START 3

Superfund Technical Assessment and Response Team 3 – Region 8

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ANALYTICAL RESULTS REPORT
for a
COMBINED SITE INSPECTION and REMOVAL ASSESSMENT

SMURFIT-STONE MILL
Near Missoula, Missoula County, Montana

TDD Nos. 1105-09 and 1109-07

August 20, 2012

URS
OPERATING SERVICES, INC.

In association with:
Garry Struthers Associates, Inc.
LT Environmental, Inc.
TechLaw, Inc.
Tetra Tech EMI
TN & Associates, Inc.

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(CERCLIS ID #: MTN000802850)

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1.0 INTRODUCTION

This Analytical Results Report (ARR) for a combined Site Inspection (SI) and Removal Assessment (RA) of the Smurfit-Stone Mill site (CERCLIS ID# MTN000802850) near Missoula, Missoula County, Montana (Figure 1) is submitted in accordance with the task elements specified in Technical Direction Documents (TDD) No. 1105-09 and 1109-07, issued to URS Operating Services, Inc. (UOS) by the Region VIII office of the U.S. Environmental Protection Agency (EPA) under Superfund Technical Assessment and Response Team 3 (START) contract # EP-W-05-050. This report has been prepared in accordance with the EPA "Guidance for Performing Site Inspections under CERCLA," Interim Final, September 1992 (EPA 1992a), and the "Region 8 Supplement to Guidance for Performing Site Inspections under CERCLA" (EPA 1993). This ARR is intended to be read in conjunction with the Smurfit-Stone Mill Preliminary Assessment (PA) (UOS 2011a), the Smurfit-Stone Mill Field Sampling Plan (FSP) (UOS 2011b), and the Smurfit-Stone Mill Sampling Activities Report (SAR) (UOS 2011c).

UOS conducted field work at the Smurfit-Stone Mill site during the week of October 23, 2011, and the final sample shipment occurred on November 2, 2011. UOS was also tasked with collecting split samples for the owner of the facility, M2Green Redevelopment, LLC (M2Green), through their consulting firm Hydrometrics, Inc. Robert Parker, Site Assessment Manager for the EPA, was present on site and accompanied UOS in the field on October 24. Joyce Ackerman, On-Scene Coordinator for the EPA, was also present on site and accompanied UOS in the field from October 25 through 29. The field work followed the Site Inspection (SI) format, the applicable UOS Technical Standard Operating Procedures (TSOPs) (UOS 2005b), and the Generic Quality Assurance Project Plan (UOS 2005a).

Field activities specifically included the collection of 75 field environmental samples comprised of 17 surface soil/source (0-2 feet below ground surface [bgs]) samples, 8 subsurface soil/source (>2 feet bgs) samples, 20 co-located surface water and sediment samples (from 10 locations), 21 groundwater samples (collected from existing monitoring and domestic wells, as well as newly installed monitoring wells), and 9 field Quality Assurance/Quality Control (QA/QC) samples, which included 2 surface soil replicates, 2 groundwater duplicates, 1 rinsate, and 2 trip blanks (in addition to the laboratory matrix spike/matrix spike duplicates [MS/MSD]) (Table 8) (UOS 2011c).

Samples that were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs [aroclors]) were shipped via FedEx to the EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS) laboratory, Spectrum Analytical, Inc. (aka

Mitkem Laboratories), in Warwick, Rhode Island. Samples that were analyzed for metals (total metals for soils and sediments, both total and dissolved metals for water samples) were shipped via FedEx to the EPA CLP RAS laboratory, Chemtech Consulting Group, Inc., in Mountainside, New Jersey. Samples that were analyzed for chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans (CDDs/CDFs) (dioxins and furans) were shipped via FedEx to ALS Laboratory Group in Salt Lake City, Utah, and then forwarded to ALS Laboratory Group in Burlington, Ontario, Canado which is a laboratory procured by UOS outside of the EPA CLP, as the EPA CLP was unable to perform the non-RAS analyses during the time of the assessment.

Groundwater and soil samples analyzed for asbestos were hand-delivered to the Reservoirs Environmental, Inc. laboratory in Denver, Colorado.

The following issues were noted upon laboratory receipt of samples:

- The inorganics CLP laboratory received several total and dissolved metals samples with duplicate CLP IDs. New CLP IDs were assigned to the dissolved metals samples. Analytical results tables in this ARR report reflect up-to-date CLP ID numbers.
- The interior temperature of shipment coolers is supposed to be 4°C +/- 2°C. A number of coolers with organic samples were received with temperatures ranging from 6.5°-10° C. Reasons for this include that some shipments were bumped by FedEx and arrived later than expected, and that the private laboratory procured for dioxin and furan analysis forwarded samples to another laboratory in Canada.
- Approximately 18 glass sample jars were broken in shipment. However, sufficient jars were collected at each location so that enough volume to run each sample was received by the laboratory. Nonetheless, in a few cases re-analysis of samples was not an option, if needed.
- Soil/sediment samples to be analyzed for VOCs were collected in 4 oz. glass jars, which is not recommended under current EPA CLP sampling requirements, but is an acceptable method of sample collection. Due to shipping issues, some samples were also analyzed outside hold time according to CLP sampling requirements. Analytical data from these samples have been validated and are included in this report with validation qualifiers as appropriate.

All other samples were received by the laboratories in good condition, within holding times, and with the cooler custody seals intact.

All CLP and private laboratory data, with the exception of those for asbestos, were validated by third party subcontracted chemists at TechLaw, Inc. No significant data quality issues were identified during the data validation. CLP Form 1 documents and the data validation reports are presented under separate cover in Appendix E.

This report presents the analytical results for characterization of the on-site sources and targets potentially impacted in the groundwater, soil exposure, and surface water pathways. The air pathway is also discussed (Section 8.0). Field observations are presented in the SAR, and project photos are presented in Appendix A.

2.0 OBJECTIVES

This investigation was completed as a combined SI and RA, which have similar objectives in terms of data collection but utilize the data for different purposes. An SI evaluates information gathered with regard to the EPA's Hazard Ranking System (HRS) criteria for the purpose of determining whether additional investigation is warranted, and if the site is a potential candidate for the national priorities list (NPL). An RA evaluates information gathered to determine if an immediate threat exists to the environment or to human health, such that a removal action should be conducted immediately.

It should be noted that this sampling event did not examine every potential source area of the mill property (e.g., the industrial core of the facility, underground and aboveground storage tank locations) and, therefore, should not be used in isolation to determine any future regulatory requirements for the site.

The specific objectives of this combined RA and SI were to:

- Confirm suspected source areas, and evaluate each by HRS criteria (including volumes, containment, and contaminant characteristics);
- Determine if contaminants have been transported from site sources, or are likely to be transported from site sources through erosion or in the event of catastrophic flooding of the site, to the Clark Fork River or O'Keefe Creek, through direct discharge or through surface or groundwater;
- Determine if contaminants have been transported from the site to nearby domestic groundwater wells, and if so, to determine if contamination is present above appropriate water quality standards and benchmarks;

- Evaluate if an exposure threat from site contaminants exists to on-site workers or other persons accessing the mill property, domestic groundwater users near the site, or the environment, particularly to surface water receptor targets (e.g., in the Clark Fork River and O'Keefe Creek); and
- Document the recreational use (particularly for fishing) of the Clark Fork River in the vicinity of the mill.

3.0 SITE LOCATION AND DESCRIPTION

The Smurfit-Stone Mill is located in west-central Montana, approximately 11 miles northwest of the town of Missoula, Montana, in Missoula County (Figure 1). The Smurfit-Stone Mill was a large integrated pulp and paper mill that was in operation from 1957 through early 2010 (Photos 1, 2, 38 in the PA report) (UOS 2011a). The mill is located approximately 3 miles south of the town of Frenchtown and, therefore, has often been referred to as the Frenchtown Mill. The facility address is 14377 Pulp Mill Road, Missoula, Montana, and the coordinates of the center of the industrial core of the mill facility are 46.963502° north latitude and 114.200120° west longitude. The mill covers approximately 3,150 acres (Figure 1).

The mill site is located in the northeastern portion of the U.S. Geological Survey (USGS) Primrose Quadrangle Map (USGS 1999). For planning purposes under this assessment, the site boundary was defined by the outside perimeter of the land parcels that constitute the mill property. The legal description of these parcels is provided in Appendix A of the PA report, and the site boundary is shown in Figures 1 and 2 (Montana Department of Revenue [MDR] 2011). The western boundary of the site is the Clark Fork River, with the site having approximately 3.6 miles of river frontage (Photos 1, 6, 13, 14 in the PA report) (UOS 2011a). For this ARR, the site boundaries have been redefined as the outside perimeter of the confirmed sources identified at the site (e.g., sludge ponds) (Figure 3).

Under the HRS, the downstream target distance limit (TDL) of the site (for the groundwater pathway) is defined as a 4-mile radius surrounding the outside perimeter of the site sources, and the Clark Fork River (for the surface water pathway) to a distance 15 miles downstream of the mill site probable point of entry (PPE) (Figure 1). This TDL includes the confluences of creeks draining into the Clark Fork River (Deep, Albert, O'Keefe, Mill, Sixmile, and Ninemile Creeks), as well as the Frenchtown Ponds State Park and portions of the Lolo National Forest. The site lies within the Montana Audubon Clark Fork River – Grass Valley Important Bird Area (Montana Audubon 2009).

The mill site lies within the Clark Fork River valley and is generally flat, with an elevation range from approximately 3,070 feet near the core industrial area of the mill to approximately 3,040 feet at the Clark Fork River in the northwest corner of the site. Elevations within the 4-mile radius range from approximately 3,015 feet within the Clark Fork River valley to the northwest to nearly 5,000 feet in the mountains to both the east and west sides of the site.

The core industrial footprint of the 3,150-acre mill site covers approximately 100 acres. Over 900 acres of the site consist of a series of unlined ponds used to store both treated and untreated wastewater effluent from the mill, as well as primary sludge recovered from untreated wastewater. Additional unlined ponds were also subsequently used for landfilling various solid wastes produced at the mill. Much of the remaining acreage of the site (approximately 1,800 acres) is used for agricultural purposes, with over 1,200 acres of grasslands for cattle grazing and over 600 acres irrigated for alfalfa and grain crops (MDR 2011, Montana County Rural Initiatives 2010).

Source areas on the site confirmed through chemical analysis include four sludge ponds (sludge ponds 3, 4, 5, and 17), an emergency spill pond (pond 8, with two separate cells), an exposed soil pile adjacent to landfill A, one wastewater storage pond (pond 2), and a soil landfarming area (Tables 9 through 18, Figure 2). Additional potential sources at the site that were not characterized as part of this assessment include 11 additional wastewater storage ponds, 3 wastewater treatment aeration basins, and 2 polishing ponds. Only the four sludge ponds, the emergency spill pond, one wastewater storage pond, and the landfarming area were targeted for sampling during this assessment, as they were determined to have the highest potential for containing hazardous substances, or, in the case of the wastewater storage pond, were determined to be the most at risk in the event of a catastrophic flood.

4.0 SITE BACKGROUND

4.1 SITE HISTORY

The site began operation as a pulp mill in the fall of 1957. Later expansions and improvements allowed the facility to produce paper, primarily rolls of kraft linerboard that is used in the production of corrugated containers (i.e., the outside layers of cardboard boxes). Linerboard produced at the mill was shipped to box plants where it was used to make a variety of corrugated containers (Smurfit-Stone undated). The mill also produced bleached pulp from 1960 through 1999. The mill ceased operations in January 2010.

A brief timeline of the mill's history is provided below. A more detailed history of the site, including an expanded timeline and process descriptions, may be found in Section 3.0 of the PA report (UOS 2011a).

- 1957: Pulp mill begins operation in November with a production capacity of 250 tons per day (tpd) of kraft pulp.
- 1958: First wastewater storage ponds constructed in August following complaints of fish kills, foam, and discoloration in the Clark Fork River. Allowable discharges to river occur only during high flow periods (March through June).
- 1960: First paper machine and bleaching operation installed. Production increases to 450 tpd of linerboard and 150 tpd of bleached pulp.
- 1966: Second paper machine and two continuous digesters are installed. Capacity increased to 1,150 tpd, of which 150 tpd is bleached pulp.
- 1969: Primary clarifier installed to remove suspended solids from wastewater prior to storage in settling ponds.
- 1974-1975: Mill installs secondary treatment aeration basins and three experimental "rapid infiltration" percolation ponds. Seven hundred acres of settling ponds are in existence. One-third of wastewater effluent is discharged directly to Clark Fork River following primary (clarifier) and secondary treatment.
- 1977: Three-year $170 million expansion to increase capacity to 1,850 tpd. Majority of wastewater (63 percent) is being disposed of through rapid infiltration ponds.
- 1980: Third paper machine and a waste wood boiler for power generation installed.
- 1984: Montana Department of Health and Environmental Services (MDHES) issues 2-year temporary permit allowing year-round direct discharge to the Clark Fork River (only if flows were greater than 1,900 cubic feet per second [cfs]) and begins study to determine its effects on river. Only 14 percent of wastewater is infiltrating through ponds.
- 1986: Stone Container Corporation purchases mill.

- 1988: Stone Container Corporation completes construction of color removal treatment system.
- 1990: Old Corrugated Container (OCC) facility added to recycle (repulp) old cardboard containers.
- 1993: Pulp mill production is approximately 1,900 tons of pulp per day (1,500 tons of virgin kraft pulp from wood chips and 400 tons from repulping old corrugated containers).
- 1997: Sludge dewatering facility constructed and becomes operational.
- 1999: Bleaching plant operations cease, color removal plant treatment discontinued.
- 2001-2004: Business conditions curtail production to 1,600 tpd of linerboard from 1,100-1,200 tpd of virgin pulp and 550 tpd of recycled pulp from the OCC.
- 2009: Smurfit-Stone files for Chapter 11 bankruptcy in January.
- 2010: Smurfit-Stone emerges from bankruptcy, but shuts down mill in January.
- 2011: Mill property purchased by MLR Investments in March. Mill property purchased by M2 Green (Green Investment Group Incorporated) in May.

4.2 SITE CHARACTERISTICS

4.2.1 Physical Geography

The Smurfit-Stone Mill site is located within Missoula Valley of the Clark Fork Basin. The basin is bounded by the Continental Divide on the east and south, the Montana-Idaho state line on the west, and the Flathead River-Clark Fork divide to the north. The Valley has an area of about 180 square miles and is drained by the Clark Fork River, Ninemile Creek, and their tributaries (USGS 1999).

The mill site is generally flat, with an elevation range from approximately 3,070 feet near the core industrial area of the mill to approximately 3,040 feet at the Clark Fork River in the northwest corner of the site. Elevations within the 4-mile radius range from approximately 3,015 feet within the river valley to the northwest to nearly 5,000 feet in the mountains to both the east and west of the site.

4.2.2 Geology and Hydrogeology

The Missoula Valley was flooded and drained during successive glaciations and interglaciations in the Pleistocene Epoch (1 million years ago to 25,000 years ago). About 12,000 years ago, the Missoula Valley lay beneath a lake nearly 2,000 feet deep. Glacial Lake Missoula formed as the Cordilleran Ice Sheet dammed the Clark Fork River just as it entered present day Idaho. Fill from the lake is estimated to have reached a maximum depth of 3,000 feet within the valley (Montana Bureau of Mines and Geology [MBMG] 1965).

The mill site is underlain by alluvial sands and gravels, bounded on the west side of the Clark Fork River by Precambrian bedrock and by fine-grained Lake Missoula deposits immediately east. The shallow alluvial sands and gravels are approximately 25 to 35 feet thick beneath the mill site and thin to the east. Depth to groundwater across the site during field work for this assessment varied from 6.5 bgs adjacent to the Clark Fork River in the northwest portion of the site (as measured within existing monitoring well SMW-18) to 26.25 feet bgs at the landfill A area (measured from an installed Geoprobe well). Fine-grained Lake Missoula sediments (clays and silts) extend beneath the shallow alluvial gravels and are approximately 120 to 150 feet thick. The Lake Missoula sediments are underlain by a thick coarse-grained alluvial aquifer. This deeper aquifer system is the principal aquifer for water supply in the area, including Smurfit-Stone's production wells (MBMG 1998, Hydrometrics and Inskeep 2004).

The fine-grained Lake Missoula sediments have a reported vertical permeability of 3.5 x 10^{-5} centimeters per second (cm/s). The estimated hydraulic conductivity of the deep alluvial aquifer is 5.3 x 10^{-1} cm/s (Grimestad 1992). Conformational aquifer testing was beyond the scope of this investigation.

4.2.3 Meteorology

The mill site is located in a semiarid climate zone. Prevailing wind direction is from the northwest. The mean annual precipitation as totaled at the Missoula International Airport is 13.81 inches (National Oceanic and Atmospheric Administration [NOAA] 2011a). The 2-year, 24-hour rainfall event for this area is 1.37 inches (NOAA 2011b).

4.2.4 Hydrology

The Clark Fork River forms the majority of the 3.6-mile-long western property boundary of the site, flowing from the south to the north (Figure 1). The Clark Fork drains an area of 9,003 square miles, and average annual flow for the river, measured at a USGS gauging station below Missoula (USGS station #12353000) from 1930 through 2010, is 4,169 cfs (USGS 2011). During the time of the investigation, the discharge of the Clark Fork averaged 3,828 cfs.

O'Keefe Creek flows from east to west across the southern extent of the mill property, adjacent to ponds 17 (sludge), 1A, and 2 (both treated wastewater storage) (Figure 2). During the investigation, UOS collected flow measurements from O'Keefe Creek using a Marsh-McBirney Model 2000 flow meter, recording the flow rate as 1.3475 cfs (Appendix D).

In 2012, the Montana Natural Heritage Program (MTNHP) completed provisional wetland mapping for the area covered by the Primrose Quadrangle Map (Appendix E). This inventory identifies many individual palustrine emergent and scrub-shrub wetlands occurring along the Clark Fork River along the western border of the mill property. A narrow stretch of wetland is also mapped within O'Keefe Creek, along the eastern border pond 1A. Many site ponds also contain wetlands, although only a few of these (e.g., pond 13) contain wetlands that may be eligible for scoring under the HRS (i.e., if it can be shown that eligible wetlands existed in this area prior to the construction of the pond).

4.3 PREVIOUS INVESTIGATIONS

Previous environmental investigations at the site appear to have been undertaken, by both the mill and by the MDHES, primarily to document surface and groundwater quality in an effort to understand and address nutrient loading to the Clark Fork River. For example, beginning in 1983 the MDHES conducted a 2-year study to determine the effects of year-round direct discharge of wastewater from the mill to the Clark Fork River (MDHES 1985). The study documented nutrients, suspended solids, dissolved oxygen, ammonia and metals, and color concentrations in the river; investigated its ecological health (e.g., macro-invertebrate sampling); and identified aesthetics (especially the appearance of foam and colored water), groundwater pollution of the

shallow aquifer, and ongoing air quality degradation (especially odor and particulates) as areas of concern.

The 1995 MPDES discharge permit required the mill to conduct a surface water mixing zone study to delineate the boundary condition of the mixing zone for the direct discharge of wastewater to the Clark Fork River (Hydrometrics 1996). The finding of this study determined that the downstream monitoring station for the mill (i.e., the Huson sampling station located 6 miles downstream from the site) was a valid location for compliance monitoring and a reasonable location for determination of the mixing zone boundary.

The MPDES permit issued in 2000 required that the mill delineate the groundwater mixing zone boundary condition, defined as the extent of travel of seepage where the groundwater concentration for total dissolved solids (TDS) was greater than or equal to 500 milligrams per liter (mg/L). The permit also required Smurfit-Stone to monitor groundwater wells (Photo 11) for the purpose of establishing correlation factors for concentrations of nutrients between newer and older monitoring wells. This investigative work was completed in November 2004 and found that groundwater with TDS concentrations > 500 mg/L was largely contained between Marcure Lane on the north, Mullan Road on the east, and the Clark Fork River to the west; and that water quality sampling within seven residential wells near the crossgradient (to the north) boundary of the mixing zone showed high quality drinking water with no influence of process wastewater constituents or TDS from the shallow alluvial groundwater system (Hydrometrics and Inskeep 2004).

Environmental compliance monitoring performed at the site included the following (EPA 1993, Montana Department of Environmental Quality [MDEQ] 2010b, Smurfit-Stone 2004):

- Wastewater discharge: nutrients (nitrogen and phosphorus), pH, biochemical oxygen demand (BOD), total organic carbon (TOC), total suspended solids (TSS), ammonia, color, and toxicity, with occasional testing for dioxins;
- Non-contact cooling water discharge: oil sheen, foam, temperature, and weekly pH;
- Groundwater: nutrients, color, sodium, and BOD every 2 months to determine seepage contribution the Clark Fork River;
- In-stream monitoring of the Clark Fork River: color, temperature, dissolved oxygen, and nutrients; and

- Air: total reduced sulfur, opacity, NOx, sulfur dioxide, total suspended particulates, and particulate matter smaller than 10 microns in diameter (PM10).

Site assessments have apparently been performed at six of eight petroleum storage tank locations at the site. The assessments found evidence of leaks at three of the tanks. The remediation of the releases is being overseen by the Petroleum Release Section of the MDEQ (formerly the MPHES).

Previous investigations by the EPA appear to be limited to a chemical safety audit conducted by the Region 8 Technical Assistance Team from February 9 through 12, 1993. The purpose of the audit was to document facility processes, chemical hazards, accidental release prevention practices, and emergency response preparedness and planning (EPA 1993).

5.0 DATA QUALITY OBJECTIVES PROCESS

The EPA Data Quality Objectives (DQO) Process is a seven-step systematic planning approach to develop acceptance or performance criteria for EPA-funded projects (EPA 2000). The seven steps of the DQO process are:

Step 1 The Problem Statement;
Step 2 Identifying the Decision;
Step 3 Identifying the Decision Inputs;
Step 4 Defining the Study Boundaries;
Step 5 Developing a Decision Rule;
Step 6 Defining Tolerance Limits on Decision Errors; and
Step 7 Optimizing the Sample Design.

Based on information provided by the EPA and the Missoula City and County Health Department (MCCHD), an understanding of the nature of the site (a former pulp and bleached paper mill), the potential sources present (sludge ponds, an emergency spill pond, wastewater ponds, a landfarming area), and the potential risks associated with the hazardous substances likely present in the sources, the project team currently identify the surface water and groundwater pathways as being the pathways of most concern at the site. The air and soil exposure pathways are considered to be of less concern, as there appear to be few if any residents or sensitive environments within 0.25 mile of source areas, and no residences, day care centers, schools, or work areas (except the few mill workers) located within 200 feet

of observed contamination. Nonetheless, as it has been reported by the MCCHD that fugitive dust emissions have been generated at the site and carried offsite (MCCHD 2011), these pathways may warrant further investigation.

These risks and pathways of concern are presented in Appendix C: Conceptual Site Model, and described in more detail in the Data Quality Objectives Seven-Step Planning Approach, presented in Table 1 below.

TABLE 1
Data Quality Objectives Seven-Step Planning Approach

Step 1 Problem Statement	Step 2 Identifying the Decisions	Step 3 Decision Inputs	Step 4 Study Boundaries	Step 5 Decisions Rules	Step 6 Tolerance Limits on Errors	Step 7 Optimization of Sample Design
There is a potential for contamination from a former pulp and paper mill to impact the Clark Fork River, O'Keefe Creek, groundwater, and soil adjacent to the mill property. There was a lack of empirical data on the presence of contamination along exposure pathways and within potential source areas at the former mill. The Clark Fork River is a fishery, and wetlands have been identified along the banks of the creek. Numerous domestic and public supply wells in the vicinity of the former mill use groundwater.	The principal decision for the Removal Assessment objective of this investigation was whether or not there is an immediate risk to groundwater, surface water, and/or human receptors from potential contamination (such as dioxin/furans and metals) from the former mill that warrants a removal action and/or further investigation. The principal decision for the Site Investigation objective of this investigation was to determine whether or not the site had a high probability of qualifying for the National Priorities List via the Hazard Ranking System.	The information that was required to arrive at a decision for this site included: • Analytical data from source area samples to determine the presence and concentration of contaminants in source areas; • Analytical data from surface water, groundwater, soil, and sediment samples to determine if contaminants from the potential waste sources have migrated into aquifers below the former mill, and/or into the Clark Fork River or O'Keefe Creek; • Confirmation of environmental (e.g., wetlands) and human health targets (e.g., people consuming fish) directly or potentially impacted by migration of contaminants from the sources; and • Comparison of analytical results to background concentrations and HRS benchmarks.	The site covers approximately 3,150 acres, of which approximately 1,000 acres may be potential sources (e.g., sludge ponds, an emergency spill pond, a historical landfarming area, wastewater storage ponds). The site is bounded on the west by the Clark Fork River, on the south by O'Keefe Creek, and primarily by agricultural land to the east and north. The physical limits of the current investigation were the Clark Fork River from just upstream of the site, downstream to outfall 4; groundwater beneath the site, within domestic wells along the northern site boundary, and at background locations to the south of the site; and surface and subsurface soils and sludges within the boundary of the site. Approximately 4,000 people reside within 4 miles of the site and source their potable water from groundwater. The pathways of primary concern at the former Smurfit-Stone Mill site are the surface water and groundwater pathways. The soil exposure and air pathways appear to be of lesser concern due to a lack of nearby population or sensitive environments. However, there have been recent reports of dust plumes being carried offsite and these pathways may, therefore, warrant investigation. Potential human health and environmental targets include the population surrounding the former mill, on-site workers, aquatic and wetland environments downstream of the former mill, consumers of fish from the Clark Fork River, and recreational users of the area.	Results for each sample were compared to site-specific background samples in addition to surface water, groundwater, or soil benchmarks as appropriate (see Tables). Superfund Chemical Data Matrix (SCDM) and MDEQ Circular 7 benchmarks were utilized for this investigation. SCDM benchmarks are applicable to the SI portion of this investigation. There are no benchmarks for sediments or subsurface soils. The EPA and other appropriate agencies (such as the MDEQ) and their representatives will continue to work together to evaluate the site data obtained during field activities to determine if a time-critical removal is warranted, or if additional information is required to characterize the site or migration of the waste from the site. Analytical results have been used to determine a preliminary HRS score for the site.	Samples were collected to identify potential human health and environmental targets for the various pathways and to determine background concentrations for soils, surface water, groundwater, and sediments. Sampling, measurement, and decision errors were minimized by using standard field and laboratory operating procedures, collecting an appropriate number of quality control samples, meeting standard holding times, and ensuring that samples are representative of site conditions. Sample locations were biased to collect information from areas with the greatest potential for contamination. Sampling activities adhered to the UOS TSOPs and the UOS Generic Quality Assurance Project Plan (QAPP) to ensure data reproducibility. All data, with the exception of the asbestos results, have been validated in accordance with CLP National Functional Guidelines to document data quality. Criteria for data quality parameters are presented in section 7.1	In some instances, sample locations were field-modified by the project manager or leader of the field sampling crew based upon an increased understanding of known environmental conditions and additional information obtained during field activities. An opportunity sample was collected from an area of possible contaminated material observed adjacent to landfill A. A detailed description of the sample design is available in the Field Sampling Plan (UOS 2011b)

6.0 SAMPLE NOMENCLATURE, LOCATIONS AND METHODS

6.1 SAMPLE NOMENCLATURE

Sample identification followed the following format:

- SS_(Matrix ID)_(Sample Number)

SS stands for Smurfit-Stone. Matrices were identified as follows:

- SW = surface water
- SE = sediment
- SO = soil (source samples, both surface and subsurface)
- Soil samples were also given a two-digit number at the end of the sample ID to indicate sample depth. For surface soil samples, this number is 02 and indicates the sample was collected from 0 to 2 feet bgs (SSSO0202). For depth samples, the two-digit number at the end indicates the deepest depth at which the sample was collected. Depth samples were generally collected over a 2-foot interval.
- GW = groundwater, from domestic wells, existing monitoring and supply wells, and from Geoprobe wells installed as part of this investigation

Sample locations were then numbered sequentially.

6.2 SAMPLE LOCATIONS

Field activities specifically included the collection of 75 field environmental samples comprised of 17 surface soil/source (0-2 feet below ground surface [bgs]) samples, 8 subsurface soil/source (>2 feet bgs) samples, 20 co-located surface water and sediment samples (from 10 locations), 21 groundwater samples (collected from existing monitoring and domestic wells, as well as newly installed monitoring wells), and 9 field QA/QC samples, which included 2 surface soil replicates, 2 groundwater duplicates, 1 rinsate, and 2 trip blanks (in addition to the laboratory MS/MSD) (Table 8) (UOS 2011c).

Specific sample locations were determined in the field based upon safe access and orientation to potential waste sources or pathways (e.g., groundwater wells were installed within or downgradient of potential source areas, the closest domestic wells to source areas, surface water sampling locations were located below outfalls). Sampling locations and procedures generally

followed those pre-determined in the FSP with some exceptions, which are outlined in Section 3.0 of the SAR and summarized in Section 10.2.4 of this report (UOS 2011c). The deviations in sampling location from the FSP are highlighted with shading in Table 8.

Source areas on the site confirmed through chemical analysis include four sludge ponds (sludge ponds 3, 4, 5 and 17), an emergency spill pond (pond 8, with two separate cells), an exposed soil pile adjacent to landfill A, one wastewater storage pond (pond 2), and a soil landfarming area (Tables 8 through 17, Figure 2). Additional potential sources at the site that were not characterized as part of this assessment include 11 additional wastewater storage ponds, 3 wastewater treatment aeration basins, and 2 polishing ponds. Only the four sludge ponds, the emergency spill pond, one wastewater storage pond, and the landfarming area were intended to be targeted for sampling during this assessment, as they were determined to have the highest potential for containing hazardous substances, or, in the case of the wastewater storage pond, were considered to be most at risk in the event of a catastrophic flood. The exposed soil pile adjacent to landfill A was sampled as opportunity sample SSSO1702 when what appeared to be exposed soil/sludge adjacent to landfill A was observed in the field.

6.2.1 Source Samples

Sludge Pond Samples

As planned, four soil/source samples (two surface and two subsurface) were collected from sludge ponds 3 and 17 (Figure 2). Only three soil/source samples were collected from sludge ponds 4 and 5 (two surface and one subsurface) as the track-mounted Geoprobe® could not safely access the proposed sampling locations due to a soft surface (Photo 1). Subsurface soil sampling locations SSSO1110 (sludge pond 4) and SSSO0902 (sludge pond 5) were moved from the center of each pond to the edge, due to the lack of safe access for the track mounted Geoprobe® to the proposed sampling locations (Photo 3).

Emergency Spill Pond Samples

One surface and one subsurface soil/source sample were collected from the dry cell of the emergency spill pond, and one surface soil/source sample was collected from the wet cell of the emergency spill pond (Figure 2). The second subsurface sample was not collected due to lack of safe access for the track mounted Geoprobe® to the proposed sampling

location. Duplicate samples and extra volume MS/MSD samples were collected at the surface sample locations for both the dry and wet cells of the emergency spill pond.

Wastewater Storage Pond Samples

As planned, two surface soil/source samples were collected from wastewater pond 2 (Figure 2).

Landfarm Area Samples

As planned, three surface soil/source samples were collected from the landfarm area (Figure 2).

Opportunity Sample

One opportunity sample (SSSO1702) was added to the sample plan and was collected from an area of what appeared to be exposed soil/sludge adjacent to landfill A (Photo 5) (Figure 2).

6.2.2 Surface Water and Sediment Samples

One co-located surface water and sediment sample was collected from O'Keefe Creek, and one co-located sample was collected from the Clark Fork River. Release surface water and sediment samples were collected from four locations below four facility wastewater outfalls to the Clark Fork River, and from two locations on O'Keefe Creek (20 total samples from 10 locations) (Figure 3).

6.2.3 Groundwater Samples

Shallow Aquifer

Groundwater samples were collected from eight temporary groundwater monitoring wells installed with a track mounted Geoprobe®. These wells were completed within the shallow aquifer at the site and located within and downgradient of potential source areas, including the sludge ponds, the emergency spill pond, and landfills A and G. In addition, groundwater samples were collected from seven existing monitoring wells completed within the shallow aquifer, targeting locations downgradient of the majority of source

areas and adjacent to the Clark Fork River, and one background location on the southern part of the mill property (Figure 3).

Deeper Aquifer

One existing supply well located on the mill property was sampled as the background location for the deeper aquifer. Groundwater samples were also collected from five domestic wells completed in the deeper aquifer and located just outside the property boundary of the site, and generally crossgradient of source areas (Figure 3).

Duplicate and extra volume MS/MSD groundwater samples were collected from a temporary Geoprobe® well located within or downgradient of pond 20 (landfill E), and a duplicate groundwater sample was also collected from an existing domestic well (deeper aquifer) located crossgradient of the mill (the well for 15400 Marcure Lane).

Field water quality parameters and well data for the wells sampled during this investigation are summarized in Table 2 below.

TABLE 2
Groundwater Field Data

Sample Number	Sample Time	Sample Date/Time	Well Diameter (inches)	Depth to Water (bgs)	Total Depth (ft)	Temperature (°C)	Conductivity (µS/cm)	pH	Total Dissolved Solids (ppm)	Salinity (parts per thousand)	Total Purge volume (gallons)	Notes
Shallow aquifer												
SSGW01 (bg)	9:30	10/26/2011	4	10.77	29.25	11.6	484	7.40	344	0.221	37	Clear water
SSGW03	9:10	10/26/2011	1	17.00	29.90	10.6	9930	7.70	7.01	5.01	1.5	Grey with sulfur smell
SSGW04	14:05	10/26/2011	1	20.45	28.50	10.5	5570	7.31	3.45	2.79	1	Grey with methane odor - confirmed with PID/FID
SSGW05	17:25	10/26/2011	1	26.25	30.25	12.6	6990	7.73	5.29	3.40	0.5	Black water
SSGW07	11:37	10/26/2011	1	22.95	40.55	10.6	5210	7.42	3.69	2.62	2.2	Strong gas odor
SSGW08	18:50	10/27/2011	1	12.50	29.95	10.4	3750	7.76	2.63	1.85	2.5	Brown water
SSGW10	14:10	10/27/2011	1	13.65	40.65	11.3	3030	8.64	2.12	1.45	3.75	Dark grey
SSGW11	17:20	10/27/2011	1	12.83	36.85	11.2	2530	7.89	1.79	1.20	3	Dark grey
SSGW12	10:20	10/27/2011	1	12.25	37.10	11.0	2160	7.78	1.52	1.12	3.1	Dark grey
SSGW13	10:55	10/27/2011	4	7.73	30.78	10.3	2420	7.51	1.72	1.17	46	Brownish in color throughout purge
SSGW14	12:05	10/27/2011	4	10.90	36.17	7.7	2610	7.71	1.83	1.25	34	Brownish color and petroleum odor
SSGW15	15:05	10/27/2011	4	14.00	35.50	13.3	2470	7.51	1.76	1.21	42	Sulfur smell with brownish water
SSGW16	17:05	10/27/2011	4	16.95	40.90	12.3	2550	7.64	1.78	1.22	47	Brown with light sulfur smell
SSGW17	18:20	10/27/2011	4	7.70	30.20	13.3	1765	7.56	1.27	0.855	47	Brown with strong sulfur odor
SSGW18	10:23	10/27/2011	4	6.50	32.50	10.3	2580	7.49	1.83	1.24	52	Brownish color with sulfur smell
Deep aquifer*												
SSGW02 (bg)	10:30	10/26/2011	12	NR	~140-170	12.2	468	7.54	NR	NR	12,000	Existing deep well with pump
SSGW23	12:45	10/29/2011	6	NR	~140-170	11.1	721	7.90	512	351.00	240	Clear water
SSGW24	13:50	10/29/2011	6	NR	~140-170	10.7	622	7.99	442	301.00	102	Clear water
SSGW25	13:20	10/29/2011	6	NR	~140-170	11.0	671	7.97	475	326.00	243	Clear water
SSGW26	11:50	10/29/2011	6	NR	~140-170	10.9	549	8.01	390	265.00	213	Clear water
SSGW27	15:30	10/25/2011	6	NR	~140-170	10.9	1635	7.91	1160	804.00	600	Clear water

bg background location
bgs below ground surface
ft feet
ppm parts per million
ppt parts per thousand
°C Celsius
µS/Cm microseimens per centimeter
NR Not Reported
* Deep aquifer wells: Wells could not be gauged due to presence of pumps. Total depths are estimated based on bore log information from construction.

6.3 SAMPLING METHODS

6.3.1 Soil/Source and Sediment Sampling

Soil/source and sediment samples were collected in accordance with procedures described in TSOP 4.16, "Surface and Shallow Depth Soil Sampling" and TSOP 4.17, "Sediment Sampling" (UOS 2005b). Augers or a slam bar with a core sampler were not used to collect surface soil/source samples as the equipment available from the EPA had too small of a capacity to collect both EPA samples and Smurfit-Stone splits samples in a timely manner. In addition, decontamination of the reusable sampling equipment would have proved to be very time-consuming, given the viscous nature of the sludge. Instead, these samples were collected with disposable plastic scoops, either from Geoprobe® macro-core sleeves or directly from the surface of the potential source.

A steel shovel was sometimes needed to assist in the collection of source samples, due to the viscous nature of the material and the desire to collect a large amount of material (e.g., at locations where a laboratory matrix spike/matrix spike duplicate sample was needed) to a depth of 2 feet bgs. The shovel was decontaminated prior to its initial use and then between sampling locations as per TSOP 4.11 "Equipment Decontamination" (UOS 2005b). The same stainless steel cutting shoe was used for each Geoprobe® source and groundwater location. The cutting shoe is the only reusable part of the sampling system that makes contact with in situ soils. The drilling subcontractor, MSE Technology Application, Inc., decontaminated the cutting shoe prior to its initial use and then between sampling locations using a method equivalent to that in TSOP 4.11. A rinsate blank (sample SSSW89) was collected from both the shovel and the cutting shoe to assess the quality and thoroughness of the decontaminating procedures used (Photo 6).

All surface soil samples were collected from 0-2 feet bgs. Due to the apparent homogeneity of the sampled intervals, soils from each location were not composited prior to being placed in sample containers.

Samples for VOC analysis were collected first due to concerns about volatilization. At locations where samples were collected from macro-core sleeves, if sufficient volume for all containers was not gathered with a single push, the Geoprobe® location was slightly offset and additional volume was collected in a new sleeve

Field screening of soils with immunoassay test kits was proposed for the landfarm area if visual evidence of contamination was not observed. The test kits were not used as an aerial photo was found within the M2Green office building that showed the entire land parcel had been used for landfarming (Photo 7), and specific areas devoid of vegetation were noted in the field (Photo 8).

6.3.2 Surface Water and Groundwater Sampling

Surface water sampling was conducted according to TSOP 4.18, "Surface Water Sampling." UOS personnel measured general water quality parameters including pH, temperature, and electrical conductivity of each sample using a Eutech Instruments PCSTestr 35 Model multi-parameter instrument, as described in TSOP 4.14 "Water Sample Field Measurements" (UOS 2005b). All field data was recorded in field logbooks (Appendix B). Field instrumentation was calibrated daily, and all calibration and field data were recorded in a field logbook. All aqueous source and surface water samples analyzed for dissolved metals were filtered by using a peristaltic pump to draw the water directly through a 0.45 micrometer (µm) filter with disposable dedicated Tygon® tubing into the sample bottle. Surface water samples were collected directly from the source into the sample bottle, and sampling was conducted from the farthest downstream location to the farthest upstream location to minimize the potential for cross-contamination.

Groundwater samples were collected from seven existing shallow groundwater monitoring wells using dedicated Geosquirt™ disposable purge pumps. The dedicated Geosquirt™ pumps were used rather than a peristaltic pump or disposable bailers because they enabled much more rapid purge times. This greatly accelerated the sampling schedule.

All water samples were preserved as appropriate and stored on ice immediately after collection. The sample locations were photographed and recorded with a GPS.

7.0 ANALYTICAL RESULTS

7.1 ANALYTICAL PARAMETERS

The surface soil/source, subsurface soil/source, surface water, sediment, and groundwater samples collected during this site assessment were analyzed by the EPA CLP for RAS using the following methods:

- VOCs in soil/source, sediment, and waters by method CLP-SOM01.2 (based on EPA Method 8260B);
- SVOCs in soil/source, sediment, and waters by method CLP-SOM01.2 (based on EPA Method 8270D);
- PCBs in soil/source, sediment, and waters by method CLP-SOM01.2 (based on EPA Method 8082A);
- Total target analyte list (TAL) metals in soil and sediment samples by method CLP-SOM01.2 (based on EPA Method 6010C via AES or 6020 via MS);
- Total and dissolved TAL metals in waters by method CLP-SOM01.2 (based on EPA Method 6010C via AES or 6020 via MS);

Samples to be analyzed for CDDs and CDFs were sent to a private laboratory (ALS Laboratory Group) for analysis by method EPA 8290A. A private lab was used, rather than an EPA CLP laboratory for non-RAS, as the EPA CLP program was unable to perform the analyses during the time of the assessment.

The approved FSP stated that a "limited number" of groundwater and surface soil samples would be analyzed for asbestos by a private laboratory. A total of three surface soil samples and two groundwater samples were collected and sent to a private laboratory (Reservoirs Environmental, Inc.) for analysis using Transmission Electron Microscopy (TEM) for water samples and Polarized Light Microscopy (PLM) analysis for soil samples.

Petroleum fraction analysis was not performed as part of this investigation.

7.2 ANALYTICAL DATA – HRS REVIEW AND RA ASSESSMENT

The sample data collected during this RA/SI were reviewed using the HRS guidelines for analytical interpretation (Office of the Federal Register 1990). The analytical data is listed in

Tables 9 through 33a. Elevated concentrations of contaminants (defined as 3 times or more above background contaminant values) are noted in the analytical results tables and are determined by sample concentrations based on the following:

- If the background analyte concentration is greater than its Sample Quantitation Limit (SQL), and if the release sample analyte concentration is greater than its SQL, 3 times greater than the background, and 5 times greater than the blank concentration.
- If the background analyte concentration is not greater than its SQL and if the release sample analyte concentration is greater than its SQL, greater than the background Contract Required Detection Limit (CRDL), and 5 times greater than the blank analyte concentration.

Analytical results are also compared to environmental benchmark values. Surface soil/source samples were compared to SCDM Reference Dose Screening Concentration (RDSC) and Cancer Risk Screening Concentration (CRSC) soil benchmark values (Tables 9 through 13). Analytical results for surface water were compared to SCDM Surface Water Pathway Environmental (Acute and Chronic), as well as MDEQ Circular 7 Aquatic Life Standards (Acute and Chronic) and Human Health Standards (Surface Water) (Tables 19 through 23a). MDEQ Circular 7 Freshwater Aquatic Life Standards for some metals, which are hardness dependent, and Standards for pentachlorophenol, which are pH dependent, were adjusted per guidance in Circular 7.

Analytical results for groundwater were compared to SCDM RDSC and CRSC benchmark values, maximum contaminant levels (MCLs), and MDEQ Circular 7 Human Health Standards (Groundwater) (Tables 29 through 33a). Analytical results for subsurface soils and sediment were compared only to background results because no benchmarks have been established for subsurface soil or sediment (Tables 14 through 18 and 24 through 28).

Results that exceed the background concentration by 3 times are indicated by a shaded cell in the analytical results tables. Results that exceed a benchmark are indicated by an open star (☆). Sample quantitation limits are included in Appendix E.

For the SI portion of this investigation, comparison of analytical results to SCDM benchmarks, MDEQ Circular 7 values, and background concentrations were performed to assess the site according to HRS guidelines. All analytical results were reviewed separately by an EPA toxicologist as part of the RA portion of this assessment.

Toxicity Equivalent (TEQ) values for the dioxin and furan samples are also presented within the analytical tables (Tables 10, 15, 20, 25, and 30). As the toxicity of the individual dioxin and furan congeners can vary by orders of magnitude, each congener concentration is usually multiplied by individual World Health Organization (WHO) Toxicity Equivalence Factors (TEFs), which standardize each congener's toxicity to the toxicity of 2,3,7,8-TCDD (the most toxic of the congeners). When each dioxin/furan congener concentration is multiplied by its individual TEF, the product is the "WHO TEF Concentration" of that congener. The sum of the all of the WHO TEF concentrations of congeners is the TEQ, which allows the toxicity of a mixture of dioxin and furans to be expressed as a single number, and in terms of the most toxic form; 2,3,7,8-TCDD (EPA 2010, MDEQ 2012).

All CLP laboratory data were validated by a third party subcontracted chemist at TechLaw, Inc. The PCB results for samples SSGW05 (a shallow aquifer groundwater grab sample collected from a temporary Geoprobe®-installed groundwater well located within landfill A) and SSGW18 (a shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 [adjacent to Clark Fork River]) were rejected during data validation because surrogate percent recoveries were less than 10 percent. No other significant data quality issues were identified, and the CLP Form 1 documents, the data reports from ALS Laboratory Group and Reservoirs Environmental Inc., and the validation reports are presented under separate cover in Appendix E.

7.3 SELECTION OF BACKGROUND LOCATIONS

In order to determine representative background conditions, five background locations were sampled. A background surface soil grab sample (SSSO0102) was collected from the edge of the mill property to the north (upwind) of potential source areas. This sample is intended to represent soil conditions (both surface and subsurface) at unimpacted locations of the site.

