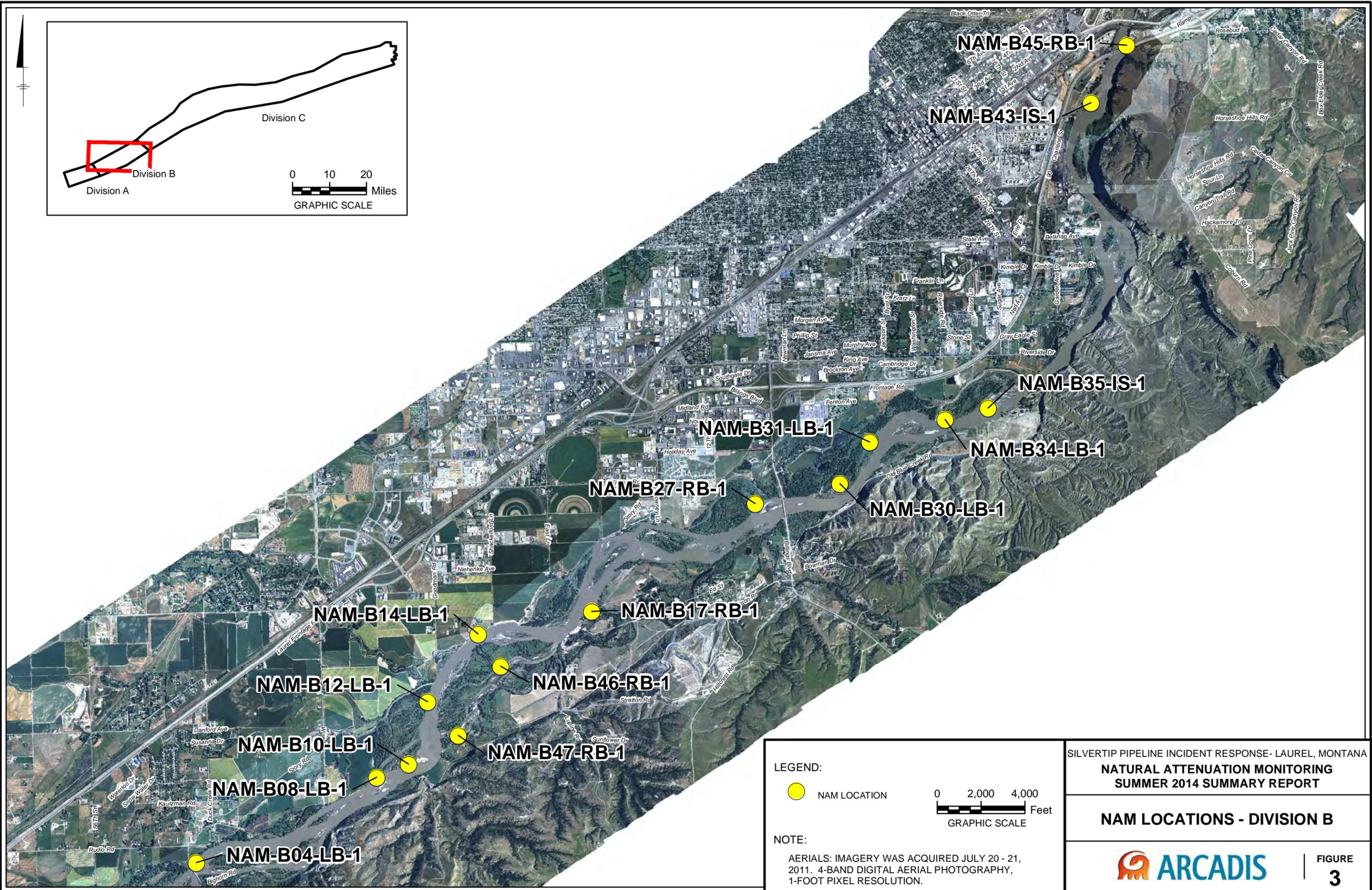
AERIALS: IMAGERY WAS ACQUIRED JULY 20 - 21, 2011. 4-BAND DIGITAL AERIAL PHOTOGRAPHY, 1-FOOT PIXEL RESOLUTION.

