Appendix H

EPA Investigation

D. Miller

START

Superfund Technical Assessment and Response Team
- Region VIII

United States
Environmental Protection Agency

Contract No. 68-W5-0031

ANALYTICAL RESULTS REPORT FOR EXPANDED SITE INSPECTION

DURANGO LEAD SMELTER
Durango, Colorado

TDD No. 9705-0010

APRIL 13, 1998

URS
OPERATING SERVICES, INC.

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ANALYTICAL RESULTS REPORT
for
EXPANDED SITE INSPECTION

Durango Lead Smelter
Durango, Colorado

CERCLIS ID # CO0001399633

EPA Contract No. 68-W5-0031
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EXPANDED SITE INSPECTION

Durango Lead Smelter
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1.0 INTRODUCTION

URS Operating Services, Inc. (UOS) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, to conduct an Expanded Site Inspection (ESI) at the Durango Lead Smelter (DLS) site (CERCLIS ID #CO0001399633) in Durango, La Plata County, Colorado. Field work for this ESI was conducted the week of October 20, 1997.

This Analytical Results Report (ARR) has been prepared in accordance with Technical Direction Document (TDD) 9705-0010, the "Guidance for Performing Site Inspections Under CERCLA," Interim Final September 1992, and the "Region VIII Supplement to Guidance for Performing Site Inspections Under CERCLA" (U.S. Environmental Protection Agency (EPA) 1992; EPA 1993). Field work included sampling and non-sampling data collection. Samples of surface water and sediment were collected from the Animas River and Lightner Creek. Fish tissue samples were collected from the Animas River. Environmental sampling procedures followed those outlined in the UOS Technical Standard Operating Procedures (TSOPs) for field operations at hazardous waste sites and "Guidelines For Studies of Contaminants in Biological Tissues for the National Water Quality Assessment Program" (URS Operating Services Inc. (UOS) 1995; U.S. Geological Survey (USGS) 1994). Non-sampling activities included site observations, photo documentation, and identification and delineation of wetlands along the Animas River.

Site characterization samples included ten surface water samples, ten collocated sediment samples, twelve brown trout fillet samples, twelve rainbow trout fillet samples, and seven Quality Assurance/Quality Control (QA/QC) samples (in addition to the laboratory matrix spike/matrix spike duplicates (MS/MSD). The quality assurance samples followed the requirements of the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" and included one duplicate surface water sample, one rinsate sample from sediment sampling equipment, one rinsate sample from fish tissue sample preparation equipment, and four fish tissue duplicate samples. The fish tissue duplicate samples were collected by separating out the left and right fillets from the largest fish of each species (brown trout and rainbow trout) collected at each location (upgradient of the site and downgradient of the site). The above mentioned QA/QC samples are collected at a minimum frequency of one per twenty environmental samples for the same matrix (EPA 1993). One surface water sample and one sediment sample were collected in triple volume for the laboratory MS/MSD and are not considered additional samples. In addition, two fish samples, one from each of the trout species

(brown and rainbow trout), was individually designated as MS/MSDs for the fish tissue matrix. All aqueous and sediment samples were analyzed through the EPA Contract Laboratories Program (CLP), Routine Analytical Services (RAS) for total metals at Sentinel, Inc. of Huntsville, Alabama. Additionally, surface water samples were analyzed through the EPA CLP Unique Laboratory Sample Analyses (ULSA) for total organic carbon (TOC) at Acculabs Research of Golden, Colorado. Hardness has been calculated on an as needed basis from total metals analyses. All fish tissue samples were analyzed through the EPA CLP ULSA for total metals at Quanterra Labs of Arvada, Colorado.

2.0 OBJECTIVES

The purpose of this ESI is to screen for risk to human health and the environment by gathering information with regard to EPA's Hazard Ranking System (HRS) criteria. The specific objectives of this ESI are:

- Collect fish fillet samples from the Animas River to determine if site contaminants have bioaccumulated in fish tissue, thus posing a potential threat to individuals ingesting fish from the Animas River; and

- Collect surface water and sediment samples from the Animas River at intervals of approximately 500 feet to test for the extent of contamination in water and sediments.

- Identify and delineate all wetlands present within the surface water and sediment sampling reach.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION AND DESCRIPTION

The DLS site is located in the southeast quarter of Section 30, T. 35 N., R. 9 W., of the Durango West Quadrangle, La Plata County, Colorado. The site is located southwest of Durango, along the west bank of the Animas River (Figures 1 and 2). The approximate site coordinates are 37° 16' 03.00" N. latitude and 107° 53' 00.00" W. longitude (USGS 1963b).

3.2 SITE HISTORY AND PREVIOUS WORK

The history of smelting operations at the site extends from 1882 through approximately 1935. The San Juan Smelting and Mining Company, originally at Silverton, Colorado, began operation in Durango in 1882. In 1887, it was reported to have smelted over $1 million worth of silver, lead, gold, and copper, and was the largest smelter in the San Juan Mountains. At the turn of the century, all the major smelting corporations in Durango merged to become the American Smelting and Refining Company at this location. The American Smelting and Refining Company closed in the mid 1930s, and was dismantled in approximately 1942 (Smith 1980).

The United States Vanadium Corporation built a uranium processing mill at the site of the former lead smelter operation in 1942. The uranium mill operation and the associated tailings at this location were the focus of a U.S. Department of Energy (DOE) Uranium Mill Tailings Remedial Action (UMTRA) that was conducted to clean up the uranium mill tailings deposited along the Animas River. During the removal of those tailings (from 1986 to 1991), the DOE also removed the remaining lead smelter stack, building materials, and rubble associated with the former lead smelter. The slag, a by-product of the lead smelter operation, was left at the site because it was not within the scope of responsibility of the DOE under the UMTRA project. The slag was graded and the site area was covered with clean backfill and topsoil and vegetated. The west bank of the Animas River was riprapped to minimize erosion (U.S. Department of Energy (DOE) 1995). The UMTRA activity and associated remediation, while not the subject of this ESI, have played a major role in the redistribution of lead slag wastes at this site.

3.3 SITE CHARACTERISTICS

3.3.1 Physical Geography

The DLS site is located along the west bank of the Animas River (Figure 1). The site is located approximately 6,520 feet above mean sea level in La Plata County (USGS 1963a). The DLS site is approximately 15 acres in size, or 653,400 square feet (DOE 1995; UOS 1996). Site topography is generally flat, with a slight southeast slope allowing drainage

toward the Animas River. The slag was graded during the UMTRA project before backfill was brought in (Colorado Department of Public Health and the Environment (CDPHE) 1996; UOS 1996). The site is situated in a transitional area between the Southern Rocky Mountain Physiographic Province and the Colorado Plateau Province (Bureau of Reclamation (BOR) 1981).

3.3.2 Geology

The site area is underlain by the dark gray to black marine Mancos Shale, which is more than 1,700 feet thick. The Mancos Shale is truncated by the Smelter Mountain fault south of the site area. The Point Lookout Sandstone and Menefee Formations outcrop south of the site area and south of the Smelter Mountain fault. At the site area along the base of Smelter Mountain, the Mancos Shale is directly overlain by a layer of colluvium up to 25 feet thick. The colluvium consists of poorly sorted, silty soil derived from Smelter Mountain. Along Lightner Creek and the Animas River, alluvial deposits of sand and gravel up to 15 feet thick occur over the shale bedrock and the colluvium (DOE 1995).

3.3.3 Hydrogeology

Hydrostratigraphic units at the DLS site include the consolidated bedrock unit overlain by unconsolidated surficial deposits. Together the surficial hydrostratigraphic units (alluvium and colluvium) and the bedrock unit (the uppermost few feet of weathered, fractured Mancos Shale) directly under the surficial deposits comprise the uppermost aquifer in the site area. Groundwater occurs in a shallow alluvial aquifer overlying bedrock at the former lead smelter site. Groundwater at the site moves predominantly through the alluvium overlying the low-permeability Mancos Shale bedrock and discharges into the Animas River to the east (DOE 1995).

In gravels above the bedrock, the hydraulic conductivity is estimated to be 7×10^{-3} centimeters per second (cm/sec). In the colluvium near the base of Smelter Mountain, recharge is primarily by runoff from the mountain and by infiltrating precipitation. Sand

and gravel deposits receive recharge from Lightner Creek and the Animas River (DOE 1995).

3.3.4 Hydrology

Site topography indicates that surface water drainage via overland flow is directed to the south and east toward the Animas River (USGS 1963b; UOS 1996). The annual mean discharge rate of the Animas River approximately one mile upstream of the site is 823 cubic feet per second (cfs) (USGS 1996). Upstream of the site area, the Animas River has a drainage area of approximately 770 square miles (DOE 1995). The site lies within the Animas River 100-year flood plain (BOR 1981).

3.3.5 Meteorology

The DLS site is located in a semiarid climate zone. The mean annual precipitation as totaled from the University of Delaware (UD) database is 12.83 inches. The net annual precipitation as calculated from precipitation and evapotranspiration data obtained from the UD database is 1.61 inches (University of Delaware, Center for Climate Research, Department of Geography 1986). The 2-year, 24-hour rainfall event for this area is 1.5 inches (Dunne, Thomas and Luna B. Leopold 1978).

4.0 ANALYTICAL DATA

4.1 DATA VALIDATION AND INTERPRETATION

The sample data collected during this focused SI were reviewed using the HRS guidelines for analytical interpretation (Office of Federal Register 1990). As reported in the analytical results in Tables 2 and 3, concentrations of contaminants in surface water and sediment samples, as noted by a star (★), are determined to be significantly above background based on the following:

- If the **upgradient** analyte concentration is greater than its Sample Quantitation Limit (SQL), and if the **release sample** analyte concentration is greater than its SQL, three times greater than the upgradient, and five times greater than the blank concentration.

- If the **upgradient** analyte concentration is not greater than its SQL and if the **release sample** analyte concentration is greater than its SQL, greater than the upgradient SQL, and five times greater than the blank analyte concentration.

All data analyzed by the CLP ULSA laboratories were validated by TechLaw, Inc. All data are acceptable for use as qualified in the data validation report. The complete data validation report, laboratory forms, and SQL calculations are located in Appendix C.

Results can also be qualified as estimated based upon two criteria. The first of the criteria is noted by a **J** qualifier and indicates that the associated numerical value is an estimated quantity because quality control criteria were not met. The presence of the analyte is considered reliable. The second of the criteria is noted by brackets **[ ]** and indicates that the associated numerical value was detected below the Contract Required Detection Limit (CRDL), but was detected at a level greater than the method detection limit and therefore is required by the CLP contract to be qualified as an estimate by the laboratory. Analytes that were non-detect are noted by a **U** qualifier following the detection limit for that analyte.

