Smoky Canyon Mine – Area A
Monitoring Data
May-June 2006

Technical Memorandum

Water Quality Monitoring Data Report
May-June 2006

Smoky Canyon Mine - Area A

July 20, 2006

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1. Introduction

Surface water flow conditions during the spring of 2006 represented more typical annual high-flow conditions at the Smoky Canyon Mine than those monitored over the past several years, including the years when surface water flows and water quality were monitored to support the AOC Site Investigation (2002-2004). In recent past years, the spring snowmelt period did not produce normal high-flow conditions due to a prolonged drought (2000-2005) and lower than normal winter snowfall amounts.

The scope of the mine's spring, high-flow surface water and groundwater monitoring program was expanded in 2006 to allow for an evaluation of the effects of higher runoff and surface water flows on water quality in the vicinity of the Smoky Canyon Mine.

This Technical Memorandum reports results from surface water and groundwater monitoring activities conducted for the Smoky Canyon Mine during May and June 2006. Also included herein are more detailed presentation and analysis of results from monitoring locations in the Pole Canyon Creek, Sage Creek and lower Crow Creek drainages. This report focuses on those results because they are relevant to the Removal Actions being considered for the Pole Canyon overburden disposal area and related decisions for actions at other locations within Area A at the Smoky Canyon Mine.

2. Scope of Surface Water and Groundwater Monitoring Activities

There were five distinct data collection tasks associated with the spring 2006 surface water monitoring conducted at the Smoky Canyon Mine:

1. Routine monitoring in accordance with the Smoky Canyon Mine Draft Environmental Monitoring Program Plans (MFG, 2002)
2. Site Investigation monitoring during a typical high flow period as specified by the Area A Site Investigation Work Plan (MFG, 2003a)
3. Monitoring to support the Pole Canyon Creek removal action design
4. Monitoring to further assess conditions associated with Hoopes Spring
5. Voluntary water quality monitoring in the Panels F and G EIS study area

The spring 2006 monitoring locations included all of the mine's routine surface water and groundwater monitoring stations plus additional surface water stations and groundwater monitoring wells. All of the locations included in the spring 2006 monitoring work are identified and mapped on Figures 1 and 2. In total samples were collected at 47 surface water stations and 9 groundwater monitoring wells between May 3 and May 25, 2006. Surface water samples were also collected on June 22, 2006, at six of the previously sampled surface water locations in lower Sage Valley and two groundwater monitoring wells that were not accessible in May.

Water samples were submitted to Silver Valley Laboratories (Wallace, Idaho), and sample handling, storage, and chain of custody procedures were in accordance with Standard Operating Procedures used during the Site Investigation (MFG, 2003b). Field duplicates and field blank samples were also collected and submitted for laboratory analyses.

The analyses requested for each sample submitted to the laboratory depended on the associated data collection task.

- Groundwater and surface water samples collected from the locations previously monitored during the Area A Site Investigation were analyzed for the parameters listed on Table 1. This list was provided to Simplot by the Idaho Department of Environmental Quality as the recommended suite of chemical analyses for surface water samples collected during the spring of 2006. Surface water flows and groundwater water levels were also measured during May 2006 and recorded at the Site Investigation monitoring locations.

- Samples collected from the routine monitoring locations that were not included in the Site Investigation were analyzed for the parameters specified by the Draft Environmental Monitoring Program Plans.

- Samples collected at the Panels F and G baseline monitoring locations were analyzed for the parameters listed on Table 2; this analyte list was informally reviewed by Idaho Department of Environmental Quality prior to the May 2006 monitoring event.

3. Results

All field and laboratory data associated with samples collected in May and June 2006 are reported in Appendix A. Table 3 is a summary of the 2006 flow and selenium concentration data for all locations sampled, and Figures 3, 4, and 5 present selenium concentrations for surface water samples collected from the Sage Valley area during May 2005, May 2006, and June 2006, respectively.

a. Surface Water Flow Data

The flow data reported on Table 3 demonstrate that significantly higher flow conditions existed during the 2006 monitoring event than during the high-flow monitoring events in 2003, 2004, and 2005. The Sage Creek flow measured at LSV-3, between South Fork Sage Creek and the confluence with Crow Creek, was 52.3 cubic feet per second (cfs) in May 2006 compared to flow less than 20 cfs during the previous three high-flow monitoring events.

At the lower Pole Canyon Creek station LP, 5 cfs was measured in May 2006 where the flow had been less than 2 cfs during the previous three high-flow monitoring events. During May 2006, Pole Canyon Creek flow entered Sage Valley and continued southeast across the valley to join the north fork of Sage Creek. Previously, all of the lower Pole Canyon Creek flow was lost to the valley floor before the confluence with the north fork of Sage Creek, and no Pole Canyon Creek water flowed directly into Sage Creek. Although flow was not measured in June 2006, it was apparent that lower Pole Canyon Creek flow was being lost across Sage Valley, and there was no longer any visible surface flow to northern Sage Creek.