Co-located background surface water and sediment samples (SSSW01/SSSE01 and SSSW04/SSSE04) were collected from O'Keefe Creek, immediately upstream of the PPE from the landfarm area, and from the Clark Fork River immediately upstream of potential source areas of the mill, respectively. These samples were collected to document conditions on O'Keefe Creek and the Clark Fork River upstream of areas potentially impacted by the site. It should be noted that the background sediment sample location on O'Keefe Creek (SSSE01) contained concentrations of numerous dioxin and furan congeners that were significantly elevated above the

concentrations found in the background sediment sample location on the Clark Fork River (SSSE04). The reason for this is not clear, although it possible that the background location on O'Keefe Creek has been affected by contaminated dust blowing from the surface of sources at the mill site. Alternatively, there may be an unknown source of dioxins and furan farther upstream on O'Keefe Creek. Additional sampling would be needed to confirm either scenario.

Two background groundwater samples were collected (SSGW01 and SSGW02) from existing wells located upgradient of potential site sources. Sample SSGW01 was collected from an existing monitoring well located upgradient of the mill (SMW-20) to document background conditions in the shallow aquifer. Sample SSGW02 was collected from an existing production well (SSSGW02) located upgradient of the mill to document background conditions in the deeper aquifer.

7.4 SOIL SOURCE SAMPLE RESULTS

Eighteen surface soil source samples (including 2 replicate samples) and 7 subsurface soil source samples were collected from several different potential source areas (Tables 9 through 18; Figure 2). One background surface soil sample was collected and is discussed in detail in Section 7.3 above.

When compared to the RA/SI investigation background concentrations, soil samples documented observed contamination (defined as concentrations greater than 3 times background concentrations) for the following organic analytes:

- 4-methylphenol in surface soils from sludge ponds 4 and 5; in subsurface soils from all four sludge ponds; and in surface soils from the emergency spill pond;
- Naphthalene and phenanthrene in the surface soil from the emergency spill pond; and
- Isopropylbenzene and phenol in subsurface soil from sludge pond 5.

In addition, observed contamination of butylbenzylphthalate, di-n-butylphthalate, and bis-2-ethylhexylphthalate was documented in some surface soil samples, and observed contamination of acetone was documented in some subsurface soils. Some amount of di-n-butylphthalate (a plasticizer) in samples is likely due to sample container and laboratory contamination as phthalate compounds leach from plastic sampling containers and laboratory equipment, and di-n-butylphthalate was found in the laboratory blank. The remaining phthalate compounds were not

found in the laboratory blank and are likely from degraded plastics that were noted in many of the ponds, in particular, emergency spill pond 8.

Observed contamination was documented for multiple dioxin/furan congeners within surface and subsurface soil samples collected from sludge ponds 3, 4, 5 and 7, emergency spill pond 8, the landfarming area, the wastewater storage pond, and the soil pile adjacent to landfill A. Observed contamination for Total-TCDD was documented in all soil source samples collected, with the highest concentrations being documented in sludge ponds 17 and 3.

When compared to the investigation background values, observed contamination (defined as concentrations greater than 3 times background) was documented for the following inorganic analytes:

- Antimony, arsenic, barium, cadmium, calcium, chromium, lead, manganese, nickel, potassium, silver, and zinc were elevated in at least one surface soil sample, and antimony and calcium were elevated in at least one subsurface soil sample.
- Locations containing elevated metals include all four sludge ponds (however, the only metal elevated in sludge pond 5 was calcium), the emergency spill pond, and the soil pile adjacent to landfill A.
- The metals that were elevated in the most samples were barium (three samples), cadmium (four samples), manganese (seven samples), and calcium (eight samples). The remaining metals listed in the first bullet point were found at elevated concentrations in only one or two surface and subsurface samples.

Concentrations of benzo(a)pyrene exceeded the SCDMs RDSC or CRSC benchmarks in one surface soil sample from the emergency spill pond. Arsenic exceeded the SCDMs RDSC or CRSC benchmarks in surface soils at all locations sampled, including the background location. There were no other SCDM benchmark exceedances for metals that have a SCDM benchmark available. In addition, multiple dioxins/furan compounds exceeded the SCDM CRSC benchmarks in samples from sludge ponds 3 and 7, and the emergency spill pond (8).

An analysis of the analytical data from soil/source samples revealed the following:

- Concentrations of metals were generally higher (as evidenced by the larger number of soil analytical results exceeding 3 times background concentrations) in surface soils than in subsurface soils.
- Sludge ponds 3 and 17 contained twice the number of elevated metals (eight) as the next most impacted location, and these sources, as well as the emergency spill pond, contained significantly more elevated dioxins/furans than the remaining locations sampled.
- The wastewater storage pond, landfarming area, and sludge pond 5 did not contain elevated metals, with the exception of calcium. These locations did contain dioxins/furans at elevated concentrations.
- Based on the presence of elevated levels of organic and inorganic compounds when compared to background concentrations, all ponds sampled were identified as sources of observed contamination.

7.5 GROUNDWATER RELEASE SAMPLE RESULTS

Sixteen groundwater samples (including 1 duplicate sample and 1 background sample) were collected from the shallow aquifer, and 7 groundwater samples were collected from the deep aquifer (including 1 duplicate sample and 1 background sample) (Tables 29 through 33; Figure 2). The background samples are discussed in detail in Section 7.3 above.

The PCB results for samples SSGW05 (a shallow aquifer groundwater grab sample collected from a temporary Geoprobe® well located within landfill A) and SSGW18 (a shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 [adjacent to Clark Fork River]) were rejected during data validation because surrogate percent recoveries were less than 10 percent. Estimated PCB concentrations of aroclor-1254 were elevated in some surface soil samples. However, when the estimated data were adjusted (as required per the EPA Quick Reference Fact Sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination"), adjusted concentrations were less than 3 times the background concentration (EPA 1996). Given the number of observed releases of other contaminants, the rejection of this sample result is unlikely to affect this assessment.

When compared to the investigation background values, groundwater sample locations contained elevated levels (defined as concentrations greater than 3 times background concentrations) of the following organic and inorganic analytes:

- SSGW05 (a shallow aquifer groundwater sample located within or downgradient of landfill A) contained elevated concentrations of acetone, chlorobenzene, ethylbenzene, o-xylene, m,p-xylene, and isopropylbenzene.
- Dissolved and total aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, and vanadium were all elevated in at least one groundwater sample.
- Locations containing at least 12 elevated total and/or dissolved metals include shallow groundwater beneath or downgradient of the sludge ponds, landfill A, landfill 6, landfill E, aeration basins, and landfill G.
- Total and dissolved aluminum, arsenic, manganese, sodium, and various dioxins/furans were present at elevated levels in all samples from the shallow aquifer. Total iron was also present at elevated levels in all samples from the shallow aquifer.
- The two groundwater samples containing the highest concentrations and largest number of elevated dioxins/furans were SSGW04 (shallow well located downgradient of sludge pond 3) and SSGW05 (shallow well located downgradient of landfill A). (Other wells also had elevated concentrations of various congeners.)
- Both total and dissolved iron and sodium, and dissolved arsenic, copper, and nickel were the only elevated analytes present in groundwater samples from the deeper aquifer.

Iron exceeded the MDEQ Human Health Standards for groundwater in all shallow and deep groundwater samples except the background sample and a duplicate sample. Barium, chromium, and manganese exceeded the MCL, the SCDM RDSC, and/or the MDEQ Human Health Standards for groundwater in several shallow groundwater samples. The SCDM CRSC was exceeded for four dioxin and two furan congeners, with most of the exceedances in samples SSGW04 and SSGW05.

An analysis of the analytical data from groundwater samples reveals the following:

- As you move further away from the sludge ponds and landfills, fewer elevated metals and dioxins/furans were present in shallow aquifer samples. In addition, samples taken further from the sludge ponds and landfills generally had metals and dioxins/furans concentrations an order of magnitude lower than those located closer to the sludge ponds and landfills.

- Arsenic, barium, calcium, chromium, manganese, nickel, potassium, and zinc are present at elevated levels in both source samples and groundwater samples, and of these, arsenic and manganese are the two most widespread.
- There are a large number of dioxins/furans (including Total-TCDD) that were present in source soils and also present in shallow groundwater.

Field notes indicate that a petroleum odor was detected from groundwater collected at the SSGW14 location (existing monitoring well SMW-13), although VOC and SVOC results from the sample collected from this well did not indicate the presence of any petroleum compounds. However, it should be noted that petroleum fraction analysis was not performed as part of this investigation.

7.6 SURFACE WATER RELEASE SAMPLE RESULTS

Ten surface water samples (including 2 background samples) were collected as part of this assessment, including 3 samples from O'Keefe Creek and 7 samples from the Clark Fork River (Tables 18 through 22; Figure 3). The background surface water samples are discussed in detail in Section 7.3 above.

When compared to the investigation background values in surface water, dissolved manganese from four samples in the Clark Fork River exceeded the background concentration by 3 times. Manganese was also present at 3 times background concentrations in some source samples (e.g., those collected from ponds 3, 17). Dissolved aluminum from one sample in O'Keefe Creek was present at 3 times the background concentration. Aluminum was not elevated in any source sample. No other analytes were detected at elevated concentrations in surface water.

The concentration of dissolved aluminum exceeded the MDEQ Aquatic Life Standard (Chronic) in one water sample collected from O'Keefe Creek, and concentrations of total alumimum exceeded the SCDM Surface Water Pathway Environmental (Chronic) Standard in two samples from O'Keefe Creek. The concentration of WHO TEQ values for dioxin and furan concentrations in all surface water samples exceeded the MDEQ Human Health Standard. No other analytes exceeded benchmark values. It should be noted that for some analytes, the detection limit exceeded the value of the benchmark.

7.7 SEDIMENT RELEASE SAMPLE RESULTS

Ten sediment samples (including 2 background samples) were collected as part of the assessment, including 3 samples from O'Keefe Creek and 7 samples from the Clark Fork River (Tables 23 through 27; Figure 3). The background samples are discussed in detail in Section 7.3 above.

When compared to the investigation background values for sediment, calcium is elevated above 3 times background concentrations in three samples from the Clark Fork River. Chromium and potassium are elevated in one sample from the Clark Fork River, adjacent to wastewater storage pond 13, and vanadium is elevated in one sample from the Clark Fork River, immediately downstream of outfall 4. Calcium was elevated in many source samples, but chromium and potassium were elevated in only one source sample each.

When compared to the background samples, at least one dioxin or furan congener is present at elevated concentrations in all sediment release samples collected. As many as three dioxin congeners are present at elevated concentrations in O'Keefe Creek in the release samples (e.g., SSSE03), and as many as 13 dioxin and furan congeners are present at elevated concentrations in the Clark Fork River (SSSE09). The samples with the greatest concentrations and highest number of elevated dioxins/furans were generally collected downstream of, but close to, an outfall (e.g., SSSE07 [outfall 2], SSSE09 [outfall 3] and SSSE10 [outfall 4]). The sediment sample SSSE05, collected adjacent to pond 2, had a similar number of elevated dioxins/furans. The most commonly elevated congeners across all sediment samples were 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD), 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD), Total Heptachlorodibenzo-p-dioxins, and Octachlorodibenzo-p-dioxin (OCDD).

8.0 PATHWAY ANALYSIS

8.1 SOURCES AND WASTE CHARACTERIZATION

Table 3 below summarizes potential source and source containment characteristics observed during the assessment. Chemical analysis has been used to document the concentrations of hazardous substances within potential sources, or in groundwater beneath or immediately downgradient of each source. If an analyte is present in a sample at 3 times background concentrations, the sample was used to characterize the area where it was collected as a source.

A detailed summary of potential sources of contamination at the site is provided in both the PA report (UOS 2011a) and the FSP (UOS 2011b). Analytical results from surface and subsurface soil samples collected within the ponds, the former landfarm area, and the pile near landfill A are described above within section 7.4 and are shown in Tables 9 through 18. Analytical results from groundwater samples collected immediately beneath or downgradient of the three landfills investigated are shown in Tables 29 through 33a.

TABLE 3
Dimensions and Containment Characteristics for Potential Sources

Source Name	Source Type (per HRS)	Surface Area (acres)* [acres]§	Average Depth* (feet bgs)	Depth Observed with Geoprobe® (feet bgs)	Volume* (acre feet)	Cover Present?	Liner Present?	Leachate Collection System Present?	Run-on/ Run-off Controls Present?
Sludge Pond 3	Backfilled Surface Impoundment	20 [22]	8	16	160	Yes (wood chips only), cover not complete (Photo 9)	No	No	No
Sludge Pond 4	Surface Impoundment	23 [32]	10	6.5-8	230	No, some vegetation (Photo 10)	No	No	No
Sludge Pond 5	Surface Impoundment	24 [30]	14	16.5	336	No, some vegetation (Photos 2, 3)	No	No	No
Sludge Pond 17	Surface Impoundment	24 [28]	7.2	12-13.5	173	No, some vegetation (Photo 11)	No	No	No
Emergency Spill Pond (Pond 8)	Surface Impoundment	24 [26]	5	5.6 in dry cell	120	No, some vegetation (Photo 12)	No	No	No
Pond 2	Surface Impoundment	121 [124]	11.7	NA	1,414	No, some vegetation (Photo 13)	No	No	No
Landfill A	Landfill	11 [9]	NA	NA	NA	Yes, 18″ clay, vegetation (Photo 14)	No	No	No
Landfill 6	Landfill	16 [11]	6.1	NA	97	Yes, 18″ clay, vegetation (Photo 15)	No	No	No
Landfill G	Landfill	4 [2]	NA	NA	NA	Yes, 18″ clay, vegetation (Photo 16)	No	No	No
Former landfarm	Landfarm	36 [18]	NA	NA	NA	No, largely vegetated (Photo 8)	No	No	No
Pile near Landfill A	Pile, other	[1.95]	NA	NA	NA	No, unvegetated (Photo 5)	No	No	No

* From Smurfit-Stone "Pond Statistics," undated
§ Estimated from aerial photograph.
NA Not applicable

8.2 SURFACE WATER PATHWAY AND TARGETS

The mill site lies within the Clark Fork River valley and is generally flat, with an elevation range from approximately 3,070 feet near the mill facility to approximately 3,040 feet at the Clark Fork River in the northwest corner of the site. Overland flow from the site would generally travel west towards the river, although much of it would be captured in ponds or diverted by various ditches and channels, such as the non-contact cooling water ditch (Photo 10 in the PA report).

The Clark Fork River flows from the south to the north and has an annual mean discharge at a point below Missoula (USGS station 12353000, 4.5 miles west of Missoula) of 5,293 cfs (USGS 2011). Construction of the wastewater storage ponds on the mill site led to the relocation of the Clark Fork River channel to the west. Much of the mill site lies within the Federal Emergency Management Agency (FEMA) 100-year floodplain (FEMA 1988).

The western boundary of the site is the Clark Fork River, with the site having approximately 3.6 miles of river frontage (Figure 2, Photos 1, 6, 13, and 14 in the PA report). Chloride-ion concentrations in mill site groundwater monitoring wells show that mill effluent percolating through the wastewater storage ponds reaches the river (Grimestad 1992).

Surface water targets include sensitive environments (wetlands) adjacent to and downstream of the site, as well as the fishery of the Clark Fork River. Drinking water does not appear to be threatened, as all municipal water supply systems in the local area appear to utilize only groundwater (EPA 2011). It should be noted that shallow groundwater wells along the Clark Fork River downstream of the site would most likely be influenced by flows from the river (e.g., during spring runoff periods when the river would be a “losing” stream).

O’Keefe Creek flows from east to west across the southern extent of the mill property, adjacent to ponds 17 (sludge), 1A and 2 (both treated wastewater storage) (Figure 2). The USGS reported a stream flow measurement of 186.0 cfs from O’Keefe Creek in 1980 (USGS 2011). The creek had a substantial flow during the site reconnaissance in June 2011 (Photo 16 in the PA report), but was measured as only 1.35 cfs by UOS during this assessment in October 2011 (Appendix D).

8.2.1 Wetlands

In 2012, the MTNHP completed provisional wetland mapping for the area covered by the Primrose Quadrangle Map (Appendix E). This inventory identifies many individual

palustrine emergent and scrub-shrub wetlands (coded PEMA, PEMC, PSSA and PSSCx on the wetlands map) occurring along the Clark Fork River along the western border of the mill property.

Wetlands of these two specific types occurring in individual river frontage lengths of greater than 0.1 mile are presumed to be eligible for scoring as surface water targets under the HRS. Between sediment sampling locations SSSE05 (adjacent to pond 2) and sediment sampling location SSSE10 (just downstream of outfall 4) there are eight individual palustrine emergent wetlands totalling approximately 1.55 frontage miles, and three palustrine scrub-shrub wetlands totaling approximately 0.35 frontage mile (Appendix E). The sediment sample SSSE05 was collected within an area mapped by the MTNHP as palustrine emergent wetlands, and sediment sample SSSE06 was collected within an area mapped as palustrine scrub-shrub wetlands. HRS-eligible wetlands occurring downstream of sample location SSSE10 have not been calculated for this report, but provisional mapping downstream also shows numerous palustrine emergent and scrub-shrub throughout the length of the 15-mile TDL.

A narrow stretch of palustrine emergent wetland, approximately 0.2 mile in length, is also mapped within O'Keefe Creek, along the eastern border pond 1A (Appendix E).

In addition to wetlands frontage along the Clark Fork River and O'Keefe Creek, a significant amount (at least 35 acres) of palustrine emergent wetlands are shown to be present within on-site ponds; in particular, ponds 12 and 13 (Appendix E). Although they occur in constructed surface impoundments, these wetlands could possibly be considered HRS-eligible (i.e., if it could be shown that eligible wetlands existed in these areas prior to the construction of the impoundments).

8.2.2 Fishery

The entire length of the 15-mile TDL is considered a fishery with a Montana Fish, Wildlife and Parks (MFWP) fishery resource value of 1 (Outstanding). The MFWP Deep Creek fishing access site is located at the confluence of Deep Creek and the Clark Fork, approximately 0.5 mile upstream of the southern mill site boundary. The 423-acre MFWP Erskine fishing access site begins approximately 2.5 miles downstream of the mill site and stretches for approximately 2.5 river miles. There were an estimated 37,996 angling

days per year on this segment of the Clark Fork River in 2009 (MFWP 2011). Recreational fishing for the following species is reported in the fishery: brown trout, largemouth bass, mountain white fish, smallmouth bass, rainbow trout, northern pike, yellow perch, and westslope cutthroat trout (MFWP 2011). It is assumed that fish are caught for consumption, but evidence of this has not been gathered as part of this investigation.

Although the stretch of river adjacent to the mill site is considered a fishery with an MFWP fishery resource value of 1 (Outstanding), no fishermen were observed during the field activities. This may simply have been due to the season (late fall) and timing of the field work (mostly weekdays). Two MFWP fishing access sites are located in the vicinity of the site (approximately 0.5 mile upstream of the southern mill site boundary, and beginning approximately 2.5 miles downstream of the mill site), but neither site was visited during the field activities. The only evidence of recreation on the stretch of the river adjacent to the mill noted during the field work was tire tracks and the remains of a campfire on a sand bar west of pond 11 (Photo 19).

An estimate of the quantity of fish in the segment of the river adjacent to the mill could not be found. However, a 1990 fish survey along the Erskine fishing access site showed 17 brown trout for every 1,000 feet of river length (MFWP 2011). A 2007 study within the Deep Creek fishing access site found no mussels were present (MFWP 2010). Numerous river rafting companies offer fishing/float trips on the Clark Fork River, although it is not clear if any float the segment of the river adjacent to the mill site.

It has also been reported that crayfish are harvested for consumption from the Clark Fork River, although exact locations and quantities are not clear (MCCHD 2012).

8.2.3 Threatened and Endangered Species

The river segment adjacent to the mill is listed as a Wildlife Protected Area as it is a bald eagle nesting area and a big game critical wintering area, and is a historical peregrine falcon nesting area (MFWP 2011). Sensitive or threatened environments or species were not observed during this site inspection. Threatened and endangered species present within Missoula County are shown in Table 4 below (USFWS 2011b):

TABLE 4
Threatened and Endangered Species Occurring in Missoula County, Montana

Species Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald Eagle	*
Ursus arctos horribilis	Grizzly Bear	Federally-listed Threatened
Howellia aquatilis	Water Howellia	Federally-listed Threatened
Lynx canadensis	Canadian Lynx	Federally-listed Threatened
Salvelinus confluentus	Bull Trout	Federally-listed Threatened

*Though not currently listed as threatened or endangered by the USFWS under the Endangered Species Act, the bald eagle is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The Clark Fork River has been identified as nodal habitat for the federally listed endangered bull trout. Nodal habitats are defined as waters that provide migratory corridors and over-wintering areas, or are otherwise critical to the population at some point in its life history. Nodal waters are essential for the survival of migratory bull trout.

The MTNHP lists 65 animal species of special concern, including 9 mammals and 23 birds, as well as 49 plant species of special concern as occurring in Missoula County (MTNHP 2011).

8.2.4 Observed Release, Attribution and Actual Contamination

UOS collected surface water and sediment release samples from Smurfit-Stone Mill late October 2011. Two background locations were sampled: one in O'Keefe Creek upstream of the PPE for the landfarm area, and one in the Clark Fork River upstream of potential source areas of the mill.

Analysis of surface water samples indicated concentrations of dissolved manganese from four samples in the Clark Fork River exceeded the background concentration by 3 times. Manganese was also present at 3 times background concentrations in source samples from the site, but was not present at elevated concentrations in the one source area that is adjacent to the Clark Fork River, or in O'Keefe Creek. It is possible that the dissolved manganese in surface water is coming from elevated dissolved manganese in the shallow groundwater. No other analytes were detected at elevated concentrations (defined as concentrations 3 times background concentration) in surface water.

Concentrations of total arsenic exceeded the MDEQ Aquatic Life Standards (Chronic) and Human Health Standards (Surface Water) in all surface water samples collected

(including background samples). However, for HRS purposes arsenic was not considered elevated because it did not exceed 3 times the background level. No other analytes exceeded benchmark values. It should be noted that for some analytes, the detection limit exceeded the value of the benchmark.

Analysis of sediment release samples indicated chromium was elevated in one sample from the Clark Fork River (SSSE08, collected adjacent to wastewater storage pond 13), and vanadium was elevated in one sample from the Clark Fork River (sample SSSE10, collected immediately downstream of outfall 4). Chromium was elevated in only one source sample. Vanadium was not present at elevated concentrations in source samples.

The Clark Fork River upstream of Missoula has been affected by the historical deposition of metals-contaminated (particularly arsenic and copper) tailings from mining activities in the Butte, Montana area. Much of the metals-contaminated sediments have been removed from the Clark Fork, but remnant contamination from the sediments will continue to impact groundwater, surface water, and sediment quality within the river for some time. While it is possible that this contamination has affected surface water and sediment quality within the Clark Fork River as far downstream as the area of the mill, the background surface water and sediment samples collected for this investigation at a site on the Clark Fork above the source areas of the mill clearly show that manganese contamination in surface water release samples appears to be attributable to the mill site. Total and dissolved manganese was elevated in every shallow groundwater sample (with the exception of the background sample) collected during this investigation.

Various dioxin and furan congeners were present at elevated concentrations in all sediment release samples collected and were also present at elevated levels in all identified sources. Between 1 and 3 dioxin congeners were present at elevated concentrations in O'Keefe Creek (e.g., SSSE03), and as many as 13 dioxins/furan congeners are present at elevated concentrations in the Clark Fork River (e.g., SSSE09). The samples with the greatest concentrations and highest number of elevated dioxins/furan congeners were generally collected downstream of, but close to, an outfall (e.g., SSSE07 [outfall 2], SSSE09 [outfall 3] and SSSE10 [outfall 4]). The sediment sample SSSE05, collected adjacent to pond 2, had a similar number of elevated dioxins/furans. The most commonly elevated congeners across all sediment samples were 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD), 1,2,3,4,6,7,8-Heptachlorodibenzo-p-

dioxin (HpCDD), Octachlorodibenzo-p-dioxin (OCDD), and Total-HpCDD. Three of these substances have a bioaccumulation potential factor value of 5,000 or greater under the HRS. No other sources of dioxins or furans are known to occur in the study area.

The farthest upstream PPE for dioxin and furan congeners (e.g., 2,3,7,8-TCDD) within the surface water pathway is a point on O'Keefe Creek east of sludge pond 17. While no direct breaches of sludge pond 17 into the creek were noted during field sampling activities, it is believed that contaminated dust blowing from the surface of the various sludge ponds (including sludge pond 17) has likely been deposited, either directly or through overland flow, into the creek (the prevailing wind direction is from the northwest and O'Keefe Creek lies directly adjacent to the ponds to the south and east). O'Keefe Creek drains into the Clark Fork River along the southern border of the wastewater storage pond 2. As no sediment sample locations on the Clark Fork River showed observed release concentrations of 2,3,7,8-TCDD, the TDL for 2,3,7,8-TCDD within O'Keefe Creek ends at the creeks confluence with the Clark Fork River. The in-water segment of this TDL, all subject to actual contamination (Level II) under the HRS, includes a stretch of palustrine emergent wetlands that is approximately 0.2 mile in length. It does not appear that O'Keefe Creek is fished as the creek is small and there are numerous other superior fishing opportunites in the area.

The highest PPE on the Clark Fork River for various dioxin and furan congeners (e.g., 1,2,3,4,6,7,8-HpCDD) is adjacent to wastewater storage pond 2. This pond is bordered by O'Keefe Creek to the southeast and the Clark Fork River to the south and west. As with sludge pond 17, no direct breaches of this pond into either O'Keefe Creek or the Clark Fork River were noted during field activities. However, it has been reported that dust occasionally blows from the surface of the various ponds. It is, therefore, believed that this dust has been deposited, either directly or through subsequent overland flow, into both O'Keefe Creek and the Clark Fork River. The lowest downstream observed release sample for various dixon and furan congeners (including 1,2,3,4,6,7,8-HpCDD) is SSSE10, collected from a point on the Clark Fork River approximately 3 miles downstream of wastewater storage pond 2, and just below outfall 4.

This entire 3 mile segment of the Clark Fork is subject to actual contamination (Level II) under the HRS. As discussed above, there are eight individual palustrine emergent wetlands totalling approximately 1.55 frontage miles, and three palustrine scrub-shrub

wetlands totaling approximately 0.35 frontage mile within this 3 mile stretch of the Clark Fork (Appendix E). The sediment sample SSSE05 was collected within an area mapped by the MTNHP as palustrine emergent wetlands, and the sediment sample SSSE06 was collected within an area mapped as palustrine scrub-shrub wetlands. HRS-eligible wetlands occurring downstream of sample location SSSE10 have not been calculated for this report, but provisional mapping downstream also shows numerous palustrine emergent and scrub-shrub throughout the length of the 15-mile TDL.

As part of its National Bioaccumulation Study, the EPA collected fish tissue from both a large-scale sucker and a rainbow trout at a location on the Clark Fork River near the Huson sampling station (approximately 6 miles downstream of the mill site). The tissue from the sucker showed levels of various PCB congeners exceeding environmental or human health guidelines, as well as detectable amounts of 2,3,7,8-TCDF. The rainbow trout was analyzed only for dioxins and furans but also showed a detectable amount of 2,3,7,8-TCDF (EPA 1992b). Fish tissue was not collected as part of the current investigation.

8.3 GROUNDWATER PATHWAY AND TARGETS

The Smurfit-Stone Mill site is located adjacent to the Clark Fork River. The mill is underlain by a shallow alluvial sand and gravel aquifer. The alluvial aquifer is approximately 25 to 35 feet thick beneath the mill site and thins to the east (Hydrometrics 2004).

The fine-grained Lake Missoula sediments extend underneath the shallow alluvial gravels and are approximately 120 to 150 feet thick (Grimestad 1992). These sediments are underlain by a thick coarse-grained alluvial aquifer, which is the principal water supply aquifer for both the mill and for local ranches (Hydrometrics and Inskeep 2004). Depth to groundwater within the shallow alluvial (unconfined) aquifer varied across the site from 6.5 to 26.3 feet during October 2011 sampling (Table 2).

Groundwater flow directions in the shallow alluvial aquifer are generally to the west and north in the vicinity of the mill, towards the river. However, flow directions vary seasonally in response to areal recharge, water level fluctuations in the mill's wastewater storage ponds, seasonal changes in the stage of the Clark Fork River, and seasonal flows in irrigation ditches (Hydrometrics and Inskeep 2004). Groundwater velocity measured in background wells on the mill site average 4

feet per day, and hydraulic conductivity measured across the entire mill site averages approximately 335 feet per day (Grimestad 1992).

Ponds built at the site were not lined, and percolation of wastewater through the bottom of the ponds into the shallow alluvial aquifer was relied on as a means of water disposal (MDHES 1974, Smurfit-Stone 2004). As such, the shallow alluvial aquifer has been contaminated with mill effluent. As reported by the MDHES in the Environmental Impact Statement for the proposed expansion of the mill:

> *The shallow aquifer underlying the effluent storage ponds contains considerable seepage water from the pond system. Pond wastes have also entered the deep aquifer in the vicinity of the plant. The quality of percolated wastewaters is significantly inferior to natural groundwater* (MDHES 1974, page 180).

In addition, Grimestad has stated:

> *…ongoing Mill chemical sampling indicates that the underlying groundwaters are already carrying a significant load of the expected leachate constituent chemicals from nearby storage pond and effluent-distribution ditch leakage* (Grimestad 1992, page 11).

Numerous drinking water wells exist within 4 miles of the site (Table 5), including seven private domestic wells located along the northern boundary of the site and within the groundwater mixing zone boundary for the site effluent (Hydrometrics and Inskeep 2004). All of the wells are completed in the deeper aquifer (total depths range from 141.5 to 169 feet bgs).

All municipal water supply systems in the local area utilize groundwater (EPA 2011). The nearest municipal wells to the mill are two adjacent public supply wells for the Magnolia Estates located at 13475 Mullan Road, approximately 700 feet from the mill property boundary (and 1 mile upgradient from sludge pond 17) (MBMG 2011). The next closest public supply wells are associated with the Frenchtown Valley View Trailer Court, located approximately 0.5 mile north of the northern boundary of the mill.

There are an estimated 4,364 people within 4 miles of the site who use groundwater domestically. A summary of commercial and private wells located within a 4-mile radius of the mill site is provided in Table 5 below:

TABLE 5
Domestic Wells within a 4 Mile Radius of the Smurfit-Stone Mill Site

Radius (in miles)	Number of Wells	Estimated Population Served*
0 – 0.25	57	140
0.25 – 0.50	63	155
0.50 – 1.0	156	384
1.0 – 2.0	362	891
2.0 – 3.0	677	1665
3.0 – 4.0	459	1129
Total	**1,774**	**4,364**

* Assumes one well per household and 2.46 persons per household for Missoula County.
Sources: State of Montana, Department of Natural Resources and Conservation, Water Resources Division, 2011; US Census Bureau 2010 census (U.S. Census Bureau 2011).

The mill also used groundwater for the facility water supply. The Montana Groundwater Information Center lists over 40 wells registered by various previous owners of the mill property for industrial, fire protection, monitoring, and domestic use (MBMG 2011). The present status of these wells, and the intentions that M2Green have for their future use or abandonment, is not clear.

UOS collected groundwater release samples from 15 locations in the shallow aquifer and 6 locations in the deep aquifer in late October 2011. No groundwater release samples were collected from the deep aquifer beneath the source areas.

Analysis of shallow groundwater release samples indicates numerous metals and dioxins/furan congeners were present at elevated concentrations. Aluminum, arsenic, iron, manganese, sodium, and various dioxins/furan congeners were present at elevated levels in all samples from the shallow aquifer. Arsenic, barium, calcium, chromium, manganese, nickel, potassium, zinc, and a number of dioxins/furan congeners were present at elevated levels in both source samples and groundwater samples, and of these, arsenic, manganese, and dioxins/furans are the most widespread at the time of this investigation.

In addition, chlorobenzene, ethylbenzene, o-xylene, m,p-xylene, and isopropylbenzene were present at elevated concentrations in SSGW05 (shallow aquifer groundwater sample located within or downgradient of landfill A). Isopropylbenzene was present at an elevated concentration in one subsurface source sample (from sludge pond 5). The two groundwater samples containing the highest concentrations and largest number of elevated dioxins/furans were SSGW04 (shallow

well located downgradient of sludge pond 3) and SSGW05 (shallow well located downgradient of landfill A).

As you move further away from the sludge ponds and landfills, fewer elevated metals and dioxins/furans were present in shallow aquifer samples. In addition, samples taken further from the sludge ponds and landfills generally had metals and dioxins/furans concentrations an order of magnitude lower than those located closer to the sludge ponds and landfills.

Iron exceeded the MDEQ Human Health Standards for groundwater in all shallow groundwater samples. Barium, chromium, and manganese exceeded the MCL, the SCDM RDSC, and/or the MDEQ Human Health Standards for groundwater in several shallow groundwater samples. The MDEQ Human Health Standard for iron was exceeded by one deep aquifer groundwater sample. The SCDM CRSC was exceeded by four dioxin congeners and two furan congeners, with most of the exceedances in samples SSGW04 and SSGW05.

Currently, no known users of shallow groundwater exist, and the deep aquifer in the area of residences located north of the site and crossgradient of the sources, appears to be unimpacted. However, the deep aquifer immediately beneath the site was not sampled during this investigation. The closest deep aquifer well sample to the mill was taken from a private well located approximately 2 miles north (generally crossgradient) of the source areas sampled during this investigation.

Although both Grimestad and Hydrometrics reported that groundwater flow occurs from the deeper aquifer upwards to the shallow aquifer, in the Environmental Impact Statement for the proposed expansion of the mill, MDHES reported that although there was a poor vertical hydraulic connection between the aquifers, pond wastes had already entered the deep aquifer due to leakage from the upper to the lower aquifer (MDHES 1974).

8.4 SOIL EXPOSURE PATHWAY AND TARGETS

The Smurfit-Stone Mill site has numerous soil sources of waste. It is not clear if site workers regularly access these sources. In October 2011, UOS collected surface and subsurface soil samples from a number of potential source areas. The sources examined and confirmed through chemical analysis as a part of this investigation include 4 sludge ponds (sludge ponds 3, 4, 5 and 17), an emergency spill pond (pond 8, with two separate cells), an exposed soil pile adjacent to landfill A, one wastewater storage pond (pond 2), and a soil landfarming area (Tables 9 through

18, Figure 2). Additional potential soil sources at the site that were not characterized as part of this assessment include 11 additional wastewater storage ponds, 3 wastewater treatment aeration basins, and 2 polishing ponds.

The identified sources lack covering material and are sparsely vegetated. Sludge pond 3 is partially covered with wood chips. Soil exposure targets could include an unknown number of workers who are conducting salvage operations (e.g., removing equipment) from the industrial core of the mill. The number of current workers on site is unknown, but workers were present during the site reconnaissance and during sampling activities.

At the time of the sampling in October 2011, the sludge ponds and emergency spill pond contained standing puddles of water, and the soil was very soft. Pond 3 had recently been covered with 10 to 12 inches of wood chips, reportedly for dust control (Marxer 2011). In late September 2011, the Missoula County Health Department reported that they had received citizen complaints regarding airborne emissions from the settling ponds at the mill. These complaints were reported during a dry spell and a windy period. One complainant described a plume of dust approximately 250 feet high and 0.5 mile wide and smaller plumes of approximately 100 feet high on 2 subsequent days (MCCHD 2011).

After being capped with 18 inches of clay and 6 inches of topsoil, formal closure of the three former landfill areas occurred in September 1995 (MDEQ 1995). These areas are currently largely revegetated.

The nearest residences are located in a small development approximately 0.5 mile east and southeast of the core industrial area (and within 0.25 mile of the mill property boundary). In addition, a ranch that lies within the boundary of the site is located approximately 1 mile due north of the industrial area of the mill site. Access to the core industrial area of the site is controlled, and there were security guards present at the facility entrance during the site reconnaissance. The entire site was not fenced and access could be gained from the Clark Fork River. Evidence of recreational activities (e.g., ATV tracks, discarded beer cans) was not observed on or near any of the source areas during field work in October 2011.

Population within 4 miles of the site is shown in Table 6 below:

TABLE 6
Population within a 4-Mile Radius of the Smurfit-Stone Mill Site

Distance from Site	Population (# of persons)
On Site	0
0 – 0.25 Mile	241
>0.25 – 0.5 Mile	218
>0.5 – 1 Mile	85
>1 – 2 Miles	838
>2 – 3 Miles	1,836
>3 – 4 Miles	1,030
Total population within 4 miles	**4,248**

Source: U.S. Census Bureau 2010.

Threatened and endangered species are described in the Surface Water Pathway section above.

UOS collected surface soil/source samples from 17 locations (including 1 background location). All of these samples were collected from areas suspected to be sources. No soil samples were collected from nearby non-source areas to determine whether observed contamination in sources had spread to adjacent soils.

Soils from 0-2 feet bgs are to be considered when assessing the soil exposure pathway under the HRS. Surface soil/source sample locations contained observed contamination (defined as concentrations greater than 3 times background concentrations; i.e., elevated concentrations) in the form of the following analytes:

- 4-methylphenol was detected in surface soils from sludge ponds 4 and 5 and in surface soils from the emergency spill pond.
- Naphthalene and phenanthrene were detected in the surface soil from the emergency spill pond.
- As many as 15 dioxin/furan congeners were detected at elevated concentrations in all surface soil source samples collected. Total-TCDD was detected at elevated levels in all source samples collected, with the highest concentrations being documented in sludge ponds 17 and 3.
- Antimony, arsenic, barium, cadmium, calcium, chromium, lead, manganese, nickel, potassium, silver, and zinc were elevated in at least one surface soil sample. The metals

that were elevated in the most samples were barium (three samples), cadmium (four samples), manganese (seven samples), and calcium (eight samples).

- Locations containing elevated metals include all four sludge ponds (however, the only metal elevated in sludge pond 5 was calcium), the emergency spill pond, and the soil pile adjacent to landfill A.

Concentrations of benzo(a)pyrene exceeded the SCDMs RDSC or CRSC benchmarks in one surface soil sample from the emergency spill pond. Arsenic exceeded the SCDMs RDSC or CRSC benchmarks in surface soils at all locations sampled, including the background location. There were no other SCDM benchmark exceedances for those metals that have a benchmark available. In addition, multiple dioxins/furans exceeded the SCDM CRSCs in samples from sludge ponds 3 and 7 and the emergency spill pond.

8.5 AIR PATHWAY AND TARGETS

The air pathway was not evaluated as a part of this site reassessment because of the very low population density in the Smurfit-Stone Mill area and the fact that the ground surface is snow-covered for at approximately 4 months out of the year.

The mill site is located in a semiarid climate zone. Prevailing wind direction is from the northwest. It is feasible that particulate contaminants (e.g., from the surface of the dry, uncovered sludge ponds) could be blown off site.

Total wetlands acreage (as computed from existing USFWS NWI mapping) within 4 miles of the mill site boundary is shown in Table 7 below. It should be noted that more detailed provisional wetland maps generated by the MTNHP have recently become available. The acreage within Table 7 below is taken from the older USFWS data. It is expected that total wetlands acreage from both sources would be similar.

TABLE 7
USFWS-Identified Wetlands within 4 Miles of the Smurfit-Stone Mill Site

Distance from Site	Wetlands (acres)
On Site	986
0 – 0.25 Mile	261
>0.25 – 0.5 Mile	84
>0.25 – 1 Mile	260

TABLE 7
USFWS-Identified Wetlands within 4 Miles of the Smurfit-Stone Mill Site

Distance from Site	Wetlands (acres)
>1 – 2 Miles	420
>2 – 3 Miles	430
>3 – 4 Miles	227
Total acres within 4 Miles	**2,668**

Source: USFWS 2011a, National Wetlands Inventory.

Access to the core industrial area of the site is controlled, and there were security guards present at the facility entrance during the site reconnaissance. The entire site was not fenced, however, and access could also be gained from the Clark Fork River. The nearest residences are located in a small development approximately 0.5 mile east and southeast of the core industrial area (and within 0.25 mile of the mill property boundary).

9.0 DATA QUALITY ANALYSIS

9.1 DATA QUALITY OBJECTIVES

The EPA DQO Process is a seven-step systematic planning approach to develop acceptance or performance criteria for EPA-funded projects. The project team identified the surface water and soil exposure pathways, and to a lesser extent, the groundwater pathway, as the likely pathways of most potential concern at the site. Surface water and sediment samples were used to determine if there was a significant release of contaminants in the surface water pathway, and groundwater samples were used to determine if there was a significant release to groundwater. Currently, the impact to groundwater was limited to the shallow aquifer, which does not appear to be utilized. Soil samples were collected from waste sources to determine the potential for contamination to exist in soils and to migrate to other pathways.

The principal goal of this SI was to conduct a limited, initial field investigation at the mill to determine if a time-critical removal is necessary to protect human health and the environment. The primary study questions for this investigation that were answered by the results of this investigation were:

1.) Determining if landfills, wastewater storage pits, sludge ponds, and an emergency spill pond contained elevated concentrations of PCBs, VOCs, SVOCs, dioxins, furans, metals and/or asbestos;
2.) Determining if groundwater in the vicinity of the site and surface water and sediments in O'Keefe Creek and the Clark Fork River were impacted by sources at the site;
3.) Determining if environmental sample concentrations exceed applicable benchmarks; and
4.) Determining if elevated concentrations of metals identified in groundwater, surface water, and sediments are attributable to the sources at the paper mill.

Nineteen surface soil source samples (including 2 replicate samples and 1 background sample) and 8 subsurface soil source samples were collected from several different potential source areas. Seventeen shallow aquifer groundwater samples (including 1 duplicate sample and 1 background sample) and 6 deep aquifer groundwater samples (including 1 duplicate sample and 1 background sample) were collected. Ten co-located sediment and surface water locations (including 2 background locations) were sampled (10 surface water samples and 10 sediment samples) as part of the assessment, including 3 sample locations from O'Keefe Creek and 7 sample locations from the Clark Fork River (UOS 2011c).

All analytical data have been reviewed and verified to ensure that data is acceptable for the intended use (Appendix E). The Data Quality Objectives for this project have been met, and the data collected is of sufficient quality to answer the study questions.

9.2 DATA VALIDATION AND INTERPRETATION

All data were validated by a third party subcontracted chemist from TechLaw, Inc. according to the document "EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," dated January 2010. Raw data were reviewed for completeness and transcription accuracy on to the summary forms. Approximately 10 to 20 percent of the results reported in each of the samples, calibrations, and quality control analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

There were 10 sample data groups: H30Q0, H30S7, H30T6, H30X4, MH3BA0, MH3BA1, MH30S4, MH30S8, MH30T9, MH30Z9. Each data group has a corresponding data validation

package. There were some qualifications applied to each data package associated with this sampling event. Descriptions of each qualification are summarized in the Review Narrative Summary at the front of each package and detailed in various subsequent review sections. In brief, the reasons given for data qualification were blank contamination, negative blank contamination, inductively-coupled plasma (ICP) interference, matrix spike recovery issues, and serial dilution criteria not being met.

All data are deemed acceptable for use as qualified in the data validation reports. The data validation reports, laboratory Form 1s, chains-of-custody, and SQL calculations are presented in Appendix E.

10.0 MEASUREMENT QUALITY OBJECTIVES

10.1 FIELD QUALITY CONTROL PROCEDURES

All samples were handled and preserved as described in TSOP 4.2, "Sample Containers, Preservation, and Maximum Holding Times." Calibration of the pH, temperature, and conductivity meters followed instrument manufacturers' instruction manuals and TSOP 4.14, "Water Sample Field Measurements." Sample collection generally progressed from downstream to upstream to prevent cross-contamination (UOS 2005b).

The following samples were collected to evaluate quality assurance at the site in accordance with the "Guidance for Performing Site Inspections under CERCLA," Interim Final September 1992, the "Region 8 Supplement to Guidance for Performing Site Inspections under CERCLA," and the UOS Generic QAPP (EPA 1992, 1993; UOS 2005a):

- A field replicate sample and a double-volume soil sample were both collected at the SSSO1302 and SSSO1402 locations. The replicated samples were labeled SSSO99 and SSSO89, respectively, and the double-volume samples were used for MS/MSDs. The relative percentage differences between the primary samples and the duplicate samples are shown in the analytical tables. The extra volume samples were not labeled as separate samples, and the replicate samples were blind to the laboratory.
- One field groundwater duplicate was collected at both the SSSGW10 and SSSGW26 locations. The duplicate samples, labeled SSGW89 and SSSGW99, respectively, were blind to the lab. The relative percentage differences between the primary and duplicate

samples are shown in the analytical tables. In addition, a triple volume sample (not labeled as a separate sample) was collected at SSSGW10 and used for MS/MSD.

- One field rinsate blank (SSSW89) and two trip blanks (SSSW99A and SSSW99B) were collected.

The UOS Generic QAPP serves as the primary guide for the integration of QA/QC procedures for the START contract (UOS 2005a).

10.2 DATA QUALITY ASSESSMENT

Quality attributes are qualitative and quantitative characteristics of the collected data. The principle quality attributes to environmental studies are bias, sensitivity, precision, representativeness, comparability, and completeness. Data quality indicators (DQIs) are specific indicators of quality attributes. The following DQIs were considered during the review of field collection techniques and field QA/QC results, as well as laboratory QA/QC:

10.2.1 Bias

Bias is systematic or persistent distortion of a measurement process that causes errors in one direction. The extent of bias can be determined by an evaluation of laboratory initial calibration/continuing calibration verification, laboratory control samples, interference checks, spike duplicates, blank spike, MS/MSD, method blank, and trip blank.

A review of the validation forms for soil, sediment, and water samples detected a high bias in the data sets MH3BA0 and MH3BA1 for beryllium, silver, and thallium; in the data sets MH30S4 and MH30S8 for antimony, arsenic, beryllium, cadmium, and vanadium. There was a positive interference for these metals in the ICP interference check samples.

Due to negative blank contamination, a negative bias was assigned for cadmium in data set MH3BA0, for silver in data set MH30S4, and for potassium in data set MH30S8. A negative bias as a result of ICP interference was also assigned to data sets MH30S4 and MH30S8 for silver.