All surface water and sediment data were validated by TechLaw, Lakewood, Colorado. Data qualified with an **R** (all aqueous samples for antimony, arsenic, and selenium) indicate that the analyte specific for that sample was rejected. Aqueous sample data for antimony, arsenic, and selenium were rejected due to the matrix spike being out of the acceptable range of detection. Resampling is necessary to confirm the presence of the antimony, arsenic, and selenium.

As reported in the analytical results for fish tissue samples in Tables 4 through 7, elevated concentrations of contaminants, as noted by a star (★), are determined by sample concentrations based on the following:

- If the sample concentrations are greater than the benchmarks for the surface water pathway human food chain. These benchmarks include the U.S. Food and Drug Administration Action Level (FDAAL), Reference Dose Screening Concentrations, or Cancer Risk Screening Concentrations (EPA 1995).

Fish tissue results were statistically analyzed to determine if the downstream fish population contained significantly higher concentrations of analytes than the background fish population. A comparison between the means of the two populations was performed using a t-test for populations with different standard deviations. The t-statistic and degrees of freedom were compared to the student-t distribution value Table for a 95% significance level. The test was used to prove or disprove the hypothesis that the downstream fish population has metal concentrations equal to or greater than the upstream fish population. All fish tissue data were validated by TechLaw, Lakewood, Colorado. All data are acceptable for use as qualified in the data validation report. The complete data validation report and laboratory forms are located in Appendix C.

5.0 WASTE CHARACTERIZATION

The buried slag that remains along the west bank of the Animas River is approximately 25 feet thick and covers approximately 15 acres (DOE 1995; UOS 1996). The volume of slag has been estimated at approximately 200,000 cubic yards of material. As a part of the DOE UMTRA, the slag was graded and covered by a minimum of approximately 18 to 24 inches of clean backfill and approximately 6 inches of topsoil. The area was vegetated with indigenous plant species (DOE 1995). Building material, rubble and bricks, and the smelter stack were removed as a part of the UMTRA by the DOE to the Bodo Canyon disposal site, approximately 1.5 miles to the southwest of the site in a mountain valley near Bodo Canyon. During the UMTRA removal, the DOE sampled the bricks from the old smelter stack. The DOE indicated the presence of Radium-226 concentrations in the brick material. However, during the UOS site reconnaissance, foundation material, rusted metal beams, and old bricks were noted along the west bank of the Animas River where slag outcrops were identified (UOS 1996). The former raffinate ponds indicated on Figure 2 were associated with the DOE UMTRA project and were approximately 3,000 feet downstream of the DLS site at the approximate location of DLX-SW/SE-7. Raffinate, the waste solution produced from

the uranium-vanadium recovery process, was stored in evaporation ponds. Contaminated soils from these ponds were removed and relocated by the DOE during the remedial action (DOE 1995).

A total of eleven slag samples were collected by MK-Ferguson Company in 1989 and exhibited the following elements as the highest concentrations of all eleven samples: antimony (70 ppm); arsenic (480 ppm); barium (8,100 ppm); cobalt (160 ppm); copper (5,400 ppm); lead (25,000 ppm); mercury (0.5 ppm); molybdenum (150 ppm); uranium (233 ppm); vanadium (910 ppm) (DOE 1995).

6.0 SURFACE WATER AND SEDIMENT PATHWAY

6.1 SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

Collocated surface water and sediment samples were collected at nine locations along the Animas River and at one location on Lightner Creek (Figure 2). All surface water and sediment samples collected downstream of the site PPE were collected at approximate 0.10 mile or 500 foot spacings from the previous sample location. The sample locations and rationale are presented in Table 1.

The background sample on the Animas River (DLX-SW/SE-01) was collected from the west bank of the river approximately 0.25 mile upstream of site influences. The MS/MSD was collected at the background location. The background sample on Lightner Creek (DLX-LC-SW/SE-01) was collected from approximately 0.60 mile upstream of the confluence of Lightner Creek and the Animas River adjacent to the Best Western Motel parking lot. The sample collected from the site probable point of entry (PPE) into the Animas River (DLX-SW/SE-02) was collected from a point immediately below the Smelter Rapids. Sample DLX-SW/SE-03 was collected from the west bank of the Animas River approximately 55 yards downstream of the Smelter Rapids. Sample DLX-SW/SE-04 was collected from the west bank of the Animas River immediately across the stream from the Main Wastewater Treatment Plant Building. Sample DLX-SW/SE-05 was collected from the west bank of the Animas River just upstream and across the river from the Park Visitors Center. Sample DLX-SW/SE-06 was collected from the west bank of the Animas River approximately 30 yards upstream of the City Park boat launch. Sample DLX-SW/SE--07 was collected from the west bank of the Animas River from a location that is approximately 15 yards downstream of the City

Park boat launch. Sample DLX-SW/SE-08 was collected from the west bank of the Animas River from a location that is approximately 170 yards downstream of sample station DLX-SW/SE-07. The most downstream sample location was DLX-SW/SE-09, which is located on the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge. Each of the surface water-sediment sample locations downgradient of the site PPE was spaced approximately 500 feet from the adjacent sample location.

6.2 SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

The surface water and sediment sample analytical results are reported in Tables 2 and 3. Laboratory data and validation comments may be found in Appendix C, under separate cover.

Aluminum was detected at concentrations significantly above background in surface water samples DLX-SW-02, DLX-SW-03, DLX-SW-05, DLX-SW-07, DLX-SW-08, DLX-SW-09, and DLX-SW-10. Mercury was detected at a concentration significantly above background in sediment sample DLX-SE-04, and silver was detected at a concentration significantly above background in sediment samples DLX-SE-06 and DLX-SE-07.

6.3 FISH TISSUE SAMPLE LOCATIONS

Fish tissue samples were collected from both brown and rainbow trout at upgradient and downgradient segments along the Animas River (Table 1 and Figure 1). It should be noted that these fish tissue samples that were collected constitute a grab sample of the existing fish population and may not account for migration of fish within the Animas River.

All fish collected for this ESI were collected under State of Colorado Division of Wildlife scientific collection license #97-0752. The fish were collected by employing an electro-shock method from a 16-foot self-bailing raft. The raft was owned and operated the U.S. Bureau of Reclamation Durango field office crew. The fish collection areas were changed from the approved sample plan locations because of the access requirements for the Bureau of Reclamation crew's boat. Fish tissue samples DLX-BR-1A through DLX-BR-1F and DLX-RB-1A through DLX-RB-1F were collected

from the upgradient (background) fish sampling reach, located between 7 and 9 miles upstream of the site. Fish tissue samples DLX-BR-2A through DLX-BR-2F and DLX-RB-2A through DLX-R-2F were collected from the downgradient (potentially affected) fish sampling reach, located between 3.5 and 5.0 miles downstream of the site.

6.4 FISH TISSUE ANALYTICAL RESULTS

All fish tissue samples were compared on a statistical basis as a grab fish population upgradient to a grab fish population downgradient of the site. It is important to note that while these fish tissue samples were collected from sampling reaches upgradient and downgradient, respectively, of the site, it is the nature of fish to migrate; hence, it can not be confirmed that these fish have lived their entire lives either upgradient or downgradient of the site.

Duplicate fish tissue sample results were comparative with little differences in inorganic concentrations between the left and right fillets (Tables 4 through 7).

A statistical analysis was conducted on the inorganic fish tissue data to determine the range of concentrations for each analyte in upstream and downstream tissue samples based upon a 95% confidence level. The range of concentrations for upstream and downstream tissue samples were then compared to identify significant differences between upstream and downstream fish tissue. Tables 8 and 9 show the concentration ranges for upstream and downstream rainbow trout and brown trout, along with the applicable benchmarks for comparison. There were no elements detected in fish tissue samples found to be statistically significantly elevated.

6.5 ATTRIBUTION AND SURFACE WATER AND SEDIMENT PATHWAY TARGETS

The concentration of mercury (DLX-SE-04), while meeting criteria as significantly above background, is potentially attributable to a more widespread problem arising from elevated mercury concentrations in the southern Colorado mountains from area power plants (EPA 1991). Detections of aluminum in surface water samples are likely not attributable to the DLS site since aluminum was not detected as a source contaminant.

Municipal drinking water for the city of Durango is supplied from surface water that is collected from the Florida and Animas Rivers and then is mixed and supplied to the entire population of Durango. The main surface water intake for the municipal supply is located along the Florida River, a separate watershed from the Animas River that flows to the south approximately five miles to the east of the site (Figure 1). The municipal surface water intake on the Animas River, at 29th Street in Durango, is located approximately two miles upstream of the site (Figure 1). Water from the Animas River is used primarily when there is a high demand on the municipal water supply, generally during the summer months (Durango Public Works 1996).

The DLS site is located on the west banks of the Animas River. Contaminants from the buried slag could potentially migrate to the surface water pathway where slag is exposed at the river bank and where slag is exposed in drainages leading to the Animas River (UOS 1996).

The Animas River is a recreational fishery (Colorado Division of Wildlife (CDOW) 1996). The Colorado Department of Wildlife stocks the Animas River with brown trout, rainbow trout, and cutthroat trout. Native species in the Animas River include the blue head sucker (that is most abundant), flannel mouth sucker, mottled sculpin, and speckled dace. Occasionally the non-native white sucker is identified in the Animas. The stretch of the Animas from Lightner Creek (one mile north of the site area) to Purple Cliffs (approximately two and one-half miles downstream of the DLS site) was used by approximately 6,200 anglers from April 1990 through August 1990. The fishing limit is two fish, 16 inches or longer (artificial flies and lures only). The catch rate on this stretch of the Animas is 0.75 fish per hour or 1.2 fish per angler per trip, or approximately 3,000 pounds per year (based on an estimate of 0.4 pounds per fish greater than or equal to a 16-inch fish) (CDOW 1996).

The Animas River, a recreational water body, is used as a kayak course adjacent to the site area (UOS 1996). There are no private drinking water intakes identified along the Animas River downstream of the site (Durango Public Works 1996). There are no U.S. Department of the Interior National Wetland Inventory (NWI) maps available for the Durango area; however, emergent riverine wetland growth was identified during the site reconnaissance along the 15-mile downstream target distance limit. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland

frontage were observed along the Animas River. This wetland extends from an area immediately downgradient of the approximate location of sample location DLX-SW/SE-3 to an area immediately upgradient of the Santa Rita Bridge. The next closest downgradient wetland frontage grouping was located approximately one mile downstream of the DLS site at the Santa Rita Bridge and totaled approximately 1,820 feet of frontage distance (URS Greiner 1997).