SILVERTIP PIPELINE INCIDENT RESPONSE - LAUREL, MONTANA  
NATURAL ATTENUATION MONITORING  
SUMMER 2014 SUMMARY REPORT

NAM LOCATIONS - DIVISION A

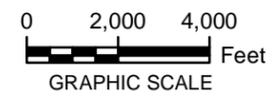


CITY: MPLS, DIV: GROUP: IM, DB: MG, LD: EL  
SILVERTIP Path: Z:\GIS\PROJECTS\ENV\Laurel\MT\NAM\mxd\Div\_B\_NAM\_Locs\_20140917.mxd



LEGEND:

● NAM LOCATION



NOTE:

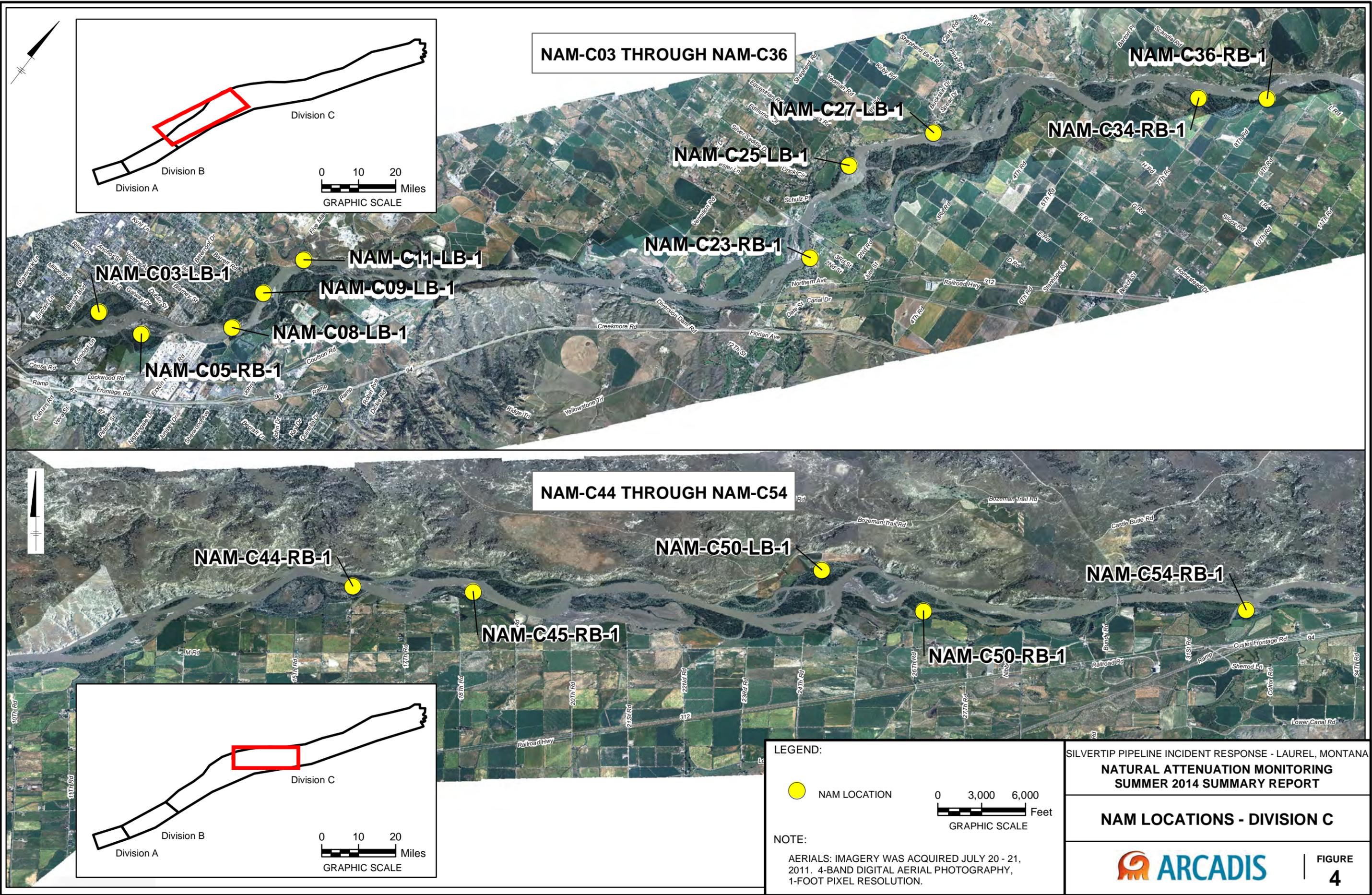
AERIALS: IMAGERY WAS ACQUIRED JULY 20 - 21, 2011. 4-BAND DIGITAL AERIAL PHOTOGRAPHY, 1-FOOT PIXEL RESOLUTION.