10.2.2 Sensitivity

Sensitivity generally refers to the capability of a method or instrument to discriminate between small differences in analyte concentration and is generally discussed as detection limits. Before sampling begins, it is important to compare detection limits and project requirements in order to select a method with the necessary detection limits to meet the project goals. The detection limits are described in the analytical methods.

All detection limits met the CLP requirements; therefore, all sensitivity requirements for the project were met.

The SCDM CRSC for benzo(a)pyrene and dibenz(a,h)anthracene in surface source soils is 82 micrograms per kilogram (µg/kg), lower than the CRQL for the CLP Program (170 µg/kg). Both of the samples in which benzo(a)pyrene was detected were above the SCDM CRSC. Therefore, it is possible that benzo(a)pyrene is present in additional samples at concentrations exceeding the CRSC. In addition, the MDEQ Human Health Standards for Surface Water, MCLs, SCDM CRSCs, and MDEQ Human Health Standards for Groundwater for benzo(a)pyrene and dibenz(a,h)anthracene are 1 to 2 orders of magnitude lower than the CRQLs for these compounds (3.3 micrograms per liter [µg/L]).

10.2.3 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical, or substantially similar, conditions and is expressed as the relative percent difference (RPD) between the sample pairs. The field duplicates and MS/MSDs were used to evaluate precision.

Results are generally deemed acceptable if the RPD between the sample pairs is < 35 percent for soils and sediments, and < 20 percent for waters. The results outside of the acceptable range were:

- an RPD of 45 percent for aroclor-1254 between the surface soil sample SSSO1402 and its replicate SSSO8902;
- an RPD of 36 percent for bis(2-ethylhexyl)phthalate between the surface soil sample SSSO1302 and its replicate SSSO9902;

- an RPD of 67 percent for selenium between the surface soil sample SSSO1302 and its replicate SSSO9902;
- an RPD of 29 percent for dissolved lead between the groundwater sample SSGW10 and its replicate SSGW89; and
- an RPD of 21 percent for dissolved zinc between the groundwater sample SSGW10 and its replicate SSGW89.

RPD results are presented in the analytical tables.

10.2.4 Representativeness

Representativeness is the measure of the degree to which data accurately and precisely represent a characteristic of a population parameter, variations at a sampling point, a process condition, or an environmental condition. Representativeness was achieved by adherence to TSOPs for sampling procedures, field and laboratory QA/QC procedures, appropriateness of sample material collected, analytical method and sample preparation, and achievement of acceptance criteria documented in the FSP for the project. Various deviations from the FSP were documented within Section 3.0 of the SAR (UOS 2011c) and are listed again below:

- Proposed subsurface soil samples SSSO10xx (sludge pond 5), SSSO12xx (sludge pond 4), and SSSO14xx (emergency spill pond 8, wet cell); and Geoprobe® groundwater samples SSGW06 (sludge pond 4) and SSGW09 (emergency spill pond 8, wet cell) were not collected as the track-mounted Geoprobe® could not safely access these proposed sampling locations due to a soft surface (Photo 1).
- Geoprobe® groundwater sampling location SSGW07 was moved from within sludge pond 5 to a location on the berm between sludge ponds 4 and 5, due to the lack of safe access for the Geoprobe® to the proposed sampling location (Photo 2).
- Proposed subsurface soil sampling locations SSSO11xx (sludge pond 4) and SSSO09xx (sludge pond 5) were moved from the center of each pond to the edge, due to the lack of safe access for the Geoprobe® to the proposed sampling locations (Photo 3).

- Surface soil samples SSSO0702, SSSO1002, SSSO1202, and SSSO1402 were collected directly from the surface of ponds with disposable plastic scoops, rather than from Geoprobe® macro-core sleeves, due to the lack of safe access for the Geoprobe® to the proposed sampling locations (Photo 4).
- Surface soil samples SSSO0502 and SSSO0602 were collected directly from the surface of ponds with disposable plastic scoops, rather than from Geoprobe® macro-core sleeves, in order to expedite the sampling schedule (i.e., they were collected prior to the arrival of the Geoprobe® on site).
- Domestic well locations SSGW19, SSGW20, SSGW21, and SSGW22 were not sampled, because the wells could not be located on the ground, or access to sample was either not granted or pursued. Domestic well SSGW23 (15762 Marcure Lane) was located approximately 0.25 mile northwest of its assumed location.
- Opportunity sample SSSO1702 was added to the sample plan, being collected from an area of what appeared to be exposed soil/sludge adjacent to landfill A (Photo 5).
- The second soil/source replicate sample SSSO9902 was collected from a sludge location, rather than a sediment location, to ensure that a sufficient number of replicates were collected for the sludge matrix.
- The second groundwater duplicate sample SSGW99 was collected from the SSGW26 location (15400 Marcure Lane) rather than the SSGW20 location as the owner of the well at the SSGW20 location was not available to grant access.

10.2.5 Comparability

Comparability is the qualitative term that expresses the confidence that two data sets can contribute to common interpretation and analysis and is used to describe how well samples within a data set, as well as two independent data sets, are interchangeable.

This is the first data set gathered from the site for the EPA. Comparability has been controlled by collecting all samples in one sampling event.

All samples were sent to a CLP laboratory or a private laboratory (asbestos and dioxins and furans), and all data were validated (Appendix E). All samples were collected using the same FSP, TSOPs, and sampling equipment; therefore, all sample data from this

event are internally comparable. These same methods and procedures will be used during any future sampling events to ensure comparability.

10.2.6 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system and is measured using the formula: *Percent Completeness = (Number of Valid Measurements / Number of Planned Measurements) x 100*. Excluding the opportunity samples that were added in the field, the percent completeness for this project was 88 percent. When adding the one opportunity sample collected in the field, the percent completeness increases to 89 percent. Samples were generally collected in accordance with the FSP, except for instances where access could not be gained, or where conditions in the field were different than expected or unsafe.

11.0 DATA GAPS

Upon completion of field work for this project and the receipt and review of analytical data, several key data gaps have emerged. These include:

- Additional sampling of other potential sources at the site (e.g., 11 wastewater storage ponds) and the core industrial area, as well as the overland flow segment between sludge pond 17 and O'Keefe Creek, and between wastewater storage pond 2 and the Clark Fork River;
- Sampling of the deep aquifer directly beneath the site, to confirm prior reports that it has been contaminated;
- Confirmation of the current groundwater flow direction (expected to be generally west towards the Clark Fork River);
- Volume estimates of known sources;
- Off-site soil sampling to determine if site contaminants have been transported to areas near residents, workers, or sensitive environments;
- Documentation of the source of potable water for on-site workers;
- Documentation of the potential for on-site workers to access known sources;
- Field verification of HRS-eligible wetlands (i.e., meeting the definition of a wetlands as outlined in 40 CRF 230.0) along the Clark Fork River and O'Keefe Creek within the 15-mile TDL; and
- Documentation of human fish consumption along the 15-mile TDL.

12.0 SUMMARY

The Smurfit-Stone Mill is located in west-central Montana, approximately 11 miles northeast of the town of Missoula, Montana, in Missoula County. The Smurfit-Stone Mill was a large integrated pulp and paper mill that was in operation from 1957 through early 2010.

A number of potential sources of contamination were identified during the preliminary assessment of the site. Only four sludge ponds, the emergency spill pond, one wastewater storage pond, and the landfarming area were intended to be targeted for sampling during this assessment, as they were determined to have the highest potential for containing hazardous substances, or, in the case of the wastewater storage pond, were considered to be most at risk in the event of a catastrophic flood. An additional potential source (what appeared to be exposed soil/sludge adjacent to landfill A) was identified and also sampled during the assessment. All of these potential source areas were confirmed to contain hazardous substances through chemical analysis during this investigation (Tables 8 through 17, Figure 2). Other potential sources at the site that were not characterized as part of this assessment include 11 additional wastewater storage ponds, 3 wastewater treatment aeration basins, and 2 polishing ponds. Additional potential sources likely exist on the site, particularly in the core industrial area, which was not investigated.

Based upon the risks associated with the hazardous substances thought possibly to be present on the site, the project team identified the surface water and soil exposure, and to a lesser extent, the groundwater pathway, as the pathways of potential concern at the site. Site impact to groundwater was confirmed for the shallow aquifer, which does not appear to be utilized. The deeper aquifer appeared not to be affected, but sampling of this aquifer occurred only in domestic wells located some distance crossgradient of source areas, and in one background location.

Analytical results that indicate observed contamination, an observed release, or compounds present at concentrations exceeding benchmarks for the surface water, soil exposure, and groundwater pathways are discussed in the following paragraphs.

Analysis of surface water samples indicated elevated concentrations of dissolved manganese in the Clark Fork River. Concentrations of total arsenic exceeded the MDEQ Aquatic Life Standards (Chronic) and Human Health Standards (Surface Water) in all surface water samples collected (including background samples).

Analysis of sediment release samples indicated chromium and vanadium were each elevated in sediment at a single location in the Clark Fork River. Various dioxin and furan congeners were present at elevated concentrations in all sediment release samples collected.

A number of organic compounds, including 4-methylphenol, naphthalene, phenanthrene, and several dioxin/furan congeners were found at elevated concentrations in source samples. Total-TCDD was detected at elevated levels in all source samples collected. In addition, antimony, arsenic, barium, cadmium, calcium, chromium, lead, manganese, nickel, potassium, silver, and zinc were elevated in at least one surface soil sample. Concentrations of benzo(a)pyrene, arsenic, and multiple dioxin/furan congeners exceeded the SCDMs RDSC or CRSC benchmarks in surface soil/source samples. No soil samples were collected from non-source areas near the sources to determine whether observed contamination in sources had spread to adjacent soils.

Arsenic, barium, calcium, chromium, manganese, nickel, potassium, zinc, and a number of dioxin/furan congeners were present at elevated levels in shallow groundwater samples. In addition, chlorobenzene, ethylbenzene, o-xylene, m,p-xylene and isopropylbenzene were present at elevated concentrations in SSGW05 (shallow aquifer groundwater sample located within or downgradient of landfill A). Isopropylbenzene was present at an elevated concentration in one subsurface source sample (from sludge pond 5). Concentrations of iron, barium, chromium, manganese, and a few dioxin/furan congeners exceeded the MCL, the SCDM CRSC and/or RDSC, and/or the MDEQ Human Health Standards for groundwater in shallow groundwater samples.

Between sediment sampling locations SSSE05 (adjacent to pond 2) and sediment sampling location SSSE10 (just downstream of outfall 4) there exist eight individual palustrine emergent wetlands totalling approximately 1.55 frontage miles, and three palustrine scrub-shrub wetlands totaling approximately 0.35 frontage mile (Appendix E). The sediment sample SSSE05 was collected within an area mapped by the MTNHP as palustrine emergent wetlands and the sediment sample SSSE06 was collected within an area mapped as palustrine scrub-shrub wetlands. HRS-eligible wetlands occurring downstream of sample location SSSE10 have not been calculated for this report.

A narrow stretch of palustrine emergent wetland is also mapped within O'Keefe Creek, along the eastern border of pond 1A (Appendix E).

The entire length of the 15-mile TDL is considered a fishery with a MFWP fishery resource value of 1 (Outstanding). The 423-acre MFWP Erskine fishing access site begins approximately 2.5 miles

downstream of the mill site and stretches for approximately 2.5 river miles. There were an estimated 37,996 angling days per year on this segment of the Clark Fork River in 2009. It is assumed that fish are caught for consumption, but evidence of this has not been gathered.

Numerous river rafting companies offer float trips on the Clark Fork River, although it is not clear if any float the segment of the river adjacent to the mill site.

The river segment adjacent to the mill is listed as a Wildlife Protected Area as it is a bald eagle nesting area, a big game critical wintering area, and a historical peregrine falcon nesting area. Threatened, endangered, and protected species present within Missoula County include the bald eagle, grizzly bear, Water Howellia, Canadian lynx, and bull trout.

The Clark Fork River has been identified as nodal habitat for the federally listed endangered bull trout. Nodal habitats are defined as waters that provide migratory corridors and over-wintering areas, or are otherwise critical to the population at some point in its life history. Nodal waters are essential for the survival of migratory bull trout.

There is no documentation that surface water from the Clark Fork River within the 15-mile downstream limit is used as a source of drinking water. All records indicate that drinking water in the area is sourced from the deep aquifer.

In late September 2011, the Missoula County Health Department reported that they had received citizen complaints regarding airborne emissions (dust) from the settling ponds at the mill. These complaints were reported during a dry spell and a windy period. One complainant described a plume of dust approximately 250 feet high and 0.5 mile wide and smaller plumes of approximately 100 feet high plumes on 2 subsequent days. The nearest residences are located in a small development approximately 0.5 mile east and southeast of the core industrial area (and within 0.25 mile of the mill property boundary). In addition, a ranch that lies within the boundary of the site is located approximately 1 mile due north of the industrial area of the mill site. Soils near these residences have not been tested to determine whether airborne emissions from the site could be depositing contaminated soil and impacting residents via the soil exposure pathway, and air has not been tested to determine whether contaminated dust is posing a threat to residents via the air pathway.

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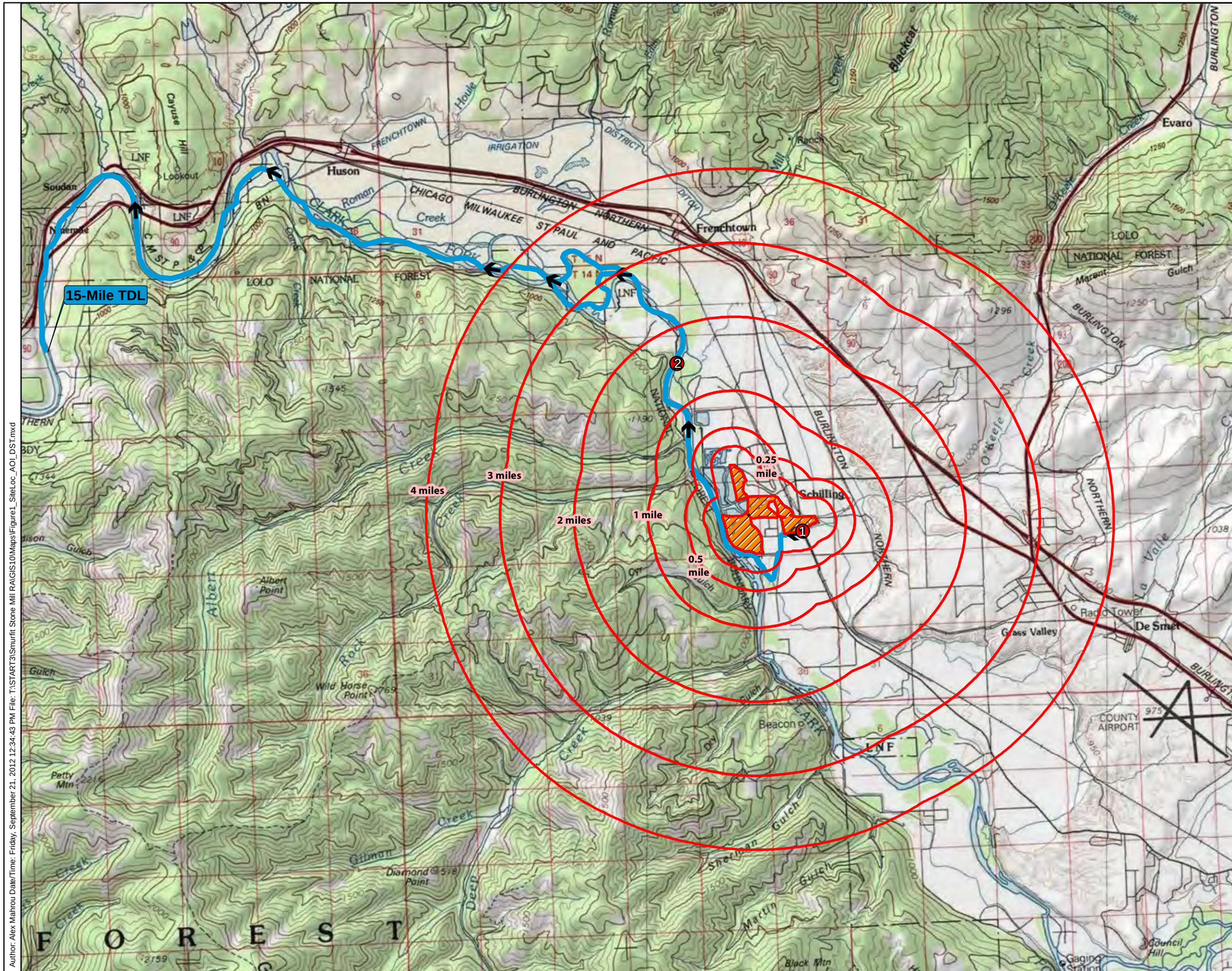


Legend

- 1 Most Upstream PPE
- 2 Furthest Downstream PPE
- 4-Mile Area of Influence
- Source Areas
- 15-Mile Target Distance Limit (TDL)

TDD Title: **Smurfit-Stone Mill RA and SI**

Figure Title: Site Location, Area of Influence, and 15-Mile Downstream Target Distance Limit (TDL)

Figure No. 1
TDD State: MT
TDD County: Missoula
TDD: 1105-09
Date: 09/2012

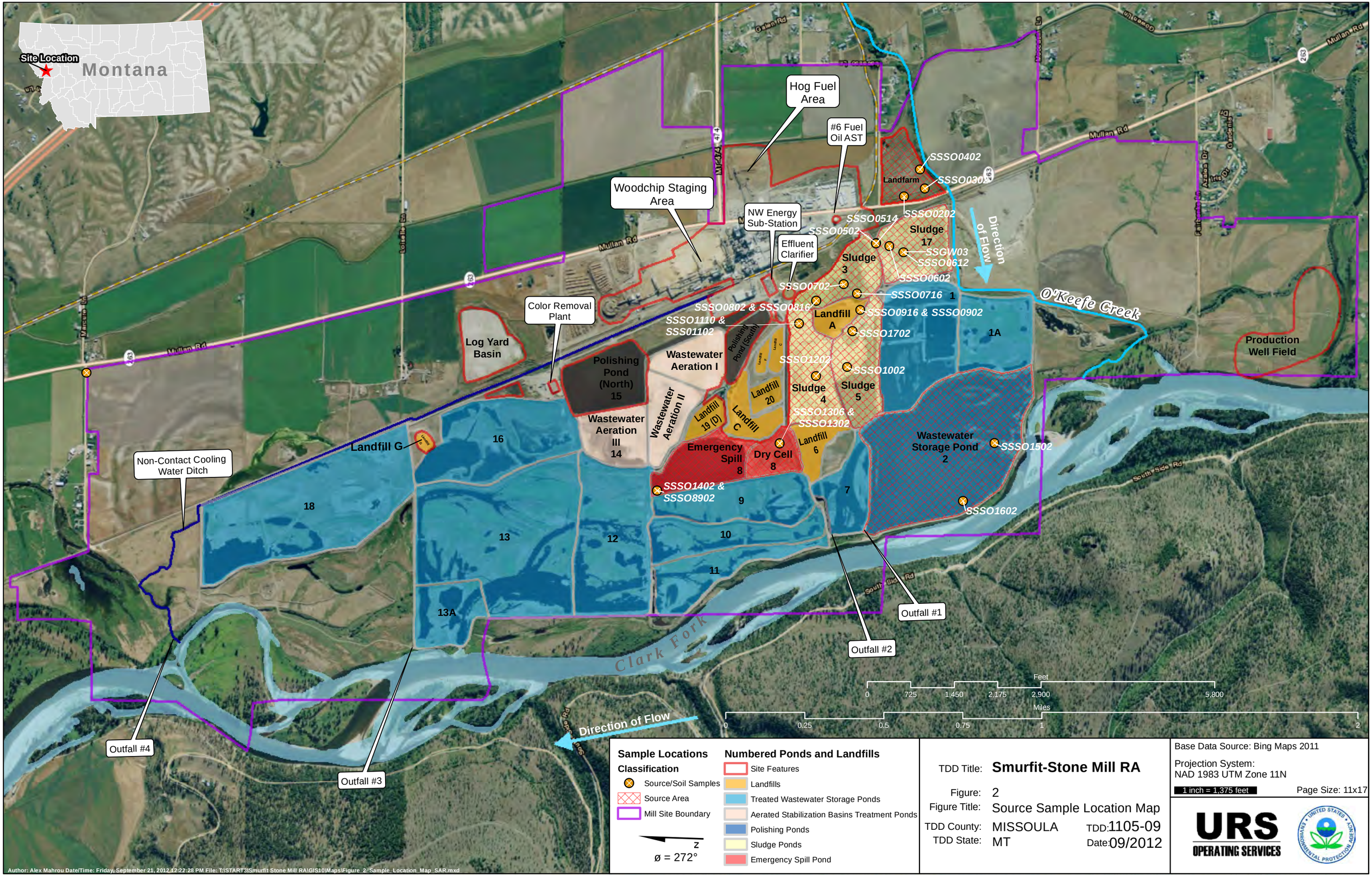
Base Data Source: Bing Maps 2011
Datum/Projection: NAD 1983 UTM Zone 11N
Page Size: 11x17

Miles
0 0.5 1 2

N

URS OPERATING SERVICES

Author: Alex Mahrou Date/Time: Friday, September 21, 2012 12:34:43 PM File: T:\START3\Smurfit Stone Mill RA\GIS10\Maps\Figure1_SiteLoc_AOI_DST.mxd


Site Location
Montana
Hog Fuel Area
#6 Fuel Oil AST
Woodchip Staging Area
NW Energy Sub-Station
Effluent Clarifier
Color Removal Plant
Log Yard Basin
Polishing Pond (North) 15
Wastewater Aeration I
Wastewater Aeration II
Wastewater Aeration III 14
Polishing Pond (South)
Landfill A
Landfill 20
Landfill 19 (D)
Landfill C
Landfill 6
Emergency Spill 8
Dry Cell 8
Sludge 3
Sludge 17
Sludge 4
Sludge 5
Landfarm
Wastewater Storage Pond 2
Landfill G
Production Well Field
O'Keefe Creek
Clark Fork
Direction of Flow
Non-Contact Cooling Water Ditch
Outfall #1
Outfall #2
Outfall #3
Outfall #4
SSSO0402
SSSO0302
SSSO0202
SSSO0514
SSSO0502
SSGW03
SSSO0612
SSSO0602
SSSO0702
SSSO0716
SSSO0802 & SSSO0816
SSSO0916 & SSSO0902
SSSO1110 & SSS01102
SSSO1702
SSSO1202
SSSO1002
SSSO1306 & SSSO1302
SSSO1502
SSSO1402 & SSSO8902
SSSO1602
Mullan Rd
South Side Rd
Feet
0 725 1,450 2,175 2,900 5,800
Miles
0 0.25 0.5 0.75 1 2
Sample Locations
Classification
Source/Soil Samples
Source Area
Mill Site Boundary
N
ø = 272°
Numbered Ponds and Landfills
Site Features
Landfills
Treated Wastewater Storage Ponds
Aerated Stabilization Basins Treatment Ponds
Polishing Ponds
Sludge Ponds
Emergency Spill Pond
TDD Title: Smurfit-Stone Mill RA
Figure: 2
Figure Title: Source Sample Location Map
TDD County: MISSOULA
TDD State: MT
TDD: 1105-09
Date: 09/2012
Base Data Source: Bing Maps 2011
Projection System: NAD 1983 UTM Zone 11N
1 inch = 1,375 feet
Page Size: 11x17
URS OPERATING SERVICES
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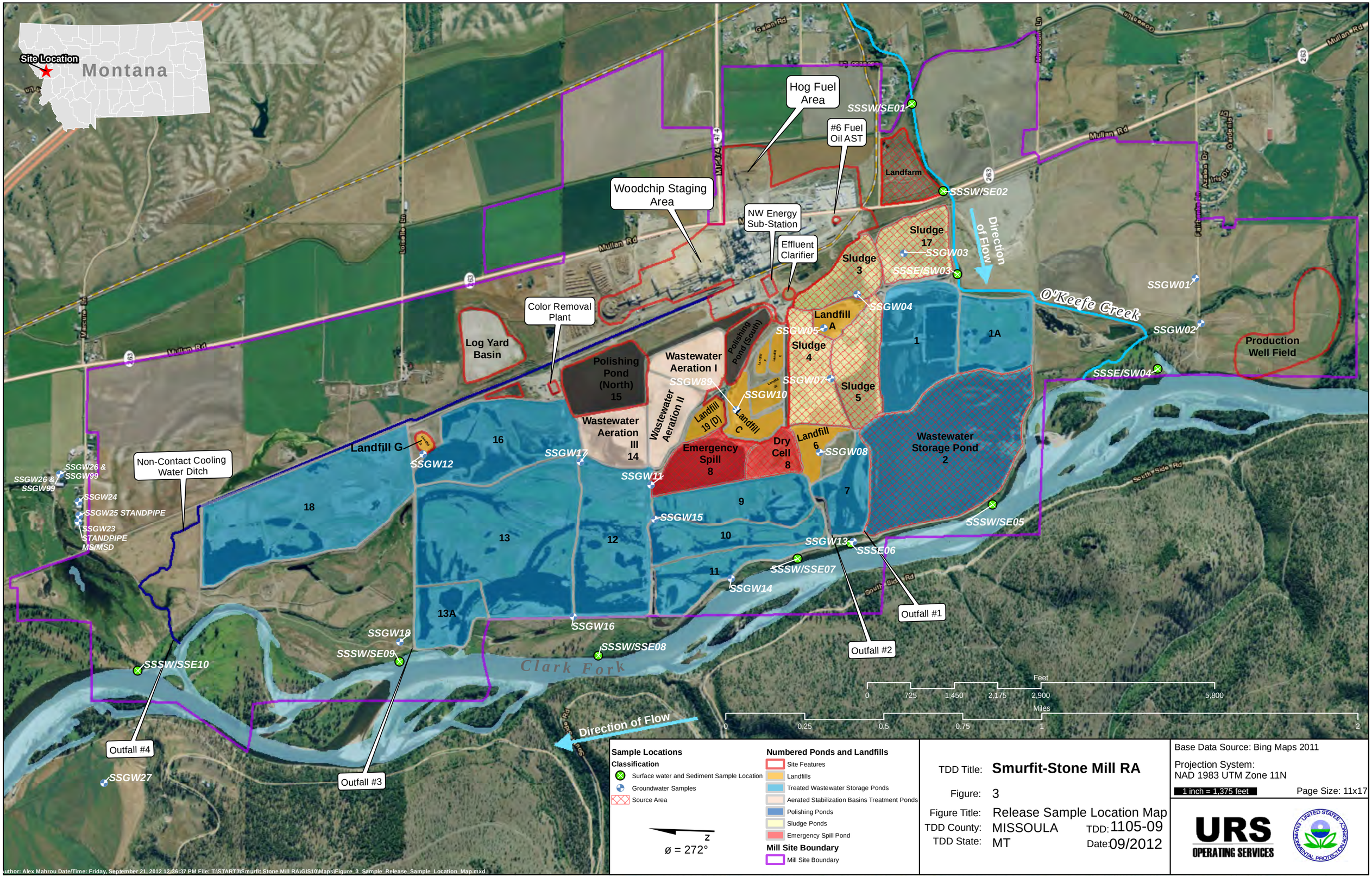
Site Location
Montana
Hog Fuel Area
#6 Fuel Oil AST
Woodchip Staging Area
NW Energy Sub-Station
Effluent Clarifier
Color Removal Plant
Log Yard Basin
Polishing Pond (North) 15
Wastewater Aeration I
Wastewater Aeration II
Wastewater Aeration III 14
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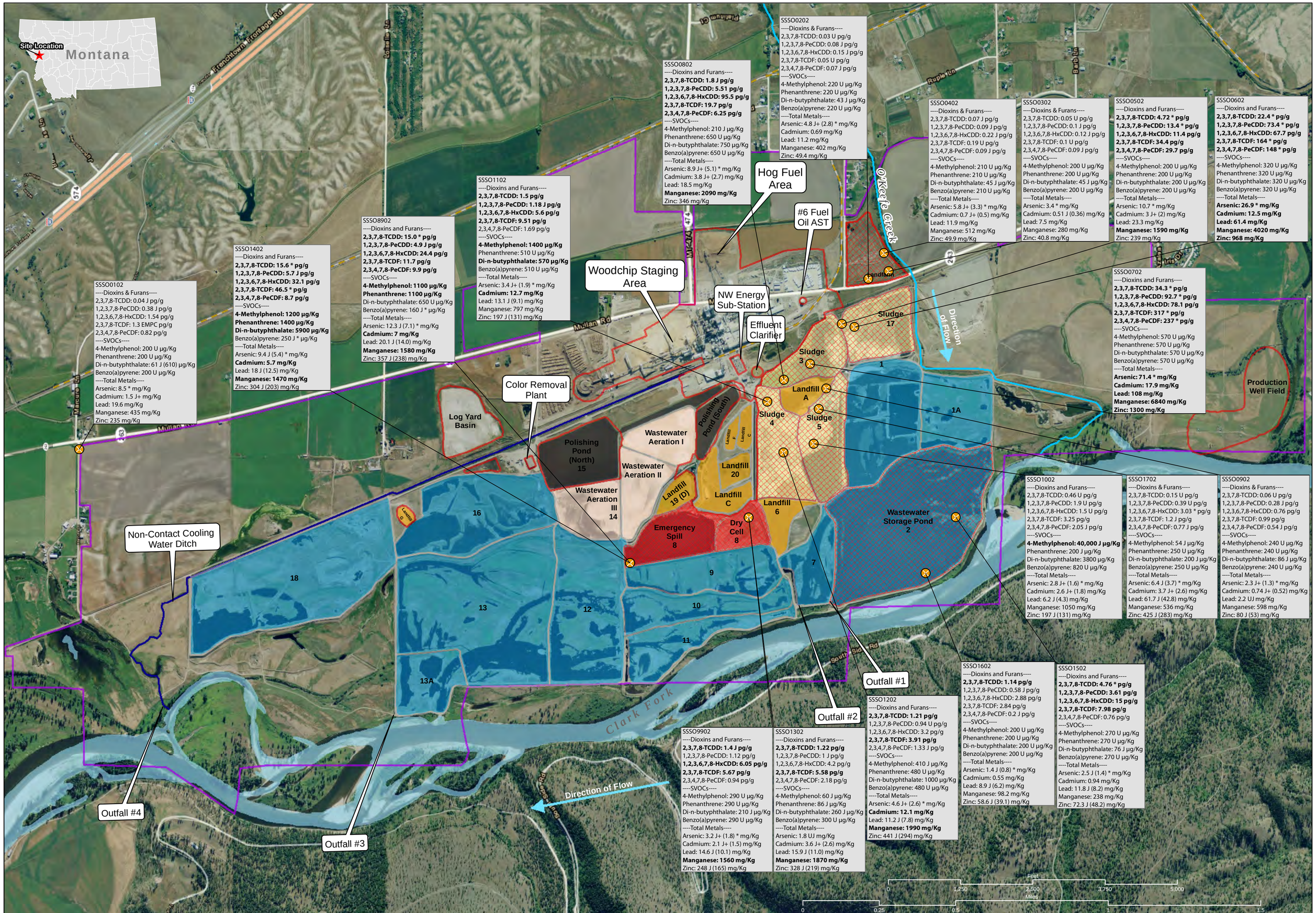
Landfill 19 (D)
Landfill C
Landfill A
Landfill G
Landfill 6
Emergency Spill 8
Dry Cell 8
Sludge 3
Sludge 4
Sludge 5
Sludge 17
Landfarm
Wastewater Storage Pond 2
Production Well Field
Non-Contact Cooling Water Ditch
O'Keefe Creek
Clark Fork
Direction of Flow
Outfall #1
Outfall #2
Outfall #3
Outfall #4
SSSW/SE01
SSSW/SE02
SSGW03
SSSE/SW03
SSGW04
SSGW05
SSGW07
SSGW08
SSGW10
SSGW11
SSGW12
SSGW13
SSGW14
SSGW15
SSGW16
SSGW17
SSGW18
SSGW23 STANDPIPE MS/MSD
SSGW24
SSGW25 STANDPIPE
SSGW26 & SSGW99
SSGW27
SSGW01
SSGW02
SSSE/SW04
SSSW/SE05
SSSE06
SSSW/SSE07
SSSW/SSE08
SSSW/SE09
SSSW/SSE10
Feet
0 725 1,450 2,175 2,900 5,800
Miles
0 0.25 0.5 0.75 1 2
Sample Locations
Classification
Surface water and Sediment Sample Location
Groundwater Samples
Source Area
N
ø = 272°
Numbered Ponds and Landfills
Site Features
Landfills
Treated Wastewater Storage Ponds
Aerated Stabilization Basins Treatment Ponds
Polishing Ponds
Sludge Ponds
Emergency Spill Pond
Mill Site Boundary
Mill Site Boundary
TDD Title: Smurfit-Stone Mill RA
Figure: 3
Figure Title: Release Sample Location Map
TDD County: MISSOULA
TDD: 1105-09
TDD State: MT
Date: 09/2012
Base Data Source: Bing Maps 2011
Projection System: NAD 1983 UTM Zone 11N
1 inch = 1,375 feet
Page Size: 11x17
URS OPERATING SERVICES
Author: Alex Mahrou Date/Time: Friday, September 21, 2012 12:36:37 PM File: T:\START3\Smurfit Stone Mill RA\GIS10\Maps\Figure_3_Sample_Release_Sample_Location_Map.mxd



SSSO0102
----Dioxins & Furans----
2,3,7,8-TCDD: 0.04 J pg/g
1,2,3,7,8-PeCDD: 0.38 J pg/g
1,2,3,6,7,8-HxCDD: 1.54 pg/g
2,3,7,8-TCDF: 1.3 EMPC pg/g
2,3,4,7,8-PeCDF: 0.82 pg/g
----SVOCs----
4-Methylphenol: 200 U µg/Kg
Phenanthrene: 200 U µg/Kg
Di-n-butyphthalate: 61 J (610) µg/Kg
Benzo(a)pyrene: 200 U µg/Kg
----Total Metals----
Arsenic: 8.5 * mg/Kg
Cadmium: 1.5 J+ mg/Kg
Lead: 19.6 mg/Kg
Manganese: 435 mg/Kg
Zinc: 235 mg/Kg

SSSO1402
----Dioxins and Furans----
2,3,7,8-TCDD: 15.6 * pg/g
1,2,3,7,8-PeCDD: 5.7 J pg/g
1,2,3,6,7,8-HxCDD: 32.1 pg/g
2,3,7,8-TCDF: 46.5 * pg/g
2,3,4,7,8-PeCDF: 8.7 pg/g
----SVOCs----
4-Methylphenol: 1200 µg/Kg
Phenanthrene: 1400 µg/Kg
Di-n-butyphthalate: 5900 µg/Kg
Benzo(a)pyrene: 250 J * µg/Kg
----Total Metals----
Arsenic: 9.4 J (5.4) * mg/Kg
Cadmium: 5.7 mg/Kg
Lead: 18 J (12.5) mg/Kg
Manganese: 1470 mg/Kg
Zinc: 304 J (203) mg/Kg

SSSO8902
----Dioxins and Furans----
2,3,7,8-TCDD: 15.0 * pg/g
1,2,3,7,8-PeCDD: 4.9 J pg/g
1,2,3,6,7,8-HxCDD: 24.4 pg/g
2,3,7,8-TCDF: 11.7 pg/g
2,3,4,7,8-PeCDF: 9.9 pg/g
----SVOCs----
4-Methylphenol: 1100 µg/Kg
Phenanthrene: 1100 µg/Kg
Di-n-butyphthalate: 650 U µg/Kg
Benzo(a)pyrene: 160 J * µg/Kg
----Total Metals----
Arsenic: 12.3 J (7.1) * mg/Kg
Cadmium: 7 mg/Kg
Lead: 20.1 J (14.0) mg/Kg
Manganese: 1580 mg/Kg
Zinc: 357 J (238) mg/Kg

SSSO1102
----Dioxins and Furans----
2,3,7,8-TCDD: 1.5 pg/g
1,2,3,7,8-PeCDD: 1.18 J pg/g
1,2,3,6,7,8-HxCDD: 5.6 pg/g
2,3,7,8-TCDF: 9.51 pg/g
2,3,4,7,8-PeCDF: 1.69 pg/g
----SVOCs----
4-Methylphenol: 1400 µg/Kg
Phenanthrene: 510 U µg/Kg
Di-n-butyphthalate: 570 µg/Kg
Benzo(a)pyrene: 510 U µg/Kg
----Total Metals----
Arsenic: 3.4 J+ (1.9) * mg/Kg
Cadmium: 12.7 mg/Kg
Lead: 13.1 J (9.1) mg/Kg
Manganese: 797 mg/Kg
Zinc: 197 J (131) mg/Kg

SSSO0802
----Dioxins and Furans----
2,3,7,8-TCDD: 1.8 J pg/g
1,2,3,7,8-PeCDD: 5.51 pg/g
1,2,3,6,7,8-HxCDD: 95.5 pg/g
2,3,7,8-TCDF: 19.7 pg/g
2,3,4,7,8-PeCDF: 6.25 pg/g
----SVOCs----
4-Methylphenol: 210 J µg/Kg
Phenanthrene: 650 U µg/Kg
Di-n-butyphthalate: 750 µg/Kg
Benzo(a)pyrene: 650 U µg/Kg
----Total Metals----
Arsenic: 8.9 J+ (5.1) * mg/Kg
Cadmium: 3.8 J+ (2.7) mg/Kg
Lead: 18.5 mg/Kg
Manganese: 2090 mg/Kg
Zinc: 346 mg/Kg

SSSO0202
----Dioxins & Furans----
2,3,7,8-TCDD: 0.03 U pg/g
1,2,3,7,8-PeCDD: 0.08 J pg/g
1,2,3,6,7,8-HxCDD: 0.15 J pg/g
2,3,7,8-TCDF: 0.05 U pg/g
2,3,4,7,8-PeCDF: 0.07 J pg/g
----SVOCs----
4-Methylphenol: 220 U µg/Kg
Phenanthrene: 220 U µg/Kg
Di-n-butyphthalate: 43 J µg/Kg
Benzo(a)pyrene: 220 U µg/Kg
----Total Metals----
Arsenic: 4.8 J+ (2.8) * mg/Kg
Cadmium: 0.69 mg/Kg
Lead: 11.2 mg/Kg
Manganese: 402 mg/Kg
Zinc: 49.4 mg/Kg

SSSO0402
----Dioxins & Furans----
2,3,7,8-TCDD: 0.07 J pg/g
1,2,3,7,8-PeCDD: 0.09 J pg/g
1,2,3,6,7,8-HxCDD: 0.22 J pg/g
2,3,7,8-TCDF: 0.19 U pg/g
2,3,4,7,8-PeCDF: 0.09 J pg/g
----SVOCs----
4-Methylphenol: 210 U µg/Kg
Phenanthrene: 210 U µg/Kg
Di-n-butyphthalate: 45 J µg/Kg
Benzo(a)pyrene: 210 U µg/Kg
----Total Metals----
Arsenic: 5.8 J+ (3.3) * mg/Kg
Cadmium: 0.7 J+ (0.5) mg/Kg
Lead: 11.9 mg/Kg
Manganese: 512 mg/Kg
Zinc: 49.9 mg/Kg

SSSO0302
----Dioxins & Furans----
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.1 J pg/g
1,2,3,6,7,8-HxCDD: 0.12 J pg/g
2,3,7,8-TCDF: 0.1 U pg/g
2,3,4,7,8-PeCDF: 0.09 J pg/g
----SVOCs----
4-Methylphenol: 200 U µg/Kg
Phenanthrene: 200 U µg/Kg
Di-n-butyphthalate: 45 J µg/Kg
Benzo(a)pyrene: 200 U µg/Kg
----Total Metals----
Arsenic: 3.4 * mg/Kg
Cadmium: 0.51 J (0.36) mg/Kg
Lead: 7.5 mg/Kg
Manganese: 280 mg/Kg
Zinc: 40.8 mg/Kg

SSSO0502
----Dioxins and Furans----
2,3,7,8-TCDD: 4.72 * pg/g
1,2,3,7,8-PeCDD: 13.4 * pg/g
1,2,3,6,7,8-HxCDD: 11.4 pg/g
2,3,7,8-TCDF: 34.4 pg/g
2,3,4,7,8-PeCDF: 29.7 pg/g
----SVOCs----
4-Methylphenol: 200 U µg/Kg
Phenanthrene: 200 U µg/Kg
Di-n-butyphthalate: 200 U µg/Kg
Benzo(a)pyrene: 200 U µg/Kg
----Total Metals----
Arsenic: 10.7 * mg/Kg
Cadmium: 3 J+ (2) mg/Kg
Lead: 23.3 mg/Kg
Manganese: 1590 mg/Kg
Zinc: 239 mg/Kg

SSSO0602
----Dioxins and Furans----
2,3,7,8-TCDD: 22.4 * pg/g
1,2,3,7,8-PeCDD: 73.4 * pg/g
1,2,3,6,7,8-HxCDD: 67.7 pg/g
2,3,7,8-TCDF: 164 * pg/g
2,3,4,7,8-PeCDF: 148 * pg/g
----SVOCs----
4-Methylphenol: 320 U µg/Kg
Phenanthrene: 320 U µg/Kg
Di-n-butyphthalate: 320 U µg/Kg
Benzo(a)pyrene: 320 U µg/Kg
----Total Metals----
Arsenic: 26.9 * mg/Kg
Cadmium: 12.5 mg/Kg
Lead: 61.4 mg/Kg
Manganese: 4020 mg/Kg
Zinc: 968 mg/Kg

SSSO0702
----Dioxins and Furans----
2,3,7,8-TCDD: 34.3 * pg/g
1,2,3,7,8-PeCDD: 92.7 * pg/g
1,2,3,6,7,8-HxCDD: 78.1 pg/g
2,3,7,8-TCDF: 317 * pg/g
2,3,4,7,8-PeCDF: 237 * pg/g
----SVOCs----
4-Methylphenol: 570 U µg/Kg
Phenanthrene: 570 U µg/Kg
Di-n-butyphthalate: 570 U µg/Kg
Benzo(a)pyrene: 570 U µg/Kg
----Total Metals----
Arsenic: 71.4 * mg/Kg
Cadmium: 17.9 mg/Kg
Lead: 108 mg/Kg
Manganese: 6840 mg/Kg
Zinc: 1300 mg/Kg

SSSO1002
----Dioxins and Furans----
2,3,7,8-TCDD: 0.46 U pg/g
1,2,3,7,8-PeCDD: 1.9 U pg/g
1,2,3,6,7,8-HxCDD: 1.5 U pg/g
2,3,7,8-TCDF: 3.25 pg/g
2,3,4,7,8-PeCDF: 2.05 J pg/g
----SVOCs----
4-Methylphenol: 40,000 J µg/Kg
Phenanthrene: 200 J µg/Kg
Di-n-butyphthalate: 3800 µg/Kg
Benzo(a)pyrene: 820 U µg/Kg
----Total Metals----
Arsenic: 2.8 J+ (1.6) * mg/Kg
Cadmium: 2.6 J+ (1.8) mg/Kg
Lead: 6.2 J (4.3) mg/Kg
Manganese: 1050 mg/Kg
Zinc: 197 J (131) mg/Kg

SSSO1702
----Dioxins & Furans----
2,3,7,8-TCDD: 0.15 U pg/g
1,2,3,7,8-PeCDD: 0.39 U pg/g
1,2,3,6,7,8-HxCDD: 3.03 * pg/g
2,3,7,8-TCDF: 1.2 J pg/g
2,3,4,7,8-PeCDF: 0.77 J pg/g
----SVOCs----
4-Methylphenol: 54 J µg/Kg
Phenanthrene: 250 U µg/Kg
Di-n-butyphthalate: 200 J µg/Kg
Benzo(a)pyrene: 250 U µg/Kg
----Total Metals----
Arsenic: 6.4 J (3.7) * mg/Kg
Cadmium: 3.7 J+ (2.6) mg/Kg
Lead: 61.7 J (42.8) mg/Kg
Manganese: 536 mg/Kg
Zinc: 425 J (283) mg/Kg

SSSO0902
----Dioxins & Furans----
2,3,7,8-TCDD: 0.06 U pg/g
1,2,3,7,8-PeCDD: 0.28 J pg/g
1,2,3,6,7,8-HxCDD: 0.76 pg/g
2,3,7,8-TCDF: 0.99 pg/g
2,3,4,7,8-PeCDF: 0.54 J pg/g
----SVOCs----
4-Methylphenol: 240 U µg/Kg
Phenanthrene: 240 U µg/Kg
Di-n-butyphthalate: 86 J µg/Kg
Benzo(a)pyrene: 240 U µg/Kg
----Total Metals----
Arsenic: 2.3 J+ (1.3) * mg/Kg
Cadmium: 0.74 J+ (0.52) mg/Kg
Lead: 2.2 UJ mg/Kg
Manganese: 598 mg/Kg
Zinc: 80 J (53) mg/Kg

SSSO1602
----Dioxins and Furans----
2,3,7,8-TCDD: 1.14 pg/g
1,2,3,7,8-PeCDD: 0.58 J pg/g
1,2,3,6,7,8-HxCDD: 2.88 pg/g
2,3,7,8-TCDF: 2.84 pg/g
2,3,4,7,8-PeCDF: 0.2 J pg/g
----SVOCs----
4-Methylphenol: 200 U µg/Kg
Phenanthrene: 200 U µg/Kg
Di-n-butyphthalate: 200 U µg/Kg
Benzo(a)pyrene: 200 U µg/Kg
----Total Metals----
Arsenic: 1.4 J (0.8) * mg/Kg
Cadmium: 0.55 mg/Kg
Lead: 8.9 J (6.2) mg/Kg
Manganese: 98.2 mg/Kg
Zinc: 58.6 J (39.1) mg/Kg