7.0 ADDITIONAL PATHWAYS

7.1 GROUNDWATER PATHWAY

The DOE has documented 20 wells within a two-mile radius of the site, that serve approximately 47 people based on 2.35 persons per household in Durango (DOE 1995; U.S. Department of Commerce, Bureau of the Census (USDOC) 1990). The Colorado State Engineers Office has records of 90 household-use-only well permits (that serve approximately 211 people) completed to the alluvium and bedrock within two to four miles of the site (Colorado State Engineer's Office 1996; USDOC 1990). While records for these wells exist, UOS attempted to sample the closest of these wells in 1996 for the Durango Lead Smelter Screening Site Inspection, only to discover that these residences are all now supplied by municipal water from the Florida and Animas Rivers (Durango Public Works 1996; UOS 1996). Development and utility policies for the city of Durango currently prohibit the drilling of private wells within the city limits (Durango Public Works 1996).

7.2 AIR AND SOIL EXPOSURE PATHWAYS

Waste slag from the former smelter operation was buried on site during the DOE UMTRA project. Slag outcroppings were observed during the UOS site reconnaissance, but had minimal surface exposure for air pathway consideration (UOS 1996). If contaminants migrated through the air pathway, proximal targets include the total population,(12,430 people) of the city of Durango, which is situated within four miles of the site (USDOC) 1990). The nearest residences (approximately five houses) are located on the east bank of the Animas River, approximately one-quarter of a mile to the east of the site. The site area was backfilled with a minimum of 18 to 24 inches of clean backfill and

another 6 inches of topsoil, and vegetated by the DOE during the UMTRA (CDPHE 1996). The prevailing wind direction is west-northwest down the river valley (DOE 1995).

The DLS site is owned by the state of Colorado. The UMTRA was conducted by the DOE. The source area (slag) was covered with a minimum of 18 to 24 inches of backfill and another 6 inches of topsoil during the UMTRA. Slag outcroppings were identified during the UOS site reconnaissance along the west bank of the Animas River (UOS 1996). Currently, the state of Colorado plans to sell the southern portion of the site (the location of the former raffinate ponds) to the Bureau of Reclamation for the installation of a pumping station as a part of the Animas/La Plata Wastewater Management Plan (Figure 2). The northern portion of the property (the former location of the uranium mill tailings and current location of buried lead smelter slag) is slated for purchase by the city of Durango (CDPHE 1996).

Access to the site is restricted by fencing and locking gates (UOS 1996). Approximately 4,143 people reside within one mile of the site, of whom approximately 1,036 reside within the 0.25-mile radius of influence (USDOC 1990). The Site Inspection (SI) conducted by UOS in 1996 indicated elevated concentrations of copper, lead, manganese, and silver in residential soils sampled in the predominant downwind direction of the DLS site (UOS 1996).

Other potential targets include federally listed threatened or endangered species that may be potentially present in La Plata County. These species include the black-footed ferret (endangered), Knowlton's cactus (endangered), American peregrine falcon (endangered), bald eagle (threatened), Eskimo curlew (endangered), and the southwestern willow flycatcher (endangered). Critical habitat for the Mexican spotted owl (threatened) occurs in La Plata County (USFWS 1996).

8.0 SUMMARY

The DLS site is a former lead smelter and covers approximately 15 acres on the west bank of the Animas River. A Site Inspection (SI) conducted by UOS in 1996 concluded the potential for vanadium and zinc contamination was a viable threat and that further sampling was necessary. Detections from the previous SI were not reported in this ESI and releases observed in the previous SI were not confirmed or documented again in the completion of this ESI. There were no observed releases within 0.4 miles downstream of the DLS site. At 0.4 miles downstream, mercury was detected as an observed release; however, airborne mercury is a common problem in this area.

Contaminants from the buried slag could potentially migrate to the surface water pathway where slag is exposed at the river bank and where slag is exposed in drainages leading to the Animas River.

There are no private drinking water intakes identified along the Animas River downstream of the site. The Animas River is a recreational fishery and is stocked by the Colorado Division of Wildlife with brown trout, rainbow trout, and cutthroat trout. Native species in the Animas River include the blue head sucker (that is most abundant), flannel mouth sucker, mottled sculpin, and speckled dace. The catch rate on this stretch of the Animas is 0.75 fish per hour or 1.2 fish per angler per trip, or approximately 3,000 pounds per year (based on an estimate of 0.4 pounds per fish greater than or equal to a 16-inch fish).

The Animas River, a recreational water body, is used as a kayak course adjacent to the site area. There are no NWI maps available for the Durango area; however, emergent riverine wetland growth was identified during the site reconnaissance along the 15-mile downstream target distance limit. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland frontage were observed along the Animas River. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland frontage were observed along the Animas River. This wetland started immediately downgradient of the approximate location of sample location DLX-SW/SE-3 and ended immediately upgradient of the Santa Rita Bridge.

A statistical analysis was conducted on the inorganic fish tissue data to determine the range of concentrations for each analyte in upstream and downstream tissue samples based upon a 95 % confidence level. The range of concentrations for upstream and downstream tissue samples were then compared to identify significant

differences between upstream and downstream fish tissue, along with the applicable benchmarks for comparison. There were no elements detected in fish tissue samples found to be statistically significantly elevated.

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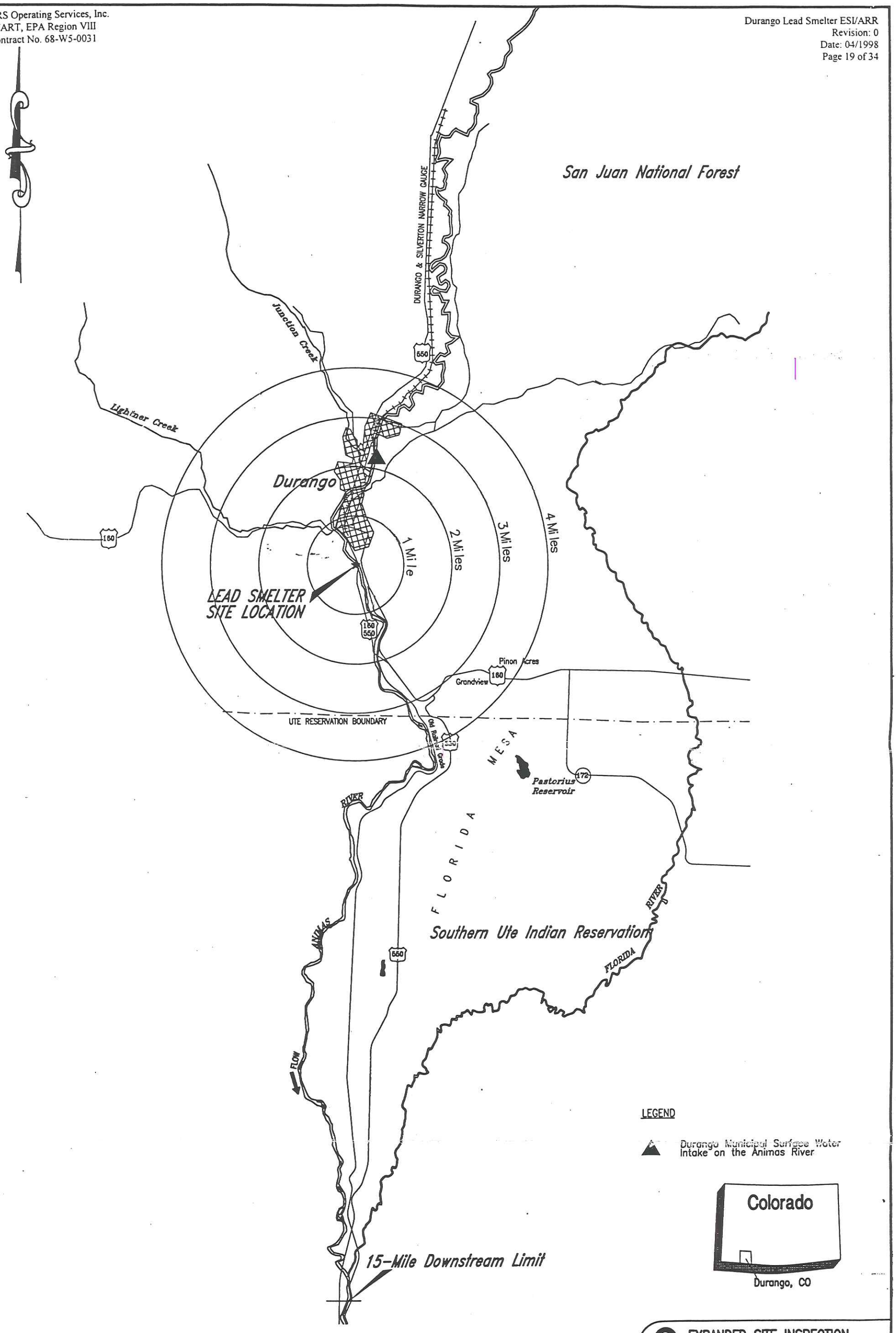

SOURCE:
USGS 1983
UOS 1996

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EXPANDED SITE INSPECTION
UOS Job No. 75-70510.00