SILVERTIP PIPELINE INCIDENT RESPONSE - LAUREL, MONTANA  
NATURAL ATTENUATION MONITORING  
SUMMER 2014 SUMMARY REPORT

NAM LOCATIONS - DIVISION B



CITY: MPLS, DIV/GROUP: IM, DB: MG, LD: EL  
SILVERTIP Path: Z:\GIS\PROJECTS\ENVI\Laurel\MT\NAM\mxd\Div\_C\_NAM\_Locs\_20140917.mxd





## **Appendix A**

NAM Forms

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy) <u>9/16/14</u>	Time (24h): std / daylight <u>8:55</u>	Season/Year: <u>FALL 2014</u>
Location ID: <u>NAM-AD2-RB-1</u>				
Division: <u>A</u>				
River Segment: <u>02</u>	Left Bank <input checked="" type="checkbox"/> Right Bank <input type="checkbox"/> Island <input type="checkbox"/>	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	<u>Eric Lunin</u>	<u>ARCADIS</u>	<u>[Signature]</u>	
<b>3 LOCATION</b>				
GPS: LATITUDE <u>45</u> deg. <u>39' 17.2123</u> min.	LONGITUDE <u>-108</u> deg. <u>45 13.7049</u> min.	Datum: _____		
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy ___ Closed Canopy ___ <input checked="" type="checkbox"/> Rip-rap ___ Grassy field ___ Debris Pile ___ Other ___				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves ___ bark <input checked="" type="checkbox"/> stems ___ willows ___				
logs ___ grasses ___ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number: <u>1625</u>	Direction Photo Taken: <u>162°</u>			
Height above ground (inches): <u>41</u>				
<b>6 COMMENTS</b>				
<p><u>Natural attenuation is apparent</u>                      <u>Stake retrieved</u></p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy) 9/10/14	Time (24h): std / daylight 8:51	Season/Year: FALL 2014
Location ID: NAM-413-6B-1				
Division: A				
River Segment: 13	<u>Left Bank</u> Right Bank / Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	Eric Lwin	ARCADIS		
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>39</u> 06.8507 min.	LONGITUDE <u>-108</u> deg. <u>42</u> 38.4459 min.	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy _____ Closed Canopy <input checked="" type="checkbox"/> Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark _____ stems _____ willows _____				
logs <input checked="" type="checkbox"/> grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:	<u>1039</u>	Direction Photo Taken:		
Height above ground (inches):	<u>41</u>	<u>351</u>		
<b>6 COMMENTS</b>				
<p>Natural Attenuation is apparent</p> <p style="text-align: right;">Stake recovered</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				
Sketch area				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: NAM-A24-LB-1		9/10/14	10:17	FALL 2014
Division: A				

River Segment: 24	<input checked="" type="checkbox"/> Left Bank / <input type="checkbox"/> Right Bank / <input type="checkbox"/> Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm	Air Temp +/- ___ deg C
-------------------	---	---	------------------------

<b>2 TEAM #</b>	Name	Company	Signature
	ERIC LUNIN	ARCADIS	

**3 LOCATION**

GPS: LATITUDE 45 deg. 40 37.1304 min. LONGITUDE -108 deg. 40 17.5063 min. Datum: \_\_\_\_\_