SSSO1502
----Dioxins and Furans----
2,3,7,8-TCDD: 4.76 * pg/g
1,2,3,7,8-PeCDD: 3.61 pg/g
1,2,3,6,7,8-HxCDD: 15 pg/g
2,3,7,8-TCDF: 7.98 pg/g
2,3,4,7,8-PeCDF: 0.76 pg/g
----SVOCs----
4-Methylphenol: 270 U µg/Kg
Phenanthrene: 270 U µg/Kg
Di-n-butyphthalate: 76 J µg/Kg
Benzo(a)pyrene: 270 U µg/Kg
----Total Metals----
Arsenic: 2.5 J (1.4) * mg/Kg
Cadmium: 0.94 mg/Kg
Lead: 11.8 J (8.2) mg/Kg
Manganese: 238 mg/Kg
Zinc: 72.3 J (48.2) mg/Kg

SSSO1202
----Dioxins and Furans----
2,3,7,8-TCDD: 1.21 pg/g
1,2,3,7,8-PeCDD: 0.94 U pg/g
1,2,3,6,7,8-HxCDD: 3.2 pg/g
2,3,7,8-TCDF: 3.91 pg/g
2,3,4,7,8-PeCDF: 1.33 J pg/g
----SVOCs----
4-Methylphenol: 410 J µg/Kg
Phenanthrene: 480 U µg/Kg
Di-n-butyphthalate: 1000 µg/Kg
Benzo(a)pyrene: 480 U µg/Kg
----Total Metals----
Arsenic: 4.6 J+ (2.6) * mg/Kg
Cadmium: 12.1 mg/Kg
Lead: 11.2 J (7.8) mg/Kg
Manganese: 1990 mg/Kg
Zinc: 441 J (294) mg/Kg

SSSO9902
----Dioxins and Furans----
2,3,7,8-TCDD: 1.4 J pg/g
1,2,3,7,8-PeCDD: 1.12 pg/g
1,2,3,6,7,8-HxCDD: 6.05 pg/g
2,3,7,8-TCDF: 5.67 pg/g
2,3,4,7,8-PeCDF: 0.94 pg/g
----SVOCs----
4-Methylphenol: 290 U µg/Kg
Phenanthrene: 290 U µg/Kg
Di-n-butyphthalate: 210 J µg/Kg
Benzo(a)pyrene: 290 U µg/Kg
----Total Metals----
Arsenic: 3.2 J+ (1.8) * mg/Kg
Cadmium: 2.1 J+ (1.5) mg/Kg
Lead: 14.6 J (10.1) mg/Kg
Manganese: 1560 mg/Kg
Zinc: 248 J (165) mg/Kg

SSSO1302
----Dioxins and Furans----
2,3,7,8-TCDD: 1.22 pg/g
1,2,3,7,8-PeCDD: 1 J pg/g
1,2,3,6,7,8-HxCDD: 4.2 pg/g
2,3,7,8-TCDF: 5.58 pg/g
2,3,4,7,8-PeCDF: 2.18 pg/g
----SVOCs----
4-Methylphenol: 60 J µg/Kg
Phenanthrene: 86 J µg/Kg
Di-n-butyphthalate: 260 J µg/Kg
Benzo(a)pyrene: 300 U µg/Kg
----Total Metals----
Arsenic: 1.8 UJ mg/Kg
Cadmium: 3.6 J+ (2.6) mg/Kg
Lead: 15.9 J (11.0) mg/Kg
Manganese: 1870 mg/Kg
Zinc: 328 J (219) mg/Kg

BOLD	Analytical Result > 3 x background value = observed contamination
*	Concentration > benchmark

Sample Locations
Classification
- Source/Soil Samples
- Source Area
- Mill Site Boundary

z
ø = 272°

Numbered Ponds and Landfills
- Site Features
- Landfills
- Treated Wastewater Storage Ponds
- Aerated Stabilization Basins Treatment Ponds
- Polishing Ponds
- Sludge Ponds
- Emergency Spill Pond

TDD Title: **Smurfit-Stone Mill RA**
Figure: 4
Figure Title: Selected Analytical Results for Sources & Surface Soils
TDD County: MISSOULA
TDD State: MT
TDD: 1105-09
Date: 09/2012

Base Data Source: Bing Maps 2011
Projection System:
NAD 1983 UTM Zone 11N
1 inch = 1,060 feet
Page Size: ANSI C

URS OPERATING SERVICES

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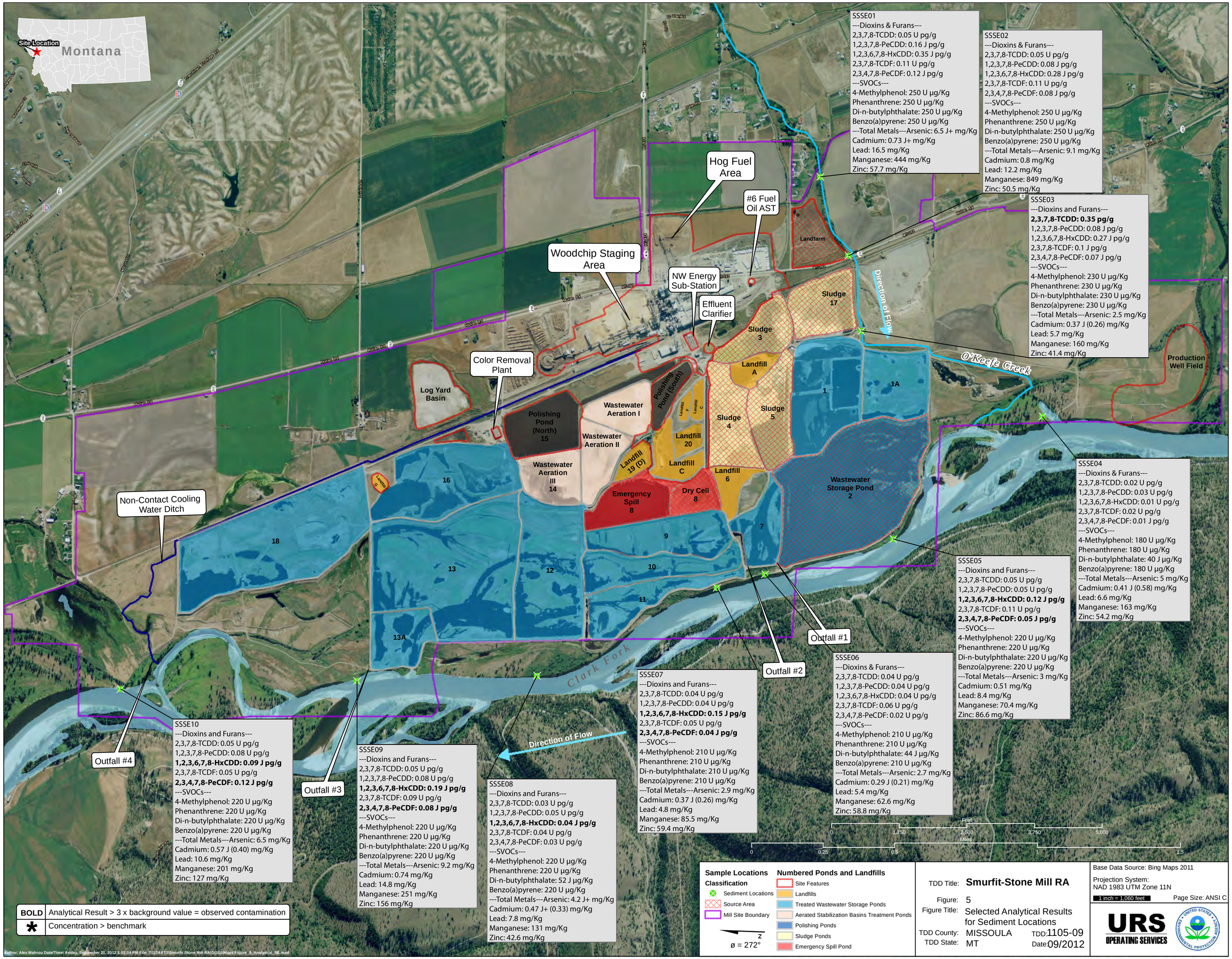
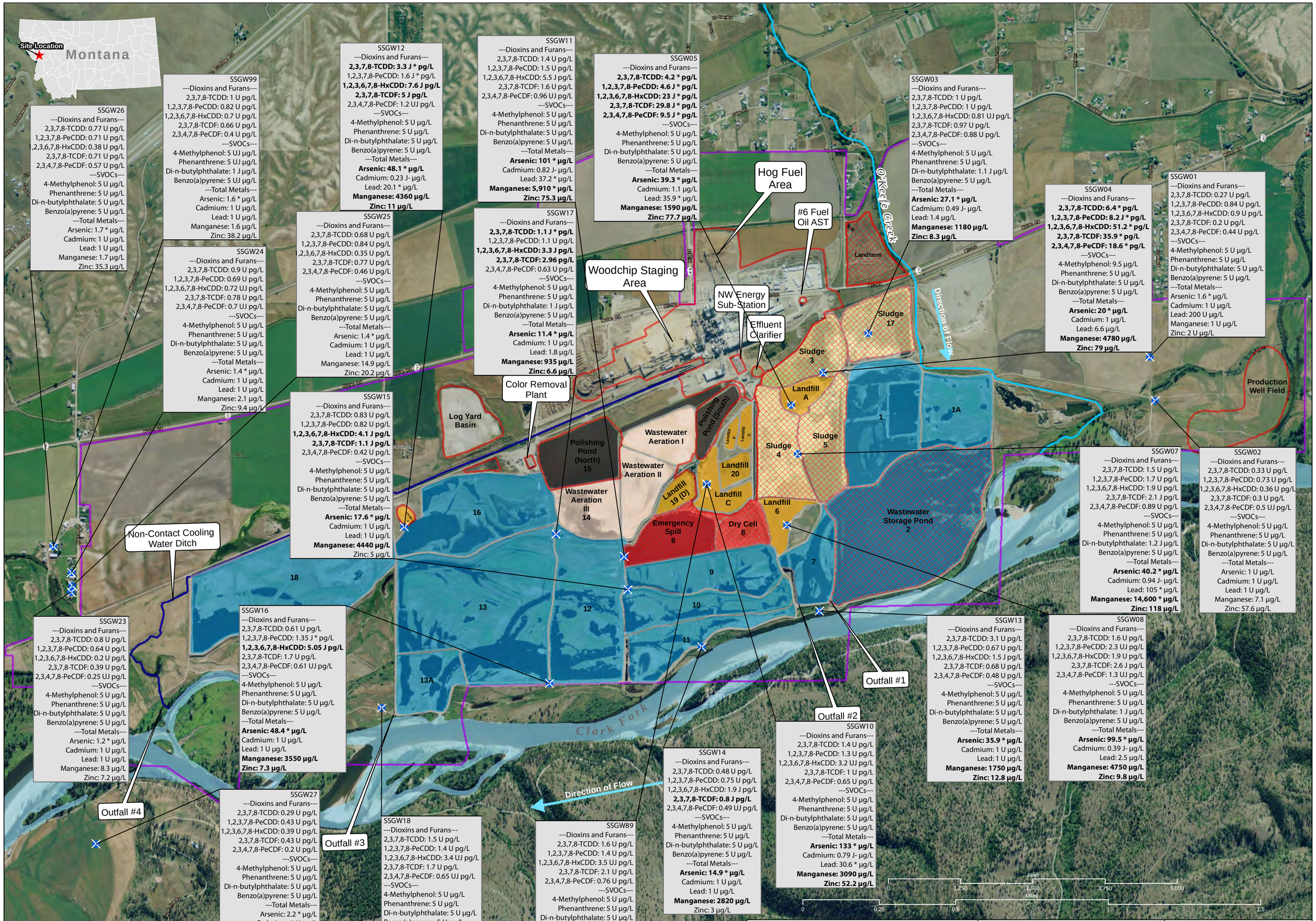

Site Location
Montana
Hog Fuel Area
#6 Fuel Oil AST
Woodchip Staging Area
NW Energy Sub-Station
Effluent Clarifier
Color Removal Plant
Non-Contact Cooling Water Ditch
Landfarm
Sludge 17
Sludge 3
Landfill A
Sludge 4
Sludge 5
Direction of Flow
O'Keefe Creek
Production Well Field
Log Yard Basin
Polishing Pond (North) 15
Wastewater Aeration I
Wastewater Aeration II
Wastewater Aeration III 14
Polishing Pond (South)
Landfill F
Landfill C
Landfill 20
Landfill 19 (D)
Landfill C
Landfill 6
Emergency Spill 8
Dry Cell 8
Wastewater Storage Pond 2
1
1A
16
18
13
12
10
9
7
11
13A
Clark Fork
Outfall #1
Outfall #2
Outfall #3
Outfall #4
Direction of Flow
SSSE01
---Dioxins & Furans---
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.16 J pg/g
1,2,3,6,7,8-HxCDD: 0.35 J pg/g
2,3,7,8-TCDF: 0.11 U pg/g
2,3,4,7,8-PeCDF: 0.12 J pg/g
---SVOCs---
4-Methylphenol: 250 U µg/Kg
Phenanthrene: 250 U µg/Kg
Di-n-butylphthalate: 250 U µg/Kg
Benzo(a)pyrene: 250 U µg/Kg
---Total Metals---Arsenic: 6.5 J+ mg/Kg
Cadmium: 0.73 J+ mg/Kg
Lead: 16.5 mg/Kg
Manganese: 444 mg/Kg
Zinc: 57.7 mg/Kg
SSSE02
---Dioxins & Furans---
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.08 J pg/g
1,2,3,6,7,8-HxCDD: 0.28 J pg/g
2,3,7,8-TCDF: 0.11 U pg/g
2,3,4,7,8-PeCDF: 0.08 J pg/g
---SVOCs---
4-Methylphenol: 250 U µg/Kg
Phenanthrene: 250 U µg/Kg
Di-n-butylphthalate: 250 U µg/Kg
Benzo(a)pyrene: 250 U µg/Kg
---Total Metals---Arsenic: 9.1 mg/Kg
Cadmium: 0.8 mg/Kg
Lead: 12.2 mg/Kg
Manganese: 849 mg/Kg
Zinc: 50.5 mg/Kg
SSSE03
---Dioxins and Furans---
2,3,7,8-TCDD: 0.35 pg/g
1,2,3,7,8-PeCDD: 0.08 J pg/g
1,2,3,6,7,8-HxCDD: 0.27 J pg/g
2,3,7,8-TCDF: 0.1 J pg/g
2,3,4,7,8-PeCDF: 0.07 J pg/g
---SVOCs---
4-Methylphenol: 230 U µg/Kg
Phenanthrene: 230 U µg/Kg
Di-n-butylphthalate: 230 U µg/Kg
Benzo(a)pyrene: 230 U µg/Kg
---Total Metals---Arsenic: 2.5 mg/Kg
Cadmium: 0.37 J (0.26) mg/Kg
Lead: 5.7 mg/Kg
Manganese: 160 mg/Kg
Zinc: 41.4 mg/Kg
SSSE04
---Dioxins & Furans---
2,3,7,8-TCDD: 0.02 U pg/g
1,2,3,7,8-PeCDD: 0.03 U pg/g
1,2,3,6,7,8-HxCDD: 0.01 U pg/g
2,3,7,8-TCDF: 0.02 U pg/g
2,3,4,7,8-PeCDF: 0.01 J pg/g
---SVOCs---
4-Methylphenol: 180 U µg/Kg
Phenanthrene: 180 U µg/Kg
Di-n-butylphthalate: 40 J µg/Kg
Benzo(a)pyrene: 180 U µg/Kg
---Total Metals---Arsenic: 5 mg/Kg
Cadmium: 0.41 J (0.58) mg/Kg
Lead: 6.6 mg/Kg
Manganese: 163 mg/Kg
Zinc: 54.2 mg/Kg
SSSE05
---Dioxins and Furans---
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.05 U pg/g
1,2,3,6,7,8-HxCDD: 0.12 J pg/g
2,3,7,8-TCDF: 0.11 U pg/g
2,3,4,7,8-PeCDF: 0.05 J pg/g
---SVOCs---
4-Methylphenol: 220 U µg/Kg
Phenanthrene: 220 U µg/Kg
Di-n-butylphthalate: 220 U µg/Kg
Benzo(a)pyrene: 220 U µg/Kg
---Total Metals---Arsenic: 3 mg/Kg
Cadmium: 0.51 mg/Kg
Lead: 8.4 mg/Kg
Manganese: 70.4 mg/Kg
Zinc: 86.6 mg/Kg
SSSE06
---Dioxins & Furans---
2,3,7,8-TCDD: 0.04 U pg/g
1,2,3,7,8-PeCDD: 0.04 U pg/g
1,2,3,6,7,8-HxCDD: 0.04 U pg/g
2,3,7,8-TCDF: 0.06 U pg/g
2,3,4,7,8-PeCDF: 0.02 U pg/g
---SVOCs---
4-Methylphenol: 210 U µg/Kg
Phenanthrene: 210 U µg/Kg
Di-n-butylphthalate: 44 J µg/Kg
Benzo(a)pyrene: 210 U µg/Kg
---Total Metals---Arsenic: 2.7 mg/Kg
Cadmium: 0.29 J (0.21) mg/Kg
Lead: 5.4 mg/Kg
Manganese: 62.6 mg/Kg
Zinc: 58.8 mg/Kg
SSSE07
---Dioxins and Furans---
2,3,7,8-TCDD: 0.04 U pg/g
1,2,3,7,8-PeCDD: 0.04 U pg/g
1,2,3,6,7,8-HxCDD: 0.15 J pg/g
2,3,7,8-TCDF: 0.05 U pg/g
2,3,4,7,8-PeCDF: 0.04 J pg/g
---SVOCs---
4-Methylphenol: 210 U µg/Kg
Phenanthrene: 210 U µg/Kg
Di-n-butylphthalate: 210 U µg/Kg
Benzo(a)pyrene: 210 U µg/Kg
---Total Metals---Arsenic: 2.9 mg/Kg
Cadmium: 0.37 J (0.26) mg/Kg
Lead: 4.8 mg/Kg
Manganese: 85.5 mg/Kg
Zinc: 59.4 mg/Kg
SSSE08
---Dioxins and Furans---
2,3,7,8-TCDD: 0.03 U pg/g
1,2,3,7,8-PeCDD: 0.05 U pg/g
1,2,3,6,7,8-HxCDD: 0.04 J pg/g
2,3,7,8-TCDF: 0.04 U pg/g
2,3,4,7,8-PeCDF: 0.03 U pg/g
---SVOCs---
4-Methylphenol: 220 U µg/Kg
Phenanthrene: 220 U µg/Kg
Di-n-butylphthalate: 52 J µg/Kg
Benzo(a)pyrene: 220 U µg/Kg
---Total Metals---Arsenic: 4.2 J+ mg/Kg
Cadmium: 0.47 J+ (0.33) mg/Kg
Lead: 7.8 mg/Kg
Manganese: 131 mg/Kg
Zinc: 42.6 mg/Kg
SSSE09
---Dioxins and Furans---
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.08 U pg/g
1,2,3,6,7,8-HxCDD: 0.19 J pg/g
2,3,7,8-TCDF: 0.09 U pg/g
2,3,4,7,8-PeCDF: 0.08 J pg/g
---SVOCs---
4-Methylphenol: 220 U µg/Kg
Phenanthrene: 220 U µg/Kg
Di-n-butylphthalate: 220 U µg/Kg
Benzo(a)pyrene: 220 U µg/Kg
---Total Metals---Arsenic: 9.2 mg/Kg
Cadmium: 0.74 mg/Kg
Lead: 14.8 mg/Kg
Manganese: 251 mg/Kg
Zinc: 156 mg/Kg
SSSE10
---Dioxins and Furans---
2,3,7,8-TCDD: 0.05 U pg/g
1,2,3,7,8-PeCDD: 0.08 U pg/g
1,2,3,6,7,8-HxCDD: 0.09 J pg/g
2,3,7,8-TCDF: 0.05 U pg/g
2,3,4,7,8-PeCDF: 0.12 J pg/g
---SVOCs---
4-Methylphenol: 220 U µg/Kg
Phenanthrene: 220 U µg/Kg
Di-n-butylphthalate: 220 U µg/Kg
Benzo(a)pyrene: 220 U µg/Kg
---Total Metals---Arsenic: 6.5 mg/Kg
Cadmium: 0.57 J (0.40) mg/Kg
Lead: 10.6 mg/Kg
Manganese: 201 mg/Kg
Zinc: 127 mg/Kg
Feet
0
1,250
2,500
3,750
5,000
Miles
0
0.25
0.5
1
1.5
BOLD Analytical Result > 3 x background value = observed contamination
* Concentration > benchmark
Sample Locations
Classification
Sediment Locations
Source Area
Mill Site Boundary
ø = 272°
Numbered Ponds and Landfills
Site Features
Landfills
Treated Wastewater Storage Ponds
Aerated Stabilization Basins Treatment Ponds
Polishing Ponds
Sludge Ponds
Emergency Spill Pond
TDD Title: Smurfit-Stone Mill RA
Figure: 5
Figure Title: Selected Analytical Results for Sediment Locations
TDD County: MISSOULA
TDD State: MT
TDD: 1105-09
Date: 09/2012
Base Data Source: Bing Maps 2011
Projection System: NAD 1983 UTM Zone 11N
1 inch = 1,060 feet
Page Size: ANSI C
URS OPERATING SERVICES
Author: Alex Mahrou Date/Time: Friday, September 21, 2012 1:01:34 PM File: T:\START3\Smurfit Stone Mill RA\GIS10\Maps\Figure_5_Analytical_SE.mxd



BOLD	Analytical Result > 3 x background value = observed contamination
*	Concentration > benchmark

Sample Locations

Classification

- Groundwater Samples
- Source Area
- Mill Site Boundary

z
ø = 272°

Numbered Ponds and Landfills

- Site Features
- Landfills
- Treated Wastewater Storage Ponds
- Aerated Stabilization Basins Treatment Ponds
- Polishing Ponds
- Sludge Ponds
- Emergency Spill Pond

TDD Title: **Smurfit-Stone Mill RA**

Figure: 6

Figure Title: Selected Analytical Results for Groundwater Locations

TDD County: MISSOULA

TDD State: MT

TDD: 1105-09

Date: 09/2012

Base Data Source: Bing Maps 2011

Projection System: NAD 1983 UTM Zone 11N

1 inch = 1,060 feet

Page Size: ANSI C

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TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Soil/Source	SSSO0102	Surface soil grab sample from mill property to the north (upwind) of potential source areas.	Determine background surface soil conditions on site.
	SSSO0202	Surface soil/source grab sample from landfarm area (most contaminated location).	Characterize on-site sources and contamination.
	SSSO0302	Surface soil/source grab sample from landfarm area.	Characterize on-site sources and contamination.
	SSSO0402	Surface soil/source grab sample from landfarm area.	Characterize on-site sources and contamination.
	SSSO0502	Surface soil/source grab sample from sludge pond 17.	Characterize on-site sources and contamination.
	SSSO0514	Subsurface soil/source grab sample from sludge pond 17.	Characterize on-site sources and contamination.
	SSSO0602	Surface soil/source grab sample from sludge pond 17.	Characterize on-site sources and contamination.
	SSSO0612	Subsurface soil/source grab sample from sludge pond 17.	Characterize on-site sources and contamination.
	SSSO0702	Surface soil/source grab sample from sludge pond 3.	Characterize on-site sources and contamination.
	SSSO0716	Subsurface soil/source grab sample from sludge pond 3.	Characterize potential on-site sources and contamination.
	SSSO0802	Surface soil/source grab sample from sludge pond 3.	Characterize potential on-site sources and contamination.
	SSSO0816	Subsurface soil/source grab sample from sludge pond 3.	Characterize potential on-site sources and contamination.
	SSSO0902	Surface soil/source grab sample from sludge pond 5.	Characterize potential on-site sources and contamination.
	SSSO0916	Subsurface soil/source grab sample from sludge pond 5.	Characterize potential on-site sources and contamination.
	SSSO1002	Surface soil/source grab sample from sludge pond 5.	Characterize potential on-site sources and contamination.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Soil/Source (cont.)	SSSO10xx	Subsurface soil/source grab sample from sludge pond 5. **[not collected due to lack of safe access]**	Characterize potential on-site sources and contamination.
	SSSO1102	Surface soil/source grab sample from sludge pond 4.	Characterize potential on-site sources and contamination.
	SSSO1110	Subsurface soil/source grab sample from sludge pond 4.	Characterize potential on-site sources and contamination.
	SSSO1202	Surface soil/source grab sample from sludge pond 4.	Characterize potential on-site sources and contamination.
	SSSO12xx	Subsurface soil/source grab sample from sludge pond 4. **[not collected due to lack of safe access]**	Characterize potential on-site sources and contamination.
	SSSO1302	Surface soil/source grab sample from emergency spill pond (8) dry cell.	Characterize potential on-site sources and contamination.
	SSSO1306	Subsurface soil/source grab sample from emergency spill pond (8) dry cell.	Characterize potential on-site sources and contamination.
	SSSO1402	Surface soil/source grab sample from emergency spill pond (8) wet cell.	Characterize potential on-site sources and contamination.
	SSSO14xx	Subsurface soil/source grab sample from emergency spill pond (8) wet cell. **[not collected due to lack of safe access]**	Characterize potential on-site sources and contamination.
	SSSO1502	Surface soil/source grab sample from pond 2.	Characterize potential on-site sources and contamination.
	SSSO1602	Surface soil/source grab sample from pond 2.	Characterize potential on-site sources and contamination.
	SSSO1702	Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A.	Characterize potential on-site sources and contamination.
Surface Water and Sediment	SSSW/SE01	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area.	Document background conditions along O'Keefe Creek.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Surface Water and Sediment (Cont)	SSSW/SE02	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area.	Document potential site impacts to the surface water pathway along O'Keefe Creek downstream of the landfarm area.
	SSSW/SE03	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17.	Document potential site impacts to the surface water pathway along O'Keefe Creek downstream of sludge pond 17.
	SSSW/SE04	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill.	Document background conditions along the Clark Fork River.
	SSSW/SE05	Grab sample collected from the Clark Fork River adjacent to pond 2.	Document potential site impacts to the surface water pathway along the Clark Fork River.
	SSSW/SE06	Grab sample collected from the Clark Fork River immediately downstream of outfall 1.	Document potential site impacts to the surface water pathway along the Clark Fork River downstream of outfall 1.
	SSSW/SE07	Grab sample collected from the Clark Fork River immediately downstream of outfall 2.	Document potential site impacts to the surface water pathway along the Clark Fork River downstream of outfall 2.
	SSSW/SE08	Grab sample collected from Clark Fork River adjacent to pond 13.	Document potential site impacts to the surface water pathway along the Clark Fork River.
	SSSW/SE09	Grab sample collected from the Clark Fork River immediately downstream of outfall 3.	Document potential site impacts to the surface water pathway along the Clark Fork River downstream of outfall 3.
	SSSW/SE10	Grab sample collected from the Clark Fork River immediately downstream of outfall 4.	Document potential site impacts to the surface water pathway along the Clark Fork River downstream of outfall 4.
Groundwater	SSGW01	Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20).	Determine background conditions of groundwater in shallow aquifer.
	SSGW02	Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11).	Determine background conditions of groundwater in deeper aquifer.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Groundwater (cont.)	SSGW03	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17.	Document potential site impacts on shallow groundwater aquifer.
	SSGW04	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3.	Document potential site impacts on shallow groundwater aquifer.
	SSGW05	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A.	Document potential site impacts on shallow groundwater aquifer.
	SSGW06	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 4. **[not collected due to lack of safe access]**	Document potential site impacts on shallow groundwater aquifer.
	SSGW07	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5.	Document potential site impacts on shallow groundwater aquifer.
	SSGW08	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6.	Document potential site impacts on shallow groundwater aquifer.
	SSGW09	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of emergency spill pond 8. **[not collected due to lack of safe access]**	Document potential site impacts on shallow groundwater aquifer.
	SSGW10	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of pond 20 (landfill E).	Document potential site impacts on shallow groundwater aquifer.
	SSGW11	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins.	Document potential site impacts on shallow groundwater aquifer.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Groundwater (cont.)	SSGW12	Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G.	Document potential site impacts on shallow groundwater aquifer.
	SSGW13	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River).	Document potential site impacts on shallow groundwater aquifer.
	SSGW14	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River).	Document potential site impacts on shallow groundwater aquifer.
	SSGW15	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources).	Document potential site impacts on shallow groundwater aquifer.
	SSGW16	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River).	Document potential site impacts on shallow groundwater aquifer.
	SSGW17	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources).	Document potential site impacts on shallow groundwater aquifer.
	SSGW18	Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River).	Document potential site impacts on shallow groundwater aquifer.
	SSGW19	Deeper aquifer groundwater grab sample collected from existing domestic well located within landfarm area. **[well did not exist at presumed location]**	Document potential site impacts on deeper groundwater aquifer.
	SSGW20	Deeper aquifer groundwater grab sample collected from existing domestic well located adjacent to pond 18. **[owner was not home to enable access]**	Document potential site impacts on deeper groundwater aquifer.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
Groundwater (cont.)	SSGW21	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill. **[well did not exist at presumed location]**	Document potential site impacts on deeper groundwater aquifer.
	SSGW22	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill. **[well did not exist at presumed location]**	Document potential site impacts on deeper groundwater aquifer.
	SSGW23	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane).	Document potential site impacts on deeper groundwater aquifer.
	SSGW24	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane).	Document potential site impacts on deeper groundwater aquifer.
	SSGW25	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane).	Document potential site impacts on deeper groundwater aquifer.
	SSGW26	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane).	Document potential site impacts on deeper groundwater aquifer.
	SSGW27	Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well).	Document potential site impacts on deeper groundwater aquifer.
QA/QC (water)	SSGW89	Duplicate of sample SSGW10. (M S/MSD was also collected here. 3 x volume for water)	Document the precision of sample collection procedures and laboratory analysis.
	SSGW99	Duplicate of sample SSGW26.	Document the precision of sample collection procedures and laboratory analysis.

TABLE 8
Sample Locations and Rationale
(changes from FSP noted in bold and shading)

Matrix	Sample #	Location	Rationale
QA/QC (soil/sludge/sediment)	SSSO89	Replicate of SSSO1402. MS/MSD was also collected here (2 x volume for sludge).	Document the precision of sample collection procedures and laboratory analysis.
	SSSO99	Replicate of SSSO1302. MS/MSD was also collected here (2 x volume for sludge).	Document the precision of sample collection procedures and laboratory analysis.
QA/QC (blanks)	SSSW89	Rinsate blank.	Document thoroughness of decontamination procedures.
	SSSW99A, B	Trip blanks.	Document cross-contamination of VOC samples.

The deviations in sampling location from the FSP are highlighted with shading.

TABLE 9
PCB Results in Sources/Surface Soils
Units µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from Sludge Pond 5
Aroclor-1016	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1221	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1232	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1242	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1248	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1254	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1260	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1262	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ
Aroclor-1268	-	-	*38 U*	43 U	39 U	41 U	39 UJ	63 UJ	110 UJ	120 UJ	47 U	160 UJ

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/Kg milligrams per kilogram
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 9, continued
PCBs in Sources/Surface Soils
Units µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond (8) dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond (8) wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Aroclor-1016	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U
Aroclor-1221	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U
Aroclor-1232	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U
Aroclor-1242	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U
Aroclor-1248	-	-	45 J	87 J	59 U	59 J	-	120 UJ	130 UJ	-	53 U	38 U	59 J
Aroclor-1254	-	-	80 J	150 J (15)	110 J (11)	80 J	16	530 J (53)	200 J (20)	45	53 U	38 U	71
Aroclor-1260	-	-	98 U	94 U	59 U	100	-	120 UJ	350 J	-	53 U	38 U	47 U
Aroclor-1262	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U
Aroclor-1268	-	-	98 U	94 U	59 U	57 U	-	120 UJ	130 UJ	-	53 U	38 U	47 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/Kg milligrams per kilogram
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values.
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 10
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO0102 L1080162-1 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	WHO TEF Concentration	SSSO0202 L1080162-2 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0302 L1080162-3 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0402 L1080162-4 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0502 L1080162-5 Surface soil/source grab sample from sludge pond 17	WHO TEF Concentration
2,3,7,8-TCDD	-	4.3	*0.04 J*	0.04000 J	0.03 U	0.01850 U	0.05 U	0.02950 U	0.07 J	0.07000 J	4.72 ☆	4.72000
1,2,3,7,8-PeCDD	-	8.5	*0.38 J*	0.38000 J	0.08 J	0.08000 J	0.1 J	0.10000 J	0.09 J	0.09000 J	13.4 ☆	13.40000
1,2,3,4,7,8-HxCDD	-	110	*0.69 J*	0.06900 J	0.07 J	0.00700 J	0.08 J	0.00800 J	0.11 J	0.01100 J	8.6	0.86000
1,2,3,6,7,8-HxCDD	-	110	*1.54*	0.15400	0.15 J	0.01500 J	0.12 J	0.01200 J	0.22 J	0.02200 J	11.4	1.14000
1,2,3,7,8,9-HxCDD	-	100	*1.67*	0.16700	0.21 J	0.02100 J	0.16 J	0.01600 J	0.31 J	0.03100 J	10.8	1.08000
1,2,3,4,6,7,8-HpCDD	-	4300	*40.6*	0.40600	3.46	0.03460	2.85	0.02850	4.24	0.04240	48.5	0.48500
OCDD	-	-	*310*	0.09300	25.9	0.00777	18.7	0.00561	59.5	0.01785	85.3	0.02559
Total-TCDD	-	-	*0.17*	-	1.24	-	0.88	-	0.56	-	278	-
Total TCDD # Homologues	-	-	*2*	-	3	-	4	-	2	-	15	-
Total-PeCDD	-	-	*1.34*	-	0.07 U	-	0.3	-	0.09	-	208	-
Total PeCDD # Homologues	-	-	*4*	-	0	-	2	-	1	-	9	-
Total-HxCDD	-	-	*7.94*	-	0.51	-	0.87	-	1.21	-	169	-
Total HxCDD # Homologues	-	-	*3*	-	1	-	2	-	3	-	7	-
Total-HpCDD	-	-	*72.1*	-	6.56	-	5.05	-	8.78	-	83.4	-
Total HpCDD # Homologues	-	-	*2*	-	2	-	2	-	2	-	2	-
2,3,7,8-TCDF	-	43	*1.3 EMPC*	0.13000 EMPC	0.05 U	0.00255 U	0.1 U	0.00500 U	0.19 U	0.00950 U	34.4	3.44000
1,2,3,7,8-PeCDF	-	-	*0.68*	0.02040	0.04 J	0.00120 J	0.16 J	0.00480 J	0.1 J	0.00300 J	19	0.57000
2,3,4,7,8-PeCDF	-	43	*0.82*	0.24600	0.07 J	0.02100 J	0.09 J	0.02700 J	0.09 J	0.02700 J	29.7	8.91000
1,2,3,4,7,8-HxCDF	-	430	*1.5*	0.15000	0.06 UJ	0.00190 UJ	0.07 UJ	0.00105 UJ	0.14 UJ	0.00105 UJ	9.94	0.99400
1,2,3,6,7,8-HxCDF	-	430	*0.68*	0.06800	0.04 UJ	0.00400 UJ	0.07 U	0.00105 U	0.07 UJ	0.00105 UJ	12.7	1.27000
1,2,3,7,8,9-HxCDF	-	430	*0.31 J*	0.03100 J	0.03 UJ	0.00085 UJ	0.03 UJ	0.00115 UJ	0.1 U	0.00125 U	5.49	0.54900
2,3,4,6,7,8-HxCDF	-	430	*0.83*	0.08300	0.06 U	0.00075 U	0.05 UJ	0.00105 UJ	0.11 UJ	0.00105 UJ	15.7	1.57000
1,2,3,4,6,7,8-HpCDF	-	4300	*10.9*	0.10900	0.63 J	0.00630 J	0.57 J	0.00570 J	2.14	0.02140	12.5	0.12500
1,2,3,4,7,8,9-HpCDF	-	4300	*0.95*	0.00950	0.03 UJ	0.00016 UJ	0.04 U	0.00020 U	0.11 UJ	0.00050 UJ	4.72	0.04720
OCDF	-	-	*26.7*	0.00801	1.89	0.00057	2.28	0.00068	21.4	0.00642	5.31	0.00159
Total-TCDF	-	-	*30.5*	-	3.49	-	1.12	-	2.49	-	647	-
Total TCDF # Homologues	-	-	*21*	-	2	-	2	-	5	-	21	-
Total-PeCDF	-	-	*18.1*	-	0.3	-	0.43	-	1.04	-	274	-
Total PeCDF # Homologues	-	-	*14*	-	4	-	3	-	8	-	15	-
Total-HxCDF	-	-	*16.4*	-	0.2 U	-	0.6	-	1.21	-	124	-
Total HxCDF # Homologues	-	-	*8*	-	2	-	3	-	4	-	13	-
Total-HpCDF	-	-	*29.9*	-	0.03 U	-	0.74	-	4.64	-	32.2	-

TABLE 10
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO0102 L1080162-1 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	WHO TEF Concentration	SSSO0202 L1080162-2 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0302 L1080162-3 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0402 L1080162-4 Surface soil/source grab sample from landfarm area	WHO TEF Concentration	SSSO0502 L1080162-5 Surface soil/source grab sample from sludge pond 17	WHO TEF Concentration
Total HpCDF # Homologues	-	-	*3*	-	0	-	1	-	2	-	4	-
WHO TEQ	-	-	-	2.16391	-	0.22314	-	0.24729	-	0.35647	-	39.18738

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UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/g picograms per gram
ppt parts per trillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO0602 L1080162-6 Surface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0702 L1080162-7 Surface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0802 L1080162-9 Surface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0902 L1081891-23 Surface soil/source grab sample from sludge pond 5	WHO TEF Concentration	SSSO1002 L1081891-25 Surface soil/source grab sample from sludge pond 5	WHO TEF Concentration
2,3,7,8-TCDD	-	4.3	22.4 ☆	22.40000	34.3 ☆	34.30000	1.8 J	1.80000 J	0.06 U	0.03100 U	0.46 U	0.23000 U
1,2,3,7,8-PeCDD	-	8.5	73.4 ☆	73.40000	92.7 ☆	92.70000	5.51	5.51000	0.28 J	0.28000 J	1.9 U	0.95000 U
1,2,3,4,7,8-HxCDD	-	110	46.9	4.69000	58.8	5.88000	0.62 U	0.03100 U	0.16 U	0.00800 U	1.1 U	0.05500 U
1,2,3,6,7,8-HxCDD	-	110	67.7	6.77000	78.1	7.81000	95.5	9.55000	0.76	0.07600	1.5 U	0.07500 U
1,2,3,7,8,9-HxCDD	-	100	59.9	5.99000	69.4	6.94000	41.9	4.19000	0.46 J	0.04600 J	1.3 U	0.06500 U
1,2,3,4,6,7,8-HpCDD	-	4300	311	3.11000	299	2.99000	54.4	0.54400	9.61	0.09610	31.4	0.31400
OCDD	-	-	687	0.20610	341	0.10230	279	0.08370	62.6	0.01878	321	0.09630
Total-TCDD	-	-	2320	-	1450	-	39.4	-	2.17	-	0.54	-
Total TCDD # Homologues	-	-	16	-	15	-	10	-	4	-	1	-
Total-PeCDD	-	-	1570	-	1180	-	26	-	1.88	-	1.9 U	-
Total PeCDD # Homologues	-	-	9	-	9	-	5	-	5	-	0	-
Total-HxCDD	-	-	1130	-	915	-	556	-	5.67	-	5.3	-
Total HxCDD # Homologues	-	-	6	-	7	-	4	-	5	-	1	-
Total-HpCDD	-	-	541	-	514	-	103	-	18	-	59.3	-
Total HpCDD # Homologues	-	-	2	-	2	-	2	-	2	-	2	-
2,3,7,8-TCDF	-	43	164 ☆	16.40000	317 ☆	31.70000	19.7	1.97000	0.99	0.09900	3.25	0.32500
1,2,3,7,8-PeCDF	-	-	88.8	2.66400	156	4.68000	4.62	0.13860	0.29 J	0.00870 J	1.1 J	0.03300 J
2,3,4,7,8-PeCDF	-	43	148 ☆	44.40000	237 ☆	71.10000	6.25	1.87500	0.54 J	0.16200 J	2.05 J	0.61500 J
1,2,3,4,7,8-HxCDF	-	430	45.8	4.58000	76.2	7.62000	1.3 J	0.13000 J	0.37 J	0.03700 J	1.5 J	0.15000 J
1,2,3,6,7,8-HxCDF	-	430	58.4	5.84000	95.2	9.52000	1.97	0.19700	0.28 J	0.02800 J	0.82 J	0.08200 J
1,2,3,7,8,9-HxCDF	-	430	25.5	2.55000	44.4	4.44000	0.64 J	0.06400 J	0.13 U	0.00800 U	0.9 U	0.04500 U
2,3,4,6,7,8-HxCDF	-	430	72.7	7.27000	122	12.20000	1.9 J	0.19000 J	0.36 UJ	0.00430 UJ	1.4 UJ	0.03700 UJ
1,2,3,4,6,7,8-HpCDF	-	4300	60	0.60000	95.9	0.95900	2.85	0.02850	0.7 J	0.00700 J	8.4	0.08400 J
1,2,3,4,7,8,9-HpCDF	-	4300	20.2	0.20200	35.9	0.35900	0.68 U	0.00340 U	0.27 U	0.00135 U	1.3 U	0.00650 U
OCDF	-	-	24.7	0.00741	40.2	0.01206	4.31	0.00129	0.99 UJ	0.00006 UJ	24.7	0.00741
Total-TCDF	-	-	3210	-	5840	-	233	-	7.87	-	43.5	-
Total TCDF # Homologues	-	-	22	-	22	-	19	-	11	-	13	-
Total-PeCDF	-	-	1370	-	2360	-	63.2	-	4.13	-	20.7 J	-
Total PeCDF # Homologues	-	-	15	-	16	-	13	-	7	-	10	-
Total-HxCDF	-	-	592	-	1020	-	12	-	0.67	-	5.15	-
Total HxCDF # Homologues	-	-	13	-	13	-	5	-	3	-	3	-
Total-HpCDF	-	-	150	-	254	-	6.29	-	0.27 U	-	16.5	-

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO0602 L1080162-6 Surface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0702 L1080162-7 Surface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0802 L1080162-9 Surface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0902 L1081891-23 Surface soil/source grab sample from sludge pond 5	WHO TEF Concentration	SSSO1002 L1081891-25 Surface soil/source grab sample from sludge pond 5	WHO TEF Concentration
Total HpCDF # Homologues	-	-	4	-	4	-	2	-	0	-	2	-
WHO TEQ	-	-	-	201.07951	-	293.31236	-	26.30649	-	0.91129	-	3.17021

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UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/g picograms per gram
ppt parts per trillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO1102 L1081891-26 Surface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1202 L1081891-38 Surface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1302 L1081891-28 Surface soil/source grab sample from emergency spill pond 8 dry cell	WHO TEF Concentration	SSSO9902 L1081891-37 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	WHO TEF Concentration	Relative Percentage Difference (RPD)
2,3,7,8-TCDD	-	4.3	1.5	1.50000	1.21	1.21000	1.22	1.22000	1.4 J	1.40000 J	7
1,2,3,7,8-PeCDD	-	8.5	1.18 J	1.18000 J	0.94 U	0.47000 U	1 J	1.00000 J	1.12	1.12000	6
1,2,3,4,7,8-HxCDD	-	110	1.2 U	0.06000 U	1.1 U	0.05500 U	1.1 U	0.05500 U	0.71 J	0.07100 J	-
1,2,3,6,7,8-HxCDD	-	110	5.6	0.56000	3.2	0.32000	4.2	0.42000	6.05	0.60500	18
1,2,3,7,8,9-HxCDD	-	100	2.9	0.29000	1.6 J	0.16000 J	1.9	0.19000	2.98	0.29800	22
1,2,3,4,6,7,8-HpCDD	-	4300	58.0	0.58000	52.9	0.52900	72.7	0.72700	92.8	0.92800	12
OCDD	-	-	416	0.12480	555	0.16650	678	0.20340	810	0.24300	9
Total-TCDD	-	-	3.87	-	4.59	-	6.84	-	8.12	-	9
Total TCDD # Homologues	-	-	2	-	3	-	4	-	5	-	11
Total-PeCDD	-	-	3.61	-	2.7	-	7.67	-	9.57	-	11
Total PeCDD # Homologues	-	-	3	-	2	-	5	-	6	-	9
Total-HxCDD	-	-	29.5	-	3.2	-	6.1	-	32.8	-	69
Total HxCDD # Homologues	-	-	3	-	1	-	2	-	5	-	43
Total-HpCDD	-	-	104	-	102	-	139	-	171	-	10
Total HpCDD # Homologues	-	-	2	-	2	-	2	-	2	-	0
2,3,7,8-TCDF	-	43	9.51	0.95100	3.91	0.39100	5.58	0.55800	5.67	0.56700	1
1,2,3,7,8-PeCDF	-	-	0.97 J	0.02910 J	0.84 J	0.02520 J	1.4 J	0.04200 J	1.43	0.04290	1
2,3,4,7,8-PeCDF	-	43	1.69	0.50700	1.33 J	0.39900 J	2.18	0.65400	0.94	0.28200	40
1,2,3,4,7,8-HxCDF	-	430	1.1 J	0.11000 J	0.78 U	0.03900 U	0.89 J	0.08900 J	1.52	0.15200	26
1,2,3,6,7,8-HxCDF	-	430	1.1 J	0.11000 J	0.75 U	0.03750 U	0.9 U	0.04500 U	1.07	0.10700	-
1,2,3,7,8,9-HxCDF	-	430	0.97 U	0.04850 U	0.92 U	0.04600 U	1.1 U	0.05500 U	0.54 U	0.02700 U	-
2,3,4,6,7,8-HxCDF	-	430	1.06 U	0.03600 U	0.76 U	0.03800 U	1.15	0.11500	1.1 J	0.11000 J	2
1,2,3,4,6,7,8-HpCDF	-	4300	5.6	0.05600	5.23	0.05230	6.80	0.06800	6.83	0.06830	0
1,2,3,4,7,8,9-HpCDF	-	4300	1.6 U	0.00800 U	1.4 U	0.00700 U	1.6	0.01600	0.71 J	0.00710 J	39
OCDF	-	-	13	0.00390	18.5	0.00555	21	0.00630	17.8	0.00534	8
Total-TCDF	-	-	46.9	-	21.6	-	73.9	-	65	-	6
Total TCDF # Homologues	-	-	12	-	9	-	18	-	16	-	6
Total-PeCDF	-	-	16.2	-	11.2	-	24.8	-	23.3	-	3
Total PeCDF # Homologues	-	-	10	-	7	-	10	-	11	-	5
Total-HxCDF	-	-	6.75	-	2.37	-	10.5	-	13	-	11
Total HxCDF # Homologues	-	-	3	-	1	-	6	-	7	-	8
Total-HpCDF	-	-	5.6	-	14.4	-	19.8	-	18	-	5