Durango Lead Smelter
Durango, Colorado

Area of Influence Map
Figure 1

April 1998

URS OPERATING SERVICES

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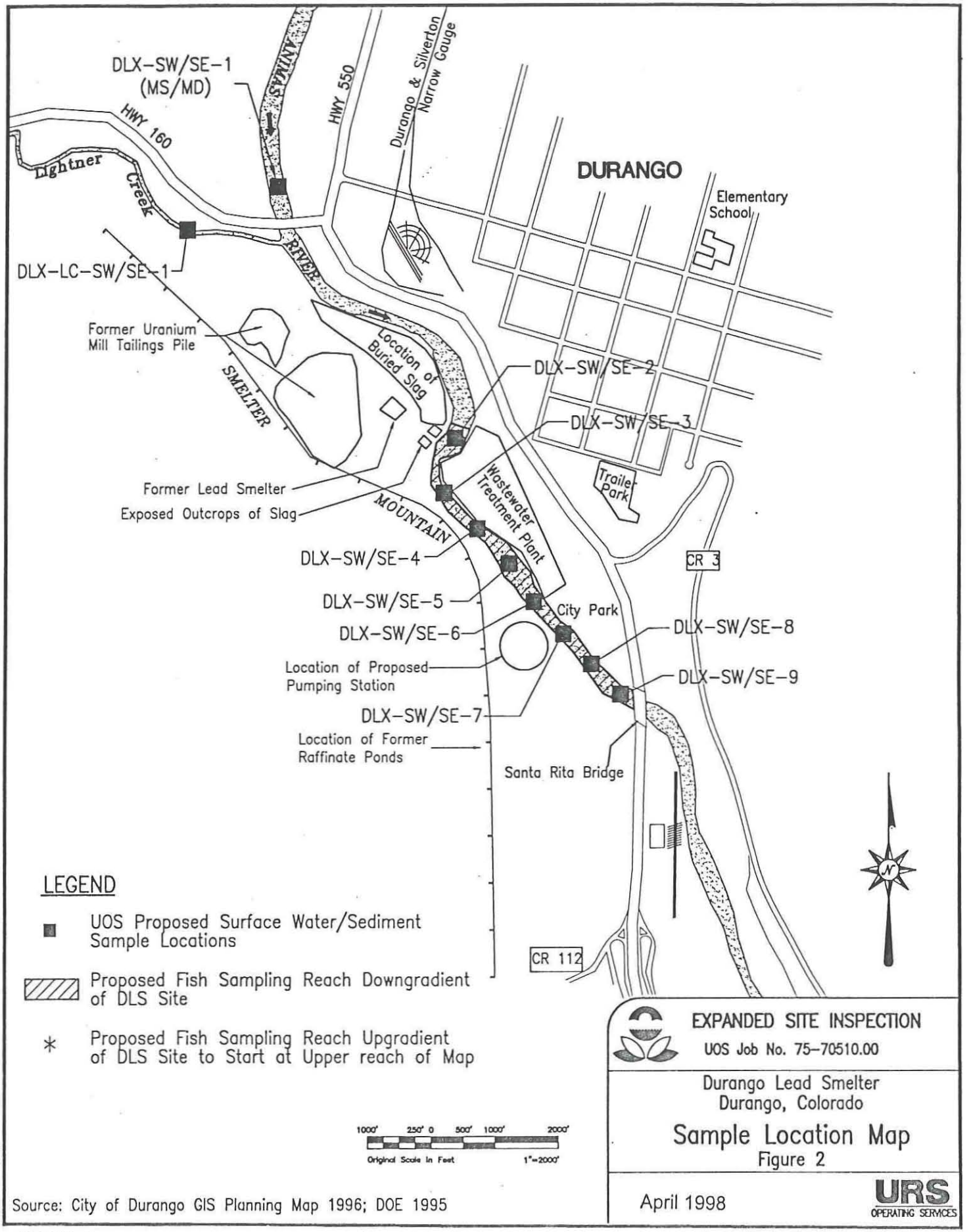

Source: City of Durango GIS Planning Map 1996; DOE 1995

EXPANDED SITE INSPECTION
UOS Job No. 75-70510.00

Durango Lead Smelter
Durango, Colorado

Sample Location Map
Figure 2

April 1998

URS OPERATING SERVICES

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TABLE 1
Sample Locations and Rationale

Matrix	Sample #	Location	Rationale
Surface Water Samples	DLX-SW-1 MS/MSD	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SW-1	Background sample collected from Lightner Creek approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.
	DLX-SW-2	Collected from the west bank of the Animas River at the site PPE, immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SW-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-6	Collected from the west bank of the Animas River approximately 30 yards upstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-8	Collected from the west bank of the Animas River approximately 500 feet downstream of the sample point DLX-SW-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Sediment Samples	DLX-SE-1 (MS/MSD)	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SE-1	Background sample collected from Lightner Creek, approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.
	DLX-SE-2	Collected from the west bank of the Animas River at the site PPE immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SE-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-6	Collected from the west bank of the Animas River approximately 30 yards upstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-8	Collected from the west bank of the Animas River approximately 500 feet downstream of DLX-SE-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue Samples	DLX-BR-1A	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1B	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1C	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1D	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1E	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1F	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-2A (MS/MSD)	Brown trout fish tissue sample collected from the Animas River between 3.5 to 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2B	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2C	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2D	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout tissue sample (continued)	DLX-BR-2E	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2F	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Rainbow Trout Fish Fillet Samples	DLX-RB-1A	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1B	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1C	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1D	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1E	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1F	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-2A (MS/MSD)	Rainbow trout fish tissue sample to be collect ed from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2B	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Rainbow Trout tissue sample (continued)	DLX-RB-2C	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2D	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2E	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2F	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Surface Water and Sediment QA/QC Samples	DLX-SW-10	Surface water duplicate of DLX-SW-8.	Quality Assurance sample to document the ability to collect collocated samples in the field.
	DLX-SW-11	Rinsate Blank from sediment sampling equipment.	Document thoroughness of decontamination process.
Fish tissue Species QA/QC Samples	DLX-BRRB-1	Rinsate Blank from fish tissue sampling equipment.	Document thoroughness of decontamination process.
	DLX-BR-1FD Brown Trout Duplicate	Duplicate background brown trout fish tissue sample collected from the Animas River between 7.0 and 9.0 miles upstream of the DLS site. Duplicate of DLX-BR-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-BR-2FD Brown Trout Duplicate	Duplicate brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-BR-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Fish Tissue QA/QC Samples (continued)	DLX-RB-1FD Rainbow Trout Duplicate QA/QC Sample	Duplicate background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site. Duplicate of DLX-RB-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-RB-2FD Rainbow Trout Duplicate QA/QC Sample	Duplicate rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-RB-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 2
Surface Water Sample Inorganic Analytical Results
Durango Lead Smelter - Animas River and Lightner Creek
Concentrations in μg/l (ppb) - October 1997/Case Number 25768

Sample No.: Sample ID: Sample Location:	MHDL88 DLX-SW-01 Animas River Background	MHDL89 DLS-LC-SW-01 Lightner Creek Background	MHDL90 DLX-SW-02 Animas River at PPE	MHDL91 DLX-SW-03 Animas River approximately 55 yards downstream of PPE	MHDL92 DLX-SW-04 Animas River at Waste Water Treatment plant	MHDL93 DLX-SW-05 Animas River at Park Visitors Center	MHDL94 DLX-SW-06 Animas River upstream of city park boat launch	MHDL95 DLX-SW-07 Animas River downstream of city park boat launch	MHDL96 DLX-SW-08 Animas River approximately 500 feet downstream of DLX-SW-07	MHDL98 DLX-SW-10 Duplicate surface water sample collected at DLX-SW-08	MHDL97 DLX-SW-09 Animas River approximately 20 yards upstream of Sant Rita Bridge	MHDL 99 DLX-SW-11 Rinsate blank
Aluminum (Al)	[175]	[23.2] J (200)	★ 250 (200)	★ 208 (200)	[174]	★ 203 (200)	[196]	★ 214 (200)	★ 223 (200)	★ 203 (200)	★ 226 (200)	[37.3] J
Antimony (Sb)	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR
Arsenic (As)	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR
Barium (Ba)	[47.1]	[89.5] (200)	[49.5]	[48.2]	[47.3]	[46.6]	[48.0]	[48.0]	[48.7]	[47.4]	[48.1]	0.60 U
Beryllium (Be)	0.10 U (5)	0.10 U (5)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Cadmium (Cd)	0.69 U	0.30 U (25)	0.58 U	0.61 U	0.69 U	0.73 U	0.63 U	0.64 U	[0.51] (25.0)	0.62 U	0.53 U	0.33 U
Calcium (Ca)	50,700 (5)	72,300 U (5)	52,200	51,000	50,300	49,200	50,700	50,300	50,000	49,000	49,600	[237]
Chromium (Cr)	0.70 U	0.70 U 10)	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U
Cobalt (Co)	1.1 U (50)	1.1 U (50)	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Copper (Cu)	[14.5] (25)	[17.2] (25)	[17.6]	[6.3]	[6.5]	54.4	[7.6]	47.9	[21.0]	[6.4] J	[21.9]	[18.9]
Iron (Fe)	333 J (100)	60.6 UJ (100)	370 J	366 J	326 J	317 J	346 J	333 J	326 J	350 J	378 J	39.1 UJ
Lead (Pb)	2.6 U (3.0)	1.8 U (3.0)	3.0 U	3.4 U	3.6 U	8.1 U	3.3 U	4.3 U	3.2 U	2.9 U	4.1 U	3.6 U
Magnesium(Mg)	7,390	25,600	7,880	7,430	7,260	7,200	7,380	7,360	7,290	7,120	7,230	[85.9]
Manganese(Mn)	103 J (15)	[13.9] J (15)	107 J	107 J	99.2 J	103 J	98.5 J	106 J	101 J	93.7 J	106 J	[5.5] J
Mercury (Hg)	0.10 U	0.10 U (0.2)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Nickel (Ni)	[1.8] (40)	1.3 U (40)	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Potassium (K)	[2,130] J	[2,260] J	[2,220] J	[2,170] J	[2,190] J	[2,130] J	[2,290] J	[2,250] J	[2,320] J	[2,270] J	[2,290] J	[140] J
Selenium (Si)	3.0 UR	2.3 UR	2.3 UR	2.3 UR	[2.8]R	2.3 UR	2.3 UR	2.3 UR	[2.6] R	2.3 UR	2.3 UR	2.3 UR
Silver (Ag)	0.80 U	0.80 U (10)	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Sodium (Na)	8,890	16,900	9,380	9,130	9,110	9,040	9,410	9,370	9,580	9,450	9,580	[701]
Thallium (Tl)	2.9 U (50)	2.9 U (50.0)	2.9 U	[3.4] (50.0)	2.9 U	2.9 U	[3.4] (50.0)	2.9 U	[3.7] (50.0)	2.9 U	2.9 U	2.9 U
Vanadium (V)	1.4 U (50)	1.4 U (50)	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Zinc (Zn)	101 J (20)	[9.4] J (20)	120 J	101 J	97.4 J	109 J	99.0 J	110 J	97.6 J	90.6 J	96.4 J	[10.2] J

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 CRDL
R - Data rejected
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)
( ) - Sample Quantitation Limit
★ - An elevation concentration as defined in section 4.1.