UNIT USED: \_\_\_\_\_

**4A HABITAT TYPE** SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED

Vegetation: Open Canopy  Closed Canopy \_\_\_\_\_ Rip-rap \_\_\_\_\_ Grassy field \_\_\_\_\_ Debris Pile  Other \_\_\_\_\_

**4B OILED VEGETATION TYPE** write "COAT" or "STAIN" as appropriate

leaves \_\_\_\_\_ bark \_\_\_\_\_ stems \_\_\_\_\_ willows \_\_\_\_\_

logs  grasses \_\_\_\_\_ Other: \_\_\_\_\_

**5 PHOTOGRAPH**

Photo Number: \_\_\_\_\_ Direction Photo Taken: \_\_\_\_\_

Height above ground (inches): 41 \_\_\_\_\_ 070

**6 COMMENTS**

logs dark & wet

Natural Attenuation is apparent

Stake recovered

**7 SKETCH** tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: <u>NAM-A28-R13-1</u>		<u>9/18/14</u>	<u>9:34</u>	FALL 2014
Division: <u>A</u>				
River Segment: <u>28</u>	Left Bank <input checked="" type="checkbox"/> Right Bank <input type="checkbox"/> Island <input type="checkbox"/>	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	<u>Eric Lunin</u>	<u>ARCADIS</u>		
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>41 13.2435</u> min.	LONGITUDE <u>108</u> deg. <u>58 37.2109</u> min.	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy _____ Closed Canopy _____ <input checked="" type="checkbox"/> Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark <input checked="" type="checkbox"/> stems _____ willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:	<u>1629</u>	Direction Photo Taken:	<u>213</u>	
Height above ground (inches):	<u>4</u>			
<b>6 COMMENTS</b>				
<u>No stake present</u>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location: <u>NAM304-LB-1</u>				FALL 2014
Division: <u>B</u>				
River Segment: <u>04</u>	<u>Left Bank</u> / Right Bank / Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	<u>Eric Lunin</u>	<u>ARCADIS</u>		
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>41</u> <u>42.1647</u> min.	LONGITUDE <u>108</u> deg. <u>38</u> <u>26.4302</u> min.	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy _____ Closed Canopy _____ <input checked="" type="checkbox"/> Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark <input checked="" type="checkbox"/> stems <input checked="" type="checkbox"/> willows _____				
logs _____ grasses <input checked="" type="checkbox"/> Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: <u>060</u>		
Height above ground (inches): <u>4'</u>				
<b>6 COMMENTS</b>				
<p>No property access granted by land owner Location not monitored</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: <u>NAM-BIO-LB-1</u>		<u>9/10</u>	<u>11:01</u>	FALL 2014
Division: <u>B</u>				
River Segment: <u>10</u>	<input checked="" type="checkbox"/> Left Bank / <input type="checkbox"/> Right Bank / <input type="checkbox"/> Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	<u>Eric Lunin</u>	<u>ABC ADIS</u>		
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>42 23.5343</u> min.	LONGITUDE <u>-108</u> deg. <u>36</u> min.	Datum: <u>08.1347</u>	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy <input checked="" type="checkbox"/> Closed Canopy _____ Rip-rap _____ Grassy field _____ Debris Pile _____ Other <u>Cobbles</u>				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark _____ stems _____ willows _____				
logs <input checked="" type="checkbox"/> grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: <u>335</u>		
Height above ground (inches): <u>2'</u>				
<b>6 COMMENTS</b>				
<p>Natural Attenuation Apparent</p> <p style="text-align: right;">Stake recovered</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy) 9/10/14	Time (24h): std / daylight 1143	Season/Year: FALL 2014
Location ID: NAM-1312-LB-1				
Division: B				
River Segment: 12	<input checked="" type="checkbox"/> Left Bank / <input type="checkbox"/> Right Bank / <input type="checkbox"/> Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	Eric Lunin	ARCADIS		