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO1102 L1081891-26 Surface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1202 L1081891-38 Surface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1302 L1081891-28 Surface soil/source grab sample from emergency spill pond 8 dry cell	WHO TEF Concentration	SSSO9902 L1081891-37 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	WHO TEF Concentration	Relative Percentage Difference (RPD)
Total HpCDF # Homologues	-	-	1	-	3	-	3	-	2	-	20
WHO TEQ	-	-	-	6.15430	-	3.95105	-	5.46370	-	6.03364	-

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UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/g picograms per gram
ppt parts per trillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO1402 L1081891-32 Surface soil/source grab sample from emergency spill pond 8 wet cell	WHO TEF Concentration	SSSO8902 L1081891-36 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSSO1502 L1080162-11 Surface soil/source grab sample from wastewater storage pond 2	WHO TEF Concentration	SSSO1602 L1080162-12 Surface soil/source grab sample from wastewater storage pond 2	WHO TEF Concentration	SSSO1702 L1081891-35 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A	WHO TEF Concentration
2,3,7,8-TCDD	-	4.3	15.6 ☆	15.60000	15.0 ☆	15.00000	2	4.76 ☆	4.76000	1.14	1.14000	0.15 U	0.07500
1,2,3,7,8-PeCDD	-	8.5	5.7 J	5.70000	4.9 J	4.90000	8	3.61	3.61000	0.58 J	0.58000	0.39 U	0.19500
1,2,3,4,7,8-HxCDD	-	110	3.9 U	0.19500	5.2 U	0.27500	-	1.5 J	0.15000	0.2 J	0.02000	0.36 U	0.01800
1,2,3,6,7,8-HxCDD	-	110	32.1	3.21000	24.4	2.44000	14	15	1.50000	2.88	0.28800	3.03 ☆	0.30300
1,2,3,7,8,9-HxCDD	-	100	19	1.90000	12.8	1.28000	19	10.3	1.03000	1.93	0.19300	0.96 J	0.09600
1,2,3,4,6,7,8-HpCDD	-	4300	157	1.57000	128	1.28000	10	67.4	0.67400	13.2	0.13200	81.8	0.81800
OCDD	-	-	1190	0.35700	918	0.27540	13	311	0.09330	61.7	0.01851	788	0.23640
Total-TCDD	-	-	28.8		26.7		4	10.3		1.32		0.84	
Total TCDD # Homologues	-	-	4		3		14	10		2		2	
Total-PeCDD	-	-	12.6		29		39	31.5		2.24		1.21	
Total PeCDD # Homologues	-	-	2		5		43	10		4		1	
Total-HxCDD	-	-	189		149		12	101		17.7		12.1	
Total HxCDD # Homologues	-	-	5		4		11	5		4		2	
Total-HpCDD	-	-	308		243		12	137		25.7		147	
Total HpCDD # Homologues	-	-	2		2		0	2		2		2	
2,3,7,8-TCDF	-	43	46.5 ☆	4.65000	11.7	1.17000	60	7.98	0.79800	2.84	0.28400	1.2 J	0.12000
1,2,3,7,8-PeCDF	-	-	6 J	0.18000	6.3 J	0.18900	2	0.47 J	0.01410	0.11 J	0.00330	0.38 J	0.01140
2,3,4,7,8-PeCDF	-	43	8.7	2.61000	9.9	2.97000	6	0.76	0.22800	0.2 J	0.06000	0.77 J	0.23100
1,2,3,4,7,8-HxCDF	-	430	4 J	0.40000	3.3 U	0.16500	-	0.45 J	0.04500	0.11 UJ	0.00345	1.12	0.11200
1,2,3,6,7,8-HxCDF	-	430	2.8 U	0.14000	3.3 J	0.33000	-	0.42 U	0.00850	0.07 UJ	0.00345	0.62 J	0.06200
1,2,3,7,8,9-HxCDF	-	430	3.4 U	0.17000	3.8 U	0.19000	-	0.22 U	0.01100	0.08 U	0.00425	0.18 UJ	0.00850
2,3,4,6,7,8-HxCDF	-	430	2.9 J	0.29000	3.9 J	0.39000	15	0.62 J	0.06200	0.19 J	0.01900	0.9 J	0.09000
1,2,3,4,6,7,8-HpCDF	-	4300	15.6	0.15600	13 J	0.13000	9	3.16	0.03160	0.92	0.00920	7.35	0.07350
1,2,3,4,7,8,9-HpCDF	-	4300	4.9 U	0.02450	5.1 U	0.02750	-	0.34 U	0.00170	0.16 U	0.00080	0.67 UJ	0.00160
OCDF	-	-	44 J	0.01320	52.5	0.01575	9	7.61	0.00228	1.5 J	0.00045	16.4	0.00492
Total-TCDF	-	-	284		270		3	37.1		8.49		7.04	
Total TCDF # Homologues	-	-	13		10		13	16		10		12	
Total-PeCDF	-	-	77.3		76		1	7.3		1.36		3.2	
Total PeCDF # Homologues	-	-	10		8		11	9		5		5	
Total-HxCDF	-	-	9.3		25.2		46	4.95		1.72		10.9	
Total HxCDF # Homologues	-	-	3		5		25	6		6		6	
Total-HpCDF	-	-	39.3		22.8		27	8.33		1.89		20.8	

TABLE 10, continued
Dioxins and Furans in Sources/Surface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration (RDSC)	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration (CRSC)	SSSO1402 L1081891-32 Surface soil/source grab sample from emergency spill pond 8 wet cell	WHO TEF Concentration	SSSO8902 L1081891-36 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSSO1502 L1080162-11 Surface soil/source grab sample from wastewater storage pond 2	WHO TEF Concentration	SSSO1602 L1080162-12 Surface soil/source grab sample from wastewater storage pond 2	WHO TEF Concentration	SSSO1702 L1081891-35 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A	WHO TEF Concentration
Total HpCDF # Homologues	-	-	2		1		33	2		3		3	
WHO TEQ	-	-		37.16570		31.02765			13.01948		2.75941		2.45632

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/g picograms per gram
ppt parts per trillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 11
VOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5
Dichlorodifluoromethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Chloromethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Vinyl chloride	230,000	93	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Bromomethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Chloroethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Trichlorofluoromethane	23,000,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,1-Dichloroethene	3,900,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Acetone	7,000,000	-	12 U	13 U	12 U	12 U	12 U	19 U	33 U	39 U	14 U	220
Carbon disulfide	7,800,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	13 J
Methyl acetate	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Methylene chloride	470,000	75,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
trans-1,2-Dichloroethene	1,600,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Methyl tert-butyl ether	-	360,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,1-Dichloroethane	16,000,000	110,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
cis-1,2-Dichloroethene	160,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Methyl ethyl ketone (2-Butanone)	6,300,000	-	12 U	13 U	12 U	12 U	12 U	19 U	33 U	39 U	14 U	50 U
Bromochloromethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Chloroform	780,000	21,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	34	25 U
1,1,1-Trichloroethane	160,000,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Cyclohexane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Carbon tetrachloride	310,000	9,100	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Benzene	310,000	12,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2-Dichloroethane	470,000	7,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,4-Dioxane	-	-	120 U	130 U	120 U	120 U	120 U	190 U	330 U	390 U	140 U	500 U
Trichloroethene	39,000	8,400	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Methylcyclohexane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2-Dichloropropane	7,000,000	18,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Bromodichloromethane	1,600,000	10,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
cis-1,3-Dichloropropene	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
4-Methyl-2-pentanone (MIBK)	6,300,000	-	12 U	13 U	12 U	12 U	12 U	19 U	33 U	39 U	14 U	50 U
Toluene	6,300,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
trans-1,3-Dichloropropene	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,1,2-Trichloroethane	310,000	11,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U

TABLE 11
VOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5
Tetrachloroethene	470,000	300,000	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
2-Hexanone	-	-	12 U	13 U	12 U	12 U	12 U	19 U	33 U	39 U	14 U	50 U
Dibromochloromethane	-	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2-Dibromoethane	700,000	320	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Chlorobenzene	1,600,000	-	5.9 U	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Ethyl benzene	7,800,000	58,000	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
o-Xylene	16,000,000	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
m,p-Xylene	16,000,000	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Styrene	16,000,000	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Bromoform	-	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
Isopropylbenzene	-	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,1,2,2-Tetrachloroethane	1,600,000	3,200	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,3-Dichlorobenzene	-	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,4-Dichlorobenzene	5,500,000	120,000	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2-Dichlorobenzene	-	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2-Dibromo-3-chloropropane	16,000	190	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2,4-Trichlorobenzene	780,000	22,000	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U
1,2,3-Trichlorobenzene	-	-	*5.9 U*	6.3 U	6 U	5.9 U	5.8 U	9.6 U	17 U	19 U	7 U	25 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
µg/kg micrograms per kilogram
ppb parts per billion
TICs Tentatively Identified Compounds
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 11, continued
VOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Dichlorodifluoromethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Chloromethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Vinyl chloride	230,000	93	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Bromomethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Chloroethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Trichlorofluoromethane	23,000,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,1-Dichloroethene	3,900,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Acetone	7,000,000	-	32 U	59	19 U	17 U	-	60	40	-	16 U	12 U	16 U
Carbon disulfide	7,800,000	-	16 U	14 J	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Methyl acetate	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Methylene chloride	470,000	75,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
trans-1,2-Dichloroethene	1,600,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Methyl tert-butyl ether	-	360,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,1-Dichloroethane	16,000,000	110,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
cis-1,2-Dichloroethene	160,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Methyl ethyl ketone (2-Butanone)	6,300,000	-	32 U	30 U	19 U	17 U	-	39 U	38 U	-	16 U	12 U	16 U
Bromochloromethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Chloroform	780,000	21,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	5.3 J
1,1,1-Trichloroethane	160,000,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Cyclohexane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Carbon tetrachloride	310,000	9,100	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Benzene	310,000	12,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2-Dichloroethane	470,000	7,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,4-Dioxane	-	-	320 U	300 U	190 U	170 U	-	390 U	380 U	-	160 U	120 U	160 U
Trichloroethene	39,000	8,400	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Methylcyclohexane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2-Dichloropropane	7,000,000	18,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Bromodichloromethane	1,600,000	10,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
cis-1,3-Dichloropropene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U

TABLE 11, continued
VOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
4-Methyl-2-pentanone (MIBK)	6,300,000	-	32 U	30 U	19 U	17 U	-	39 U	38 U	-	16 U	12 U	16 U
Toluene	6,300,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
trans-1,3-Dichloropropene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,1,2-Trichloroethane	310,000	11,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Tetrachloroethene	470,000	300,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
2-Hexanone	-	-	32 U	30 U	19 U	17 U	-	39 U	38 U	-	16 U	12 U	16 U
Dibromochloromethane	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2-Dibromoethane	700,000	320	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Chlorobenzene	1,600,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Ethyl benzene	7,800,000	58,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
o-Xylene	16,000,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
m,p-Xylene	16,000,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Styrene	16,000,000	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Bromoform	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
Isopropylbenzene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,1,2,2-Tetrachloroethane	1,600,000	3,200	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,3-Dichlorobenzene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,4-Dichlorobenzene	5,500,000	120,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2-Dichlorobenzene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2-Dibromo-3-chloropropane	16,000	190	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2,4-Trichlorobenzene	780,000	22,000	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U
1,2,3-Trichlorobenzene	-	-	16 U	15 U	9.5 U	8.5 U	-	19 U	19 U	-	8.1 U	5.8 U	7.8 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
µg/kg micrograms per kilogram
ppb parts per billion
TICs Tentatively Identified Compounds
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 12
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4
Benzaldehyde	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	120 J	650 U	240 U	820 U	510 U	480 U
Phenol	23,000,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Bis(2-chloroethyl)ether	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Chlorophenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Methylphenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,2'-Oxybis(1-chloropropane)	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Acetophenone	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
4-Methylphenol	390,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	210 J	240 U	40,000 J	1400	410 J
N-Nitroso-di-n-propylamine	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Hexachloroethane	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Nitrobenzene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Isophorone	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Nitrophenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4-Dimethylphenol	1,600,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Bis(2-chloroethoxy)methane	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4-Dichlorophenol	230,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Naphthalene	3,100,000	-	*200 U*	220 U	200 U	210 U	50 J	210 J	200 J	650 U	240 U	250 J	510 U	480 U
4-Chloroaniline	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Hexachlorobutadiene	16,000	8,200	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Caprolactam	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
4-Chloro-3-methylphenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Methylnaphthalene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Hexachlorocyclopentadiene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4,6-Trichlorophenol	-	58,000	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4,5-Trichlorophenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
1,1'-Biphenyl	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Chloronaphthalene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2-Nitroaniline	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
Dimethylphthalate	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,6-Dinitrotoluene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Acenaphthylene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
3-Nitroaniline	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U

TABLE 12
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4
Acenaphthene	4,700,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4-Dinitrophenol	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
4-Nitrophenol	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
Dibenzofuran	310,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,4-Dinitrotoluene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Diethylphthalate	63,000,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	260 J	510 U	480 U
Fluorene	3,100,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
4-Chlorophenyl-phenylether	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
4-Nitroaniline	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
4,6-Dinitro-2-methylphenol	-	-	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
N-Nitrosodiphenylamine	-	130,000	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
1,2,4,5-Tetrachlorobenzene	23,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
4-Bromophenyl-phenylether	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Hexachlorobenzene	63,000	400	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Atrazine	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Pentachlorophenol	2,300,000	5,300	*380 U*	420 U	390 U	400 U	390 U	630 U	1100 U	1300 U	470 U	1600 U	980 U	940 U
Phenanthrene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	200 J	510 U	480 U
Anthracene	23,000,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Carbazole	-	32,000	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Di-n-butylphthalate	7,800,000	-	*61 J (610)*	43 J	45 J	45 J	200 U	320 U	570 U	750	86 J	3800	570	1000
Fluoranthene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Pyrene	2,300,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Butylbenzylphthalate	16,000,000	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	860	510 U	480 U
3,3'-Dichlorobenzidine	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Benzo(a)anthracene	-	880	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Chrysene	-	88,000	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Bis(2-ethylhexyl)phthalate	1,600,000	46,000	*81 J (810)*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	290	820 U	820	480 U
Di-n-octylphthalate	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Benzo(b)fluoranthene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Benzo(k)fluoranthene	-	8,800	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Benzo(a)pyrene	-	88	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Indeno(1,2,3-cd)pyrene	-	880	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U

TABLE 12
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4
Dibenzo(a,h)anthracene		88	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
Benzo(g,h,i)perylene	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U
2,3,4,6-Tetrachlorophenol	-	-	*200 U*	220 U	200 U	210 U	200 U	320 U	570 U	650 U	240 U	820 U	510 U	480 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 12, continued
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Benzaldehyde	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Phenol	23,000,000	-	300 U	290 U	-	610 U	170 J	-	270 U	200 U	250 U
Bis(2-chloroethyl)ether	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Chlorophenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Methylphenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,2'-Oxybis(1-chloropropane)	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Acetophenone	-	-	300 U	290 U	-	510 J	400 J	12	270 U	200 U	130 J
4-Methylphenol	390,000	-	60 J	290 U	-	1200	1100	4	270 U	200 U	54 J
N-Nitroso-di-n-propylamine	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Hexachloroethane	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Nitrobenzene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Isophorone	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Nitrophenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4-Dimethylphenol	1,600,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Bis(2-chloroethoxy)methane	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4-Dichlorophenol	230,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Naphthalene	3,100,000	-	300 U	290 U	-	680	500 J	15	270 U	200 U	250 U
4-Chloroaniline	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Hexachlorobutadiene	16,000	8,200	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Caprolactam	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
4-Chloro-3-methylphenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Methylnaphthalene	-	-	300 U	290 U	-	160 J	650 U	-	270 U	200 U	250 U
Hexachlorocyclopentadiene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4,6-Trichlorophenol	-	58,000	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4,5-Trichlorophenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
1,1'-Biphenyl	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Chloronaphthalene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2-Nitroaniline	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
Dimethylphthalate	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,6-Dinitrotoluene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Acenaphthylene	-	-	300 U	290 U	-	300 J	250 J	9	270 U	200 U	250 U
3-Nitroaniline	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U

TABLE 12, continued
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Acenaphthene	4,700,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4-Dinitrophenol	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
4-Nitrophenol	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
Dibenzofuran	310,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,4-Dinitrotoluene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Diethylphthalate	63,000,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Fluorene	3,100,000	-	300 U	290 U	-	190 J	650 U	-	270 U	200 U	250 U
4-Chlorophenyl-phenylether	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
4-Nitroaniline	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
4,6-Dinitro-2-methylphenol	-	-	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
N-Nitrosodiphenylamine	-	130,000	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
1,2,4,5-Tetrachlorobenzene	23,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
4-Bromophenyl-phenylether	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Hexachlorobenzene	63,000	400	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Atrazine	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Pentachlorophenol	2,300,000	5,300	580 U	570 U	-	1200 U	1300 U	-	520 U	380 U	480 U
Phenanthrene	-	-	86 J	290 U	-	1400	1100	12	270 U	200 U	250 U
Anthracene	23,000,000	-	300 U	290 U	-	290 J	650 U	-	270 U	200 U	250 U
Carbazole	-	32,000	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Di-n-butylphthalate	7,800,000	-	260 J	210 J	11	5900	650 U	-	76 J	200 U	200 J
Fluoranthene	-	-	300 U	290 U	-	3300	650 U	-	270 U	200 U	250 U
Pyrene	2,300,000	-	300 U	290 U	-	1900	650 U	-	270 U	200 U	71 J
Butylbenzylphthalate	16,000,000	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
3,3'-Dichlorobenzidine	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Benzo(a)anthracene	-	880	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Chrysene	-	88,000	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Bis(2-ethylhexyl)phthalate	1,600,000	46,000	1200	560	36	610 U	3800	-	270 U	200 U	10,000
Di-n-octylphthalate	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Benzo(b)fluoranthene	-	-	300 U	290 U	-	360 J	210 J	26	270 U	200 U	250 U
Benzo(k)fluoranthene	-	8,800	300 U	290 U	-	220 J	150 J	19	270 U	200 U	250 U
Benzo(a)pyrene	-	88	300 U	290 U	-	250 J ☆	160 J ☆	22	270 U	200 U	250 U
Indeno(1,2,3-cd)pyrene	-	880	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U

TABLE 12, continued
SVOCs in Sources/Surface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/kg)	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Dibenzo(a,h)anthracene		88	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
Benzo(g,h,i)perylene	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U
2,3,4,6-Tetrachlorophenol	-	-	300 U	290 U	-	610 U	650 U	-	270 U	200 U	250 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 13
Total Metals and Asbestos in Sources/Surface Soils
Units of mg/kg (ppm)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (mg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (mg/kg)	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0202 H30Q1 Surface soil/source grab sample from landfarm area	SSSO0302 H30Q2 Surface soil/source grab sample from landfarm area	SSSO0402 H30Q3 Surface soil/source grab sample from landfarm area	SSSO0502 H30Q4 Surface soil/source grab sample from sludge pond 17	SSSO0602 H30Q6 Surface soil/source grab sample from sludge pond 17
Asbestos Content (%)	-	-	*ND*	ND	ND	NA	NA	NA
Aluminum	-	-	*10,300*	10,500	6,440	9,630	14,300	6,230
Antimony	31	-	*0.73 J+*	0.55 J+ (0.28)	0.2 J (0.1)	0.59 J+ (0.30)	1.3 J+ (0.66)	2 J+ (1.0)
Arsenic	23	0.43	*8.5* ☆	4.8 J+ (2.8) ☆	3.4 ☆	5.8 J+ (3.3) ☆	10.7 ☆	26.9 ☆
Barium	5,500	-	*232*	208	149	238	624	842
Beryllium	160	-	*0.9 J+*	0.89 J+ (0.70)	0.58	0.88 J+ (0.69)	0.63 J+ (0.49)	0.31 J+ (0.24)
Cadmium	39	-	*1.5 J+*	0.69	0.51 J (0.36)	0.7 J+ (0.5)	3 J+ (2)	12.5
Calcium	-	-	*6,540*	3,230	2,780	3,580	52,300	215,000
Chromium	230	-	*11.0*	10.1	7.9	9.3	19.2	23.3
Cobalt	-	-	*5.6 J (7.0)*	6	3.5 J (2.8)	6.7	4.2 J (3.4)	3.3 J (2.6)
Copper	-	-	*71.7*	18.5	13.5	19	37.5	91.8
Iron	-	-	*14700*	13900	9730	13600	14700	5200
Lead	-	-	*19.6*	11.2	7.5	11.9	23.3	61.4
Magnesium	-	-	*6,250*	4,980	3,320	4,460	6,970	17,600
Manganese	11,000	-	*435*	402	280	512	1590	4020
Nickel	1,600	-	*9.8*	9.6	6.0	9.8	18.2	17
Potassium	-	-	*2580*	1790	1500	1820	7870	3000
Selenium	390	-	*3.9 U*	4.0 U	3.9 U	3.8 U	4.2 U	5.7 U
Silver	390	-	*1.1 UJ*	1.1 UJ	1.1 U	1.1 UJ	1.2 UJ	3.6
Sodium	-	-	*149 J (3789)*	200 J (7.86)	223 J (8.77)	215 J (8.45)	1,300	5,180
Thallium	-	-	*2.8 U*	2.9 U	2.8 U	2.7 U	3.0 U	4.1 U
Vanadium	550	-	*15.9*	14.0	11.9	14.7	22.9	8.4
Zinc	23,000	-	*235*	49.4	40.8	49.9	239	968

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J+ The associated numerical value is an estimated quantity but the result may be biased high.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/kg milligrams per kilogram
ppm parts per million
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values.

Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 13, continued
Total Metals and Asbestos in Sources/Surface Soils
Units of mg/kg (ppm)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (mg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (mg/kg)	SSSO0702 H30Q8 Surface soil/source grab sample from sludge pond 3	SSSO0802 H30R0 Surface soil/source grab sample from sludge pond 3	SSSO0902 H30R2 Surface soil/source grab sample from sludge pond 5	SSSO1002 H30R4 Surface soil/source grab sample from sludge pond 5	SSSO1102 H30R6 Surface soil/source grab sample from sludge pond 4	SSSO1202 H30R8 Surface soil/source grab sample from sludge pond 4
Asbestos Content (%)	-	-	NA	NA	NA	NA	NA	NA
Aluminum	-	-	15,000	5,860	1,010	2,660	2,450	4,230
Antimony	31	-	3.4 J+ (1.7)	1.2 J+ (0.61)	7.0 UJ	4.6 UJ	11.2 UJ	11.4 UJ
Arsenic	23	0.43	71.4 ☆	8.9 J+ (5.1) ☆	2.3 J+ (1.3) ☆	2.8 J+ (1.6) ☆	3.4 J+ (1.9) ☆	4.6 J+ (2.6) ☆
Barium	5,500	-	1750	801	281 J (70.4)	386 J (96.7)	314 J (78.7)	644 J (161)
Beryllium	160	-	0.53 J+ (0.41)	0.15 J+ (0.12)	0.59 UJ	0.06 J (0.05)	0.94 UJ	0.1 J (0.08)
Cadmium	39	-	17.9	3.8 J+ (2.7)	0.74 J+ (0.52)	2.6 J+ (1.8)	12.7	12.1
Calcium	-	-	174,000	302,000	242,000 J (189,062)	103,000 J (80,469)	148,000 J (11,562)	190,000 J (14,843)
Chromium	230	-	29.1	29.2	11.7 J (9.1)	9.6 J (7.4)	12.8 J (9.92)	26.3 J (20.4)
Cobalt	-	-	6.1	1.2 J (0.96)	5.9 UJ	3.8 UJ	9.4 UJ	9.5 UJ
Copper	-	-	150	49.8	14.9 J (12.2)	34.6 J (28.4)	20.4 J (16.7)	68.4 J (56.1)
Iron	-	-	7520	3530	960	1160	1490	3250
Lead	-	-	108	18.5	2.2 UJ	6.2 J (4.3)	13.1 J (9.1)	11.2 J (7.8)
Magnesium	-	-	18,500	11,600	5,350	4,990	3,180	6,820
Manganese	11,000	-	6840	2090	598	1050	797	1990
Nickel	1,600	-	20.9	21.2	8 J (5.9)	6.9 J (5.1)	11.8 J (15.9)	17 J (12.6)
Potassium	-	-	6020	1270 J-	586 UJ	577 J (33.0)	936 UJ	952 UJ
Selenium	390	-	0.95 J (0.42)	2.2 J (0.96)	0.48 J-	0.76 J-	1.2 J-	1 J-
Silver	390	-	2.7	2.9 UJ	0.48 J-	1.2 J-	0.78 J-	2.6 J-
Sodium	-	-	7,070	7,620	10,100	6,180	3,840	7,670
Thallium	-	-	2.2	7.1 U	2.9 U	1.9 U	4.7 U	4.8 U
Vanadium	550	-	16.8	14.3 U	5.9 UJ	3.8 UJ	9.4 UJ	9.5 UJ
Zinc	23,000	-	1300	346	80 J (53)	197 J (131)	197 J (131)	441 J (294)

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J+ The associated numerical value is an estimated quantity but the result may be biased high.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/kg milligrams per kilogram
ppm parts per million
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values.
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 13, continued
Total Metals and Asbestos in Sources/Surface Soils
Units of mg/kg (ppm)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (mg/kg)	Superfund Chemical Data Matrix (SCDM) CRSC (mg/kg)	SSSO1302 H30S0 Surface soil/source grab sample from emergency spill pond 8 dry cell	SSSO9902 H30T8 Replicate of SSSO1302 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1402 H30S2 Surface soil/source grab sample from emergency spill pond 8 wet cell	SSSO8902 H30S6 Replicate of SSSO1402 MS/MSD was collected here (2 x volume for sludge)	Relative Percentage Difference (RPD)	SSSO1502 H30S4 Surface soil/source grab sample from wastewater storage pond 2	SSSO1602 H30S5 Surface soil/source grab sample from wastewater storage pond 2	SSSO1702 H30S3 Surface soil/source grab sample from area of what appeared to be exposed soil/sludge adjacent to landfill A
Asbestos Content (%)	-	-	NA	NA	-	NA	NA		NA	NA	NA
Aluminum	-	-	5,180	3,270	23	6,090	7,630	11	9,130	6,610	3,720
Antimony	31	-	10.7 UJ	0.4 8.5 UJ	-	4.9 UJ	5.2 UJ	-	6.9 UJ	5.7 UJ	6.4 UJ
Arsenic	23	0.43	1.8 UJ	3.2 J+ (1.8) ☆	-	9.4 J (5.4) ☆	12.3 J (7.1) ☆	13	2.5 J (1.4) ☆	1.4 J (0.8) ☆	6.4 J (3.7) ☆
Barium	5,500	-	675 J (169)	654 J (163)	2	671 J (168)	748 J (187)	5	306 J (76.7)	158 J (39.6)	383 J (96.0)
Beryllium	160	-	0.1 J (0.08)	0.09 J (0.07)	5	0.13 J (0.10)	0.16 J (0.13)	10	0.67 J-	0.38 J-	0.47 J (0.37)
Cadmium	39	-	3.6 J+ (2.6)	2.1 J+ (1.5)	9	5.7	7	10	0.94	0.55	3.7 J+ (2.6)
Calcium	-	-	200,000 J (156,250)	182,000 J (142,188)	5	107,000 J (83,594)	116,000 J (90,625)	4	6,760 J (5,281)	1,880 J (1,567)	211,000 J (164,843)
Chromium	230	-	23.2 J (18.0)	29.7 J (23.0)	12	18.1 J (14.0)	20.1 J (15.6)	5	14.7 J (11.4)	9.5 J (7.4)	45.1 J (35.0)
Cobalt	-	-	8.9 UJ	7.0 UJ	-	4.0 UJ	4.4 UJ	-	5.7 UJ	4.8 UJ	5.4 J (4.3)
Copper	-	-	52.3 J (42.9)	58.3 J (47.8)	5	42.3 J (34.7)	47.4 J (38.9)	6	18.4 J (15.1)	26.8 J (22.0)	90.1 J (73.9)
Iron	-	-	2520	4050	23	3030	3400	6	10400	8000	32900
Lead	-	-	15.9 J (11.0)	14.6 J (10.1)	4	18 J (12.5)	20.1 J (14.0)	6	11.8 J (8.2)	8.9 J (6.2)	61.7 J (42.8)
Magnesium	-	-	6,250	4,320	18	6,040	7,380	10	6,400	3,020	6,830
Manganese	11,000	-	1870	1560	9	1470	1580	4	238	98.2	536
Nickel	1,600	-	21.2 J (15.7)	16.3 J (12.1)	13	11 J (8.1)	11.6 J (8.6)	3	8.3 J (6.1)	5.2 J (3.9)	80.3 J (59.5)
Potassium	-	-	890 UJ	705 UJ	-	1170 J (66.9)	1410 J (80.6)	9	2610 J (149)	1500 J (85.8)	532 UJ
Selenium	390	-	4.2 J-	0.82 J-	67	1.1 J-	1.2 J-	4	4 UJ	3.3 UJ	3.7 UJ
Silver	390	-	1.8 J-	1.4 J-	13	1.1 J-	1.1 J-	0	1.1 U	0.95 U	1.1 UJ
Sodium	-	-	5,260	3,810	16	4,920	5,880	9	1,010	1,060	4,500
Thallium	-	-	4.4 U	3.5 U	-	2.0 U	2.2 U	-	2.9 U	2.4 U	2.7 U
Vanadium	550	-	8.9 UJ	7.0 UJ	-	25.3 J (18.9)	32.8 J (24.5)	13	12.1 J (9.0)	10.8 J (8.1)	6.7 J (5.0)
Zinc	23,000	-	328 J (219)	248 J (165)	14	304 J (203)	357 J (238)	8	72.3 J (48.2)	58.6 J (39.1)	425 J (283)

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
J- The associated numerical value is an estimated quantity but the result may be biased low.
J+ The associated numerical value is an estimated quantity but the result may be biased high.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/kg milligrams per kilogram
ppm parts per million
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values.
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 14
PCBs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0514 H30Q5 Subsurface soil/source grab sample from sludge pond 17	SSSO0612 H30Q7 Subsurface soil/source grab sample from sludge pond 17	SSSO0716 H30Q9 Subsurface soil/source grab sample from sludge pond 3	SSSO0816 H30R1 Subsurface soil/source grab sample from sludge pond 3	SSSO0916 H30R3 Subsurface soil/source grab sample from sludge pond 5	SSSO1110 H30R7 Subsurface soil/source grab sample from sludge pond 4	SSSO1306 H30S1 Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Aroclor-1016	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1221	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1232	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1242	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1248	*38 U*	74 U	100 U	87 U	72 U	65 J	36 J	45 U
Aroclor-1254	*38 U*	74 U	100 U	87 U	72 U	89 J	64	88 J
Aroclor-1260	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1262	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U
Aroclor-1268	*38 U*	74 U	100 U	87 U	72 U	88 U	43 U	45 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits)

Table 15
Dioxins and Furans in Sources/Subsurface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0102 L1080162-1 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	WHO TEF Concentration	SSSO0514 L1081891-21 Subsurface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0612 L1081891-22 Subsurface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0716 L1080162-8 Subsurface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0816 L1080162-10 Subsurface soil/source grab sample from sludge pond 3	WHO TEF Concentration
2,3,7,8-TCDD	*0.04 J*	0.04000 J	0.82	0.82000	1.47	1.47000	11.8	11.80000	11.6	11.60000
1,2,3,7,8-PeCDD	*0.38 J*	0.38000 J	0.38 U	0.19000 U	0.74 U	0.37000 U	0.92 J	0.92000 J	1.3 J	1.30000 J
1,2,3,4,7,8-HxCDD	*0.69 J*	0.06900 J	0.62 U	0.03100 U	0.9 U	0.04500 U	0.78 J	0.07800 J	1.8	0.18000
1,2,3,6,7,8-HxCDD	*1.54*	0.15400	8.89	0.88900	6.5	0.65000	11.5	1.15000	24.9	2.49000
1,2,3,7,8,9-HxCDD	*1.67*	0.16700	4.39	0.43900	3.14	0.31400	5.19	0.51900	12.1	1.21000
1,2,3,4,6,7,8-HpCDD	*40.6*	0.40600	24.6	0.24600	31	0.31000	81.7	0.81700	148	1.48000
OCDD	*310*	0.09300	124	0.03720	170	0.05100	939	0.28170	1260	0.37800
Total-TCDD	*0.17*	-	1.93	-	2.28	-	11.8	-	11.6	-
Total TCDD # Homologues	*2*	-	4	-	2	-	1	-	1	-
Total-PeCDD	*1.34*	-	0.38 U	-	1.23	-	4.83	-	2.6	-
Total PeCDD # Homologues	*4*	-	0	-	1	-	5	-	2	-
Total-HxCDD	*7.94*	-	52.9	-	41.3	-	63.3	-	157	-
Total HxCDD # Homologues	*3*	-	4	-	3	-	5	-	6	-
Total-HpCDD	*72.1*	-	46	-	57	-	152	-	259	-
Total HpCDD # Homologues	*2*	-	2	-	2	-	2	-	2	-
2,3,7,8-TCDF	*1.3 EMPC*	0.13000 EMPC	6.23	0.62300	11.8	1.18000	25.7	2.57000	33.8	3.38000
1,2,3,7,8-PeCDF	*0.68*	0.02040	0.61 J	0.01830 J	1.72	0.05160	0.96 J	0.02880 J	1.43 J	0.04290 J
2,3,4,7,8-PeCDF	*0.82*	0.24600	0.57 J	0.17100 J	2.34	0.70200	1.7	0.51000	1.77	0.53100
1,2,3,4,7,8-HxCDF	*1.5*	0.15000	0.35 U	0.01750 U	2.51	0.25100	1.06 J	0.10600 J	1.5 U	0.07500 U
1,2,3,6,7,8-HxCDF	*0.68*	0.06800	0.35 U	0.01750 U	2.15	0.21500	0.63 U	0.01800 U	1.5 U	0.07500 U
1,2,3,7,8,9-HxCDF	*0.31 J*	0.03100 J	0.44 U	0.02200 U	1.1 U	0.05500 U	0.43 U	0.02250 U	1.7 U	0.08500 U
2,3,4,6,7,8-HxCDF	*0.83*	0.08300	0.35 U	0.01750 U	0.94 U	0.04700 U	0.62 J	0.06200 J	1.6 U	0.08000 U
1,2,3,4,6,7,8-HpCDF	*10.9*	0.10900	0.83 UJ	0.00255 UJ	6.61	0.06610	8.5	0.08500	8	0.08000
1,2,3,4,7,8,9-HpCDF	*0.95*	0.00950	0.76 U	0.00380 U	2 J	0.02000	1.2 U	0.00600 U	2.3 U	0.00850 U
OCDF	*26.7*	0.00801	1.6 UJ	0.00011 UJ	13.3	0.00399	114	0.03420	41.9	0.01257
Total-TCDF	*30.5*	-	26.4	-	64.6	-	84.5	-	81.4	-
Total TCDF # Homologues	*21*	-	15	-	15	-	17	-	10	-
Total-PeCDF	*18.1*	-	4.13	-	23.9	-	12.4	-	8.75	-
Total PeCDF # Homologues	*14*	-	6	-	9	-	8	-	5	-
Total-HxCDF	*16.4*	-	1.44	-	13.8	-	11.3	-	3.3	-
Total HxCDF # Homologues	*8*	-	2	-	7	-	5	-	1	-
Total-HpCDF	*29.9*	-	1.35 U	-	6.6	-	45.4	-	28.8	-

Table 15
Dioxins and Furans in Sources/Subsurface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0102 L1080162-1 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	WHO TEF Concentration	SSSO0514 L1081891-21 Subsurface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0612 L1081891-22 Subsurface soil/source grab sample from sludge pond 17	WHO TEF Concentration	SSSO0716 L1080162-8 Subsurface soil/source grab sample from sludge pond 3	WHO TEF Concentration	SSSO0816 L1080162-10 Subsurface soil/source grab sample from sludge pond 3	WHO TEF Concentration
Total HpCDF # Homologues	*3*	-	1	-	1	-	2	-	2	-
WHO TEQ	-	2.16391	-	3.54546	-	5.80169	-	19.00820	-	23.00797

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/kg picograms per gram
ppt parts per trillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

Table 15, continued
Dioxins and Furans in Sources/Subsurface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0916 L1081891-24 Subsurface soil/source grab sample from sludge pond 5	WHO TEF Concentration	SSSO1110 L1081891-27 Subsurface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1306 L1081891-31 Subsurface soil/source grab sample from emergency spill pond 8 dry cell	WHO TEF Concentration
2,3,7,8-TCDD	3.6 J	3.60000 J	13.6	13.60000	0.05 U	0.26500 U
1,2,3,7,8-PeCDD	1 J	1.00000 J	0.85 J	0.85000 J	0.12 U	0.12000 U
1,2,3,4,7,8-HxCDD	1.5 U	0.07500 U	0.73 J	0.07300 J	0.11 U	0.00550 U
1,2,3,6,7,8-HxCDD	7	0.70000	15.8	1.58000	0.21 J	0.02100 J
1,2,3,7,8,9-HxCDD	3.3	0.33000	8.01	0.80100	0.12 U	0.00550 U
1,2,3,4,6,7,8-HpCDD	46.7	0.46700	115	1.15000	8.46	0.08460
OCDD	432	0.12960	839	0.25170	77.8	0.02334
Total-TCDD	1.06	-	15.7	-	0.4	-
Total TCDD # Homologues	1	-	4	-	2	-
Total-PeCDD	0.91 U	-	4.59	-	0.12 U	-
Total PeCDD # Homologues	0	-	4	-	0	-
Total-HxCDD	10.3	-	88.6	-	1.37	-
Total HxCDD # Homologues	2	-	4	-	4	-
Total-HpCDD	86	-	208	-	18.1	-
Total HpCDD # Homologues	2	-	2	-	2	-
2,3,7,8-TCDF	18.7	1.87000	41.3	4.13000	0.13 J	0.01300 J
1,2,3,7,8-PeCDF	7.95	0.23850	1.3 J	0.03900 J	0.49 U	0.00735 U
2,3,4,7,8-PeCDF	79.2	23.76000	1.9	0.57000	0.44 U	0.07350 U
1,2,3,4,7,8-HxCDF	249	24.90000	1 J	0.10000 J	0.58 J	0.05800 J
1,2,3,6,7,8-HxCDF	139	13.90000	0.59 J	0.05900 J	0.37 J	0.03700 J
1,2,3,7,8,9-HxCDF	24.5	2.45000	0.45 U	0.02250 U	0.12 U	0.00600 U
2,3,4,6,7,8-HxCDF	43.2	4.32000	0.47 UJ	0.01950 UJ	0.14 UJ	0.00475 UJ
1,2,3,4,6,7,8-HpCDF	73	0.73000	4.2 J	0.04200 J	0.58 J	0.00580 J
1,2,3,4,7,8,9-HpCDF	7.3	0.07300	0.88 U	0.00440 U	0.23 U	0.00065 U
OCDF	18.1	0.00543	20.1	0.00603	1.8	-
Total-TCDF	148	-	101	-	1.6	-
Total TCDF # Homologues	16	-	15	-	6	-
Total-PeCDF	430	-	7.16	-	0.49 U	-
Total PeCDF # Homologues	9	-	3	-	0	-
Total-HxCDF	772	-	7.57	-	1.09	-
Total HxCDF # Homologues	10	-	5	-	3	-
Total-HpCDF	97.5	-	13.5	-	1.09	-

Table 15, continued
Dioxins and Furans in Sources/Subsurface Soils
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0916 L1081891-24 Subsurface soil/source grab sample from sludge pond 5	WHO TEF Concentration	SSSO1110 L1081891-27 Subsurface soil/source grab sample from sludge pond 4	WHO TEF Concentration	SSSO1306 L1081891-31 Subsurface soil/source grab sample from emergency spill pond 8 dry cell	WHO TEF Concentration
Total HpCDF # Homologues	4	-	2	-	2	-
WHO TEQ	-	78.54853	-	23.29813	-	0.73099

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/kg picograms per gram
ppt parts per trillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
EMPC Indicates the presence of a partially coeluting interference that broadens the peak. The result is an estimated maximum possible concentration.
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM)

TABLE 16
VOCs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0514 H30Q5 Subsurface soil/source grab sample from sludge pond 17	SSSO0612 H30Q7 Subsurface soil/source grab sample from sludge pond 17	SSSO0716 H30Q9 Subsurface soil/source grab sample from sludge pond 3	SSSO0816 H30R1 Subsurface soil/source grab sample from sludge pond 3	SSSO0916 H30R3 Subsurface soil/source grab sample from sludge pond 5	SSSO1110 H30R7 Subsurface soil/source grab sample from sludge pond 4	SSSO1306 H30S1 Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Dichlorodifluoromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Chloromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Vinyl chloride	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Bromomethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Chloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Trichlorofluoromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,1-Dichloroethene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,1,2-Trichloro-1,2,2-trifluoroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Acetone	*12 U*	120	62	100	110	120	110	23
Carbon disulfide	*5.9 U*	11 U	16	13 U	11 U	17	8.9	3.3 J
Methyl acetate	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Methylene chloride	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.4 J	7 U
trans-1,2-Dichloroethene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Methyl tert-butyl ether	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,1-Dichloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
cis-1,2-Dichloroethene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
2-Butanone	*12 U*	23 U	30 U	25 U	23 U	27 U	30	14 U
Bromochloromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Chloroform	*5.9 U*	11 U	15 U	13 U	11 U	5.9 J	6.1 J	7 U
1,1,1-Trichloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Cyclohexane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Carbon tetrachloride	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Benzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2-Dichloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,4-Dioxane	*120 U*	230 U	300 U	250 U	230 U	270 U	130 U	140 U
Trichloroethene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Methylcyclohexane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2-Dichloropropane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Bromodichloromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
cis-1,3-Dichloropropene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U

TABLE 16
VOCs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0514 H30Q5 Subsurface soil/source grab sample from sludge pond 17	SSSO0612 H30Q7 Subsurface soil/source grab sample from sludge pond 17	SSSO0716 H30Q9 Subsurface soil/source grab sample from sludge pond 3	SSSO0816 H30R1 Subsurface soil/source grab sample from sludge pond 3	SSSO0916 H30R3 Subsurface soil/source grab sample from sludge pond 5	SSSO1110 H30R7 Subsurface soil/source grab sample from sludge pond 4	SSSO1306 H30S1 Subsurface soil/source grab sample from emergency spill pond 8 dry cell
4-Methyl-2-pentanone	*12 U*	23 U	30 U	25 U	23 U	27 U	13 U	14 U
Toluene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
trans-1,3-Dichloropropene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,1,2-Trichloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Tetrachloroethene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
2-Hexanone	*12 U*	23 U	30 U	25 U	23 U	27 U	13 U	14 U
Dibromochloromethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2-Dibromoethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Chlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Ethylbenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
o-Xylene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
m,p-Xylene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Styrene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Bromoform	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
Isopropylbenzene	*5.9 U*	11 U	15 U	13 U	10 J	36	6.7 U	7 U
1,1,2,2-Tetrachloroethane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,3-Dichlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,4-Dichlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2-Dichlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2-Dibromo-3-chloropropane	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2,4-Trichlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U
1,2,3-Trichlorobenzene	*5.9 U*	11 U	15 U	13 U	11 U	14 U	6.7 U	7 U

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U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits)