Other tributaries to lower Sage Creek all had higher flows in 2006 compared to the 2003-2005 monitoring events. Hoopes Spring flow, measured at station HS, increased to 3.4 cfs in May 2006 from approximately 1.5 cfs in the previous three years. For comparison to historical flow records, Hoopes Spring flows higher than 4 cfs were measured during the spring high flow conditions in 1997 and 1998. South Fork Sage Creek flow measured at station LSS was 23.6 cfs in 2006 compared to flows less than 10 cfs in 2003 and 2004.

b. Selenium Concentration Data

The selenium concentrations in the north fork of Sage Creek and lower Sage Creek were distinctly higher in May 2006 than those measured a year earlier at the same locations. For example, at the monitoring station located on lower Sage Creek below Hoopes Spring and South Fork Sage Creek, LSV-3, there was an increase in the total recoverable selenium concentration from 0.0029 mg/L in 2005 to 0.0232 mg/L in 2006.

In contrast, selenium concentrations in lower Pole Canyon Creek, Sage Creek at LS, South Fork Sage Creek, and Hoopes Spring were similar to prior years. The lower Pole Canyon Creek total recoverable selenium concentration was slightly lower in May 2006 at 0.936 mg/L compared to 1.33 mg/L in May 2005. On Sage Creek below the mine and above the confluence of the north fork of Sage Creek, station LS, and on South Fork Sage Creek, station LSS, remained low at less than 0.001 mg/L and 0.002 mg/L, respectively. Only a slight increase in total recoverable selenium was observed at Hoopes Spring where the concentration was 0.0162 in May 2006 compared to 0.0146 mg/L in May 2005.

Follow up sampling was completed at a few selected locations in Sage Valley to evaluate the duration of elevated selenium concentrations associated with spring high-flow conditions. Lower Pole Canyon Creek and Sage Creek selenium concentrations declined in the month between the May and June surface water sampling events. At lower Pole Canyon Creek the total recoverable selenium concentration was 0.682 mg/L in June, and there was no surface flow to Sage Creek observed. In Sage Creek, selenium concentrations decreased at all locations, and there was also gradual decrease in concentration with downstream distance from lower Pole Canyon Creek. At LSV-1, between the Pole Canyon Creek confluence and Hoopes Spring, the total recoverable selenium concentration decreased from 0.0336 mg/L to 0.0089 mg/L, and at LSV-2, below Hoopes Spring, the decrease was from 0.0252 mg/L to 0.0067 mg/L. The total recoverable selenium concentration at LSV-3 was 0.0067 in June compared to 0.0232 mg/L in May, and at LSV-4 the concentration decreased from 0.0146 mg/L to 0.0065 mg/L.

Selenium concentrations in Hoopes Spring water were the same during the May and June 2006 sampling events.

4. Discussion

The elevated selenium concentrations observed in lower Sage Creek during the 2006 high-flow monitoring event are directly attributable to contributions from lower Pole

Canyon Creek. Transport of selenium by Pole Canyon Creek produced elevated selenium concentrations in the north fork of Sage Creek, lower Sage Creek, and in Crow Creek below the inflow from Sage Creek. Pole Canyon Creek acted as a source of selenium to lower Sage Creek during the spring of 2006 but not during the previous high-flow sampling events. The selenium concentrations in other tributaries to Sage Creek were not substantially different than those measured in the past.

The June 2006 monitoring data indicate that once Pole Canyon Creek was no longer flowing directly into northern Sage Creek, the selenium concentrations rapidly declined along the entire downstream length of lower Sage Creek. In June, the selenium concentrations in Sage Creek remained just above the 0.005 mg/L standard at all locations.

As expected through the Site Investigation (Newfields, 2005), these results now demonstrate that under typical spring high-flow conditions Pole Canyon Creek is the dominant source of selenium to Sage Creek. These results also confirm the importance of implementing the Pole Canyon Creek diversion and infiltration portion of the EECA-identified preferred removal alternative as quickly as possible.

5. References

MFG, 2002. Draft Environmental Monitoring Program Plans, prepared by MFG, Inc. for the J.R. Simplot Company, Smoky Canyon Mine, November 2002.

MFG, 2003a. Site Investigation Work Plan for Smoky Canyon Mine Area A, prepared by MFG, Inc. for J.R. Simplot Company, Pocatello, Idaho, July 2003.

MFG, 2003b. Field Sampling Plan for Smoky Canyon Mine Area A Site Investigation, prepared by MFG, Inc. for the J.R. Simplot Company, Pocatello, Idaho, August 2003.