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TABLE 3
Sediment Sample Inorganic Analytical Results
Durango Lead Smelter - Animas River and Lightner Creek
Concentrations in mg/kg (ppm) - October 1997/Case Number 25768

Sample No.: Sample ID: Sample Location:	MHDJ20 DLX-SE-01 Animas River Background	MHDJ21 DLS-LC-SE-01 Lightner Creek Background	MHDJ22 DLX-SE-02 Animas River at PPE	MHDJ23 DLX-SE-03 Animas River approximately 55 yards downstream of PPE	MHDJ24 DLX-SE-04 Animas River at Waste Water Treatment plant	MHDJ25 DLX-SE-05 Animas River at Park Visitors Center	MHDJ26 DLX-SE-06 Animas River upstream of city park boat launch	MHDJ27 DLX-SE-07 Animas River downstream of city park boat launch	MHDW23 DLX-SE-08 Animas River approximately 500 feet downstream of DLX-SW-07	MHDW24 DLX-SE-09 Animas River approximately 20 yards upstream of Sant Rita Bridge
Aluminum (Al)	5,120 J (3.1)	4,900 J (2.9)	3,960 J	4,650 J	5,270 J	4,900 J	5,660 J	5,030 J	6,270 J	6,190 J
Antimony (Sb)	1.3 UJ (1.3)	1.2 UJ (1.2)	1.2 UJ	1.1 UJ	1.3 UJ	1.3 UJ	1.7 UJ	4.5 UJ	1.3 UJ	1.2 UJ
Arsenic (As)	7.6 J (1.1)	4.8 J (1.0)	9.5 J	7.6 J	6.9 J	[1.9] J	6.5 J	3.8 J	10.2 J	2.6 J
Barium (Ba)	133 (0.16)	180 (0.15)	111	111	124	177	118	122	159	146
Beryllium (Be)	[0.44] (0.03)	[0.51] (0.03)	[0.40]	[0.44]	[0.47]	[0.47]	[0.46]	[0.48]	[0.54]	[0.56]
Cadmium (Cd)	2.5 (0.08)	[0.75] (0.08)	2.2	2.1	2.1	1.8	1.7	2.1	2.5	2.5
Calcium (Ca)	34,200 (1.3)	39,800 (1.2)	17,300	20,000	23,300	27,900	9,630	20,800	20,300	20,200
Chromium (Cr)	5.2 (0.19)	6.4 (0.18)	4.7	4.5	5.2	5.2	5.3	4.8	5.9	6.2
Cobalt (Co)	[6.7] (0.30)	[5.7] (0.28)	[6.2]	[7.6]	[7.3]	[7.4]	[7.8]	[7.3]	[8.2]	[8.2]
Copper (Cu)	66.0 J (0.3)	23.7 J (0.28)	34.7 J	51.0 J	52.2 J	72.8 J	50.2 J	76.5 J	82.2 J	81.4 J
Iron (Fe)	14,500 (3.2)	16,200 (3.0)	14,900	13,800	16,200	14,700	14,900	15,400	17,100	16,900
Lead (Pb)	175 (0.49)	17.0 (0.46)	89.7	144	132	145	142	187	231	214
Magnesium (Mg)	3,750 (2.0)	8,690 (1.9)	5,630	4,660	5,440	4,960	3,340	4,190	4,530	4,960
Manganese (Mn)	1,120 (0.11)	168 (0.10)	1,070	1,350	993	1,220	1,190	1,450	1,460	1,230
Mercury (Hg)	[0.07] (0.07)	0.06 U (0.06)	[0.09]	0.06 U	★ 0.37 (0.07)	0.07 U	0.06 U	0.07 U	0.07 U	0.06 U
Nickel (Ni)	11.0 (0.35)	17.2 (0.30)	10.2	10.6	11.9	11.9	[8.5]	[9.4]	[9.9]	11.0
Potassium (K)	[1,100] (3.9)	1,690 (3.6)	[981]	[1,090]	[1,220]	[1,240]	[1,100]	[1,100]	[1,240]	1,300
Selenium (Si)	0.63 U (0.63)	[0.81] (0.58)	0.57 U	0.55 U	0.61 U	0.65 U	0.60 U	0.65 U	0.63 U	0.57 U
Silver (Ag)	[1.7] (0.22)	[0.83] J (0.20)	[0.97] J	[1.3]	4.2	[1.8]	★ 6.3 (0.21)	★ 5.5 (0.23)	[2.1]	4.8
Sodium (Na)	[189] (25.4)	[210] (23.6)	[293]	[162]	[152]	[283]	[143]	[210]	[202]	[435]
Thallium (Tl)	0.79 U (0.79)	0.74 U (0.74)	0.72 U	0.69 U	0.77 U	0.81 U	0.75 U	0.82 U	0.79 U	0.72 U
Vanadium (V)	19.2 (0.38)	17.1 (0.36)	21.0	14.3	19.2	16.4	15.0	16.0	17.0	17.4
Zinc (Zn)	502 (0.22)	118 (0.20)	494	484	396	425	417	530	607	649

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 CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)
( ) - Sample Quantitation Limit
★ - An elevation concentration as defined in section 4.1.

TABLE 4
Upstream Fish Tissue Analytical Results-Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:	Reference Upstream Brown Trout Tissue Value Range (95% Confidence Interval)	DLX-BR-1A Brown Trout/male 34.5 cm 38.0 cm 1 lb 4.75 oz 6.15 oz	DLX-BR-1B Brown Trout/male 32.0 cm 36.0 cm 1 lb 0.15 oz 3.85 oz	DLX-BR-1C Brown Trout/male 31.0 cm 35.0 cm 13.4 oz 3.25 oz	DLX-BR-1D Brown Trout/male 38.5 cm 42.0 cm 1 lb 11.0 oz 6.70 oz	DLX-BR-1E Brown Trout/female 36.0 cm 40.0 cm 1 lb 5.8 oz 4.55 oz	DLX-BR-1F Brown Trout/male 47.0 cm 42.5 cm 2 lb 12.8 oz 6.40 oz	DLX-BR-1FD (dup.) Brown Trout/male 47.0 cm 42.5 cm 2 lb 12.8 oz 5.15 oz
Aluminum (Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony (Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic (As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium (Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium (Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium (Ca)	68.6 - 86.9	86.3	76.9	98.9	64.8	63.0	75.8	78.5
Chromium (Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt (Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper (Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron (Fe)	5.5 - 7.7	[6.8]	[3.6]	[6.4]	[8.2]	[7.3]	[7.3]	[6.4]
Lead (Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium (Mg)	254 - 302	303	304	319	257	229	263	271
Manganese (Mn)	0.49 - 0.52	1.0 U	1.0 U	[0.55]	1.0 U	1.0 U	1.0 U	1.0 U
Mercury (Hg)	0.017 - 0.063	0.051 J	0.033 UJ	0.033 UJ	0.077 J	0.086 J	0.033 UJ	0.033 UJ
Nickel (Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium (K)	4,329 - 4,648	4,420	4,550	4,320	4,580	4,250	4,490	4,530
Selenium (Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver (Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium (Na)	222 - 308	[278]	[201]	[201]	[278]	[312]	[355]	[227]
Thallium (Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium (V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc (Zn)	2.5 - 3.2	3.7	2.9	3.3	2.7	2.4	2.8	2.4

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 CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 5
Upstream Fish Tissue Anal tic: Results-Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:	Reference Upstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	DLX-RB-1A Rainbow Trout/female 35.0 cm 37.5 cm 1 lb 6.5 oz 5.7 oz	DLX-RB-1B Rainbow/female 36.5 cm 40.5 cm 1 lb 9.55 oz 8.25 oz	DLX-RB-1C Rai ow ale .6 c 37.6 cm 1 7.7 z .1 o	DLX-RB-1D Rainbow/female 35.0 cm 38.5 cm 1 lb 5.85 oz 5.4 oz	DLX-RB-1E Rainbow/female 35.5 cm 38.5 cm 2 lb 6.8 oz 6.25 oz	DLX-RB-1F Rainbow/female 35.5 cm 39.0 cm 1 lb 3.7 oz 2.55 oz	DLX-RB-1FD (dup.) Rainbow/female 35.5 cm 39.0 cm 1 lb 3.7 oz 1.8 oz
Aluminum (Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony (Sb)	--	6.0 U	6.0 U	.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic (As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium (Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium (Be)	--	0.20 U	0.20 U	20	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium (Ca)	71.3 - 101.1	84.4	92.5	57.1	121	96.5	74.2	77.7
Chromium (Cr)	--	1.0 U	1.0 U	.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt (Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper (Cu)	--	2.0 U	2.0 U	.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron (Fe)	5.8 - 7.1	[5.0]	[6.8]	[7.3]	[7.3]	[6.4]	[5.9]	[6.4]
Lead (Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium (Mg)	268 - 274	274	263	274	274	273	274	269
Manganese (Mn)	0.49 - 0.71	1.0 U	1.0 U	[0.81]	1.0 U	[0.83]	1.0 U	[0.56]
Mercury (Hg)	0.017 - 0.036	0.041 J	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.043 J	0.035 J
Nickel (Ni)	--	4.0 U	4.0 U	.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium (K)	4,140 - 4,531	4,630	4,050	4,010	4,230	4,450	4,680	4,300
Selenium (Si)	--	20.0 U	20.0 U	0.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver (Ag)	--	1.0 U	1.0 U	.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium (Na)	204 - 264	[215]	[213]	[221]	[235]	[324]	[204]	[227]
Thallium (Tl)	--	200 U	200 U	00 U	200 U	200 U	200 U	200 U
Vanadium (V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc (Zn)	3.2 - 3.5	2.9	3.2	3.5	3.4	3.7	3.4	3.3

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 CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefor an e mate (qualified by laboratory)

TABLE 6
Downstream Fish Tissue Analytical Results-Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:	Reference Downstream Brown Trout Tissue Value Range (95% Confidence Interval)	DLX-BR-2A Brown Trout/female 41.5 cm 45.5 cm 2 lb 6.25 oz 10.4 oz	DLX-BR-2B Brown Trout/female 41.5 cm 45.5 cm 2lb 1.3 oz 9.20 oz	DLX-BR-2C Brown Trout/male 38.0 cm 42.5 cm 1 lb 13.9 oz 7.30 oz	DLX-BR-2D Brown Trout/female 40.0 cm 44.0cm 2 lb 2.65 oz 8.30 oz	DLX-BR-2E Brown Trout/female 44.0 cm 47.0 cm 3 lb 9.8 oz 10.95 oz	DLX-BR-2F Brown Trout/male 47.5 cm 51.5 cm 4 lb 4.0 oz 7.05 oz	DLX-BR-2FD (dup.) Brown Trout/male 47.5 cm 51.5 cm 4 lb 4.o oz 6.0 oz
Aluminum (Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony (Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic (As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium (Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium (Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium (Ca)	76.8 - 212.9	110	229	312	130	57.1	89.5	86.3
Chromium (Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt (Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper (Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron (Fe)	5.4 - 7.8	[7.3]	[9.1]	[5.0]	[5.9]	[5.0]	[8.2]	[5.9]
Lead (Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium (Mg)	251 - 288	274	256	274	319	256	241	267
Manganese (Mn)	0.48 - 0.57	1.0 U	[0.67]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Mercury (Hg)	0.044 - 0.073	0.039 J	0.047 J	0.057 J	0.051 J	0.10 J	0.057 J	0.061 J
Nickel (Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium (K)	4,264 - 4,796	4,830	4,300	4,730	4,760	4,400	3,870	4,820
Selenium (Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver (Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium (Na)	245 - 309	[315]	[232]	[255]	[340]	[224]	[270]	[303]
Thallium (Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium (V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc (Zn)	2.5 - 3.9	3.7	5.0	2.9	3.0	2.5	2.8	2.3