Table 17
SVOCs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID:	SSSO0102	SSSO0514	SSSO0612	SSSO0716	SSSO0816	SSSO0916	SSSO1110	SSSO1306
Laboratory Sample ID:	H30Q0	H30Q5	H30Q7	H30Q9	H30R1	H30R3	H30R7	H30S1
Location:	BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	Subsurface soil/source grab sample from sludge pond 17	Subsurface soil/source grab sample from sludge pond 17	Subsurface soil/source grab sample from sludge pond 3	Subsurface soil/source grab sample from sludge pond 3	Subsurface soil/source grab sample from sludge pond 5	Subsurface soil/source grab sample from sludge pond 4	Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Analytes								
Benzaldehyde	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Phenol	*200 U*	100 J	520 U	440 U	370 U	2400	220 U	230 U
Bis(2-chloroethyl)ether	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Chlorophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Methylphenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,2'-Oxybis(1-chloropropane)	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Acetophenone	*200 U*	94 J	520 U	440 U	370 U	460 U	220 U	230 U
4-Methylphenol	*200 U*	290 J	2400	600	790	1800	1900	230 U
N-Nitroso-di-n-propylamine	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Hexachloroethane	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Nitrobenzene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Isophorone	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Nitrophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4-Dimethylphenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Bis(2-chloroethoxy)methane	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4-Dichlorophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Naphthalene	*200 U*	95 J	190 J	110 J	110 J	460 U	110 J	230 U
4-Chloroaniline	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Hexachlorobutadiene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Caprolactam	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
4-Chloro-3-methylphenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Methylnaphthalene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Hexachlorocyclopentadiene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4,6-Trichlorophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4,5-Trichlorophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
1,1'-Biphenyl	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Chloronaphthalene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2-Nitroaniline	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
Dimethylphthalate	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,6-Dinitrotoluene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Acenaphthylene	*200 U*	380 U	320 J	440 U	77 J	460 U	100 J	230 U
3-Nitroaniline	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U

Table 17
SVOCs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0514 H30Q5 Subsurface soil/source grab sample from sludge pond 17	SSSO0612 H30Q7 Subsurface soil/source grab sample from sludge pond 17	SSSO0716 H30Q9 Subsurface soil/source grab sample from sludge pond 3	SSSO0816 H30R1 Subsurface soil/source grab sample from sludge pond 3	SSSO0916 H30R3 Subsurface soil/source grab sample from sludge pond 5	SSSO1110 H30R7 Subsurface soil/source grab sample from sludge pond 4	SSSO1306 H30S1 Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Acenaphthene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4-Dinitrophenol	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
4-Nitrophenol	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
Dibenzofuran	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,4-Dinitrotoluene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Diethylphthalate	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Fluorene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
4-Chlorophenyl-phenylether	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
4-Nitroaniline	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
4,6-Dinitro-2-methylphenol	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
N-Nitrosodiphenylamine	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
1,2,4,5-Tetrachlorobenzene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
4-Bromophenyl-phenylether	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Hexachlorobenzene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Atrazine	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Pentachlorophenol	*380 U*	740 U	1000 U	860 U	720 U	890 U	430 U	450 U
Phenanthrene	*200 U*	100 J	490 J	120 J	230 J	460 U	280	230 U
Anthracene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Carbazole	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Di-n-butylphthalate	*61 J (610)*	1600	5900	740	1400	1500	620	230 U
Fluoranthene	*200 U*	130 J	520 U	93 J	120 J	460 U	260	230 U
Pyrene	*200 U*	380 U	520 U	110 J	160 J	460 U	250	230 U
Butylbenzylphthalate	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
3,3'-Dichlorobenzidine	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Benzo(a)anthracene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Chrysene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Bis(2-ethylhexyl)phthalate	*81 J*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Di-n-octylphthalate	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Benzo(b)fluoranthene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Benzo(k)fluoranthene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Benzo(a)pyrene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Indeno(1,2,3-cd)pyrene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U

Table 17
SVOCs in Sources/Subsurface Soils
Units of µg/kg (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSO0102 H30Q0 BACKGROUND Surface soil grab sample from mill property to the north (upwind) of potential source areas	SSSO0514 H30Q5 Subsurface soil/source grab sample from sludge pond 17	SSSO0612 H30Q7 Subsurface soil/source grab sample from sludge pond 17	SSSO0716 H30Q9 Subsurface soil/source grab sample from sludge pond 3	SSSO0816 H30R1 Subsurface soil/source grab sample from sludge pond 3	SSSO0916 H30R3 Subsurface soil/source grab sample from sludge pond 5	SSSO1110 H30R7 Subsurface soil/source grab sample from sludge pond 4	SSSO1306 H30S1 Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Dibenzo(a,h)anthracene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
Benzo(g,h,i)perylene	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U
2,3,4,6-Tetrachlorophenol	*200 U*	380 U	520 U	440 U	370 U	460 U	220 U	230 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values.
Sources: EPA 2011 (CLP limits)

Table 18
Total Metals and Asbestos in Sources/Subsurface Soils
Units of mg/kg (ppm)

Field Sample ID:	SSSO0102	SSSO0514	SSSO0612	SSSO0716	SSSO0816	SSSO0916	SSSO1110	SSSO1306
Laboratory Sample ID:	H30Q0	H30Q5	H30Q7	H30Q9	H30R1	H30R3	H30R7	H30S1
	BACKGROUND							
Location:	Surface soil grab sample from mill property to the north (upwind) of potential source areas	Subsurface soil/source grab sample from sludge pond 17	Subsurface soil/source grab sample from sludge pond 17	Subsurface soil/source grab sample from sludge pond 3	Subsurface soil/source grab sample from sludge pond 3	Subsurface soil/source grab sample from sludge pond 5	Subsurface soil/source grab sample from sludge pond 4	Subsurface soil/source grab sample from emergency spill pond 8 dry cell
Analytes								
Asbestos Content (%)	*ND*	NA	NA	NA	NA	NA	NA	NA
Dilution Factor								
Aluminum	*10,300*	3,550	2,810	8,480	1,720	4,580	3,800	10,200
Antimony	*0.73 J+*	10.9 UJ	14.5 UJ	0.38 J+ (0.19)	14.2 J+ (7.2)	11.2 UJ	10.5 UJ	5.8 UJ
Arsenic	*8.5* ☆	3.0 J+ (1.7)	3.9 J+ (2.2)	2.0 UJ	2.4 UJ	3.3 J+ (1.9)	5.4 J+ (3.1)	2.0 J+ (1.1)
Barium	*232*	355 J (88.9)	317 J (79.4)	173	374	393 J (98.5)	475 J (119)	204 J (51.1)
Beryllium	*0.9 J+*	0.1 J (0.08)	1.2 UJ	0.79 J+ (0.62)	1.2 U	0.14 J (0.11)	0.12 J (0.09)	0.81 J (0.63)
Cadmium	*1.5 J+*	1.6 J+ (1.1)	1.8 J+ (1.3)	0.58 J+ (0.41)	0.61 J+ (0.43)	1.4 J+ (1.0)	2.6 J+ (1.8)	0.73 J+ (0.52)
Calcium	*6,540*	283,000 J (221,093)	126,000 J (98,438)	1,890	149,000	198,000 J (154,688)	183,000 J (142,969)	2,660 J (2,078)
Chromium	*11.0*	14.7 J (11.4)	14.8 J (11.5)	11.5	11.0	25.5 J (19.7)	18.7 J (14.5)	11.8 J (9.2)
Cobalt	*5.6 J (7.0)*	9.1 UJ	12.0 UJ	3.8 J (3.0)	0.16 J (0.13)	9.4 UJ	8.7 UJ	4.8 UJ
Copper	*71.7*	16.2 J (13.3)	30.0 J (24.6)	16.5	33.2	25.6 J (21.0)	21.0 J (17.2)	16.6 J (13.6)
Iron	*14,700*	2,600	1,520	12,500	1,320	3,380	2,720	12,700
Lead	*19.6*	6.7 UJ	7.7 UJ	7.9	7.2	10.2 J (7.1)	9.1 J (6.3)	9.2 J (6.4)
Magnesium	*6,250*	6,370	7,140	5,280	2,910	9,090	4,830	4,760
Manganese	*435*	870	1,220	89.7	514	717	1,180	104
Nickel	*9.8*	10.0 J (7.4)	11.4 J (8.4)	7.1	3.4 J (2.5)	25.9 J (19.2)	5.8 J (4.3)	8.3 J (6.1)
Potassium	*2,580*	912 UJ	1,200 UJ	1,890	518 J-	1,080 J (61.7)	871 UJ	1,800 J (102.9)
Selenium	*3.9 U*	6.4 UJ	0.69 J-	4.5 U	8.3 U	1.2 J-	0.99 J-	3.4 UJ
Silver	*1.1 UJ*	0.58 J-	1.4 J-	1.3 UJ	2.4 UJ	0.57 J-	0.49 J-	0.96 UJ
Sodium	*149 J (3789)*	4,400	4,100	1,010	3,980	9,420	4,280	1,240
Thallium	*2.8 U*	4.6 U	6.0 U	3.2 U	5.9 U	4.7 U	4.4 U	2.4 U
Vanadium	*15.9*	9.1 UJ	12 UJ	14.4	11.9 UJ	14.9 J (11.1)	8.7 UJ	15.5 J (11.6)
Zinc	*235*	107 J (71.3)	175 J (117)	41.1	90.8	128 J (85.3)	137 J (91.3)	37.1 J (24.7)

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
J+ The associated numerical value is an estimated quantity but the result may be biased high.
J- The associated numerical value is an estimated quantity but the result may be biased low.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/kg milligrams per kilogram
ppm parts per million
X.X Analytical Result > 3 x background value = observed contamination
Italic Background sample
(23.4) Adjusted value- estimated results have been adjusted per HRS guidelines and are to be used for comparison to background values

Table 19
PCBs in Surface Water
Units of µg/L

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
Aroclor-1016	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1221	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1232	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1242	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1248	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1254	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1260	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1262	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ
Aroclor-1268	-	-	-	-	-	*1 UJ*	1 UJ	1 UJ	*1 UJ*	1 UJ	1 UJ

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U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
µg/L microgram per liter
Italic Background sample
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

Table 19, continued
PCBs in Surface Water
Units of µg/

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank
Aroclor-1016	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1221	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1232	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1242	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1248	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1254	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1260	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1262	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1268	-	-	-	-	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
µg/L microgram per liter
Italic Background sample
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 20
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 L1080162-31 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	WHO TEF Concentration	SSSW02 L1080162-32 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	WHO TEF Concentration	SSSW03 L1080162-33 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	WHO TEF Concentration
2,3,7,8-TCDD	-	-	-	-	-	*0.48 U*	0.24000 U	0.56 U	0.28000 U	0.52 U	0.26000 U
1,2,3,7,8-PeCDD	-	-	-	-	-	*0.52 U*	0.26000 U	0.55 U	0.27500 U	0.71 U	0.35500 U
1,2,3,4,7,8-HxCDD	-	-	-	-	-	*0.39 U*	0.01950 U	0.43 U	0.02150 U	0.46 U	0.02300 U
1,2,3,6,7,8-HxCDD	-	-	-	-	-	*0.49 J*	0.04900 J	0.44 U	0.02200 U	0.48 U	0.02400 U
1,2,3,7,8,9-HxCDD	-	-	-	-	-	*0.47 J*	0.04700 J	0.44 U	0.02200 U	0.47 U	0.02350 U
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	*1.79 U*	0.00210 U	1.69 U	0.00240 U	1.86 U	0.00190 U
OCDD	-	-	-	-	-	*8.7 U*	0.00018 U	7.86 U	0.00010 U	10 UJ	0.00004 UJ
Total-TCDD	-	-	-	-	-	*0.48 U*	-	0.56 U	-	0.52 U	-
Total TCDD # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-PeCDD	-	-	-	-	-	*0.52 U*	-	0.55 U	-	0.71 U	-
Total PeCDD # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-HxCDD	-	-	-	-	-	*0.47*	-	0.44 U	-	0.48 U	-
Total HxCDD # Homologues	-	-	-	-	-	*1*	-	0	-	0	-
Total-HpCDD	-	-	-	-	-	*3.24*	-	1.69	-	1.86	-
Total HpCDD # Homologues	-	-	-	-	-	*2*	-	1	-	1	-
2,3,7,8-TCDF	-	-	-	-	-	*0.39 U*	0.01950 U	0.44 U	0.02200 U	0.45 U	0.02250 U
1,2,3,7,8-PeCDF	-	-	-	-	-	*0.37 U*	0.00555 U	0.26 U	0.00390 U	0.33 U	0.00495 U
2,3,4,7,8-PeCDF	-	-	-	-	-	*0.45 UJ*	0.04650 UJ	0.48 UJ	0.03300 UJ	0.42 UJ	0.04650 UJ
1,2,3,4,7,8-HxCDF	-	-	-	-	-	*0.26 U*	0.01300 U	0.21 U	0.01050 U	0.35 U	0.01750 U
1,2,3,6,7,8-HxCDF	-	-	-	-	-	*0.26 U*	0.01300 U	0.26 J	0.01050 J	0.33 U	0.01650 U
1,2,3,7,8,9-HxCDF	-	-	-	-	-	*0.64 UJ*	0.01600 UJ	0.48 UJ	0.01900 UJ	0.42 U	0.02100 U
2,3,4,6,7,8-HxCDF	-	-	-	-	-	*0.36 J*	0.03600 J	0.22 U	0.01100 U	0.34 U	0.01700 U
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	*0.33 U*	0.00165 U	0.26 U	0.00130 U	0.22 U	0.00110 U
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	*0.55 UJ*	0.00235 UJ	0.38 U	0.00190 U	0.4 UJ	0.00160 UJ
OCDF	-	-	-	-	-	*1.6 UJ*	0.00006 UJ	0.99 UJ	0.00007 UJ	0.6 U	0.00009 U
Total-TCDF	-	-	-	-	-	*0.39 U*	-	0.44 U	-	0.45 U	-
Total TCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-PeCDF	-	-	-	-	-	*0.37 U*	-	0.26 U	-	0.33 U	-
Total PeCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-HxCDF	-	-	-	-	-	*0.36 U*	-	0.26 U	-	0.42 U	-
Total HxCDF # Homologues	-	-	-	-	-	*1*	-	0	-	0	-
Total-HpCDF	-	-	-	-	-	*0.47 U*	-	0.38 U	-	0.32 U	-

TABLE 20
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 L1080162-31 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	WHO TEF Concentration	SSSW02 L1080162-32 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	WHO TEF Concentration	SSSW03 L1080162-33 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
WHO TEQ	-	-	-	-	0.05	-	0.77139 ☆	-	0.73617 ☆	-	0.83618 ☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW04 L1080162-34 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	WHO TEF Concentration	SSSW05 L1080162-35 Grab sample collected from the Clark Fork River adjacent to pond 2	WHO TEF Concentration	SSSW06 L1080162-36 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	WHO TEF Concentration
2,3,7,8-TCDD	-	-	-	-	-	*1.1 UJ*	0.55000 UJ	0.97 UJ	0.48500 UJ	0.49 U	0.24500 U
1,2,3,7,8-PeCDD	-	-	-	-	-	*0.61 U*	0.30500 U	0.71 U	0.35500 U	0.65 U	0.32500 U
1,2,3,4,7,8-HxCDD	-	-	-	-	-	*0.72 U*	0.03600 U	0.59 U	0.02950 U	0.34 U	0.01700 U
1,2,3,6,7,8-HxCDD	-	-	-	-	-	*0.76 U*	0.03800 U	0.63 U	0.03150 U	0.36 U	0.01800 U
1,2,3,7,8,9-HxCDD	-	-	-	-	-	*0.75 U*	0.03750 U	0.61 U	0.03050 U	0.36 U	0.01800 U
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	*0.78 U*	0.00180 U	0.65 UJ	0.00195 UJ	0.43 U	0.00215 U
OCDD	-	-	-	-	-	*2.99 U*	0.00011 U	3.2 U	0.00017 U	2.3 UJ	0.00013 UJ
Total-TCDD	-	-	-	-	-	*1.1 UJ*	-	0.97 UJ	-	0.49 U	-
Total TCDD # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-PeCDD	-	-	-	-	-	*0.61 U*	-	0.71 U	-	0.65 U	-
Total PeCDD # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-HxCDD	-	-	-	-	-	*0.76 U*	-	1.23	-	0.36 U	-
Total HxCDD # Homologues	-	-	-	-	-	*0*	-	2	-	0	-
Total-HpCDD	-	-	-	-	-	*0.78*	-	0.39 U	-	0.43 U	-
Total HpCDD # Homologues	-	-	-	-	-	*1*	-	0	-	0	-
2,3,7,8-TCDF	-	-	-	-	-	*0.47 U*	0.02350 U	0.41 U	0.02050 U	0.46 U	0.02300 U
1,2,3,7,8-PeCDF	-	-	-	-	-	*0.35 U*	0.00525 U	0.47 U	0.00705 U	0.34 U	0.00510 U
2,3,4,7,8-PeCDF	-	-	-	-	-	*0.32 U*	0.04800 U	0.46 U	0.06900 U	0.31 U	0.04650 U
1,2,3,4,7,8-HxCDF	-	-	-	-	-	*0.21 U*	0.01050 U	0.25 U	0.01250 U	0.23 U	0.01150 U
1,2,3,6,7,8-HxCDF	-	-	-	-	-	*0.2 U*	0.01000 U	0.24 U	0.01200 U	0.22 U	0.01100 U
1,2,3,7,8,9-HxCDF	-	-	-	-	-	*0.27 U*	0.01350 U	0.34 U	0.01700 U	0.27 U	0.01350 U
2,3,4,6,7,8-HxCDF	-	-	-	-	-	*0.22 U*	0.01100 U	0.28 U	0.01400 U	0.23 U	0.01150 U
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	*0.19 UJ*	0.00080 UJ	0.23 U	0.00140 U	0.28 U	0.00140 U
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	*0.63 U*	0.00120 U	0.33 U	0.00170 U	0.41 U	0.00205 U
OCDF	-	-	-	-	-	*0.46 U*	0.00007 U	0.64 U	0.00010 U	0.65 U	0.00010 U
Total-TCDF	-	-	-	-	-	*0.47 U*	-	0.41 U	-	0.46 U	-
Total TCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-PeCDF	-	-	-	-	-	*0.35 U*	-	0.47 U	-	0.34 U	-
Total PeCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-HxCDF	-	-	-	-	-	*0.27 U*	-	0.34 U	-	0.27 U	-
Total HxCDF # Homologues	-	-	-	-	-	*0*	-	0	-	0	-
Total-HpCDF	-	-	-	-	-	*0.63 U*	-	0.33 U	-	0.41 U	-

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW04 L1080162-34 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	WHO TEF Concentration	SSSW05 L1080162-35 Grab sample collected from the Clark Fork River adjacent to pond 2	WHO TEF Concentration	SSSW06 L1080162-36 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	-	*1*	-	0	-	0	-
WHO TEQ	-	-	-	-	0.05	-	1.09223 ☆	-	1.08886 ☆	-	0.75093 ☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 L1080162-37 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	WHO TEF Concentration	SSSW08 L1080162-38 Grab sample collected from Clark Fork River adjacent to pond 13	WHO TEF Concentration	SSSW09 L1080162-39 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	WHO TEF Concentration
2,3,7,8-TCDD	-	-	-	-	-	0.42 U	0.21000 U	0.58 U	0.29000 U	0.48 U	0.24000 U
1,2,3,7,8-PeCDD	-	-	-	-	-	0.66 U	0.33000 U	0.56 U	0.28000 U	0.66 U	0.33000 U
1,2,3,4,7,8-HxCDD	-	-	-	-	-	0.19 U	0.00950 U	0.55 U	0.02750 U	0.36 U	0.01800 U
1,2,3,6,7,8-HxCDD	-	-	-	-	-	0.2 U	0.01000 U	0.55 U	0.02750 U	0.37 U	0.01850 U
1,2,3,7,8,9-HxCDD	-	-	-	-	-	0.2 U	0.01000 U	0.55 U	0.02750 U	0.37 U	0.01850 U
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	0.55 UJ	0.00215 UJ	1.02 U	0.00215 U	0.78 UJ	0.20670 U
OCDD	-	-	-	-	-	2.54 U	0.00007 U	2.9 UJ	0.00007 UJ	1.9 UJ	0.00017 UJ
Total-TCDD	-	-	-	-	-	0.42 U	-	0.58 U	-	0.48 U	-
Total TCDD # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-PeCDD	-	-	-	-	-	0.66 U	-	0.56 U	-	0.66 U	-
Total PeCDD # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-HxCDD	-	-	-	-	-	0.2 U	-	0.55 U	-	0.37 U	-
Total HxCDD # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-HpCDD	-	-	-	-	-	0.43 U	-	1.02	-	0.53 U	-
Total HpCDD # Homologues	-	-	-	-	-	0	-	1	-	0	-
2,3,7,8-TCDF	-	-	-	-	-	0.3 U	0.01500 U	0.51 U	0.00255 U	0.46 U	0.02300 U
1,2,3,7,8-PeCDF	-	-	-	-	-	0.29 U	0.00435 U	0.36 U	0.00540 U	0.31 U	0.00465 U
2,3,4,7,8-PeCDF	-	-	-	-	-	0.26 U	0.03900 U	0.3 U	0.04500 U	0.28 U	0.04200 U
1,2,3,4,7,8-HxCDF	-	-	-	-	-	0.18 U	0.00900 U	0.25 U	0.01250 U	0.21 U	0.01050 U
1,2,3,6,7,8-HxCDF	-	-	-	-	-	0.18 U	0.00900 U	0.26 U	0.01300 U	0.21 U	0.01050 U
1,2,3,7,8,9-HxCDF	-	-	-	-	-	0.23 U	0.01150 U	0.31 U	0.01550 U	0.27 U	0.01350 U
2,3,4,6,7,8-HxCDF	-	-	-	-	-	0.19 U	0.00950 U	0.25 U	0.01250 U	0.22 U	0.01100 U
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	0.23 U	0.00115 U	0.17 U	0.00155 U	0.3 U	0.00150 U
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	0.34 U	0.00170 U	0.26 U	0.00130 U	0.41 U	0.00205 U
OCDF	-	-	-	-	-	0.51 U	0.00008 U	0.65 U	0.00010 U	0.8 U	0.00012 U
Total-TCDF	-	-	-	-	-	0.3 U	-	0.51 U	-	0.46 U	-
Total TCDF # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-PeCDF	-	-	-	-	-	0.29 U	-	0.36 U	-	0.31 U	-
Total PeCDF # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-HxCDF	-	-	-	-	-	0.23 U	-	0.31 U	-	0.27 U	-
Total HxCDF # Homologues	-	-	-	-	-	0	-	0	-	0	-
Total-HpCDF	-	-	-	-	-	0.34 U	-	0.26 U	-	0.41 U	-

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 L1080162-37 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	WHO TEF Concentration	SSSW08 L1080162-38 Grab sample collected from Clark Fork River adjacent to pond 13	WHO TEF Concentration	SSSW09 L1080162-39 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	-	0	-	0	-	0	-
WHO TEQ					0.05		0.67200 ☆		0.76412 ☆		0.95069 ☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
☆ Concentration is > benchmark
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW10 L1080162-40 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	WHO TEF Concentration	SSSW89 L1081891-20 Rinsate blank	WHO TEF Concentration
2,3,7,8-TCDD	-	-	-	-	-	0.7 U	0.35000 U	0.9 U	0.45000 U
1,2,3,7,8-PeCDD	-	-	-	-	-	0.77 U	0.38500 U	0.84 U	0.42000 U
1,2,3,4,7,8-HxCDD	-	-	-	-	-	0.56 U	0.02800 U	0.4 U	0.02000 U
1,2,3,6,7,8-HxCDD	-	-	-	-	-	0.57 U	0.02850 U	0.42 U	0.02100 U
1,2,3,7,8,9-HxCDD	-	-	-	-	-	0.57 U	0.02850 U	0.41 U	0.02050 U
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	0.54 UJ	0.00270 UJ	0.82 U	0.00410 U
OCDD	-	-	-	-	-	0.9 UJ	0.00011 UJ	1.5 U	0.00023 U
Total-TCDD	-	-	-	-	-	0.7 U	-	0.9 U	-
Total TCDD # Homologues	-	-	-	-	-	0	-	0	-
Total-PeCDD	-	-	-	-	-	0.77 U	-	0.84 U	-
Total PeCDD # Homologues	-	-	-	-	-	0	-	0	-
Total-HxCDD	-	-	-	-	-	0.57 U	-	0.42 U	-
Total HxCDD # Homologues	-	-	-	-	-	0	-	0	-
Total-HpCDD	-	-	-	-	-	0.54 U	-	0.82 U	-
Total HpCDD # Homologues	-	-	-	-	-	0	-	0	-
2,3,7,8-TCDF	-	-	-	-	-	0.37 U	0.01850 U	0.61 U	0.03050 U
1,2,3,7,8-PeCDF	-	-	-	-	-	0.33 U	0.00495 U	0.35 U	0.00525 U
2,3,4,7,8-PeCDF	-	-	-	-	-	0.29 U	0.04350 U	0.33 U	0.04950 U
1,2,3,4,7,8-HxCDF	-	-	-	-	-	0.25 U	0.01250 U	0.3 U	0.01500 U
1,2,3,6,7,8-HxCDF	-	-	-	-	-	0.24 U	0.01200 U	0.31 U	0.01550 U
1,2,3,7,8,9-HxCDF	-	-	-	-	-	0.31 U	0.01550 U	0.41 U	0.02050 U
2,3,4,6,7,8-HxCDF	-	-	-	-	-	0.25 U	0.01250 U	0.35 U	0.01750 U
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	0.22 U	0.00110 U	0.51 U	0.00255 U
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	0.3 U	0.00150 U	0.82 U	0.00410 U
OCDF	-	-	-	-	-	0.47 U	0.00007 U	1.1 U	0.00017 U
Total-TCDF	-	-	-	-	-	0.37 U	-	0.61 U	-
Total TCDF # Homologues	-	-	-	-	-	0	-	0	-
Total-PeCDF	-	-	-	-	-	0.33 U	-	0.35 U	-
Total PeCDF # Homologues	-	-	-	-	-	0	-	0	-
Total-HxCDF	-	-	-	-	-	0.31 U	-	0.41 U	-
Total HxCDF # Homologues	-	-	-	-	-	0	-	0	-
Total-HpCDF	-	-	-	-	-	0.3 U	-	0.82 U	-

TABLE 20, continued
Dioxins and Furans in Surface Water
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW10 L1080162-40 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	WHO TEF Concentration	SSSW89 L1081891-20 Rinsate blank	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	-	0	-	0	-
WHO TEQ					0.05	-	0.94493 ☆	-	1.09639 ☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
☆ Concentration is > benchmark
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 21
VOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2
Dichlorodifluoromethane	-	-	-	-	1,000	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Chloromethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Vinyl chloride	-	-	-	-	0.25	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Bromomethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Chloroethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	-	-	-	-	10,000	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	-	-	-	-	0.57	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Acetone	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U	5 U
Carbon disulfide	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Methyl acetate	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Methylene chloride	-	-	-	-	5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	-	-	-	-	30	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Methyl ethyl ketone (2-Butanone)	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U	5 U
Bromochloromethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Chloroform	-	-	-	-	57	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	-	-	-	-	200	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Cyclohexane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	-	-	-	-	2.3	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Benzene	-	-	-	-	5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	-	-	-	-	3.8	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Trichloroethene	-	-	-	-	5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Methylcyclohexane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	-	-	-	-	5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Bromodichloromethane	-	-	-	-	5.5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone (MIBK)	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U	5 U
Toluene	-	-	-	-	1,000	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	-	-	-	-	3	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U

TABLE 21
VOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2
Tetrachloroethene	-	-	-	-	5	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
2-Hexanone	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U	5 U
Dibromochloromethane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	-	-	-	-	0.004	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Chlorobenzene	-	-	-	-	100	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Ethyl benzene	-	-	-	-	530	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
o-Xylene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
m,p-Xylene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Styrene	-	-	-	-	100	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Bromoform	-	-	-	-	43	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
Isopropylbenzene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	-	-	-	-	1.7	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	-	-	-	-	320	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	-	-	-	-	75	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	-	-	-	-	420	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	-	-	-	-	35	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	-	-	-	-	-	*0.5 U*	0.5 U	0.5 U	*0.5 U*	0.5 U	0.5 U	0.5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µ/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

Table 21, continued
VOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank	SSSW99A H30S7 Trip blank	SSSW99B H3BA1 Trip blank
Dichlorodifluoromethane	-	-	-	-	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	-	-	-	-	0.25	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	-	-	-	-	10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	-	-	-	-	0.57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	-	-	-	-	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	-	-	-	-	30	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl ethyl ketone (2-Butanone)	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	-	-	-	-	57	0.5 U	0.5 U	0.5 U	0.65	0.64	0.39 J
1,1,1-Trichloroethane	-	-	-	-	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	-	-	-	-	2.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	-	-	-	-	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	-	-	-	-	3.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	-	-	-	-	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	-	-	-	-	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	-	-	-	-	5.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone (MIBK)	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	-	-	-	-	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	-	-	-	-	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	-	-	-	-	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U

Table 21, continued
VOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank	SSSW99A H30S7 Trip blank	SSSW99B H3BA1 Trip blank
Dibromochloromethane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	-	-	-	-	0.004	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	-	-	-	-	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethyl benzene	-	-	-	-	530	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	-	-	-	-	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	-	-	-	-	43	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	-	-	-	-	1.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	-	-	-	-	320	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	-	-	-	-	75	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	-	-	-	-	420	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	-	-	-	-	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

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U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µ/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 22
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
Benzaldehyde	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Phenol	-	-	-	-	300	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Bis(2-chloroethyl)ether	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Chlorophenol	-	-	-	-	81	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Methylphenol	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,2'-Oxybis(1-chloropropane)	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Acetophenone	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
4-Methylphenol	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
N-Nitroso-di-n-propylamine	-	-	-	-	0.05	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Hexachloroethane	-	-	-	-	14	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Nitrobenzene	-	-	-	-	17	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Isophorone	-	-	-	-	350	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Nitrophenol	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,4-Dimethylphenol	-	-	-	-	380	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Bis(2-chloroethoxy)methane	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,4-Dichlorophenol	-	-	-	-	77	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Naphthalene	-	-	-	-	100	*5 U*	5 U	5 U	*5 U*	5 U	5 U
4-Chloroaniline	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Hexachlorobutadiene	-	-	-	-	4.4	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Caprolactam	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
4-Chloro-3-methylphenol	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Methylnaphthalene	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Hexachlorocyclopentadiene	-	-	-	-	40	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,4,6-Trichlorophenol	-	-	-	-	14	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,4,5-Trichlorophenol	-	-	-	-	1800	*5 U*	5 U	5 U	*5 U*	5 U	5 U
1,1'-Biphenyl	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Chloronaphthalene	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2-Nitroaniline	-	-	-	-	-	*10 U*	10 U	10 U	*10 U*	10 U	10 U
Dimethylphthalate	-	-	-	-	270,000	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,6-Dinitrotoluene	-	-	-	-	0.5	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Acenaphthylene	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
3-Nitroaniline	-	-			-	*10 U*	10 U	10 U	*10 U*	10 U	10 U
Acenaphthene	-	-	-	-	670	*5 U*	5 U	5 U	*5 U*	5 U	5 U

TABLE 22
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
2,4-Dinitrophenol	-	-			69	*10 U*	10 U	10 U	*10 U*	10 U	10 U
4-Nitrophenol	-	-	-	-	60	*10 U*	10 U	10 U	*10 U*	10 U	10 U
Dibenzofuran	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
2,4-Dinitrotoluene	-	-	-	-	1.1	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Diethylphthalate	-	-	-	-	17,000	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Fluorene	-	-	-	-	1,100	*5 U*	5 U	5 U	*5 U*	5 U	5 U
4-Chlorophenyl-phenylether	-	-	-	-	-	*5 U*	5 U	*5 U*	5 U	5 U	5 U
4-Nitroaniline	-	-	-	-	-	*10 U*	10 U	10 U	*10 U*	10 U	10 U
4,6-Dinitro-2-methylphenol	-	-	-	-	-	*10 U*	10 U	10 U	*10 U*	10 U	10 U
N-Nitrosodiphenylamine	-	-	-	-	33	*5 U*	5 U	5 U	*5 U*	5 U	5 U
1,2,4,5-Tetrachlorobenzene	-	-	-	-	0.97	*5 U*	5 U	5 U	*5 U*	5 U	5 U
4-Bromophenyl-phenylether	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Hexachlorobenzene	-	-	-	-	0.0028	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Atrazine	-	-	-	-	3	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Pentachlorophenol	-	-	52*	40*	1	*10 U*	10 U	10 U	*10 U*	10 U	10 U
Phenanthrene	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Anthracene	-	-	-	-	8300	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Carbazole	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Di-n-butylphthalate	-	-	-	-	2000	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Fluoranthene	-	-	-	-	130	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Pyrene	-	-	-	-	830	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Butylbenzylphthalate	-	-	-	-	1500	*5 U*	5 U	5 U	*5 U*	5 U	5 U
3,3'-Dichlorobenzidine	-	-	-	-	0.21	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Benzo(a)anthracene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Chrysene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Di-n-octylphthalate	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Benzo(b)fluoranthene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Benzo(k)fluoranthene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Benzo(a)pyrene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Indeno(1,2,3-cd)pyrene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Dibenzo(a,h)anthracene	-	-	-	-	0.038	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Benzo(g,h,i)perylene	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U

TABLE 22
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
2,3,4,6-Tetrachlorophenol	-	-	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U

* Freshwater Aquatic Life Standards for pentachlorophenol are expressed as a function of average pH of surface water samples.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µ/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 22, continued
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank
Benzaldehyde	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Phenol	-	-	-	-	300	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethyl)ether	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2-Chlorophenol	-	-	-	-	81	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2,2'-Oxybis(1-chloropropane)	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Acetophenone	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
4-Methylphenol	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	-	-	-	-	0.05	5 U	5 U	5 U	5 U	5 U
Hexachloroethane	-	-	-	-	14	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	-	-	-	-	17	5 U	5 U	5 U	5 U	5 U
Isophorone	-	-	-	-	350	5 U	5 U	5 U	5 U	5 U
2-Nitrophenol	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	-	-	-	-	380	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethoxy)methane	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	-	-	-	-	77	5 U	5 U	5 U	5 U	5 U
Naphthalene	-	-	-	-	100	5 U	5 U	5 U	5 U	5 U
4-Chloroaniline	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene	-	-	-	-	4.4	5 U	5 U	5 U	5 U	5 U
Caprolactam	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	-	-	-	-	40	5 U	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	-	-	-	-	14	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	-	-	-	-	1800	5 U	5 U	5 U	5 U	5 U
1,1'-Biphenyl	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2-Chloronaphthalene	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2-Nitroaniline	-	-	-	-	-	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	-	-	-	-	270000	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	-	-	-	-	0.5	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	-	-			-	10 U	10 U	10 U	10 U	10 U
Acenaphthene	-	-	-	-	670	5 U	5 U	5 U	5 U	5 U

TABLE 22, continued
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank
2,4-Dinitrophenol	-	-			69	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	-	-	-	-	60	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	-	-	-	-	1.1	5 U	5 U	5 U	5 U	5 U
Diethylphthalate	-	-	-	-	17000	5 U	5 U	5 U	5 U	1.2 J
Fluorene	-	-	-	-	1100	5 U	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
4-Nitroaniline	-	-	-	-	-	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	-	-	-	-	-	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	-	-	-	-	33	5 U	5 U	5 U	5 U	5 U
1,2,4,5-Tetrachlorobenzene	-	-	-	-	0.97	5 U	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	-	-	-	-	0.0028	5 U	5 U	5 U	5 U	5 U
Atrazine	-	-	-	-	3	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	-	-	52*	40*	1	10 U	10 U	10 U	10 U	10 U
Phenanthrene	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Anthracene	-	-	-	-	8300	5 U	5 U	5 U	5 U	5 U
Carbazole	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Di-n-butylphthalate	-	-	-	-	2000	5 U	5 U	5 U	5 U	5 U
Fluoranthene	-	-	-	-	130	5 U	5 U	5 U	5 U	5 U
Pyrene	-	-	-	-	830	5 U	5 U	5 U	5 U	5 U
Butylbenzylphthalate	-	-	-	-	1500	5 U	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	-	-	-	-	0.21	5 U	5 U	5 U	5 U	5 U
Benzo(a)anthracene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Chrysene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Di-n-octylphthalate	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Benzo(a)pyrene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Dibenzo(a,h)anthracene	-	-	-	-	0.038	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U

TABLE 22, continued
SVOCs in Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Acute)	Superfund Chemical Data Matrix (SCDM) Surface Water Pathway Environmental (Chronic)	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank
2,3,4,6-Tetrachlorophenol	-	-	-	-	-	5 U	5 U	5 U	5 U	5 U

* Freshwater Aquatic Life Standards for pentachlorophenol are expressed as a function of average pH of surface water samples.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µ/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 23
Total Metals Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW01 H30T9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 H30W0 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 H30W1 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 H30W2 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 H30W3 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 H30W4 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
Dilution Factor	-	-	-						
Aluminum (dissolved**)	750	87	-	*17.5 J (22.8)*	116 ☆	19.4 J (14.9)	*6.9 J (11.5)*	8.0 J (6.2)	10.7 J (8.2)
Aluminum		-	-	*147*	149	131	*37.1*	35.7	34.1
Antimony	-	-	5.6	*2 U*	2 U	2 U	*2 U*	2 U	2 U
Arsenic	340	150	10	*1.7*	1.8	1.8	*2.7*	2.8	2.9
Barium	-	-	2000	*167*	169	168	*93.3*	94.3	93.2
Beryllium	-	-	4	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Cadmium	2.35*	0.29*	5	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Calcium	-	-	-	*26,900*	27,900	27,400	*29,600*	29,700	29,200
Chromium	-	-	100	*2 U*	2 U	2 U	*2 U*	2 U	2 U
Cobalt	-	-	-	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Copper	15.32*	10.12*	1300	*2 U*	2 U	2 U	*3.6*	3.2	3.3
Iron	-	1000	300	*218*	224	214	*200 U*	200 U	200 U
Lead	92.22*	3.59*	15	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Magnesium	-	-	-	*11,600*	11,800	11,800	*8,350*	8,420	8,430
Manganese	-	-	50	*6.4*	7.7	9	*23.3*	43.5	40.9
Nickel	508.72*	56.56*	100	*0.7 J (0.9)*	0.62 J (0.48)	0.69 J (0.53)	*0.56 J (0.43)*	0.47 J (0.36)	0.45 J (0.35)
Potassium	-	-	-	*2340*	2430	2430	*1790*	1880	1870
Selenium	20	5	50	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Silver	4.78*	-	100	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Sodium	-	-	-	*13,800*	14,300	14,600	*6,420*	8,190	8,600
Thallium	-	-	0.24	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Vanadium	-	-	-	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Zinc	129.93*	129.93*	2000	*4.8*	3.1	4.2	*6.8*	7.4	6.1

* Freshwater Aquatic Life Standards for these metals are expressed as a function of total hardness (mg/l, $CaCO_3$)
** Dissolved results are shown for aluminum, as the MDEQ Aquatic Life Standards for aluminum apply only to the dissolved, not the total fraction.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TDD Nos. 1105-09 and 1109-07
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TABLE 23, continued
Total Metals Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Montana DEQ Circular 7 Aquatic Life Standards (Acute)	Montana DEQ Circular 7 Aquatic Life Standards (Chronic)	Montana DEQ Circular 7 Human Health Standards (Surface Water)	SSSW07 H30W5 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 H30W6 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 H30W7 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 H30W8 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	SSSW89 H30W9 Rinsate blank
Dilution Factor	-	-	-					
Aluminum (dissolved**)	750	87	-	9.3 J (7.2)	40.4 (31.1)	17.4 J (13.4)	17.0 J (13.1)	-
Aluminum		-	-	34.4	45	37.5	65.6	20 U
Antimony	-	-	5.6	2 U	2 U	2 U	2 U	2 U
Arsenic	340	150	10	2.7	3.1	2.6	3	1 U
Barium	-	-	2000	90.7	94.4	90.8	87.5	10 U
Beryllium	-	-	4	1 U	1 U	1 U	1 U	1 U
Cadmium	2.35*	0.29*	5	1 U	1 U	1 U	1 U	1 U
Calcium	-	-	-	28,700	30,300	28,600	28,000	500 U
Chromium	-	-	100	2 U	2 U	2 U	2 U	2 U
Cobalt	-	-	-	1 U	1 U	1 U	1 U	1 UJ
Copper	15.32*	10.12*	1300	3.6	3.8	2.9	4.4	2 U
Iron	-	1000	300	200 U	200 U	200 U	200 U	200 U
Lead	92.22*	3.59*	15	1 U	2.1	1 U	1 U	1 U
Magnesium	-	-	-	8,170	8,710	8,200	8,130	500 U
Manganese	-	-	50	28.9	48	24.1	27.2	1 U
Nickel	508.72*	56.56*	100	0.36 J (0.28)	0.52 J (0.40)	0.46 J (0.36)	0.43 J (0.33)	1 U
Potassium	-	-	-	1,790	1,950	1,790	1,740	500 U
Selenium	20	5	50	5 U	5 U	5 U	5 U	5 U
Silver	4.78*	-	100	1 U	1 U	1 U	1 U	1 U
Sodium	-	-	-	6,850	15,600	7,540	8,560	1,380
Thallium	-	-	0.24	1 U	1 U	1 U	1 U	1 U
Vanadium	-	-	-	5 U	5 U	5 U	5 U	5 U
Zinc	129.93*	129.93*	2000	5.7	7.2	5.4	8.8	3

* Freshwater Aquatic Life Standards for these metals are expressed as a function of total hardness (mg/l, $CaCO_3$)
** Dissolved results are shown for aluminum, as the MDEQ Aquatic Life Standards for aluminum apply only to the dissolved, not the total fraction.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
MDEQ Montana Department of Environmental Quality
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

Table 23a
Dissolved Metals Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SCDM Surface Water Pathway Environmental (Acute)	SCDM Surface Water Pathway Environmental (Chronic)	SSSW01 MH30Z9 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	SSSW02 MH3100 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	SSSW03 MH3101 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	SSSW04 MH3102 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	SSSW05 MH3103 Grab sample collected from the Clark Fork River adjacent to pond 2	SSSW06 MH3104 Grab sample collected from the Clark Fork River immediately downstream of outfall 1
Dilution Factor	-	-						
Aluminum (total**)	750	87	*147* ☆	149 ☆	131 ☆	*37.1*	35.7	34.1
Aluminum	-	-	*17.5 J (22.8)*	116	19.4 J (14.9)	*6.9 J (11.5)*	8.0 J (6.2)	10.7 J (8.2)
Antimony	-	-	*2 U*	2 U	2 U	*0.18 J (0.36)*	0.21 J (0.17)	0.19 J (0.15)
Arsenic	340	150	*1.7*	1.8	1.6	*2.3*	2.7	2.6
Barium	-	-	*164*	168	158	*90.6*	93.2	90.3
Beryllium	-	-	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Cadmium	2.23*	0.27*	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Calcium	-	-	*27,400*	27,500	26,600	*29,500*	29,300	29,900
Chromium	-	-	*0.27 J (0.35)*	1 J (0.8)	0.18 J (0.14)	*0.24 J (0.31)*	0.19 J (0.15)	0.36 J (0.28)
Cobalt	-	-	*0.47 J (0.59)*	0.16 J (0.13)	0.64 J (0.50)	*0.62 J (0.78)*	0.67 J (0.53)	0.65 J (0.51)
Copper	14.87*	9.82*	*1.3 J (1.6)*	1.7 J (1.4)	1.1 J (0.88)	*1.4 J*	1.6 J	2.2
Iron	-	1000	*115 J (154)*	207	97.9 J (77.1)	*103 J (138)*	97.9 J (77.1)	114 J (89.8)
Lead	130.40*	2.83*	*0.4 J (0.6)*	0.44 J (0.34)	0.17 J (0.13)	*1.2*	0.14 J	0.34 J
Magnesium	-	-	*12,200*	12,200	12,000	*8,650*	8,710	8,660
Manganese	-	-	*4.4*	7.3	6.1	*4.8*	30.7	24.8
Nickel	512.69*	56.94*	*0.71 J (0.96)*	1.8	0.59 J (0.46)	*0.44 J*	0.48 J	0.67 J
Potassium	-	-	*2,450*	2,500	2,430	*1,850*	1,920	1,960
Selenium	-	5.0	*5 U*	5 U	5 U	*5 U*	5 U	5 U
Silver	3.87*	-	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Sodium	-	-	*14,600*	14,400	14,200	*6,180*	8,600	8,900
Thallium	-	-	*1 U*	1 U	1 U	*1 U*	1 U	1 U
Vanadium	-	-	*0.37 J (0.50)*	0.87 J (0.70)	0.56 J (0.45)	*0.57 J (0.46)*	0.81 J (0.65)	0.65 J (0.52)
Zinc	128.32*	129.37*	*3.8*	5.2	3.6	*6.2*	4.2	8.1

* Value has been adjusted for total permanent water hardness expressed as equivalent of $CaCO_3$.
** Total results are shown for aluminum, as the SCDM Standards for aluminum apply only to the total, not the dissolved fraction.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
SCDM Superfund Chemical Data Matrix
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2011 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