Newfields, 2005. Final Site Investigation Report for Smoky Canyon Mine Area A, prepared by Newfields Boulder, LLC for J.R. Simplot Company, Pocatello, Idaho, July 2005.

Table 3. Surface Water Flow and Selenium Concentration Data for Water Samples Collected May-June 2006

Station ID	Location Description	Sample ID	Sample Date	Flow cfs	Selenium-TR mg/L	Selenium-D mg/L
Smoky Canyon Mine Surface Water Quality Monitoring						
UR-3	Upper Roberts Ck	'UR-3-052106-01	5/21/2006	0.54	0.00021	0.00021
UT	Upper Tygee Ck	'UT-1-052106-01	5/21/2006	0.52	0.00035	0.00035
ET	East Tygee Ck	'ET-052106-01	5/21/2006	1.55	0.00093	0.0012
LT3	Lower Tygee Ck	'LT3-052106-01	5/21/2006	1.53	0.0012	0.00094
USm	Upper Smoky Ck	'USM-052206-01	5/22/2006	3.52	<0.0002	<0.0002
MSm	Middle Smoky Ck	'MSM-052206-01	5/22/2006	0.61	0.00061	0.00049
LSmS	Lower Smoky Spring	'LSMS-052206-01	5/22/2006	2.12	0.00026	0.0002
LSm	Lower Smoky Ck	'LSM-052206-01	5/22/2006	3.53	0.00026	0.0002
UP	Upper Pole Canyon Ck	'UP-RASW-052106-01	5/21/2006	--	0.00081	---
UP	Upper Pole Canyon Ck	'UP-052106-01	5/21/2006	--	0.0004	0.00035
LP	Lower Pole Canyon CK	'LP-052106-01	5/21/2006	4.97	0.936	0.928
LP-1	Lower Pole Canyon discharge	'LP-1-052106-01	5/21/2006	8.38	0.992	---
LP-1	Lower Pole Canyon discharge	'LP1-SW1-1009	6/22/2006	--	0.682	0.628
US	Upper Sage Ck	'US-052206-01	5/22/2006	--	0.00042	0.00021
LS	Lower Sage Ck	'LS-052206-01	5/22/2006	47.03	0.00034	0.0005
HS	Hoopes Spring	'HS-SW1-963	5/17/2006	--	0.0189	0.0169
HS	Hoopes Spring	'HS-RASW-052206-01	5/22/2006	3.39	0.0163	---
HS	Hoopes Spring	'HS-052206-01	5/22/2006	3.39	0.0162	0.0173
HS	Hoopes Spring	'HS-SW1-1010	6/22/2006	--	0.0171	0.0168
HS2	Hoopes Spring, below flume	'HS2-SW1-965	5/17/2006	--	0.0142	0.014
HS-A1	Hoopes Spring, A1	'HSA1-SW1-961	5/17/2006	--	0.0079	0.0073
HS-A2	Hoopes Spring, A2	'HSA2-SW1-962	5/17/2006	--	0.0067	0.006
HS-C1	Hoopes Spring, C1	'HSC1-SW1-964	5/17/2006	--	0.0168	0.014
USS	Upper South Fork Sage Ck	'USS-052306-01	5/23/2006	--	<0.0002	<0.0002
LSS-SP	S. Fork Sage Ck springs	'SW-SFSC-800-052206	5/22/2006	--	0.002	---
LSS	Lower South Fork Sage Ck	'LSS-052206-01	5/22/2006	23.6	0.0019	0.002
LSV-1	Lower Sage Valley 1	'LSV1-RASW-052106-0	5/21/2006	--	0.0336	0.0166
LSV-1	Lower Sage Valley 1	'LSV1-SW1-1011	6/22/2006	--	0.0089	0.0087
LSV-2	Lower Sage Valley 2	'LSV2-RASW-052106-0	5/21/2006	--	0.0252	---
LSV-2	Lower Sage Valley 2	'LSV2-SW1-1012	6/22/2006	--	0.0084	0.0076
LSV-3	Lower Sage Valley 3	'LSV3-RASW-052106-0	5/21/2006	52.33	0.0232	0.0166
LSV-3	Lower Sage Valley 3	'LSV3-SW1-1013	6/22/2006	--	0.0067	0.0065
LSV-4	Lower Sage Valley 4	'LSV-4-BSW-052106-0	5/21/2006	--	0.013	---
LSV-4	Lower Sage Valley 4	'LSV4-RASW-052106-0	5/21/2006	--	0.0146	---
LSV-4	Lower Sage Valley 4	'LSV4-SW1-1014	6/22/2006	--	0.0065	0.0065
CC-2	Crow Ck above Sage Ck	'CC-2-052306-01	5/23/2006	83.72	0.0015	---
CC-1	Crow Ck downstream of Sage Ck	'SW-CC-500-052306-0	5/23/2006	139.85	0.0054	---
CC-3	Crow Ck downstream (3 mi)	'CC-3-052306-01	5/23/2006	144.54	0.0052	---
Panels F and G Surface Water Quality Monitoring						
SW-CC-100	Crow Ck	'SW-CC-100-052506-0	5/25/2006	29.05	0.00067	---
SW-CC-300	Crow Ck	'SW-CC-300-052306-0	5/23/2006	83.72	0.0011	---
SW-CC-500	Crow Ck downstream of Sage Ck	'SW-CC-500-052306-0	5/23/2006	139.85	0.0054	---
SW-DC-400	Deer Ck	'SW-DC-400-052406-0	5/24/2006	22.6	0.0007	---
SW-DC-500	Deer Ck	'SW-DC-500-052406-0	5/24/2006	20.39	0.00083	---
SW-DC-600	Deer Ck	'SW-DC-600-052506-0	5/25/2006	30.72	0.001	---
SW-NFDC-200	North Fork Deer Ck	'SW-NFDC-200-052406	5/24/2006	0.74	0.0019	---
SW-NFDC-900	North Fork Deer Ck	'SW-NFDC-900-052406	5/24/2006	7.13	0.0012	---
SW-SFDC-300	South Fork Deer Ck	'SW-SFDC-300-052506	5/25/2006	3.88	0.00037	---
SW-SFSC-500	South Fork Sage Ck	'SW-SFSC-500-052306	5/23/2006	10.48	<0.0002	---
SW-SFSC-800	S. Fork Sage Ck springs	'SW-SFSC-800-052206	5/22/2006	--	0.002	---
SW-WC-800	Wells Canyon	'SW-WC-800-052506-0	5/25/2006	0.49	0.00081	---
SP-BOOKS	Books Spring	'SP-BOOKS-052506-01	5/25/2006	1.88	0.00067	---
SP-DC-350	Spring in Deer Ck	'SP-DC-350-052406-0	5/24/2006		0.001	---
SP-MC-300	Spring in Manning Ck	'SP-MC-300-052306-0	5/23/2006	0.27	0.00023	---
SP-REIDE	Reide springs	'SP-REIDE-052506-01	5/25/2006		0.00087	---
SP-UTDC-700	Spring in upper Deer Ck	'SP-UTDC-700-052406	5/24/2006		0.0078	---
SP-UTDC-800	Spring in upper Deer Ck	'SP-UTDC-800-052406	5/24/2006		0.00067	---
SP-UTNFDC-540	Spring in upper N. Fork Deer Ck	'SP-UTNFDC-540-0524	5/24/2006	0.23	0.0086	---
SP-WC-400	Spring in Wells Canyon	'SP-WC-400-052506-0	5/25/2006	0.23	0.0034	---
SP-WC-750	Spring in Wells Canyon	'SP-WC-750-052506-0	5/25/2006		0.0007	---