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>42</u> <del>23</del> min.	LONGITUDE <u>-108</u> deg. <u>36</u> <del>08</del> min.	Datum: <u>54.6900</u>	
UNIT USED: <u>51.3447</u>				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy ___ Closed Canopy <input checked="" type="checkbox"/> Rip-rap ___ Grassy field ___ Debris Pile ___ Other ___				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves ___ bark <input checked="" type="checkbox"/> stems ___ willows ___				
logs ___ grasses ___ Other: ___				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: <u>252</u>		
Height above ground (inches): <u>41</u>				
<b>6 COMMENTS</b>				
<p>No staining observed</p> <p style="text-align: right;">No stake</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				
Empty sketch area				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy) 9/10/14	Time (24h): std / daylight 12:04	Season/Year: FALL 2014
Location ID: NAM-B17-B13-1				
Division: B				
River Segment: 17	Left Bank <input checked="" type="checkbox"/> Right Bank <input type="checkbox"/> Island <input type="checkbox"/>	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	Eric Lunin	ARCADIS		
<b>3 LOCATION</b>				
GPS:	LATITUDE 45 deg. 43 min. 29.5952	LONGITUDE -108 deg. 34 min. 07.3102	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy _____ Closed Canopy <input checked="" type="checkbox"/> Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark <input checked="" type="checkbox"/> stems _____ willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: 170		
Height above ground (inches): 4'				
<b>6 COMMENTS</b>				
<p>Natural attenuation is apparent</p> <p style="text-align: right;">Stake recovered</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: NAM-B30-LB-1		9/18/14	13:02	FALL 2014
Division: B		River Segment: 30		Air Temp +/- ___ deg C
		<input checked="" type="checkbox"/> Left Bank <input type="checkbox"/> Right Bank / Island		Sun / Clouds / Fog / Rain / Snow / Windy / Calm
<b>2 TEAM #</b>	Name	Company	Signature	
	ERIC KUNIN	ARCADIS		
<b>3 LOCATION</b>				
GPS:	LATITUDE 45 deg. 44 min. 23.4605	LONGITUDE -108 deg. 31 min. 25.4222	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy <input checked="" type="checkbox"/> Closed Canopy _____ Rip-rap _____ Grassy field _____ Debris Pile _____ Other <u>cobbles</u>				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark <input checked="" type="checkbox"/> stems <input checked="" type="checkbox"/> willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken:		
Height above ground (inches): 4'		001		
<b>6 COMMENTS</b>				
45.73985 -108.523726				
No staining observed				
No stake				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: <u>NAM-1334 L13-1</u>		<u>9/18/14</u>	<u>1353</u>	FALL 2014
Division: <u>B</u>		River Segment: <u>01</u> <input checked="" type="checkbox"/> Left Bank / <input type="checkbox"/> Right Bank / <input type="checkbox"/> Island		Sun / Clouds / Fog / Rain / Snow / Windy / Calm
<b>2 TEAM #</b>		Name	Company	Signature
		<u>ERIC LUNIN</u>	<u>ARCADIS</u>	<u>[Signature]</u>
<b>3 LOCATION</b>		GPS: LATITUDE <u>45</u> deg. <u>44</u> <u>51.0971</u> min. LONGITUDE <u>-108</u> deg. <u>30</u> <u>16.4437</u> min. Datum: _____		
<b>4A HABITAT TYPE</b>		SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED		
Vegetation: Open Canopy <input checked="" type="checkbox"/> Closed Canopy _____ Rip-rap _____ Grassy field _____ Debris Pile _____ Other <u>Cobbles</u>				
<b>4B OILED VEGETATION TYPE</b>		write "COAT" or "STAIN" as appropriate		
leaves _____ bark <input checked="" type="checkbox"/> stems <input checked="" type="checkbox"/> willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>		Photo Number: _____ Direction Photo Taken: <u>068</u>		
Height above ground (inches): <u>41</u>				
<b>6 COMMENTS</b>		<p style="text-align: center;">45.747527 -108.504568</p> <p>No stains observed</p> <p style="text-align: right;">Stake recovered</p>		
<b>7 SKETCH</b>		tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries		