Table 23a
Dissolved Metals Surface Water
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC (µg/L)	Superfund Chemical Data Matrix (SCDM) CRSC (µg/L)	SSSW07 MH3105 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	SSSW08 MH3106 Grab sample collected from Clark Fork River adjacent to pond 13	SSSW09 MH3107 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	SSSW10 MH3108 Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Dilution Factor	-	-				
Aluminum (total**)	750	87	34.4	45	37.5	65.6
Aluminum	-	-	9.3 J (7.2)	40.4 (31.1)	17.4 J (13.4)	17.0 J (13.1)
Antimony	-	-	0.18 J (0.14)	0.18 J (0.14)	0.39 J (0.31)	0.27 J (0.21)
Arsenic	340	150	2.5	3	2.4	2.5
Barium	-	-	90.3	89.9	87.9	86.3
Beryllium	-	-	1 U	1 U	1 U	1 U
Cadmium	2.23*	0.27*	1 U	1 U	1 U	1 U
Calcium	-	-	29,200	29,600	28,800	28,300
Chromium	-	-	0.21 J (0.16)	0.44 J (0.34)	0.34 J (0.26)	0.27 J (0.21)
Cobalt	-	-	0.34 J (0.27)	0.29 J (0.23)	0.97 J (0.76)	1.1
Copper	14.87*	9.82*	1.8 J (1.4)	2.0 J	1.8 J	1.7 J
Iron	-	1000	99.3 J (78.2)	98.4 J (77.5)	123 J (96.9)	108 J (85.0)
Lead	130.40*	2.83*	0.9 J (0.69)	0.15 J (0.11)	0.3 J	0.17 J
Magnesium	-	-	8,560	9,080	8,400	8,380
Manganese	-	-	10.6	32	12.2	18.2
Nickel	512.69*	56.94*	0.44 J (0.34)	0.57 J (0.44)	0.61 J	0.51 J
Potassium	-	-	1890	2070	1830	1810
Selenium	-	5.0	5 U	5 U	5 U	5 U
Silver	3.87*	-	1 U	1 U	1 U	1 U
Sodium	-	-	7,120	18,200	7,750	8,750
Thallium	-	-	1 U	1 U	0.09 J	1 U
Vanadium	-	-	0.63 J (0.50)	5 U	0.64 J (0.51)	0.53 J (0.42)
Zinc	128.32*	129.37*	4.1	6.9	12.7	5.4

* Value has been adjusted for total permanent water hardness expressed as equivalent of $CaCO_3$.
** Total results are shown for aluminum, as the SCDM Standards for aluminum apply only to the total, not the dissolved fraction.
J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
SCDM Superfund Chemical Data Matrix
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2011 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

Table 24
PCBs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
Aroclor-1016	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1221	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1232	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1242	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1248	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1254	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1260	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1262	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U
Aroclor-1268	*49 U*	50 U	45 U	*37 U*	42 U	42 U	41 U	43 U	42 UJ	43 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits)

TABLE 25
Dioxins and Furans in Sediment
Units of pg/g (ppt)

Field Sample ID: / Laboratory Sample ID: / Location: / Analytes	SSSE01 L1080162-13 BACKGROUND Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	WHO TEF Concentration	SSSE02 L1080162-14 Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	WHO TEF Concentration	SSSE03 L1080162-15 Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	WHO TEF Concentration	SSSE04 L1080162-16 BACKGROUND Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	WHO TEF Concentration	SSSE05 L1080162-17 Grab sample collected from the Clark Fork River adjacent to pond 2	WHO TEF Concentration
2,3,7,8-TCDD	*0.05 U*	0.02800 U	0.05 U	0.02700 U	0.35	0.35000	*0.02 U*	0.01050 U	0.05 U	0.02650 U
1,2,3,7,8-PeCDD	*0.16 J*	0.16000 J	0.08 J	0.08000 J	0.08 J	0.08000 J	*0.03 U*	0.01700 U	0.05 U	0.02550 U
1,2,3,4,7,8-HxCDD	*0.2 J*	0.02000 J	0.06 U	0.00310 U	0.14 J	0.01400 J	*0.01 U*	0.00095 U	0.06 J	0.00600 J
1,2,3,6,7,8-HxCDD	*0.35 J*	0.03500 J	0.28 J	0.02800 J	0.27 J	0.02700 J	*0.01 U*	0.00095 U	0.12 J	0.01200 J
1,2,3,7,8,9-HxCDD	*0.42 J*	0.04200 J	0.06 U	0.00320 U	0.2 J	0.02000 J	*0.01 U*	0.00095 U	0.06 J	0.00600 J
1,2,3,4,6,7,8-HpCDD	*14.9*	0.14900	6.23	0.06230	7.67	0.07670	*0.06 UJ*	0.00010 UJ	2.34	0.02340
OCDD	*101*	0.03030	49.7	0.01491	69.4	0.02082	*1.05 U*	0.00000 U	15.9	0.00477
Total-TCDD	*0.05 U*	-	0.32	-	0.52	-	*0.02 U*	-	0.05 U	-
Total TCDD # Homologues	*0*	-	1	-	2	-	*0*	-	0	-
Total-PeCDD	*0.12*	-	0.08	-	0.28	-	*0.03 U*	-	0.05 U	-
Total PeCDD # Homologues	*1*	-	1	-	3	-	*0*	-	0	-
Total-HxCDD	*2.1*	-	1.11	-	0.47	-	*0.01 U*	-	0.43	-
Total HxCDD # Homologues	*2*	-	2	-	2	-	*0*	-	3	-
Total-HpCDD	*29.4*	-	11.8	-	18.4	-	*0.07*	-	4.56	-
Total HpCDD # Homologues	*2*	-	2	-	2	-	*1*	-	2	-
2,3,7,8-TCDF	*0.11 U*	0.00550 U	0.11 U	0.00550 U	0.1 J	0.01000 J	*0.02 U*	0.00105 U	0.11 U	0.00550 U
1,2,3,7,8-PeCDF	*0.07 U*	0.00114 U	0.05 J	0.00150 J	0.03 J	0.00090 J	*0.01 U*	0.00026 U	0.03 J	0.00090 J
2,3,4,7,8-PeCDF	*0.12 J*	0.03600 J	0.08 J	0.02400 J	0.07 J	0.02100 J	*0.01 J*	0.00210 J	0.05 J	0.01500 J
1,2,3,4,7,8-HxCDF	*0.13 UJ*	0.00265 UJ	0.07 UJ	0.00215 UJ	0.11 U	0.00110 U	*0.01 U*	0.00080U	0.04 UJ	0.00050 UJ
1,2,3,6,7,8-HxCDF	*0.08 UJ*	0.00265 UJ	0.06 UJ	0.00205 UJ	0.05 UJ	0.00115 UJ	*0.01 U*	0.00080 U	0.02 UJ	0.00050 UJ
1,2,3,7,8,9-HxCDF	*0.06 U*	0.00325 U	0.05 U	0.00255 U	0.03 UJ	0.00135 UJ	*0.02 U*	0.00100 U	0.01 U	0.00060 U
2,3,4,6,7,8-HxCDF	*0.05 U*	0.00275 U	0.08 UJ	0.00210 UJ	0.08 UJ	0.00120 UJ	*0.01 U*	0.00085 U	0.02 UJ	0.00050 UJ
1,2,3,4,6,7,8-HpCDF	*2.94*	0.02940	1.18	0.01180	1.41	0.01410	*0.04 J*	0.00040 J	0.44 J	0.00440 J
1,2,3,4,7,8,9-HpCDF	*0.11 U*	0.00045 U	0.12 U	0.00060	0.08 UJ	0.00030 UJ	*0.0089 U*	0.00010 U	0.02 U	0.00013 U
OCDF	*14.4*	0.00432	5.06	0.00152	4.83	0.00145	*0.1 J*	0.00003 J	1.34	0.00040
Total-TCDF	*2.88*	-	4.14	-	1.06	-	*0.02 U*	-	0.17	-
Total TCDF # Homologues	*4*	-	6	-	4	-	*0*	-	1	-
Total-PeCDF	*0.94*	-	0.79	-	0.31	-	*0.01 U*	-	0.17	-
Total PeCDF # Homologues	*4*	-	5	-	3	-	*0*	-	4	-
Total-HxCDF	*2.19*	-	0.68	-	1.96	-	*0.02 U*	-	0.25 U	-
Total HxCDF # Homologues	*3*	-	2	-	4	-	*0*	-	2	-
Total-HpCDF	*7.64*	-	3.33	-	4.39	-	*0.04 U*	-	0.02 U	-

TABLE 25
Dioxins and Furans in Sediment
Units of pg/g (ppt)

Field Sample ID: **Laboratory Sample ID:** **Location:** **Analytes**	**SSSE01** **L1080162-13** **BACKGROUND** **Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area**	**WHO TEF Concentration**	**SSSE02** **L1080162-14** **Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area**	**WHO TEF Concentration**	**SSSE03** **L1080162-15** **Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17**	**WHO TEF Concentration**	**SSSE04** **L1080162-16** **BACKGROUND** **Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill**	**WHO TEF Concentration**	**SSSE05** **L1080162-17** **Grab sample collected from the Clark Fork River adjacent to pond 2**	**WHO TEF Concentration**
Total HpCDF # Homologues	*3*	-	2	-	2	-	*1*	-	0	-
WHO TEQ	-	0.55241	-	0.27228	-	0.64106	-	0.03783	-	0.13260

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
pg/g picogram per gram
ppt parts per trillion
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits)

TABLE 25, continued
Dioxins and Furans in Sediment
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSE06 L1080162-18 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	WHO TEF Concentration	SSSE07 L1080162-19 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	WHO TEF Concentration	SSSE08 L1080162-20 Grab sample collected from Clark Fork River adjacent to pond 13	WHO TEF Concentration	SSSE09 L1080162-21 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	WHO TEF Concentration	SSSE10 L1080162-22 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	WHO TEF Concentration
2,3,7,8-TCDD	0.04 U	0.02000 U	0.04 U	0.02100 U	0.03 U	0.01750 U	0.05 U	0.02800 U	0.05 U	0.02850 U
1,2,3,7,8-PeCDD	0.04 U	0.02450 U	0.04 U	0.02250 U	0.05 U	0.02850 U	0.08 U	0.04100 U	0.08 U	0.04350 U
1,2,3,4,7,8-HxCDD	0.04 U	0.00200 U	0.03 J	0.00300 J	0.04 UJ	0.00075 UJ	0.07 UJ	0.00265 UJ	0.06 U	0.00315 U
1,2,3,6,7,8-HxCDD	0.04 U	0.00200 U	0.15 J	0.01500 J	0.04 J	0.00400 J	0.19 J	0.01900 J	0.09 J	0.00900 J
1,2,3,7,8,9-HxCDD	0.04 U	0.00205 U	0.1 J	0.01000 J	0.11 UJ	0.00075 UJ	0.09 U	0.00270 U	0.14 U	0.00325 U
1,2,3,4,6,7,8-HpCDD	0.69	0.00690	1.69	0.01690	1.44	0.01440	3.8	0.03800	2.2	0.02200
OCDD	4.53	0.00136	11.9	0.00357	9.24	0.00277	28.8	0.00864	15	0.00450
Total-TCDD	0.04 U	-	0.04 U	-	0.03 U	-	0.05 U	-	0.05 U	-
Total TCDD # Homologues	0	-	0	-	0	-	0	-	0	-
Total-PeCDD	0.04 U	-	0.06	-	0.06	-	0.08 U	-	0.08 U	-
Total PeCDD # Homologues	0	-	1	-	1	-	0	-	0	-
Total-HxCDD	0.04 U	-	0.26	-	0.38 U	-	0.29 U	-	0.14 U	-
Total HxCDD # Homologues	0	-	3	-	1	-	2	-	1	-
Total-HpCDD	1.32	-	3.75	-	3.08	-	7.5	-	4.4	-
Total HpCDD # Homologues	2	-	2	-	2	-	2	-	2	-
2,3,7,8-TCDF	0.06 U	0.00300 U	0.05 U	0.00295 U	0.04 U	0.00240 U	0.09 U	0.00485	0.05 U	0.00275 U
1,2,3,7,8-PeCDF	0.03 U	0.00047 U	0.02 U	0.00039 U	0.03 U	0.00057 U	0.07 J	0.00210 J	0.06 J	0.00180 J
2,3,4,7,8-PeCDF	0.02 U	0.00420 U	0.04 J	0.01200 J	0.03 U	0.00525 U	0.08 J	0.02400 J	0.12 J	0.03600 J
1,2,3,4,7,8-HxCDF	0.02 U	0.00135 U	0.02 UJ	0.00075 UJ	0.02 U	0.00145 U	0.14 J	0.01400 J	0.07 J	0.00700 J
1,2,3,6,7,8-HxCDF	0.02 U	0.00140 U	0.02 UJ	0.00080 UJ	0.03 U	0.00160 U	0.07 J	0.00700 J	0.08 J	0.00800 J
1,2,3,7,8,9-HxCDF	0.03 U	0.00160 U	0.02 U	0.00105 U	0.03 U	0.00185 U	0.03 U	0.00155 U	0.05 U	0.00260 U
2,3,4,6,7,8-HxCDF	0.02 U	0.00140 U	0.02 UJ	0.00085 UJ	0.03 U	0.00160 U	0.1 U	0.00130 U	0.08 U	0.00215 U
1,2,3,4,6,7,8-HpCDF	0.11 J	0.00110 J	0.36 J	0.00360 J	0.08 UJ	0.00014 UJ	0.89 J	0.00890 J	0.61 J	0.00610 J
1,2,3,4,7,8,9-HpCDF	0.02 U	0.00012 U	0.03 UJ	0.00008 UJ	0.04 U	0.00020 U	0.08 UJ	0.00028 UJ	0.1 U	0.00030 U
OCDF	0.29 J	0.00009 J	1.18	0.00035	0.47 U	0.00001 U	3.3 J	0.00099 J	1.6 U	0.00002 U
Total-TCDF	0.06 U	-	0.05 U	-	0.04 U	-	0.09 U	-	0.42	-
Total TCDF # Homologues	0	-	0	-	0	-	0	-	2	-
Total-PeCDF	0.03 U	-	0.04	-	0.03 U	-	0.67	-	0.21	-
Total PeCDF # Homologues	0	-	1	-	0	-	6	-	4	-
Total-HxCDF	0.03 U	-	0.02 U	-	0.04	-	0.62	-	0.47	-
Total HxCDF # Homologues	0	-	0	-	2	-	3	-	3	-
Total-HpCDF	0.02 U	-	0.8	-	0.04 U	-	2.38	-	0.77 U	-

TABLE 25, continued
Dioxins and Furans in Sediment
Units of pg/g (ppt)

Field Sample ID: Laboratory Sample ID: Location: Analytes	SSSE06 L1080162-18 Grab sample collected from the Clark Fork River immediately downstream of outfall 1	WHO TEF Concentration	SSSE07 L1080162-19 Grab sample collected from the Clark Fork River immediately downstream of outfall 2	WHO TEF Concentration	SSSE08 L1080162-20 Grab sample collected from Clark Fork River adjacent to pond 13	WHO TEF Concentration	SSSE09 L1080162-21 Grab sample collected from the Clark Fork River immediately downstream of outfall 3	WHO TEF Concentration	SSSE10 L1080162-22 Grab sample collected from the Clark Fork River immediately downstream of outfall 4	WHO TEF Concentration
Total HpCDF # Homologues	0	-	2	-	0	-	2	-	3	-
WHO TEQ	-	0.07353	-	0.11479	-	0.08374	-	0.20496	-	0.18062

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
pg/g picogram per gram
ppt parts per trillion
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits)

TABLE 26
VOCs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
Dichlorodifluoromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Chloromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Vinyl chloride	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Bromomethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Chloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Trichlorofluoromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,1-Dichloroethene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,1,2-Trichloro-1,2,2-trifluoroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Acetone	*15 U*	15 U	14 U	*11 U*	12 U	13 U	13 U	13 U	13 U	13 U
Carbon disulfide	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Methyl acetate	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Methylene chloride	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
trans-1,2-Dichloroethene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Methyl tert-butyl ether	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,1-Dichloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
cis-1,2-Dichloroethene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
2-Butanone	*15 U*	15 U	14 U	*11 U*	12 U	13 U	13 U	13 U	13 U	13 U
Bromochloromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Chloroform	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,1,1-Trichloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Cyclohexane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Carbon tetrachloride	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Benzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2-Dichloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,4-Dioxane	*150 U*	150 U	140 U	*110 U*	120 U	130 U	130 U	130 U	130 U	130 U
Trichloroethene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Methylcyclohexane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2-Dichloropropane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Bromodichloromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
cis-1,3-Dichloropropene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
4-Methyl-2-pentanone	*15 U*	15 U	14 U	*11 U*	12 U	13 U	13 U	13 U	13 U	13 U
Toluene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
trans-1,3-Dichloropropene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U

TABLE 26
VOCs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
1,1,2-Trichloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Tetrachloroethene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
2-Hexanone	*15 U*	15 U	14 U	*11 U*	12 U	13 U	13 U	13 U	13 U	13 U
Dibromochloromethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2-Dibromoethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Chlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Ethylbenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
o-Xylene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
m,p-Xylene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Styrene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Bromoform	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
Isopropylbenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,1,2,2-Tetrachloroethane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,3-Dichlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,4-Dichlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2-Dichlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2-Dibromo-3-chloropropane	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2,4-Trichlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U
1,2,3-Trichlorobenzene	*7.5 U*	7.3 U	6.9 U	*5.5 U*	6.2 U	6.5 U	6.5 U	6.6 U	6.4 U	6.6 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination

TABLE 27
SVOCs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
Benzaldehyde	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Phenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Bis(2-chloroethyl)ether	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Chlorophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Methylphenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,2'-Oxybis(1-chloropropane)	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Acetophenone	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Methylphenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
N-Nitroso-di-n-propylamine	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Hexachloroethane	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Nitrobenzene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Isophorone	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Nitrophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,4-Dimethylphenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Bis(2-chloroethoxy)methane	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,4-Dichlorophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Naphthalene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Chloroaniline	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Hexachlorobutadiene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Caprolactam	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Chloro-3-methylphenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Methylnaphthalene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Hexachlorocyclopentadiene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,4,6-Trichlorophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,4,5-Trichlorophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
1,1'-Biphenyl	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Chloronaphthalene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2-Nitroaniline	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
Dimethylphthalate	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,6-Dinitrotoluene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Acenaphthylene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	350
3-Nitroaniline	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
Acenaphthene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	290

TABLE 27
SVOCs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
2,4-Dinitrophenol	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
4-Nitrophenol	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
Dibenzofuran	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
2,4-Dinitrotoluene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Diethylphthalate	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Fluorene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Chlorophenyl-phenylether	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Nitroaniline	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
4,6-Dinitro-2-methylphenol	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
N-Nitrosodiphenylamine	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
1,2,4,5-Tetrachlorobenzene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
4-Bromophenyl-phenylether	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Hexachlorobenzene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Atrazine	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Pentachlorophenol	*490 U*	490 U	450 U	*360 U*	430 U	420 U	410 U	430 U	420 U	430 U
Phenanthrene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Anthracene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Carbazole	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Di-n-butylphthalate	*250 U*	250 U	230 U	*40 J*	220 U	44 J	210 U	52 J	220 U	220 U
Fluoranthene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Pyrene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Butylbenzylphthalate	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
3,3'-Dichlorobenzidine	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Benzo(a)anthracene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	140 J
Chrysene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	98 J
Bis(2-ethylhexyl)phthalate	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	90 J	220 U
Di-n-octylphthalate	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Benzo(b)fluoranthene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	62 J
Benzo(k)fluoranthene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Benzo(a)pyrene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Indeno(1,2,3-cd)pyrene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Dibenzo(a,h)anthracene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U
Benzo(g,h,i)perylene	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U

TABLE 27
SVOCs in Sediment
Units of µg/kg (ppb)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
2,3,4,6-Tetrachlorophenol	*250 U*	250 U	230 U	*180 U*	220 U	210 U	210 U	220 U	220 U	220 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
ND Not detected.
NA Not analyzed.
µg/kg micrograms per kilogram
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination

TABLE 28
Total Metals in Sediment
Units of mg/kg (ppm)

Field Sample ID:	SSSE01	SSSE02	SSSE03	SSSE04	SSSE05	SSSE06	SSSE07	SSSE08	SSSE09	SSSE10
Laboratory Sample ID:	H30S8	H30S9	H30T0	H30T1	H30T2	H30T3	H30T4	H30T5	H30T6	H30T7
	BACKGROUND			BACKGROUND						
Location:	Grab sample collected from O'Keefe Creek immediately upstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of the PPE from the landfarm area	Grab sample collected from O'Keefe Creek immediately downstream of sludge pond 17	Grab sample collected from the Clark Fork River immediately upstream of potential source areas of the mill	Grab sample collected from the Clark Fork River adjacent to pond 2	Grab sample collected from the Clark Fork River immediately downstream of outfall 1	Grab sample collected from the Clark Fork River immediately downstream of outfall 2	Grab sample collected from Clark Fork River adjacent to pond 13	Grab sample collected from the Clark Fork River immediately downstream of outfall 3	Grab sample collected from the Clark Fork River immediately downstream of outfall 4
Analytes	(µg/Kg)									
Dilution Factor										
Aluminum	*9,430*	10,000	4,440	*1,890*	3,590	2,090	2,460	5,490	4,200	3,190
Antimony	*0.47 J+*	0.5 J+ (0.3)	7.7 U	*6.1 U*	0.34 J (0.17)	0.37 J (0.19)	0.35 J (0.18)	0.49 J+ (0.25)	0.52 J (0.26)	0.52 J (0.26)
Arsenic	*6.5 J+*	9.1	2.5	*5.0*	3.0	2.7	2.9	4.2 J+	9.2	6.5
Barium	*249*	221	106	*27.7*	71.6	32.2	30.7	117	113	82.1
Beryllium	*0.89 J+*	0.93 J+ (0.73)	0.37 J (0.29)	*0.2 J (0.26)*	0.34 J (0.27)	0.22 J (0.17)	0.23 J (0.18)	0.54 J+ (0.42)	0.41 J (0.32)	0.33 J (0.26)
Cadmium	*0.73 J+*	0.8	0.37 J (0.26)	*0.41 J (0.58)*	0.51	0.29 J (0.21)	0.37 J (0.26)	0.47 J+ (0.33)	0.74	0.57 J (0.40)
Calcium	*3,330*	3,230	1,700	*803*	1,660	1,320	1,410	2,510	3,220	2,670
Chromium	*9.0*	9.8	5.0	*2.6*	5.1	3.7	4.3	8.4	6.5	7.0
Cobalt	*10.9*	9.6	3.5 J (2.8)	*2 J (2.5)*	2 J (1.6)	1.6 J (1.3)	1.7 J (1.4)	3.2 J (2.6)	3.1 J (2.5)	2.5 J (2.0)
Copper	*17.4*	19.4	9.8	*38.9*	34.8	17.4	15.5	17	73.3	43.2
Iron	*15000*	16600	7330	*5210*	6340	5670	6980	9820	8840	8040
Lead	*16.5*	12.2	5.7	*6.6*	8.4	5.4	4.8	7.8	14.8	10.6
Magnesium	*4,680*	4,870	2,410	*1,680*	2,080	1,720	1,970	3,450	3,230	2,580
Manganese	*444*	849	160	*163*	70.4	62.6	85.5	131	251	201
Nickel	*10.8*	10.7	5 J (3.7)	*2.9 J (3.9)*	3.6 J (2.7)	2.8 J (2.1)	3.9	6.3	5.2	5.1 J (3.8)
Potassium	*1,580*	1,620	885	*303 J-*	672	387 J-	388 J-	994	857	583 J-
Selenium	*5 U*	4.2 U	4.5 U	*3.5 U*	3.4 U	3.9 U	3.4 U	3.5 U	3.3 U	4.8 U
Silver	*1.4 UJ*	1.2 UJ	1.3 U	*1 U*	0.97 U	1.1 U	0.96 U	1 UJ	0.95 U	1.4 U
Sodium	*194 J (4933)*	163 J (6.41)	127 J (5.00)	*93.1 J (2367)*	105 J (4.13)	188 J (7.39)	146 J (5.74)	438 J (17.22)	118 J (4.64)	99 J (3.89)
Thallium	*3.6 U*	3 U	3.2 U	*2.5 U*	2.4 U	2.8 U	2.4 U	2.5 U	2.4 U	3.4 U
Vanadium	*15.7*	16.0	8.1	*5.0 U*	9.3	10.0	12.4	14.5	13.0	15.2
Zinc	*57.7*	50.5	41.4	*54.2*	86.6	58.8	59.4	42.6	156	127

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
J+ The associated numerical value is an estimated quantity but the result may be biased high.
J- The associated numerical value is an estimated quantity but the result may be biased low.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
mg/kg milligrams per kilogram
ppm parts per million
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination

TABLE 29
PCBs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MCL/MCLG	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Aroclor-1016	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1221	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1232	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1242	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1248	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1254	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1260	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1262	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ
Aroclor-1268	-	-	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 R	1 UJ	1 UJ

J	The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
R	Reported value is "rejected". Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
U	The analyte was not detected above the CRQL.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ	Montana Department of Environmental Quality
RDSC	Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC	Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MCLG	Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL	Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
ug/L	microgram per liter
ppb	parts per billion
Italic	Background sample
X.X	Analytical Result > 3 x background value = observed contamination
☆	Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 29, continued
PCBs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MCL/ MCLG	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Aroclor-1016	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1221	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1232	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1242	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1248	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1254	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1260	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1262	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Aroclor-1268	-	-	-	-	1 UJ	1 UJ	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
R Reported value is "rejected". Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/L pico-gram per liter
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 29, continued
PCBs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MCL/ MCLG	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Aroclor-1016	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1221	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1232	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1242	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1248	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1254	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1260	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1262	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ
Aroclor-1268	-	-	-	-	1 UJ	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 UJ

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
R Reported value is "rejected". Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
pg/L pico-gram per liter
ppb parts per billion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW01 L1080162-23 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	WHO TEF Concentration	SSGW02 L1080162-24 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	WHO TEF Concentration	SSGW03 L1081891-1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	WHO TEF Concentration	SSGW04 L1081891-2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	*0.27 U*	0.13500 U	*0.33 U*	0.16500 U	1 U	0.50000 U	6.4 ☆	6.40000
1,2,3,7,8-PeCDD	-	-	1.1	-	*0.84 U*	0.42000 U	*0.73 U*	0.36500 U	1 U	0.50000 U	8.2 J ☆	8.20000 J
1,2,3,4,7,8-HxCDD	-	-	14	-	*0.88 U*	0.04400 U	*0.36 U*	0.01800 U	0.75 U	0.03750 U	5 J	0.50000 J
1,2,3,6,7,8-HxCDD	-	-	14	-	*0.9 U*	0.04500 U	*0.36 U*	0.01800 U	0.81 UJ	0.03950 UJ	51.2 ☆	5.12000
1,2,3,7,8,9-HxCDD	-	-	14	-	*0.9 U*	0.04500 U	*0.36 U*	0.01800 U	1.3 UJ	0.03900 UJ	20 J ☆	2.00000 J
1,2,3,4,6,7,8-HpCDD	-	-	570	-	*2.9 J*	0.02900 J	*0.81 U*	0.00405 U	7.4 J	0.07400 J	426	4.26000
OCDD	-	-	-	-	*29*	0.00870	*3.8 U*	0.00023 U	28.4	0.00852	2790	0.83700
Total-TCDD	-	-	-	-	*0.27 U*	-	*0.33 U*	-	1 U	-	152	-
Total TCDD # Homologues	-	-	-	-	*0*	-	*0*	-	0	-	8	-
Total-PeCDD	-	-	-	-	*0.84 U*	-	*0.73 U*	-	1 U	-	116	-
Total PeCDD # Homologues	-	-	-	-	*0*	-	*0*	-	0	-	6	-
Total-HxCDD	-	-	-	-	*0.9 U*	-	*0.36 U*	-	3.45	-	324	-
Total HxCDD # Homologues	-	-	-	-	*0*	-	*0*	-	1	-	4	-
Total-HpCDD	-	-	-	-	*2.9*	-	*0.81 U*	-	1 U	-	749	-
Total HpCDD # Homologues	-	-	-	-	*1*	-	*0*	-	0	-	2	-
2,3,7,8-TCDF	-	-	5.7	-	*0.2 U*	0.01000 U	*0.3 U*	0.01500 U	0.97 U	0.04850 U	35.9 ☆	3.59000
1,2,3,7,8-PeCDF	-	-	-	-	*0.51 U*	0.00765 U	*0.46 U*	0.00690 U	0.69 J	0.02070 J	11 J	0.33000 J
2,3,4,7,8-PeCDF	-	-	5.7	-	*0.44 U*	0.06600 U	*0.5 UJ*	0.05550 UJ	0.88 U	0.06300 U	18.6 ☆	5.58000
1,2,3,4,7,8-HxCDF	-	-	57	-	*0.48 U*	0.02400 U	*0.29 U*	0.01450 U	0.61 U	0.03050 U	6.13 J	0.61300 J
1,2,3,6,7,8-HxCDF	-	-	57	-	*0.48 U*	0.02400 U	*0.29 U*	0.01450 U	0.6 U	0.03000 U	6.7 J	0.67000 J
1,2,3,7,8,9-HxCDF	-	-	57	-	*0.6 U*	0.03000 U	*0.35 U*	0.01750 U	0.95 U	0.04000 U	1.8 U	0.07000 U
2,3,4,6,7,8-HxCDF	-	-	57	-	*0.51 U*	0.02550 U	*0.29 U*	0.01450 U	0.61 U	0.03050 U	7.1 J	0.71000 J
1,2,3,4,6,7,8-HpCDF	-	-	570	-	*0.61 U*	0.00305 U	*0.44 U*	0.00220 U	0.99 UJ	0.00305 UJ	14 J	0.14000 J
1,2,3,4,7,8,9-HpCDF	-	-	570	-	*0.88 U*	0.00440 U	*0.66 U*	0.00330 U	1.07 U	0.00490 U	3.9 U	0.01950 U
OCDF	-	-	-	-	*1.4 U*	0.00021 U	*1.1 U*	0.00017 U	2.3 U	0.00018 U	14.2 U	0.00056 U
Total-TCDF	-	-	-	-	*0.2 U*	-	*0.3 U*	-	0.97 U	-	317	-
Total TCDF # Homologues	-	-	-	-	*0*	-	*0*	-	0	-	13	-
Total-PeCDF	-	-	-	-	*0.51 U*	-	*0.46 U*	-	1.58	-	136	-
Total PeCDF # Homologues	-	-	-	-	*0*	-	*0*	-	2	-	10	-
Total-HxCDF	-	-	-	-	*0.6 U*	-	*0.35 U*	-	2.1 U	-	20.4	-
Total HxCDF # Homologues	-	-	-	-	*0*	-	*0*	-	3	-	5	-
Total-HpCDF	-	-	-	-	*0.88 U*	-	*0.66 U*	-	1.33	-	23.6	-

TABLE 30
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW01 L1080162-23 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	WHO TEF Concentration	SSGW02 L1080162-24 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	WHO TEF Concentration	SSGW03 L1081891-1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	WHO TEF Concentration	SSGW04 L1081891-2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	*0*	-	*0*	-	2	-	1	-
WHO TEQ	-	-	-	2	-	0.92151	-	0.73234	-	1.46985	-	39.04006☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW05 L1081891-3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	WHO TEF Concentration	SSGW07 L1081891-4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	WHO TEF Concentration	SSGW08 L1081891-5 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	4.2 ☆	4.20000	1.5 U	0.75000 U	1.6 U	0.80000 U
1,2,3,7,8-PeCDD	-	-	1.1	-	4.6 J ☆	4.60000 J	1.7 U	0.85000 U	2.3 UJ	1.15000 UJ
1,2,3,4,7,8-HxCDD	-	-	14	-	3.3 U	0.16500 U	1.9 U	0.09500 U	2 U	0.10000 U
1,2,3,6,7,8-HxCDD	-	-	14	-	23 J ☆	2.30000 J	1.9 U	0.09500 U	1.9 U	0.09500 U
1,2,3,7,8,9-HxCDD	-	-	14	-	12.1 J	1.21000 J	1.9 U	0.09500 U	1.9 U	0.09500 U
1,2,3,4,6,7,8-HpCDD	-	-	570	-	546	5.46000	30.3	0.30300	20	0.20000
OCDD	-	-	-	-	5150	1.54500	395	0.11850	57.2	0.01716
Total-TCDD	-	-	-	-	4.2	-	1.5 U	-	1.6 U	-
Total TCDD # Homologues	-	-	-	-	1	-	0	-	0	-
Total-PeCDD	-	-	-	-	22 J	-	1.7 U	-	2.3 UJ	-
Total PeCDD # Homologues	-	-	-	-	4	-	0	-	0	-
Total-HxCDD	-	-	-	-	134	-	6.3	-	2 U	-
Total HxCDD # Homologues	-	-	-	-	3	-	1	-	0	-
Total-HpCDD	-	-	-	-	1040	-	56	-	33.4	-
Total HpCDD # Homologues	-	-	-	-	2	-	2	-	2	-
2,3,7,8-TCDF	-	-	5.7	-	29.8 J ☆	2.98000 J	2.1 J	0.21000 J	2.6 J	0.26000 J
1,2,3,7,8-PeCDF	-	-	-	-	4.6 J	0.13800 J	0.95 U	0.01425 U	1.3 U	0.01950 U
2,3,4,7,8-PeCDF	-	-	5.7	-	9.5 J ☆	2.85000 J	0.89 U	0.13350 U	1.3 UJ	0.19500 UJ
1,2,3,4,7,8-HxCDF	-	-	57	-	5 UJ	0.09000 UJ	0.68 U	0.03400 U	0.61 U	0.03050 U
1,2,3,6,7,8-HxCDF	-	-	57	-	4.4 J	0.44000 J	0.68 U	0.03400 U	0.64 U	0.03200 U
1,2,3,7,8,9-HxCDF	-	-	57	-	2.6 U	0.13000 U	0.95 U	0.04750 U	0.85 U	0.04250 U
2,3,4,6,7,8-HxCDF	-	-	57	-	6.2 J	0.62000 J	0.74 U	0.03700 U	0.69 U	0.03450 U
1,2,3,4,6,7,8-HpCDF	-	-	570	-	52.1	0.52100	2 UJ	0.00435 UJ	0.95 U	0.00475 U
1,2,3,4,7,8,9-HpCDF	-	-	570	-	6.7 U	0.03350 U	1.4 U	0.00700 U	1.6 U	0.00800 U
OCDF	-	-	-	-	90.1	0.02703	6.8 UJ	0.00045 UJ	3.4 U	-
Total-TCDF	-	-	-	-	98.7 J	-	2.21	-	1.3 UJ	-
Total TCDF # Homologues	-	-	-	-	7	-	1	-	0	-
Total-PeCDF	-	-	-	-	61.8 J	-	0.95 U	-	1.3 UJ	-
Total PeCDF # Homologues	-	-	-	-	7	-	0	-	0	-
Total-HxCDF	-	-	-	-	78.7	-	1.38 U	-	0.85 U	-
Total HxCDF # Homologues	-	-	-	-	3	-	1	-	0	-
Total-HpCDF	-	-	-	-	156	-	1.4 U	-	1.6 U	-
Total HpCDF # Homologues	-	-	-	-	3	-	0	-	0	-

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW05 L1081891-3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	WHO TEF Concentration	SSGW07 L1081891-4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	WHO TEF Concentration	SSGW08 L1081891-5 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6	WHO TEF Concentration
WHO TEQ	-	-	-	2	-	27.30953☆	-	2.82855☆	-	3.08391☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW10 L1081891-6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	WHO TEF Concentration	SSGW89 L1081891-18 Duplicate of sample SSGW10	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSGW11 L1081891-9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	WHO TEF Concentration	SSGW12 L1081891-10 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	1.4 U	0.70000 U	1.6 U	0.80000 U	-	1.4 U	0.70000 U	3.3 J ☆	3.30000 J
1,2,3,7,8-PeCDD	-	-	1.1	-	1.3 U	0.65000 U	1.4 U	0.70000 U	-	1.5 U	0.75000 U	1.6 J ☆	1.60000 J
1,2,3,4,7,8-HxCDD	-	-	14	-	0.93 U	0.04650 U	0.8 U	0.04000 U	-	1.1 U	0.05500 U	1.3 UJ	0.02600 UJ
1,2,3,6,7,8-HxCDD	-	-	14	-	3.2 UJ	0.04550 UJ	3.5 UJ	0.00425 UJ	-	5.5 J	0.55000 J	7.6 J	0.76000 J
1,2,3,7,8,9-HxCDD	-	-	14	-	1.6 UJ	0.04650 UJ	1.6 UJ	0.04150 UJ	-	3.4 UJ	0.05500 UJ	5.25 U	0.02650 U
1,2,3,4,6,7,8-HpCDD	-	-	570	-	29.2	0.29200	25.5	0.25500	7	35	0.35000	115	1.15000
OCDD	-	-	-	-	214	0.06420	209	0.06270	1	169	0.05070	967	0.29010
Total-TCDD	-	-	-	-	1.4 U	-	1.6 U	-	-	1.4 U	-	1 U	-
Total TCDD # Homologues	-	-	-	-	0	-	0	-	0	0	-	0	-
Total-PeCDD	-	-	-	-	1.3 U	-	1.4 U	-	-	1.5 U	-	4.4	-
Total PeCDD # Homologues	-	-	-	-	0	-	0	-	0	0	-	4	-
Total-HxCDD	-	-	-	-	16.4	-	0.85 U	-	90	1.1 U	-	37.8	-
Total HxCDD # Homologues	-	-	-	-	1	-	0	-	100	0	-	3	-
Total-HpCDD	-	-	-	-	63.6	-	51.9	-	10	35	-	241	-
Total HpCDD # Homologues	-	-	-	-	2	-	2	-	0	1	-	2	-
2,3,7,8-TCDF	-	-	5.7	-	1 U	0.05000 U	2.1 U	0.10500 U	-	1.6 U	0.08000 U	5 J	0.50000 J
1,2,3,7,8-PeCDF	-	-	-	-	0.72 U	0.01080 U	0.88 U	0.01320 U	-	0.95 U	0.01425 U	0.81 U	0.01215 U
2,3,4,7,8-PeCDF	-	-	5.7	-	0.65 U	0.09750 U	0.76 U	0.07800 U	-	0.96 UJ	0.12600 UJ	1.2 UJ	0.10500 UJ
1,2,3,4,7,8-HxCDF	-	-	57	-	0.52 U	0.02600 U	0.49 U	0.03200 U	-	0.7 U	0.03500 U	0.99 U	0.02600 U
1,2,3,6,7,8-HxCDF	-	-	57	-	0.53 U	0.02650 U	0.47 U	0.02400 U	-	0.7 U	0.03500 U	0.78 J	0.07800 J
1,2,3,7,8,9-HxCDF	-	-	57	-	0.71 U	0.03550 U	0.64 U	0.03200 U	-	0.96 U	0.04800 U	0.68 U	0.03400 U
2,3,4,6,7,8-HxCDF	-	-	57	-	0.56 U	0.02800 U	0.52 U	0.02600 U	-	0.74 U	0.03700 U	0.94 UJ	0.02750 UJ
1,2,3,4,6,7,8-HpCDF	-	-	570	-	2.4 UJ	0.00325 UJ	3.99 J	0.03990 J	-	1.23 U	0.00180 U	2.4 UJ	0.00455 UJ
1,2,3,4,7,8,9-HpCDF	-	-	570	-	1.1 U	0.00550 U	0.73 U	0.00730 U	-	0.57 U	0.00285 U	1.9 UJ	0.00700 UJ
OCDF	-	-	-	-	9.2 UJ	0.00023 UJ	15.5 J	0.00465 J	-	1.3 UJ	0.00018 UJ	5.3 UJ	0.00023 UJ
Total-TCDF	-	-	-	-	1.5	-	2.1 U	-	-	2.2	-	2.86	-
Total TCDF # Homologues	-	-	-	-	1	-	0	-	100	1	-	1	-
Total-PeCDF	-	-	-	-	0.72 U	-	0.88 U	-	-	0.95 U	-	0.81 U	-
Total PeCDF # Homologues	-	-	-	-	0	-	0	-	0	0	-	0	-
Total-HxCDF	-	-	-	-	2.71 U	-	0.64 U	-	-	1.32 U	-	0.99 U	-
Total HxCDF # Homologues	-	-	-	-	1	-	0	-	100	1	-	1	-

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW10 L1081891-6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	WHO TEF Concentration	SSGW89 L1081891-18 Duplicate of sample SSGW10	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSGW11 L1081891-9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	WHO TEF Concentration	SSGW12 L1081891-10 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	WHO TEF Concentration
Total-HpCDF	-	-	-	-	9.9	-	15.1	-	21	1.23	-	1.4 U	-
Total HpCDF # Homologues	-	-	-	-	1	-	2	-	33	1	-	0	-
WHO TEQ	-	-	-	2	-	2.12798☆	-	2.26550☆	-	-	2.89078☆	-	7.94703☆

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW13 L1080162-25 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW14 L1080162-26 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW15 L1080162-27 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	WHO TEF Concentration	SSGW16 L1080162-28 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	3.1 U	1.55000 U	0.48 U	0.24000 U	0.83 U	0.41500 U	0.61 U	0.30500 U
1,2,3,7,8-PeCDD	-	-	1.1	-	0.67 U	0.33500 U	0.75 U	0.37500 U	0.82 U	0.41000 U	1.35 J ☆	1.35000 J
1,2,3,4,7,8-HxCDD	-	-	14	-	0.36 U	0.01800 U	0.18 U	0.00900 U	0.34 U	0.01700 U	0.12 U	0.00600 U
1,2,3,6,7,8-HxCDD	-	-	14	-	1.5 J	0.15000 J	1.9 J	0.19000 J	4.1 J	0.41000 J	5.05 J	0.50500 J
1,2,3,7,8,9-HxCDD	-	-	14	-	1.2 J	0.12000 J	1.8 J	0.18000 J	2.4 J	0.24000 J	2.1 J	0.21000 J
1,2,3,4,6,7,8-HpCDD	-	-	570	-	9.36 J	0.09360 J	14.7	0.14700	22.8	0.22800	10 J	0.10000 J
OCDD	-	-	-	-	27 J	0.00810 J	39.6	0.01188	61	0.01830	38 J	0.01140 J
Total-TCDD	-	-	-	-	3.1 U	-	0.48 U	-	0.83 U	-	0.61 U	-
Total TCDD # Homologues	-	-	-	-	0	-	0	-	0	-	0	-
Total-PeCDD	-	-	-	-	0.67 U	-	0.75 U	-	0.83	-	3.44	-
Total PeCDD # Homologues	-	-	-	-	0	-	0	-	0	-	3	-
Total-HxCDD	-	-	-	-	1.2	-	12.6	-	1.65 U	-	5.05	-
Total HxCDD # Homologues	-	-	-	-	1	-	1	-	0	-	1	-
Total-HpCDD	-	-	-	-	18.2	-	28.7	-	0.34	-	12.8	-
Total HpCDD # Homologues	-	-	-	-	2	-	2	-	1	-	1	-
2,3,7,8-TCDF	-	-	5.7	-	0.68 U	0.03400 U	0.8 J	0.08000 J	1.1 J	0.11000 J	1.7 U	0.08500 U
1,2,3,7,8-PeCDF	-	-	-	-	0.58 U	0.00870 U	0.39 U	0.00585 U	0.48 U	0.00720 U	0.46 U	0.00690 U
2,3,4,7,8-PeCDF	-	-	5.7	-	0.48 U	0.07200 U	0.49 UJ	0.04950 UJ	0.42 U	0.06300 U	0.61 UJ	0.06000 UJ
1,2,3,4,7,8-HxCDF	-	-	57	-	0.29 U	0.01450 U	0.34 U	0.01700 U	0.32 U	0.01600 U	0.26 U	0.01300 U
1,2,3,6,7,8-HxCDF	-	-	57	-	0.29 U	0.01450 U	0.33 U	0.01650 U	0.32 U	0.01600 U	0.25 U	0.01250 U
1,2,3,7,8,9-HxCDF	-	-	57	-	0.36 U	0.01800 U	0.42 U	0.02100 U	0.39 U	0.01950 U	0.3 U	0.01500 U
2,3,4,6,7,8-HxCDF	-	-	57	-	0.32 J	0.03200 J	0.34 U	0.01700 U	0.32 U	0.01600 U	0.26 U	0.01300 U
1,2,3,4,6,7,8-HpCDF	-	-	570	-	0.74 UJ	0.00145 UJ	0.23 UJ	0.00080 UJ	0.4 U	0.00200 U	0.6 UJ	0.00125 UJ
1,2,3,4,7,8,9-HpCDF	-	-	570	-	0.43 U	0.00215 U	0.22 U	0.00110 U	0.54 U	0.00270 U	0.27 U	0.00095 U
OCDF	-	-	-	-	1.1 U	0.00015 U	0.67 J	0.00020 J	0.43 U	0.00006 U	1.32 U	0.00004 U
Total-TCDF	-	-	-	-	0.68 U	-	0.33 U	-	44	-	7.4	-
Total TCDF # Homologues	-	-	-	-	0	-	0	-	0	-	5	-
Total-PeCDF	-	-	-	-	0.58 U	-	0.39 U	-	1.41 U	-	3.04	-
Total PeCDF # Homologues	-	-	-	-	0	-	0	-	0	-	4	-
Total-HxCDF	-	-	-	-	0.36 U	-	0.42 U	-	0.902 U	-	0.3 U	-
Total HxCDF # Homologues	-	-	-	-	0	-	0	-	0	-	0	-
Total-HpCDF	-	-	-	-	0.67 U	-	0.22 U	-	0.54 U	-	0.27 U	-

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW13 L1080162-25 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW14 L1080162-26 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW15 L1080162-27 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	WHO TEF Concentration	SSGW16 L1080162-28 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	1	-	0	-	0	-	0	-
WHO TEQ	-	-	-	2	-	2.47215☆	-	1.36183	-	1.99076	-	2.69504☆