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Station ID	Location Description	Sample ID	Sample Date	Flow cfs	Selenium-TR mg/L	Selenium-D mg/L
Groundwater Monitoring						
GW-CO	Consent Order well	'06-123-C001	5/3/2006	---	---	0.0037
GW-CW	Culinary well	'06-091-CW02-D	4/1/2006	---	---	0.0288
GW-CW	Culinary well	'06-099-CW02-D	4/9/2006	---	---	0.037
GW-CW	Culinary well	'06-123-CW02	5/3/2006	---	---	0.0431
GW-IW	Industrial well	'06-099-IW02-D	4/9/2006	---	---	0.0131
GW-15	Alluvial well, lower Pole Canyon	'GW15-GW1-960	5/16/2006	---	1.48	1.43
GW-16	Wells Fm well, lower Pole Canyon	'GW16-GW1-976	5/19/2006	---	0.822	0.7
GW-18	Wells Fm well, near Hoopes Spring	'GW18-GW1-968	5/17/2006	---	0.0045	0.0044
GW-19	Alluvial well, Sage Valley	'GW19B-GW1-981	5/22/2006	---	0.00094	0.00088
GW-20	Alluvial well, Sage Valley	'GW20-GW1-980	5/22/2006	---	0.00058	0.00059
GW-22	Alluvial well, Sage Valley	'GW22-GW1-967	5/17/2006	---	0.0461	0.044
DC-MW-5	Wells Fm well, Deer Creek	'DCMW5-GW1-1006	6/22/2006	---	0.0106	---
MC-MW-1	Wells Fm well, S. Fork Sage Creek	'MCMW1-GW1-979	5/19/2006	---	0.00037	0.00034
MC-MW-5	Phosphoria Fm well, Manning Ck	'MCMW5-GW1-1007	6/22/2006	---	0.0171	---