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 CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 7
Downstream Fish Tissue Analytical Results-Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:		Reference Downstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	DLX-RB-2A Rainbow Trout/female 38.3 cm 42.5 cm 1 lb 8.455 oz 6.10 oz	DLX-RB-2B Rainbow Trout/male 31.5 cm 35.0 cm 1 lb 4.2 oz 4.85 oz	DLX-RB-2C Rainbow Trout/male 37.0 cm 41.0 cm 1 lb 12.95 oz 8.40 oz	DLX-RB-2D Rainbow Trout/female 30.0 cm 33.5cm 15.40 oz 4.90 oz	DLX-RB-2E Rainbow Trout/male 39.5 cm 43.0 cm 1 lb 5.1 oz 6.3 oz	DLX-RB-2F Rainbow Trout/male 40.0 cm 44.0 cm 2 lb 2.1 oz 5.75 oz	DLX-RB-2FD (dup.) Rainbow Trout/male 40.0 cm 44.0 cm 2 lb 2.1 oz 4.0 oz
Aluminum	(Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony	(Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic	(As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium	(Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium	(Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium	(Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium	(Ca)	82.7 - 140.7	126	72.3	107	191	84.1	108	93.5
Chromium	(Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt	(Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper	(Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron	(Fe)	4.5 - 17.5	28.3	[6.8]	[3.2]	[6.8]	10.0	16.4	[5.5]
Lead	(Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium	(Mg)	262 - 325	263	274	356	303	226	320	310
Manganese	(Mn)	0.49 - 0.54	1.0 U	1.0 U	1.0 U	[0.59]	1.0 U	1.0 U	1.0 U
Mercury	(Hg)	0.014 - 0.024	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.035 J
Nickel	(Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium	(K)	4,297 - 4,715	4,360	4,360	4,880	4,460	4,060	4,780	4,640
Selenium	(Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver	(Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium	(Na)	203 - 300	[306]	[287]	[190]	[221]	[336]	[266]	[153]
Thallium	(Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium	(V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	(Zn)	3.3 - 4.7	5.8	3.6	3.9	4.2	4.5	3.3	2.9

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 CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 8
Fish Tissue 95% Confidence Intervals - Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

	Reporting Limit	Reference Upstream Brown Trout Tissue Value Range (95% Confidence Interval)	Reference Downstream Brown Trout Tissue Value Range (95% Confidence Interval)	Food Chain Reference Dose /Screening Concentration (SCDM 1995)	Food Chain Cancer Risk Screening Concentration (SCDM 1995)
Aluminum (Al)	10 U	--	--	--	--
Antimony (Sb)	6.0 U	--	--	0.54	--
Arsenic (As)	10.0 U	--	--	0.41	0.0021
Barium (Ba)	1.0 U	--	--	95	--
Beryllium (Be)	0.20 U	--	--	6.8	0.00073
Cadmium (Cd)	0.50 U	--	--	0.68	--
Calcium (Ca)	20.0 U	68.6 - 86.9	76.8 - 212.9	--	--
Chromium (Cr)	1.0 U	--	--	--	--
Cobalt (Co)	1.0 U	--	--	--	--
Copper (Cu)	2.0 U	--	--	--	--
Iron (Fe)	10.0 U	5.5 - 7.7	5.4 - 7.8	--	--
Lead (Pb)	5.0 U	--	--	--	--
Magnesium (Mg)	20.0 U	254 - 302	251 - 288	--	--
Manganese (Mn)	1.0 U	0.49 - 0.52	0.48 - 0.57	6.8	--
Mercury (Hg)	0.033 U	0.017 - 0.063	0.044 - 0.073	0.41	--
Nickel (Ni)	4.0 U	--	--	27.0	--
Potassium (K)	500 U	4,329 - 4,648	4,264 - 4,796	--	--
Selenium (Si)	20.0 U	--	--	6.8	--
Silver (Ag)	1.0 U	--	--	6.8	--
Sodium (Na)	500 U	222 - 308	245 - 309	--	--
Thallium (Tl)	200 U	--	--	--	--
Vanadium (V)	1.0 U	--	--	9.5	--
Zinc (Zn)	2.0 U	2.5 - 3.2	2.5 - 3.9	410	--

-- = Values were reported as non-detect at the reporting limit specified in the Table

TABLE 9
Fish Tissue 95% Confidence Intervals - Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

	Reporting Limit	Reference Upstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	Reference Downstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	Food Chain Reference Dose /Screening Concentration (SCDM 1995)	Food Chain Cancer Risk Screening Concentration (SCDM 1995)
Aluminum (Al)	10 U	--	--	--	--
Antimony (Sb)	6.0 U	--	--	0.54	--
Arsenic (As)	10.0 U	--	--	0.41	0.0021
Barium (Ba)	1.0 U	--	--	95	--
Beryllium (Be)	0.20 U	--	--	6.8	0.00073
Cadmium (Cd)	0.50 U	--	--	0.68	--
Calcium (Ca)	20.0 U	71.3 - 101.1	82.7 - 140.7	--	--
Chromium (Cr)	1.0 U	--	--	--	--
Cobalt (Co)	1.0 U	--	--	--	--
Copper (Cu)	2.0 U	--	--	--	--
Iron (Fe)	10.0 U	5.8 - 7.1	4.5 - 17.5	--	--
Lead (Pb)	5.0 U	--	--	--	--
Magnesium (Mg)	20.0 U	268 - 274	262 - 325	--	--
Manganese (Mn)	1.0 U	0.49 - 0.71	0.49 - 0.54	6.8	--
Mercury (Hg)	0.033 U	0.017 - 0.036	0.014 - 0.024	0.41	--
Nickel (Ni)	4.0 U	--	--	27.0	--
Potassium (K)	500 U	4,140 - 4,531	4,297 - 4,715	--	--
Selenium (Si)	20.0 U	--	--	6.8	--
Silver (Ag)	1.0 U	--	--	6.8	--
Sodium (Na)	500 U	204 - 264	203 - 300	--	--
Thallium (Tl)	200 U	--	--	--	--
Vanadium (V)	1.0 U	--	--	9.5	--
Zinc (Zn)	2.0 U	3.2 - 3.5	3.3 - 4.7	410	--

-- = Values were reported as non-detect at the reporting limit specified in the Table

APPENDIX A

Sampling Activities Report

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SAMPLING ACTIVITIES REPORT
for the
EXPANDED SITE INSPECTION
of the
DURANGO LEAD SMELTER
DURANGO, COLORADO
CERCLIS ID # CO0001399633
October 21-23, 1997

INTRODUCTION

The Sampling and Analysis Plan (SAP) for the Durango Lead Smelter expanded site inspection (ESI) was approved by the U.S. Environmental Protection Agency (EPA) Site Assessment Manager (SAM), Thomas Strauss on September 12, 1997. Field activities were conducted the week of October 20, 1997 by URS Operating Services (UOS) staff. The field team consisted of Mark Rudolph, (Field Team Leader), Kevin Mackey (Health and Safety Coordinator), Sabrina Forrest (Field Sampler), and Corey Terry (Field Sampler).

All field work was conducted in Level D with PPE consisting of steel toed boots and safety glasses. During the field sampling activities the weather was sunny and mild with temperatures in the fifty degree Fahrenheit range with very light breezes. Decontamination was a four step process beginning with a soapy wash, followed by a dionized water (DI) rinse, followed by a nitric acid rinse, followed by a final DI rinse

The field team collected surface water, sediment, and fish tissue samples, gauged the flow of Lightner Creek, and identified and delineated wetlands along the surface water pathway.

Samples for inorganic analysis (Case # 25768) were shipped to Sentinel Inc. of Huntsville, Alabama on October 22, 1997. Samples for total organic carbon (TOC) analysis (ULSA # V8-980004) were shipped to ACCU Labs Research of Golden, Colorado on October 22, 1997. Fish tissue samples, that were analyzed for total metals, were shipped to Quanterra Inc. of Arvada, Colorado on November 4, 1997. All samples were shipped and received by the laboratories without incident.

SAMPLING ACTIVITIES

The attached chain-of custody forms (Attachment A) contain the shipment information for all samples collected during this ESI. Figure 2 shows the actual sample locations. Sampling activities included the collection of 55 samples, specifically 10 surface water samples, 10 collocated sediment samples, 28 fish tissue samples, and 7 Quality Assurance/Quality Control (QA/QC) samples (one duplicate surface water sample, two rinsate blanks, and four duplicate fish tissue samples).

SURFACE WATER and SEDIMENT SAMPLES

Colocated surface water and sediment samples were collected at nine locations along the Animas River and at one location on Lightner Creek (Figure 2). The sample locations and rationale are presented in Table 1. Results of the surface water quality parameters taken in the field are presented in Table 2.

A review of the field readings of surface water quality data collected in the field indicates that the pH and conductivity of the Lightner Creek sample (DLX-LC-SW-01) are higher than the readings for the Animas River and that Lightner Creek appears to have an affect upon the first Animas River sample station (DLX-SW-02) immediately downstream of the confluence of Lightner Creek with the Animas River. It can also be noted that the pH, temperature and conductivity tended to increase as the sampling proceeded upstream beginning at 10:00 am and finishing at 1:00 pm. The daily warming cycle is probably responsible for the increase in surface water temperature and probably influenced the upward creep in pH and conductivity readings. None of the changes in the field readings of water quality parameters appear to be related to site influences.