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U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW17 L1080162-29 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	WHO TEF Concentration	SSGW18 L1081891-11 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW23 L1081891-12 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	WHO TEF Concentration	SSGW24 L1081891-15 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	1.1 J ☆	1.10000 J	1.5 U	0.75000 U	0.8 U	0.40000 U	0.9 U	0.45000 U
1,2,3,7,8-PeCDD	-	-	1.1	-	1.1 U	0.55000 U	1.4 U	0.70000 U	0.64 U	0.32000 U	0.69 U	0.34500 U
1,2,3,4,7,8-HxCDD	-	-	14	-	0.43 U	0.02150 U	0.73 U	0.03650 U	0.19 U	0.00950 U	0.52 U	0.02600 U
1,2,3,6,7,8-HxCDD	-	-	14	-	3.3 J	0.33000 J	3.4 UJ	0.03700 UJ	0.2 U	0.01000 U	0.72 UJ	0.02600 UJ
1,2,3,7,8,9-HxCDD	-	-	14	-	1.4 J	0.14000 J	3.7 UJ	0.03700 UJ	0.2 U	0.01000 U	0.52 U	0.02600 U
1,2,3,4,6,7,8-HpCDD	-	-	570	-	20	0.20000	15.6	0.15600	0.43 U	0.00215 U	0.8 U	0.00400 U
OCDD	-	-	-	-	162	0.04860	73.8	0.02214	6.3 J	0.00189 J	2.1 U	0.00032 U
Total-TCDD	-	-	-	-	0.69 U	-	1.5 U	-	0.8 U	-	0.9 U	-
Total TCDD # Homologues	-	-	-	-	0	-	0	-	0	-	0	-
Total-PeCDD	-	-	-	-	1.1 U	-	1.5	-	0.64 U	-	0.69 U	-
Total PeCDD # Homologues	-	-	-	-	0	-	1	-	0	-	0	-
Total-HxCDD	-	-	-	-	16.5	-	18.3	-	0.2 U	-	0.52 U	-
Total HxCDD # Homologues	-	-	-	-	2	-	1	-	0	-	0	-
Total-HpCDD	-	-	-	-	40.4	-	15.6	-	0.43 U	-	0.8 U	-
Total HpCDD # Homologues	-	-	-	-	2	-	1	-	0	-	0	-
2,3,7,8-TCDF	-	-	5.7	-	2.96	0.29600	1.7 U	0.08500 U	0.39 U	0.01950 U	0.78 U	0.03900 U
1,2,3,7,8-PeCDF	-	-	-	-	0.7 U	0.01050 U	0.55 U	0.00825 U	0.21 U	0.00315 U	0.54 U	0.00810 U
2,3,4,7,8-PeCDF	-	-	5.7	-	0.63 U	0.09450 U	0.65 UJ	0.07200 UJ	0.25 UJ	0.02850 UJ	0.7 UJ	0.07050 UJ
1,2,3,4,7,8-HxCDF	-	-	57	-	0.38 U	0.01900 U	0.56 U	0.02800 U	0.17 U	0.00850 U	0.58 U	0.02900 U
1,2,3,6,7,8-HxCDF	-	-	57	-	0.38 U	0.01900 U	0.56 U	0.02800 U	0.17 U	0.00850 U	0.58 U	0.02900 U
1,2,3,7,8,9-HxCDF	-	-	57	-	0.51 UJ	0.02300 UJ	0.79 U	0.03950 U	0.21 U	0.01050 U	0.78 U	0.03900 U
2,3,4,6,7,8-HxCDF	-	-	57	-	0.6 J	0.01950 J	0.6 U	0.03000 U	0.17 U	0.00850 U	0.61 U	0.03050 U
1,2,3,4,6,7,8-HpCDF	-	-	570	-	1.6 UJ	0.00205 UJ	0.78 U	0.00295 U	0.16 U	0.00080 U	0.59 U	0.00295 U
1,2,3,4,7,8,9-HpCDF	-	-	570	-	0.56 U	0.00280 U	0.93 U	0.00465 U	0.22 U	0.00110 U	0.94 U	0.00470 U
OCDF	-	-	-	-	1.8 UJ	0.00008 UJ	1.9 U	0.00017 U	0.69 U	0.00010 U	0.74 UJ	0.00010 UJ
Total-TCDF	-	-	-	-	2.96	-	1.7 U	-	0.39 U	-	0.78 U	-
Total TCDF # Homologues	-	-	-	-	1	-	0	-	0	-	0	-
Total-PeCDF	-	-	-	-	0.7 U	-	1.64	-	0.21 U	-	0.54 U	-
Total PeCDF # Homologues	-	-	-	-	0	-	2	-	0	-	0	-
Total-HxCDF	-	-	-	-	0.6 U	-	0.79 U	-	0.21 U	-	0.78 U	-
Total HxCDF # Homologues	-	-	-	-	1	-	0	-	0	-	0	-
Total-HpCDF	-	-	-	-	0.56 U	-	0.93 U	-	0.22 U	-	0.94 U	-

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW17 L1080162-29 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	WHO TEF Concentration	SSGW18 L1081891-11 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	WHO TEF Concentration	SSGW23 L1081891-12 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	WHO TEF Concentration	SSGW24 L1081891-15 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	0	-	0	-	0	-	0	-
WHO TEQ	-	-	-	2	-	2.87653☆	-	2.03716☆	-	0.84269	-	1.13017

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U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW25 L1081891-16 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	WHO TEF Concentration	SSGW26 L1081891-17 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	WHO TEF Concentration	SSGW99 L1081891-19 Duplicate of sample SSGW26	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSGW27 L1080162-30 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)	WHO TEF Concentration
2,3,7,8-TCDD	30	-	0.57	-	0.68 U	0.34000 U	0.77 U	0.38500 U	1 U	0.50000 U	-	0.29 U	0.14500 U
1,2,3,7,8-PeCDD	-	-	1.1	-	0.84 U	0.42000 U	0.71 U	0.35500 U	0.82 U	0.41000 U	-	0.43 U	0.21500 U
1,2,3,4,7,8-HxCDD	-	-	14	-	0.35 U	0.01750 U	0.37 U	0.01850 U	0.69 U	0.03450 U	-	0.38 U	0.01900 U
1,2,3,6,7,8-HxCDD	-	-	14	-	0.35 U	0.01750 U	0.38 U	0.01900 U	0.7 U	0.03500 U	-	0.39 U	0.01950 U
1,2,3,7,8,9-HxCDD	-	-	14	-	0.36 U	0.01800 U	0.38 U	0.01900 U	0.7 U	0.03500 U	-	0.39 U	0.01950 U
1,2,3,4,6,7,8-HpCDD	-	-	570	-	0.83 U	0.00415 U	0.87 J	0.00870 J	0.94 U	0.00265 U	-	0.7 UJ	0.00210 UJ
OCDD	-	-	-	-	1.3 UJ	0.00012UJ	0.85 UJ	0.00013 UJ	3.1 UJ	0.00021 UJ	-	2.1 UJ	0.00008 UJ
Total-TCDD	-	-	-	-	0.68 U	-	0.77 U	-	1 U	-	-	0.29 U	-
Total TCDD # Homologues	-	-	-	-	0	-	0	-	0	-	0	0	-
Total-PeCDD	-	-	-	-	0.84 U	-	0.71 U	-	0.82 U	-	-	0.43 U	-
Total PeCDD # Homologues	-	-	-	-	0	-	0	-	0	-	0	0	-
Total-HxCDD	-	-	-	-	0.36 U	-	0.38 U	-	0.7 U	-	-	0.7	-
Total HxCDD # Homologues	-	-	-	-	0	-	0	-	0	-	0	1	-
Total-HpCDD	-	-	-	-	0.83 U	-	0.64 U	-	0.94 U	-	-	0.42 U	-
Total HpCDD # Homologues	-	-	-	-	0	-	0	-	1	-	100	0	-
2,3,7,8-TCDF	-	-	5.7	-	0.77 U	0.03850 U	0.71 U	0.03550 U	0.66 U	0.03300 U	-	0.43 U	0.02150 U
1,2,3,7,8-PeCDF	-	-	-	-	0.54 U	0.00810 U	0.42 U	0.00630 U	0.44 U	0.00660 U	-	0.23 U	0.00345 U
2,3,4,7,8-PeCDF	-	-	5.7	-	0.46 U	0.06900 U	0.57 U	0.05250 U	0.4 U	0.06000 U	--	0.2 U	0.03000 U
1,2,3,4,7,8-HxCDF	-	-	57	-	0.33 U	0.01650 U	0.24 U	0.01200 U	0.38 U	0.01900 U	-	0.17 U	0.00850 U
1,2,3,6,7,8-HxCDF	-	-	57	-	0.35 U	0.01750 U	0.24 U	0.01200 U	0.37 U	0.01850 U	-	0.17 U	0.00850 U
1,2,3,7,8,9-HxCDF	-	-	57	-	0.44 U	0.02200 U	0.34 U	0.01700 U	0.49 U	0.02450 U	-	0.22 U	0.01100 U
2,3,4,6,7,8-HxCDF	-	-	57	-	0.34 U	0.01700 U	0.26 U	0.01300 U	0.41 U	0.02050 U	-	0.18 U	0.00900 U
1,2,3,4,6,7,8-HpCDF	-	-	570	-	0.56 U	0.00280 U	0.2 U	0.00100 U	0.37 U	0.00185 U	-	0.22 U	0.00110 U
1,2,3,4,7,8,9-HpCDF	-	-	570	-	0.97 U	0.00455 U	0.33 U	0.00165 U	0.58 U	0.00290 U	-	0.32 U	0.00160 U
OCDF	-	-	-	-	1.1 U	0.00017 U	0.8 U	0.00012 U	1.2 U	0.00018 U	-	0.4 U	0.00006 U
Total-TCDF	-	-	-	-	0.77 U	-	0.71 U	-	0.66 U	-	-	0.43 U	-
Total TCDF # Homologues	-	-	-	-	0	-	0	-	0	-	0	0	-
Total-PeCDF	-	-	-	-	0.54 U	-	0.61	-	0.44 U	-	-	0.23 U	-
Total PeCDF # Homologues	-	-	-	-	0	-	2	-	0	-	100	0	-
Total-HxCDF	-	-	-	-	0.44 U	-	0.34 U	-	0.49 U	-	-	0.22 U	-
Total HxCDF # Homologues	-	-	-	-	0	-	0	-	0	-	0	0	-
Total-HpCDF	-	-	-	-	0.97	-	0.33 U	-	0.58 U	-	-	0.32 U	-

TABLE 30, continued
Dioxins and Furans in Groundwater
Units of pg/L (ppq)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Human Health Standards (Groundwater)	SSGW25 L1081891-16 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	WHO TEF Concentration	SSGW26 L1081891-17 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	WHO TEF Concentration	SSGW99 L1081891-19 Duplicate of sample SSGW26	WHO TEF Concentration	Relative Percentage Difference (RPD)	SSGW27 L1080162-30 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)	WHO TEF Concentration
Total HpCDF # Homologues	-	-	-	-	1	-	0	-	0	-	0	0	-
WHO TEQ	-	-	-	2	-	1.01339	-	0.95640	-	1.20439	-	-	0.51489

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
MDEQ Montana Department of Environmental Quality
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
WHO TEQ World Health Organization Toxicity Equivalent
WHO TEF Conc. World Health Organization Toxicity Equivalence Factor Concentration
pg/L pico-gram per liter
ppq parts per quadrillion
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark

Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards); EPA 2011 (SCDM)

TABLE 31
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Dichlorodifluoromethane	-	-	-	1,000	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Chloromethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Vinyl chloride	2	47	0.017	0.2	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Bromomethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Chloroethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Trichlorofluoromethane	-	4,700	-	10,000	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,1-Dichloroethene	7	780	-	0.6	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Acetone	-	14,000	-	-	*5 U*	*5 U*	5 U	5 U	38	5 U	5 U
Carbon disulfide	-	1,600	-	-	*0.5 U*	*0.5 U*	0.5 U	0.2 J	2 U	0.44 J	0.5 U
Methyl acetate	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Methylene chloride	5	94	11	5	*0.5 U*	*0.5 U*	0.5 U	0.32 J	2 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	100	310	-		*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Methyl tert-butyl ether	-	-	37	30	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,1-Dichloroethane	-	3,100	12	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	310	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Methyl ethyl ketone (2-Butanone)	-	94,000		-	*5 U*	*5 U*	5 U	5 U	20 U	5 U	5 U
Bromochloromethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Chloroform	-	160	2.2	70	*0.5 U*	*0.5 U*	0.5 U	0.21 J	2 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	31,000	-	200	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Cyclohexane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	3.6	0.5 U	0.5 U
Carbon tetrachloride	5	63	0.96	3	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Benzene	5	63	1.2	5	*0.5 U*	*0.5 U*	0.22 J	0.5 U	1.3 J	0.5 U	0.5 U
1,2-Dichloroethane	5	94	0.74	4	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Trichloroethene	5	7.8	1	5	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Methylcyclohexane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2.2	0.5 U	0.5 U
1,2-Dichloropropane	5	1,400	1.9	5	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Bromodichloromethane	-	310	1.1	10	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
4-Methyl-2-pentanone (MIBK)	-	2,900	-	-	*5 U*	*5 U*	5 U	5 U	20 U	5 U	5 U
Toluene	1,000	1,300	-	1,000	*0.5 U*	*0.5 U*	0.5 U	0.5 U	1.4 J	0.5 U	0.5 U

TABLE 31
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
trans-1,3-Dichloropropene	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	63	1.2	3	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Tetrachloroethene	5	94	32	5	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Methyl butyl ketone (2-Hexanone)	-	-	-	-	*5 U*	*5 U*	5 U	5 U	20 U	5 U	5 U
Dibromochloromethane	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,2-Dibromoethane	-	140	0.034	0.004	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Chlorobenzene	100	310	-	100	*0.5 U*	*0.5 U*	0.5 U	0.5 U	50	0.5 U	0.5 U
Ethyl benzene	700	1,600	6.1	700	*0.5 U*	*0.5 U*	0.5 U	0.5 U	1.7 J	0.5 U	0.5 U
o-Xylene	-	3,100	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	16	0.5 U	0.5 U
m,p-Xylene	-	3,100	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	42	0.5 U	0.5 U
Styrene	100	3,100	-	100	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Bromoform	-	-	-	80	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
Isopropylbenzene	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	-	310	0.34	2	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,3-Dichlorobenzene	-	-	-	600	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,4-Dichlorobenzene	75	1,100	12	75	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,2-Dichlorobenzene	-	-	-	600	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	3.1	0.027	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	160	2.3	70	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	-	-	-	-	*0.5 U*	*0.5 U*	0.5 U	0.5 U	2 U	0.5 U	0.5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 31, continued
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Dichlorodifluoromethane	-	-	-	1,000	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	2	47	0.017	0.2	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	-	4,700	-	10,000	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	7	780	-	0.6	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	-	14,000	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	3.8 J
Carbon disulfide	-	1,600	-	-	0.5 U	0.56	-	0.83	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	5	94	11	5	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	100	310	-		0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	-	-	37	30	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	-	3,100	12	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	310	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl ethyl ketone (2-Butanone)	-	94,000		-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	-	160	2.2	70	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	31,000	-	200	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	5	63	0.96	3	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	63	1.2	5	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	94	0.74	4	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	7.8	1	5	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	1,400	1.9	5	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	-	310	1.1	10	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone (MIBK)	-	2,900	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U

TABLE 31, continued
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Toluene	1,000	1,300	-	1,000	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	63	1.2	3	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	94	32	5	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl butyl ketone (2-Hexanone)	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	-	140	0.034	0.004	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	100	310	-	100	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	700	1,600	6.1	700	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	10,000	3,100	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	-	3,100	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	100	3,100	-	100	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	-	-	-	80	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	-	310	0.34	2	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	-	-	-	600	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	75	1,100	12	75	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	-	-	-	600	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	3.1	0.027	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	160	2.3	70	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	-	-	-	-	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 31, continued
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Dichlorodifluoromethane	-	-	-	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Chloromethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Vinyl chloride	2	47	0.017	0.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Bromomethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Chloroethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Trichlorofluoromethane	-	4,700	-	10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1-Dichloroethene	7	780	-	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Acetone	-	14,000	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	-	5 U
Carbon disulfide	-	1,600	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Methyl acetate	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Methylene chloride	5	94	11	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
trans-1,2-Dichloroethene	100	310	-		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Methyl tert-butyl ether	-	-	37	30	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1-Dichloroethane	-	3,100	12	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
cis-1,2-Dichloroethene	70	310	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
2-Butanone	-	94,000		-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	-	5 U
Bromochloromethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Chloroform	-	160	2.2	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1,1-Trichloroethane	200	31,000	-	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Cyclohexane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Carbon tetrachloride	5	63	0.96	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Benzene	5	63	1.2	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2-Dichloroethane	5	94	0.74	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Trichloroethene	5	7.8	1	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Methylcyclohexane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2-Dichloropropane	5	1,400	1.9	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Bromodichloromethane	-	310	1.1	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
cis-1,3-Dichloropropene	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
4-Methyl-2-pentanone (MIBK)	-	2,900	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	-	5 U

TABLE 31, continued
VOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Toluene	1,000	1,300	-	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
trans-1,3-Dichloropropene	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1,2-Trichloroethane	3	63	1.2	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Tetrachloroethene	5	94	32	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
2-Hexanone	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	-	5 U
Dibromochloromethane	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2-Dibromoethane	-	140	0.034	0.004	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Chlorobenzene	100	310	-	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Ethylbenzene	700	1,600	6.1	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
o-Xylene	10,000	3,100	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
m,p-Xylene	-	3,100	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Styrene	100	3,100	-	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Bromoform	-	-	-	80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Isopropylbenzene	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1,2,2-Tetrachloroethane	-	310	0.34	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,3-Dichlorobenzene	-	-	-	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,4-Dichlorobenzene	75	1,100	12	75	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2-Dichlorobenzene	-	-	-	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2-Dibromo-3-chloropropane	0.2	3.1	0.027	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2,4-Trichlorobenzene	70	160	2.3	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,2,3-Trichlorobenzene	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 32
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Benzaldehyde	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Phenol	-	11,000	-	300	*5 U*	*5 U*	5 U	1.6 J	5 U	5 U	5 U
Bis(2-chloroethyl)ether	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2-Chlorophenol	-	-	-	81	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,2'-Oxybis(1-chloropropane)	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Acetophenone	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
4-Methylphenol	-	180	-	-	*5 U*	*5 U*	5 U	9.5	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	-	-	-	0.05	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Hexachloroethane	-	-	-	30	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	-	-	-	17	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Isophorone	-	-	-	400	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2-Nitrophenol	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	-	730	-	380	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethoxy)methane	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	-	110	-	77	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Naphthalene	-	1,500	-	100	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
4-Chloroaniline	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene	-	7.3	1.1	5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Caprolactam	-	-	-	-	*5 U*	*5 U*	5 U	5 U	12	5 U	5 U
4-Chloro-3-methylphenol	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	-	-	-	50	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	-	-	7.7	30	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	-	-	-	1800	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
1,1'-Biphenyl	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2-Chloronaphthalene	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U

TABLE 32
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
2-Nitroaniline	-	-	-	-	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	-	-	-	270000	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	-	-	-	0.5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	-	-	-	-	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
Acenaphthene	-	2,200	-	670	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	-	110	-	69	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	-	-	-	60	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	-	150	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	-	-	-	1.1	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Diethylphthalate	-	29,000	-	17000	*5 U*	*5 U*	5 U	5 U	5 U	1.2 J	1.2 J
Fluorene	-	1,500	-	1100	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
4-Nitroaniline	-	-	-	-	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	-	-	-	-	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	-	-	17	33	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
1,2,4,5-Tetrachlorobenzene	-	11	-	0.97	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	1	29	0.053	0.2	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Atrazine	-	-	-	3	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	1	1,100	0.71	1	*10 U*	*10 U*	10 U	10 U	10 U	10 U	10 U
Phenanthrene	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Anthracene	-	11000	-	2100	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Carbazole	-	-	4.3	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Di-n-butylphthalate	-	3,700	-	2000	*5 U*	*5 U*	1.1 J	5 U	5 U	1.2 J	1 J
Fluoranthene	-	-	-	130	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Pyrene	-	1,100	-	830	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U

TABLE 32
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Butylbenzylphthalate	-	7,300	-	1500	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	-	-	-	0.21	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Benzo(a)anthracene	-	-	0.12	0.5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Chrysene	-	-	12	50	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Bis(2-ethylhexyl)phthalate	6	730	6.1	-	*5 U*	*5 U*	11 ☆	5 U	5 U	1 J	1.3 J
Di-n-octylphthalate	-	730	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	-	-	-	0.5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	-	-	1.2	5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Benzo(a)pyrene	0.2	-	0.012	0.05	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	-	-	0.12	0.5	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Dibenzo(a,h)anthracene	-	-	0.012	0.05	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U
2,3,4,6-Tetrachlorophenol	-	-	-	-	*5 U*	*5 U*	5 U	5 U	5 U	5 U	5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
Italic Background sample
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 32, continued
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Benzaldehyde	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Phenol	-	11,000	-	300	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethyl)ether	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorophenol	-	-	-	81	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,2'-Oxybis(1-chloropropane)	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Acetophenone	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
4-Methylphenol	-	180	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	-	-	-	0.05	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloroethane	-	-	-	30	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	-	-	-	17	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Isophorone	-	-	-	400	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrophenol	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	-	730	-	380	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethoxy)methane	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	-	110	-	77	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	-	1,500	-	100	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
4-Chloroaniline	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene	-	7.3	1.1	5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Caprolactam	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	-	-	-	50	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	-	-	7.7	30	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	-	-	-	1800	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
1,1'-Biphenyl	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U

TABLE 32, continued
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
2-Chloronaphthalene	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitroaniline	-	-	-	-	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	-	-	-	270000	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	-	-	-	0.5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	-	-	-	-	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthene	-	2,200	-	670	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	-	110	-	69	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	-	-	-	60	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	-	150	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	-	-	-	1.1	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Diethylphthalate	-	29,000	-	17000	1.3 J	5.0 UJ	-	1.1 J	5 U	5 U	5 U	5 U	5 U
Fluorene	-	1,500	-	1100	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitroaniline	-	-	-	-	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	-	-	-	-	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	-	-	17	33	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4,5-Tetrachlorobenzene	-	11	-	0.97	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	1	29	0.053	0.2	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Atrazine	-	-	-	3	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	1	1,100	0.71	1	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	10 U
Phenanthrene	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Anthracene	-	11000	-	2100	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Carbazole	-	-	4.3	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Di-n-butylphthalate	-	3,700	-	2000	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U

TABLE 32, continued
SVOCs in Groundwater
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Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Fluoranthene	-	-	-	130	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Pyrene	-	1,100	-	830	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Butylbenzylphthalate	-	7,300	-	1500	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	-	-	-	0.21	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)anthracene	-	-	0.12	0.5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Chrysene	-	-	12	50	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Bis(2-ethylhexyl)phthalate	6	730	6.1	-	1.4 J	2.0 J	18	1 J	5 U	5 U	5 U	5 U	5 U
Di-n-octylphthalate	-	730	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	-	-	-	0.5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	-	-	1.2	5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)pyrene	0.2	-	0.012	0.05	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	-	-	0.12	0.5	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Dibenzo(a,h)anthracene	-	-	0.012	0.05	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
2,3,4,6-Tetrachlorophenol	-	-	-	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 32, continued
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Benzaldehyde	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Phenol	-	11,000	-	300	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Bis(2-chloroethyl)ether	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2-Chlorophenol	-	-	-	81	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2-Methylphenol	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,2'-Oxybis(1-chloropropane)	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Acetophenone	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Methylphenol	-	180	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
N-Nitroso-di-n-propylamine	-	-	-	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Hexachloroethane	-	-	-	30	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Nitrobenzene	-	-	-	17	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Isophorone	-	-	-	400	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2-Nitrophenol	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4-Dimethylphenol	-	730	-	380	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Bis(2-chloroethoxy)methane	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4-Dichlorophenol	-	110	-	77	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Naphthalene	-	1,500	-	100	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Chloroaniline	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Hexachlorobutadiene	-	7.3	1.1	5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Caprolactam	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Chloro-3-methylphenol	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2-Methylnaphthalene	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Hexachlorocyclopentadiene	-	-	-	50	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4,6-Trichlorophenol	-	-	7.7	30	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4,5-Trichlorophenol	-	-	-	1800	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
1,1'-Biphenyl	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U

TABLE 32, continued
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
2-Chloronaphthalene	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2-Nitroaniline	-	-	-	-	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
Dimethylphthalate	-	-	-	270000	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,6-Dinitrotoluene	-	-	-	0.5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Acenaphthylene	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
3-Nitroaniline	-	-	-	-	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
Acenaphthene	-	2,200	-	670	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4-Dinitrophenol	-	110	-	69	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
4-Nitrophenol	-	-	-	60	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
Dibenzofuran	-	150	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,4-Dinitrotoluene	-	-	-	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Diethylphthalate	-	29,000	-	17000	5 U	5 U	1.1 J	5 U	1.1 J	5 U	1.1 J	-	5 U
Fluorene	-	1,500	-	1100	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Chlorophenyl-phenylether	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Nitroaniline	-	-	-	-	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
4,6-Dinitro-2-methylphenol	-	-	-	-	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
N-Nitrosodiphenylamine	-	-	17	33	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
1,2,4,5-Tetrachlorobenzene	-	11	-	0.97	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
4-Bromophenyl-phenylether	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Hexachlorobenzene	1	29	0.053	0.2	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Atrazine	-	-	-	3	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Pentachlorophenol	1	1,100	0.71	1	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	-	10 U
Phenanthrene	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Anthracene	-	11000	-	2100	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Carbazole	-	-	4.3	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Di-n-butylphthalate	-	3,700	-	2000	1 J	5 U	5 U	5 U	5 U	5 U	1 J	-	5 U

TABLE 32, continued
SVOCs in Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Fluoranthene	-	-	-	130	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Pyrene	-	1,100	-	830	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Butylbenzylphthalate	-	7,300	-	1500	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
3,3'-Dichlorobenzidine	-	-	-	0.21	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Benzo(a)anthracene	-	-	0.12	0.5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Chrysene	-	-	12	50	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Bis(2-ethylhexyl)phthalate	6	730	6.1	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Di-n-octylphthalate	-	730	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Benzo(b)fluoranthene	-	-	-	0.5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Benzo(k)fluoranthene	-	-	1.2	5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Benzo(a)pyrene	0.2	-	0.012	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Indeno(1,2,3-cd)pyrene	-	-	0.12	0.5	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Dibenzo(a,h)anthracene	-	-	0.012	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
Benzo(g,h,i)perylene	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U
2,3,4,6-Tetrachlorophenol	-	-	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	-	5 U

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MDEQ Montana Department of Environmental Quality
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micrograms per liter
ppb parts per billion
BOLD Background value
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits); EPA 2011 (SCDM); EPA 2011 (Low Concentration Detection Limits); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33
Total Metals and Asbestos Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	SSGW01 H30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 H30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 H30X2 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 H30X3 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 H30X4 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 H30X6 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 H30X7 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Asbestos Content (%)	-	-	-	-	-	-	-	-	-	-
Aluminum	-	-	-	*20 U*	*20 U*	441	2360	7320	16700	795
Antimony	6	15	-	*2 U*	*2 U*	2 U	2 U	2 U	2 U	4.5
Arsenic	10	11	0.057	*1.6* ☆	*1 U*	27.1 ☆	20 ☆	39.3 ☆	40.2 ☆	99.5 ☆
Barium	2,000	2,600	-	*293*	*284*	1,860 ☆	1,360 ☆	2,140 ☆	3,640 ☆	129
Beryllium	4	73	-	*1 U*	*1 U*	1 UJ	1 UJ	2.2	2.2 J+ (1.76)	1 UJ
Cadmium	5	180	-	*1 U*	*1 U*	0.49 J-	1	1.1	0.94 J-	0.39 J-
Calcium	-	-	-	*49,300*	*62,000*	57,000	258,000	29,500	277,000	7,7600
Chromium	100	110	-	*2 U*	*2 U*	9	18.5	47.4	77.4	32.4
Cobalt	-	-	-	*1 U*	*1 U*	1.1 J (0.9)	2.3 J (1.8)	11.6 J (9.1)	34.4 J (27.1)	1.7 J (1.3)
Copper	1,300	-	-	*2 U*	*2 U*	6.7	19.5	89.1	177	8
Iron	-	-	-	*200 U*	*211*	2,630	5,090	30,700	72,500	6,160
Lead	15	-	-	*200 U*	*1 U*	1.4	6.6	35.9 ☆	105 ☆	2.5
Magnesium	-	-	-	*17,900*	*19,900*	1,220,000	172,000	52,100	178,000	29,600
Manganese	-	5,100	-	*1 U*	*7.1*	1,180	4,780	1,590	14,600 ☆	4,750
Nickel	-	730	-	*1*	*0.62 J (0.80)*	14.4	16.2	27	49.6	18.6
Potassium	-	-	-	*4,950*	*2,420*	70,600	23,400	46,200	26,700	20,300
Selenium	50	180	-	*5 U*	*5 U*	5 U	5 U	0.95 J (0.67)	5 U	0.98 J (0.70)
Silver	-	180	-	*1 U*	*1 U*	1 UJ	1 UJ	1 U	1 UJ	1 U
Sodium	-	-	-	*10,400*	*11,000*	1,170,000	821,000	1,920,000	797,000	812,000
Thallium	0.5	-	-	*1 U*	*1 U*	1 UJ	1 UJ	1 U	1 UJ	1 U
Vanadium	-	260	-	*5 U*	*5 U*	8.9	12.4	74.8	40.4	151
Zinc	-	11,000	-	*2 U*	*57.6*	8.3	79	77.7	118	9.8

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2011 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33, continued
Total Metals and Asbestos Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	SSGW10 H30X9 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of Pond 20 (landfill E)	SSGW89 H30Z9 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 H30Y0 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 H30Y1 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 H30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 H30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 H30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 H30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
AsbestosContent(%)	-	-	-	34.60 U	-	-	-	34.60 U	-	-	-	-
Aluminum	-	-	-	7,780	7290	3	11,300	1,720	96.9	255	250	324
Antimony	6	15	-	2.3 U	2.1 U	-	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	10	11	0.057	133 ☆	132 ☆	0	101 ☆	48.1 ☆	35.9 ☆	14.9 ☆	17.6 ☆	48.4 ☆
Barium	2,000	2,600	-	945	903	2	1270 ☆	202	110	98.1	89.5	91.5
Beryllium	4	73	-	1 U	1	-	1.2 U	1 U	1 U	1 U	1 U	1 U
Cadmium	5	180	-	0.79 J-	0.88 J-	5	0.82 J-	0.23 J-	1 U	1 U	1 U	1 U
Calcium	-	-	-	50,600	50,900	0	53,900	62,500	64,000	47,500	49,700	48,600
Chromium	100	110	-	132 ☆	130 ☆	1	167 ☆	49.7	3.5	5.1	6.6	4.7
Cobalt	-	-	-	8.3 J (6.5)	8.3 J	0	13.5 J (1.3)	2.4 J (1.9)	1 U	1 U	1 U	1 U
Copper	1,300	-	-	96.2	89.7	3	112	39.2	6.5	2.9	2.3	3
Iron	-	-	-	27,300	27,300	0	41,200	40,400	1,070	789	897	2,080
Lead	15	-	-	30.6 ☆	29.7	1	37.2 ☆	20.1 ☆	1 U	1 U	1 U	1 U
Magnesium	-	-	-	24,500	24,500	0	28,200	19,200	17,100	15,200	15,400	14,700
Manganese	-	5,100	-	3,090	3,180	1	5,910 ☆	4,360	1,750	2,820	4,440	3,550
Nickel	-	730	-	40.4	39.3	1	53.4	11.9	5.1	3.6	5.9	4.5
Potassium	-	-	-	8,840	8,770	0	13,600	18,800	13,500	19,600	16,200	22,200
Selenium	50	180	-	5 U	5 U	-	5 U	5 U	5 U	5 U	5 U	5 U
Silver	-	180	-	1 U	1 U	-	0.3 J (0.2)	1 U	1 U	1 U	1 U	1 U
Sodium	-	-	-	694,000	719,000	2	584,000	481,000	439,000	510,000	469,000	519,000
Thallium	0.5	-	-	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	-	260	-	92.8	93.1	0	61	31.7	22	21.7	25.1	29.9
Zinc	-	11,000	-	52.2	52.7	0	75.3	11	12.8	3	5	7.3

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2011 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33, continued
Total Metals and Asbestos Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	SSGW17 H30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 H30Y7 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 H30Z2 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 H30Z3 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 H30Z4 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 H30Z5 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 H30Z8 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 H30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
AsbestosContent(%)	-	-	-	-	-	-	-	--	-	-	-	-
Aluminum	-	-	-	1,010	251	20 U	20 U	20 U	20 U	20 U	-	20 U
Antimony	6	15	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	2 U
Arsenic	10	11	0.057	11.4 ☆	41.7 ☆	1.2 ☆	1.4 ☆	1.4 ☆	1.7 ☆	1.6 ☆	3	2.2 ☆
Barium	2,000	2,600	-	102	143	155	364	195	538	539	0	156
Beryllium	4	73	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Cadmium	5	180	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Calcium	-	-	-	30,500	56,300	73,100	69,000	70,100	63,600	64,100	0	132,000
Chromium	100	110	-	5.8	4.2	2 U	20 U	2 U	2 U	2 U	-	2 U
Cobalt	-	-	-	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	-	1 U
Copper	1,300	-	-	7.3	6.3	2 UJ	2 U	2 U	2 UJ	2 UJ	-	2 U
Iron	-	-	-	635	4,020	863	200 U	1,970	200 U	207	-	356 ☆
Lead	15	-	-	1.8	1.9	1 U	1 U	1 U	1 U	1 U	-	1 U
Magnesium	-	-	-	8,370	17,700	25,600	24,000	24,300	21,700	21,700	0	53,800
Manganese	-	5,100	-	935	3430	8.3	2.1	14.9	1.7	1.6	3	1 U
Nickel	-	730	-	2.3	5.5	0.53 J (0.41)	0.38 J (0.29)	0.81 J (0.63)	0.35 J (0.27)	0.3 J	8	1.9
Potassium	-	-	-	18,400	16,300	2,210	2,030	2,090	1,940	1,960	1	3,860
Selenium	50	180	-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	-	0.7 J (0.5)
Silver	-	180	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Sodium	-	-	-	346,000	515,000	42,900	26,900	36,100	18,400	18,600	1	160,000
Thallium	0.5	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Vanadium	-	260	-	33	28.5	5 U	5 U	5 U	5 U	5 U	-	5 U
Zinc	-	11,000	-	6.6	13.7	7.2	9.4	20.2	35.3	38.2	4	18.6

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
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µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark *Italic* Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2011 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33a
Dissolved Metals Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW01 MH30X0 BACKGROUND Shallow aquifer groundwater grab sample collected from existing monitoring well located upgradient of mill (e.g., SMW-20)	SSGW02 MH30X1 BACKGROUND Deeper aquifer groundwater grab sample collected from existing production well located upgradient of mill (production deep well #11)	SSGW03 MH3B85 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 17	SSGW04 MH3B86 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 3	SSGW05 MH3B87 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill A	SSGW07 MH3B88 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of sludge pond 5	SSGW08 MH3B89 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill 6
Aluminum	-	-	-	-	*7.1 J (9.2)*	*2.5 J (3.3)*	67.8	53.7	176	31.2	711
Antimony	6	15	-	6	*0.19 J (0.24)*	*2 U*	2 U	2 U	0.35 J	0.37 J	4.3
Arsenic	10	11	0.057	10	*1.6* ☆	*0.93 J (1.26)* ☆	26.2 ☆	16.1 ☆	31 ☆	32.4 ☆	95.9 ☆
Barium	2,000	2,600	-	1,000	*298*	*276*	1,820 ☆	1,190 ☆	481	3,190 ☆	121
Beryllium	4	73	-	4	*1 U*	*1 U*	0.17 J	1 U	0.38 J	0.16 J	0.63 J
Cadmium	5	180	-	5	*1 U*	*1 U*	0.67 J	0.13 J	0.62 J	0.25 J	0.44 J
Calcium	-	-	-	-	*51,200*	*62,900*	57,000	185,000	21,400	292,000	77,400
Chromium	100	110	-	100	*0.43 J (0.56)*	*0.68 J (0.88)*	7.3	5.8	37.7	7.3	32.2
Cobalt	-	-	-	-	*0.41 J (0.52)*	*0.28 J (0.36)*	0.95 J	1.6	4	2.1	2.8
Copper	1,300	-	-	1,300	*1.8 J (2.3)*	*0.49 J (0.61)*	2.3	2.1	4.1	2.3	4
Iron	-	-	-	300	*146 J (185)*	*152 J (193)*	1,890 ☆	1,110 ☆	7,250 ☆	18,100 ☆	6,190 ☆
Lead	15	-	-	15	*0.16 J (0.21)*	*0.32 J (0.42)*	0.99 J (0.76)	0.71 J (0.54)	1.4	0.56 J	1.7
Magnesium	-	-	-	-	*18,900*	*20,400*	1,190,000	154,000	51,200	151,000	28,900
Manganese	-	5,100	-	50	*1.1*	*4.9*	1,100 ☆	4,530 ☆	726 ☆	9,240 ☆	4,790☆
Nickel	-	730	-	100	*0.6 J (0.8)*	*0.61 J (0.79)*	13.8	10.2	12.2	8.9	19.9
Potassium	-	-	-		*5,170*	*2,510*	68,500	21,000	47,000	23,100	19,700
Selenium	50	180	-	50	*5 U*	*5 U*	1.2 J	0.94 J	1.8 J	1.4 J	1.7 J
Silver	-	180	-	100	*1*	*1 U*	0.13 J	1 U	0.14 J	0.11 J	0.14 J
Sodium	-	-	-	-	*11,000*	*11,500*	1,090,000	791,000	202,0000	778,000	766,000
Thallium	0.5	-	-	2	*1 U*	*1 U*	1 U	1 U	1 U	0.091 J	1 U
Vanadium	-	260	-	-	*0.91 J (1.14)*	*0.86 J (1.07)*	6.8	7.4	55.2	9.8	141
Zinc	-	11,000	-	2,000	*5.8*	*14.4*	2.9	3	4.3	3.6	10.4

J The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U The analyte was not detected above the CRQL.
RDSC Superfund Chemical Data Matrix (SCDM) Reference Dose Screening Concentration
CRSC Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration
MCLG Maximum Contaminant Level Goal. A non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.
MCL Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.
µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2004 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33a, continued
Dissolved Metals Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW10 MH3B90 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of pond 20 (landfill E)	SSGW89 MH3B98 Duplicate of sample SSGW10	Relative Percentage Difference (RPD)	SSGW11 MH3B91 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located downgradient of aeration basins	SSGW12 MH3B92 Shallow aquifer groundwater grab sample collected from temporary Geoprobe® well located within or downgradient of landfill G	SSGW13 MH30Y2 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-14 (adjacent to Clark Fork River)	SSGW14 MH30Y3 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-13 (adjacent to Clark Fork River)	SSGW15 MH30Y4 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-17 (downgradient of most potential sources)	SSGW16 MH30Y5 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-11 (adjacent to Clark Fork River)
Aluminum	-	-	-	-	216	264	10	210	160	93.1	235	209	317
Antimony	6	15	-	6	1.4 J	2.1 U	-	0.75 J (0.59)	0.52 J	0.84 J (0.66)	0.61 J	0.19 J	0.45 J
Arsenic	10	11	0.057	10	121 ☆	109 ☆	5	90.4 ☆	63.3 ☆	35.7 ☆	13 ☆	14.5 ☆	44.8 ☆
Barium	2,000	2,600	-	1,000	600	495	10	189	135	110	90.4	93.3	90.2
Beryllium	4	73	-	4	0.19 J	1 U	-	0.14 J	0.088 J	1 U	1 U	1 U	1 U
Cadmium	5	180	-	5	0.33 J	1 U	-	0.24 J	0.15 J	0.21 J	1 U	1 U	0.12 J
Calcium	-	-	-	-	44,200	39,600	5	47,600	47,400	65,600	47,300	50,500	49,200
Chromium	100	110	-	100	11.6	13.1	6	10.5	4.5	5.1	4.6	5.4	4.5
Cobalt	-	-	-	-	0.98 J	1.2	-	2.2	1.3	0.66 J	0.73 J	0.61 J	0.48 J
Copper	1,300	-	-	1,300	2.3	2.9	12	3.7	11.7	4.9	3.1	3	2.7
Iron	-	-	-	300	2,910 ☆	2,350 ☆	11	6,630 ☆	6,510 ☆	1,070 ☆	896 ☆	576 ☆	2,050 ☆
Lead	15	-	-	15	1.2	2.2	29	4.6	8.6	0.62 J	0.83 J (0.63)	0.28 J	0.69 J (0.53)
Magnesium	-	-	-	-	19,400	17,200	6	2,0300	14,600	17,900	15,300	16,300	15,100
Manganese	-	5,100	-	50	1,320 ☆	1,180 ☆	6	4260 ☆	3630 ☆	1,800 ☆	2,660 ☆	4,170 ☆	3,580 ☆
Nickel	-	730	-	100	14	13.7	1	11.2	5.4	4.8	3.9	5.3	4.3
Potassium	-	-	-		7,200	7,130	0	10,500	16600	14,000	20,200	16,500	22,700
Selenium	50	180	-	50	1.1 J	1.4 J	12	0.72 J	5 U	5 U	5 U	5 U	5 U
Silver	-	180	-	100	0.11 J	1 U	-	0.1 J	0.097 J	0.12 J	1 U	1.5	1 U
Sodium	-	-	-	-	693,000	675,000	1	549,000	440,000	485,000	533,000	483,000	560,000
Thallium	0.5	-	-	2	1 U	1 U	-	1 U	1 U	0.12 J	1 U	1 U	1 U
Vanadium	-	260	-	-	65.8	67.4	1	35.7	32.4	21.9	20.1	22.6	30.2
Zinc	-	11,000	-	2,000	10.3	6.7 J	21	5.3	2.7	4.7	3.8	13.5	6.2

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µg/L micro-gram per liter
ppb parts per billion
X.X Analytical Result > 3 x background value = observed contamination
☆ Concentration is > benchmark
Italic Background sample
Sources: EPA 2011 (CLP limits and Low Concentration Detection Limits); EPA 2004 (SCDM); MDEQ 2010 (Circular DEQ-7, Montana Numeric Water Quality Standards)

TABLE 33a, continued
Dissolved Metals Groundwater
Units of µg/L (ppb)

Field Sample ID: Laboratory Sample ID: Location: Analytes	MCL/ MCLG	Superfund Chemical Data Matrix (SCDM) RDSC	Superfund Chemical Data Matrix (SCDM) CRSC	MDEQ Circular 7 Human Health Standards (Groundwater)	SSGW17 MH30Y6 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-19 (downgradient of most potential sources)	SSGW18 MH3B93 Shallow aquifer groundwater grab sample collected from existing groundwater monitoring well SMW-10 (adjacent to Clark Fork River)	SSGW23 MH3B94 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15762 Marcure Lane)	SSGW24 MH3B95 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15700 Marcure Lane)	SSGW25 MH3B96 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15740 Marcure Lane)	SSGW26 MH3B97 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (15400 Marcure Lane)	SSGW99 MH3B99 Duplicate of sample SSGW26	Relative Percentage Difference (RPD)	SSGW27 MH30Z6 Deeper aquifer groundwater grab sample collected from existing domestic well located crossgradient of mill (Clark Fork Cattle Ranch well)
Aluminum	-	-	-	-	562	260	20 U	20 U	20 U	3 J	20 U	-	6.8 J
Antimony	6	15	-	6	0.47 J	1.1 J (0.87)	2 U	2 U	2 U	2 U	2 U	-	2 U
Arsenic	10	11	0.057	10	9.2 ☆	42.2 ☆	1 ☆	0.68 J ☆	0.91 J ☆	1.9 ☆	1.3 ☆	19	2.1 ☆
Barium	2,000	2,600	-	1,000	71.8	143	144	345	193	520	500	2	159
Beryllium	4	73	-	4	1 U	0.29 J	0.062 J	1 U	1 U	0.11 J	1 U	-	1 U
Cadmium	5	180	-	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Calcium	-	-	-	-	29,300	56,200	68,600	65,900	68,400	61,300	59,400	2	133,000
Chromium	100	110	-	100	4.7	3.4	0.69 J	0.7 J	0.51 J	0.81 J	2 U	-	2 J
Cobalt	-	-	-	-	0.41 J	0.62 J	0.14 J	0.55 J	0.3 J	0.44 J	1 U	-	0.38 J
Copper	1,300	-	-	1,300	3.8	5.6	1.4 J	1.4 J	1.5 J	2.2	2 U	-	1.4 J
Iron	-	-	-	300	384 ☆	4,070 ☆	610 ☆	346 ☆	958 ☆	333 ☆	293	6	362 ☆
Lead	15	-	-	15	0.97 J (0.74)	1.7	0.72 J	0.67 J	0.58 J	0.83 J	1.2	-	0.29 J
Magnesium	-	-	-	-	8,380	17,400	23,800	22,500	23,800	20,800	20,100	2	54,900
Manganese	-	5,100	-	50	921 ☆	3,340 ☆	7.9	3.5	12	3.4	3.9	7	7.6
Nickel	-	730	-	100	2.5	5.6	1.3	1.2	1.1	1.2	1.2 U	-	2.6
Potassium	-	-	-		18,300	16,000	2,060	1,930	2,020	2,000	1,820	5	3,970
Selenium	50	180	-	50	5 U	5 U	5 U	5 U	5 U	0.69 J	5 U	-	5 U
Silver	-	180	-	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Sodium	-	-	-	-	357,000	494,000	39,100	24,600	35,200	17,500	17,600	0	162,000
Thallium	0.5	-	-	2	1 U	1 U	0.1 J	1 U	1 U	0.11 J	1 U	-	1 U
Vanadium	-	260	-	-	28.3	31.4	5 U	5 U	5 U	5 U	5 U	-	1.5 J
Zinc	-	11,000	-	2,000	6.2	3.9	7	12.7	14.6	39.8	36.3 J	5	20.2

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