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: MAM-1335-15-1		9/10/14	1300	FALL 2014
Division: B				
River Segment: 35	Left Bank / Right Bank (Island)	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp + / - ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	ERIC LUNIN	ARCADIS		
<b>3 LOCATION</b>				
GPS: LATITUDE	45 deg. 44.55.5485 min.	LONGITUDE	-108 deg. 29.48.6989 min.	Datum: _____
UNIT USED: _____				
<b>4A HABITAT TYPE</b> SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED				
Vegetation: Open Canopy <input checked="" type="checkbox"/> Closed Canopy _____ Rip-rap _____ Grassy field _____ Debris Pile _____ Other: COBBLES				
<b>4B OILED VEGETATION TYPE</b> write "COAT" or "STAIN" as appropriate				
leaves _____ bark <input checked="" type="checkbox"/> stems _____ willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: 045		
Height above ground (inches): 41				
<b>6 COMMENTS</b>				
<p>natural attenuation is apparent</p> <p style="text-align: right;">no stake, flagging recommended</p>				
<b>7 SKETCH</b> tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: <u>NAM-B47-RB-1</u>		<u>9/8/14</u>	<u>10:47</u>	FALL 2014
Division: <u>B</u>				
River Segment: <u>47</u>	Left Bank / <u>(Right Bank)</u> / Island	Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
<b>2 TEAM #</b>	Name	Company	Signature	
	<u>ERIC LUNIN</u>	<u>ARCADIS</u>	<u>[Signature]</u>	
<b>3 LOCATION</b>				
GPS:	LATITUDE <u>45</u> deg. <u>42</u> <sup>35.7287</sup> min.	LONGITUDE <u>-108</u> deg. <u>35</u> <sup>35.6849</sup> min.	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy <input checked="" type="checkbox"/> Closed Canopy _____ Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves _____ bark <input checked="" type="checkbox"/> stems _____ willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: <u>312</u>		
Height above ground (inches): <u>4'</u>				
<b>6 COMMENTS</b>				
<p>Twig with small coat observed, no other oil stains observed</p> <p>No stake</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				
Empty sketch area				

<b>1 GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h): std / daylight	Season/Year:
Location ID: NAM-C03-LB-1		9/18/14	15:18	FALL 2014
Division: C		Sun / Clouds / Fog / Rain / Snow / Windy / Calm		Air Temp +/- ___ deg C
River Segment: 03		<input checked="" type="checkbox"/> Left Bank / <input type="checkbox"/> Right Bank / Island		
<b>2 TEAM #</b>	Name	Company	Signature	
	Eric Lunin	ARCADIS		
<b>3 LOCATION</b>				
GPS:	LATITUDE 45 deg. 48' 47.6138 min.	LONGITUDE -108 deg. 27' 29.5222 min.	Datum: _____	
UNIT USED: _____				
<b>4A HABITAT TYPE</b> <i>SELECT only one primary (P) shoreline type and any number of secondary (S) types. CIRCLE those OILED</i>				
Vegetation: Open Canopy _____ Closed Canopy _____ <input checked="" type="checkbox"/> Rip-rap _____ Grassy field _____ Debris Pile _____ Other _____				
<b>4B OILED VEGETATION TYPE</b> <i>write "COAT" or "STAIN" as appropriate</i>				
leaves <input checked="" type="checkbox"/> bark <input checked="" type="checkbox"/> stems <input checked="" type="checkbox"/> willows _____				
logs _____ grasses _____ Other: _____				
<b>5 PHOTOGRAPH</b>				
Photo Number:		Direction Photo Taken: 300		
Height above ground (inches): 2'				
<b>6 COMMENTS</b>				
<p>Mild staining observed</p> <p style="text-align: right;">Stake retrieved</p>				
<b>7 SKETCH</b> <i>tripod setup in relation to nearby features, trees, rocks, water bodies, parcel boundaries</i>				



## **Appendix B**

Photo Log

Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-A02-RB-1**



Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-A13-LB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-A24-LB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-A28-RB-1**





Silvertip Incident  
Laurel, Montana

<b>LOCATION ID</b>
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<b>NAM-B04-LB-1</b>
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No Photograph Available.

NAM location was inaccessible and not inspected due to private property land access restrictions.



Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B10-LB-1**



Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B12-LB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B17-RB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B30-LB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B34-LB-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B35-IS-1**





Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-B47-RB-1**



Silvertip Incident  
Laurel, Montana

**LOCATION ID**

**NAM-C03-LB-1**