The background sample on the Animas River (DLX-SW/SE-01) was collected from the west bank of the river approximately 0.25 mile upstream of site influences. The MS/MSD was collected at the background location. The background sample on Lightner Creek (DLX-LC-SW/SE-01) was collected from approximately 0.60 mile upstream of the confluence of Lightner Creek and the Animas River adjacent to the Best Western Motel parking lot. The sample collected from the site probable point of entry (PPE) into the Animas River (DLX-SW/SE-02) was collected from a point immediately below the Smelter Rapids. Sample DLX-SW/SE-03 was collected from the west bank of the Animas River approximately 55 yards downstream of the Smelter Rapids. Sample DLX-SW/SE-04 was collected from the west bank of the Animas River immediately across the stream from the Main Wastewater Treatment Plant Building. Sample DLX-SW/SE-05 was collected from the west bank of the Animas River just upstream and across the river from the Park Visitors Center. Sample DLX-SW/SE-06 was collected from the west

bank of the Animas River approximately 30 yards upstream of the wastewater discharge into the Animas River. Sample DLX-SW/SE--07 was collected from the west bank of the Animas River from a location that is approximately 15 yards downstream of the City Park boat launch. Sample DLX-SW/SE-08 was collected from the west bank of the Animas River from a location that is approximately 170 yards downstream of sample station DLX-SW/SE-07. The most downstream sample location was DLX-SW/SE-09 which is located on the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge. Each of the surface water-sediment sample locations downgradient of the site PPE was space approximately 500 feet from the adjacent sample location.

FISH TISSUE SAMPLES

Fish tissue samples were collected from both brown and rainbow trout at upgradient and downgradient segments along the Animas River (Table 1 and Figure 1). The fish were collected by employing an electro-shock method from a 16-foot self-bailing raft The raft was owned and operated the U.S. Bureau of Reclamation Durango field office crew. The fish collection areas were changed from the approved sample plan locations because of the access requirements for the Bureau of Reclamation crew's boat. The upgradient (background) fish sampling reach was located between seven and nine miles upstream of the site. The downgradient (potentially affected) fish sampling reach was located between three and one half and five miles downstream of the site.

The upgradient (background) fish tissue samples were collected on October 22, 1997 and were

prepared and preserved with dry ice the evening of October 22, 1997. The downgradient fish tissue samples were collected and prepared on October 23, 1997 and also preserved with dry ice.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

A total of seven QA/QC samples were collected for this ESI. More specifically one duplicate surface water sample, one rinsate blank for sediment sampling equipment, one rinsate blank for fish tissue preparation equipment, one rainbow trout background duplicate sample, one brown trout background duplicate sample, one rainbow trout downstream duplicate sample, and one brown trout downstream duplicate sample were all collected for this ESI (Table 1). The surface water duplicate sample, DLX-SW-10, was collected at sample station DLX-SW-08. The rinsate blank sample for sediment sampling equipment, DLX-SW-11, was collected after decontamination of sampling equipment following the collection of DLX-LC-SE-01. The rinsate blank sample for the fish sampling equipment, DLX-BRRB-1 was collected prior to preparation of fish tissue samples. Duplicate fish tissue samples DLX-BR-1FD, DLX-BR-2FD, DLX-RB-1FD, and DLX-RB-2FD were collected from the left half of the fish where the right halves were samples DLX-BR-1F, DLX-BR-2F, DLX RB-1F, and DLX-RB-2F, respectively.

FIELD OBSERVATIONS

Slag from the site was observed to be actively eroded by the Animas River at the site PPE Slag from the site was observed in the River and photographs were taken to document this observed

release and will be included in the Analytical Results Report (ARR)

Stream side emergent and scrub/shrub wetlands were observed and documented along the west bank of the Animas River between sample location DLX-SW/SE-09 to approximately thirty five yards downstream of Smelter Rapids.

No unusual physical abnormalities were observed in the fish collected for this ESI. The fish habitat and overall health appeared to be in good in the fish collected from the downgradient fish sampling reach.

TABLE 1
Sample Locations and Rationale

Matrix	Sample #	Location	Rationale
Surface Water Samples	DLX-SW-1 MS/MSD	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SW-1	Background sample collected from Lightner Creek approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.
	DLX-SW-2	Collected from the west bank of the Animas River at the site PPE, immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SW-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-6	Collected from the west bank of the Animas River just upstream of the Waste Water Treatment Plant discharge.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-8	Collected from the west bank of the Animas River approximately 500 feet downstream of the sample point DLX-SW-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.
Sediment Samples	DLX-SE-1 (MS/MSD)	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SE-1	Background sample collected from Lightner Creek, approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Sediment Samples (continued)	DLX-SE-2	Collected from the west bank of the Animas River at the site PPE immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SE-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-6	Collected from the west bank of the Animas River just upstream of the Waste Water Treatment Plant discharge.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-8	Collected from the west bank of the Animas River approximately 500 feet downstream of DLX-SE-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.
Brown Trout Fish Tissue Samples	DLX-BR-1A	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1B	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1C	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1D	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue samples (continued)	DLX-BR-1E	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1F	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-2A (MS/MSD)	Brown trout fish tissue sample to be collected from the Animas River between 3.5 to 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2B	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2C	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2D	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2E	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2F	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Rainbow Trout Fish Fillet Samples	DLX-RB-1A	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1B	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue samples (continued0	DLX-RB-1C	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1D	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1E	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1F	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-2A (MS/MSD)	Rainbow trout fish tissue sample to be collect ed from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2B	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish speciesdownstream of the site PPE.
	DLX-RB-2C	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2D	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2E	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2F	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Surface Water and Sediment QA/QC Samples	DLX-SW-10	Surface water duplicate of DLX-SW-8.	Quality Assurance sample to document the ability to collect collocated samples in the field.
	DLX-SW-11	Rinsate Blank from sediment sampling equipment.	Document thoroughness of decontamination process.
Trout Species QA/QC Samples	DLX-BRRB-1	Rinsate Blank from fish tissue sampling equipment.	Document thoroughness of decontamination process.
	DLX-BR-1FD Brown Trout Duplicate	Duplicate background brown trout fish tissue sample to be collected from the Animas River between 7.0 and 9.0 miles upstream of the DLS site. Duplicate of DLX-BR-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-BR-2FD Brown Trout Duplicate	Duplicate brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-BR-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-1FD Rainbow Trout Duplicate QA/QC Sample	Duplicate background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site. Duplicate of DLX-RB-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-RB-2FD Rainbow Trout Duplicate QA/QC Sample	Duplicate rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-RB-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

Table 2
Field Readings of Water Quality Parameters
Durango Lead Smelter ESI
October 21, 1997

Location	DLX-SW-01 Animas River Background	DLX-LC-SW-01 Lightner Creek Background	DLX-SW-02 Animas River at PPE	DLX-SW-03 Animas River approximately 55 yards downstream from PPE	DLX-SW-04 Animas River at Waste Water Treatment Plant	DLX-SW-05 Animas River at Park Visitors Center	DLX-SW-06 Animas River at wastewater treatment discharge	DLX-SW-07 Animas River downstream of city park boat launch	DLX-SW-08 Animas River approximately 500 feet downstream of DLX-SW-07	DLX-SW-09 Animas River approximately 20 yards upstream of Santa Rita Bridge
Sample time	1320	1300	1215	1150	1135	1110	1050	1035	1025	1015
pH	7.40	7.70	7.08	6.94	7.02	6.92	6.87	6.90	6.88	7.02
Temperature ° F	53.9	54.0	53.4	51.1	51.3	51.1	49.4	48.0	46.5	46.2
Conductivity $\mu s/cm^2$	414	683	607	404	429	403	399	392	389	390

All samples from Animas River except DLX-LC-SW-01 which was collected from Lighter Creek (LC)

ATTACHMENT A

CHAIN-OF-CUSTODY FORMS

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Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analysis)

SAS No. (if applicable): —

Case No.: 25768

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
DLX	70510	VOS	VOS	10/22/97	Fed Ex

Regional Information: —

Sampler (Name): Mark Rudolph

Airbill Number: 320647 7013

Non-Superfund Program:

Sampler Signature:

Site Name: Durango Lead Smelter

City, State: Durango, CO

Site Spill ID: 85ZZ

3. Purpose*: Lead — [X] SF, [ ] PRP, [ ] ST, [ ] FED; Early Action — [ ] CLEM, [ ] PA, [ ] REM, [ ] RI, [ ] SI, [X] ESI; Long-Term Action — [ ] FS, [ ] RD, [ ] RA, [ ] O&M, [ ] NPLD

5. Ship To: (205) 534-9800
Sentinel Inc.
2800 Bob Wallace Ave, Suite L3
Huntsville, AL 35805
ATTN: Beverly Kilgore

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval, — = Not a QC Sample)
MHDL88	1	L	G	2		X						8-153759, 60	DLX-SW-1	10/21/97 1320	—	MK	—
MHDL89						X						8-153761	DLX-LC-SW-1	1300	—	MK	—
MHDL90						X						8-153762	DLX-SW-2	1215	—	MK	—
MHDL91						X						8-153763	DLX-SW-3	1150	—	MK	—
MHDL92						X						8-153764	DLX-SW-4	1135	—	MK	—
MHDL93						X						8-153765	DLX-SW-5	1110	—	MK	—
MHDL94						X						8-153766	DLX-SW-6	1050	—	MK	—
MHDL95						X						8-153767	DLX-SW-7	1035	—	MK	—
MHDL96						X						8-153768	DLX-SW-8	1025	—	MK	—
MHDL97						X						8-153769	DLX-SW-9	1015	—	MK	—

Shipment for Case Complete? (Y/N): (Y)

Page: 1 of 3

Sample(s) to be Used for Laboratory QC: MHDL88

Additional Sampler Signatures: —

Chain of Custody Seal Number(s): —

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark Rudolph	10/22/97 1200	Fed Ex			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

A21-012-5 REV 3-93

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EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

361553

EPA United States Environmental Protection Agency Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable): —

Case No.: 25768

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
DLX	70510	8	VOS	10/22/97	Fed Ex

Regional Information: —

Sampler (Name): Mark Rudolph

Airbill Number: 320647 7013

Non-Superfund Program: —

Sampler Signature: Mark Rudolph

5. Ship To: Sentinel Inc, 2800 Bob Wallace Ave. Suite L3, Huntsville, AL 35805, (205) 534-9800, ATTN: Beverly Kilgore

Site Name: Durango Lead Smelter

City, State: Durango, CO

Site Spill ID: 8577

3. Purpose*: Lead [X] SF [ ] PRP [ ] ST [ ] FED; Early Action [ ] CLEM [ ] PA [ ] REM [ ] RI [ ] SI [X] ESI; Long-Term Action [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

6. Matrix (Enter in Column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Field QC, 5. Soil/Sediment, 6. Oil (High only), 7. Waste (High only), 8. Other (specify in Column A)

7. Preservative (Enter in Column D): 1. HCl, 2. HNO_3, 3. NaOH, 4. H_2SO_4, 5. $K_2CR_2O_7$, 6. Ice only, 7. Other (specify in Column D), N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MHDL98	1	L	G	2		X						8-153770	DLX-SW-10	10/21/97 1015	—	MM	D
MHDL99	1					X						8-153771	DLX-SW-11	1315	—	MM	R
MHDJ19	1					X						8-153772	DLX-BRB-1	1450	—	MM	R
MHDJ20	5			6		X						8-153773, 83	DLX-SE-1	1320 1320 MS/MSD	—	MM	—
MHDJ21						X						8-153774	DLX-LC-SE-1	1300	—	MM	—
MHDJ22						X						8-153775	DLX-SE-2	1215	—	MM	—
MHDJ23						X						8-153776	DLX-SE-3	1150	—	MM	—
MHDJ24						X						8-153777	DLX-SE-4	1135	—	MM	—
MHDJ25						X						8-153778	DLX-SE-5	1110	—	MM	—
MHDJ26						X						8-153779	DLX-SE-6	1050	—	MM	—

Shipment for Case Complete? (Y/N): (Y)

Page: 2 of 3

Sample(s) to be Used for Laboratory QC: MHDJ20

Additional Sampler Signatures: —

Chain of Custody Seal Number(s): —

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark Rudolph	10/22/97 1200	Fed Ex			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-5 REV. 3/93

2 of 3

EPA United States Environmental Protection Agency
Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analysis)

Case No. 25768

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
DLX	70510	8	UOS	10/22/97	Fed EX

Regional Information: —

Sampler (Name): Mark Rudolph

Airbill Number: 320647 7013

Non-Superfund Program: —

Sampler Signature: Mark Rudolph

Site Name: Durango Lead Smelter

3. Purpose*
Lead: [X] SF [ ] PRP [ ] ST [ ] FED
Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [ ] SI [X] ESI
Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

5. Ship To
Sentinel Inc
2800 Bob Wallace Ave, Suite L3
Huntsville, AL 35805
(205) 534-9800
ATTN: Beverly Kilgore

City, State: Durango, CO

Site Spill ID: 85EZ

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MHDW27	5	L	G	6		X						8-153780	DLX-SE-7	10/21/97 1035	—	MR	—
MHDW23	↓	↓	↓	↓		X						8-153781	DLX-SE-8	10/21/97 1025	—	MR	—
MHDW24	↓	↓	↓	↓		X						8-153782	DLX-SE-9	10/21/97 1015	—	MR	—

MR MR MR

Shipment for Case Complete? (Y/N): (Y)

Page: 3 of 3

Sample(s) to be Used for Laboratory QC: —

Additional Sampler Signatures: —

Chain of Custody Seal Number(s): —

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark Rudolph	10/22/97 1200	Fed EX			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

A21-012-13 REV

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

264950

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: Acculabs Research / Tom Balka
4663 Table Mountain Dr Golden, CO 80205

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Durango Lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE: Mark Rudolph

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	TOC	MS/MSD (If needed)	Duplicate			Lab #	REMARKS / TAG #
DLX-SW-1	10/21/97	1320		X	DLX-SW-1	2	X	X				2611, 2613	8-153784, 85
DLX-LC-SW-1		1300		X	DLX-LC-SW-1	1	X					2612	8-153786
DLX-SW-2		1215		X	DLX-SW-2	1	X					2614	8-153787
DLX-SW-3		1150		X	DLX-SW-3	1	X					2615	8-153795
DLX-SW-4		1135		X	DLX-SW-4	1	X					2616	8-153788
DLX-SW-5		1110		X	DLX-SW-5	1	X					2617	8-153789
DLX-SW-6		1050		X	DLX-SW-6	1	X					2618	8-153790
DLX-SW-7		1035		X	DLX-SW-7	1	X					2619	8-153791
DLX-SW-8		1025		X	DLX-SW-8	1	X					2620	8-153792
DLX-SW-9		1015		X	DLX-SW-9	1	X					2621	8-153793
DLX-SW-10		1025		X	DLX-SW-10	1	X		X of DLX-SW-8			2622	8-153794

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Mark Rudolph	10/22/97	1200	Fed Ex				
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: Fed Ex AIRBILL NUMBER: 3206477002	

71-50906.00
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White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3590 ULSA # UB-980004

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: Bob Weiber
Quanterra 4955 Yarrow St. Arvada, CO 80002

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Durango Lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE:
Mark R

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	Total Metals	MS/MSD	Duplicate			Label #	REMARKS / TAG #
DLX-BR-1A	10/22/97	1830		X	DLX-BR-1A	1	X					2645	8-163121
DLX-BR-1B		1835		X	DLX-BR-1B	1	X					2646	8-163122
DLX-BR-1C		1845		X	DLX-BR-1C	1	X					2647	8-163123
DLX-BR-1D		1850		X	DLX-BR-1D	1	X					2648	8-163124
DLX-BR-1E		1900		X	DLX-BR-1E	1	X					2649	8-163125
DLX-BR-1F		1910		X	DLX-BR-1F	1	X					2650	8-163126
DLX-BR-1FD		1910		X	DLX-BR-1FD	1	X		X			2651	8-163127
DLX-RB-1A		1720		X	DLX-RB-1A	1	X					2652	8-163128
DLX-RB-1B		1735		X	DLX-RB-1B	1	X					2653	8-163129
DLX-RB-1C		1750		X	DLX-RB-1C	1	X					2654	8-163130
DLX-RB-1D		1800		X	DLX-RB-1D	1	X					2655	8-163131
DLX-RB-1E		1810		X	DLX-RB-1E	1	X					2656	8-163132
DLX-RB-1F		1820		X	DLX-RB-1F	1	X					2657	8-163133
DLX-RB-1FD	↓	1820		X	DLX-RB-1FD	1	X		X			2658	8-163134

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Mark R	11/4/97	1350					
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: AIRBILL NUMBER:	

71-50906.00
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White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3591

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: Bob Weibel - Quanterra
4955 Yarrow St Arvada, CO 80002

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Durango Lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE:
Mark Rudolph

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	Total Metals	MS/MSD	Duplicate			Label # / Tag # REMARKS
DLX-BR-2A	10/23/97	1520		X	DLX-BR-2A	1	X	X				2631 8-163107
DLX-BR-2B		1525		X	DLX-BR-2B	1	X					2632 8-163108
DLX-BR-2C		1535		X	DLX-BR-2C	1	X					2633 8-163109
DLX-BR-2D		1545		X	DLX-BR-2D	1	X					2634 8-163110
DLX-BR-2E		1550		X	DLX-BR-2E	1	X					2635 8-163111
DLX-BR-2F		1600		X	DLX-BR-2F	1	X					2636 8-163112
DLX-BR-2FD		1600		X	DLX-BR-2FD	1	X		X			2637 8-163113
DLX-RB-2A		1420		X	DLX-RB-2A	1	X	X				2638 8-163114
DLX-RB-2B		1425		X	DLX-RB-2B	1	X					2639 8-163115
DLX-RB-2C		1435		X	DLX-RB-2C	1	X					2640 8-163116
DLX-RB-2D		1445		X	DLX-RB-2D	1	X					2641 8-163117
DLX-RB-2E		1500		X	DLX-RB-2E	1	X					2642 8-163118
DLX-RB-2F		1505		X	DLX-RB-2F	1	X					2643 8-163119
DLX-RB-2FD		1505		X	DLX-RB-2FD	1	X		X			2644 8-163120

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Mark Rudolph	11/4/97	1350					
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: AIRBILL NUMBER:	

71-50906.00
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White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3586

APPENDIX B

Photolog

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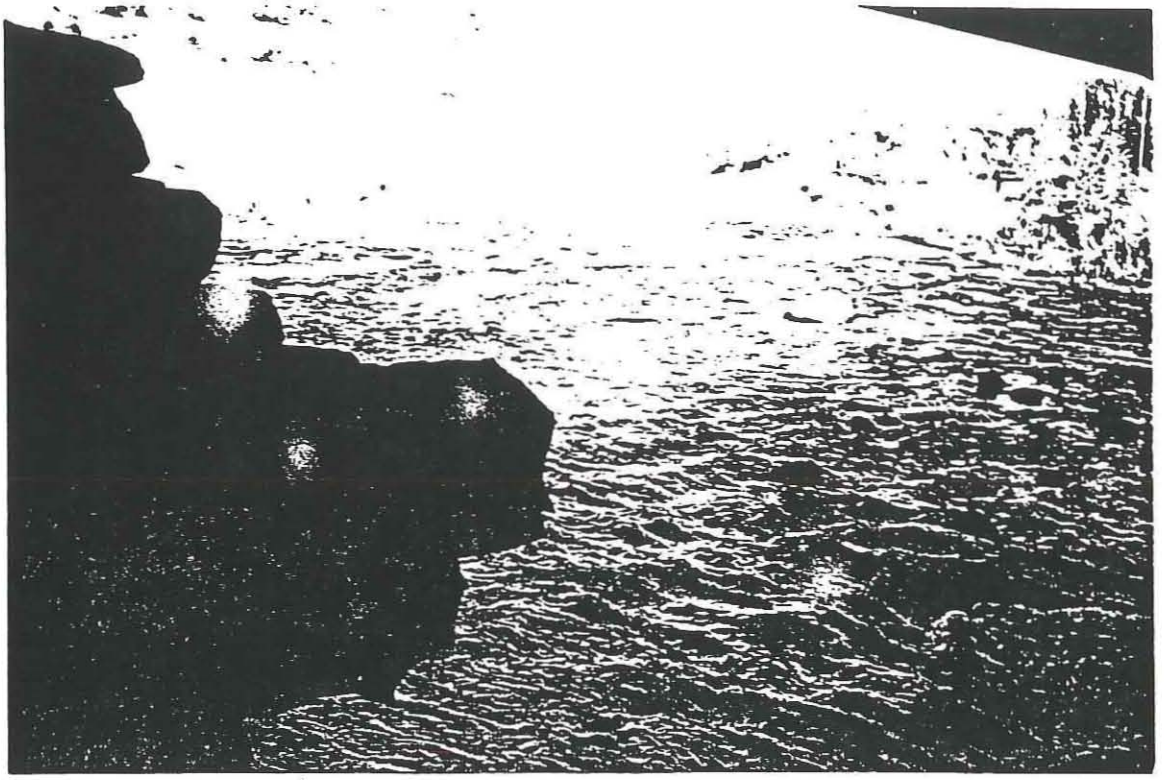


Photo 1. View upstream along Animas River from beneath Santa Rita Bridge at the most downstream sample location DLX-SW/SE-09.

Photo 2. View upstream along Animas River of UOS sampling crew (Mackey, Howley and Terry) collecting sample at DLX-SW/SE-08.

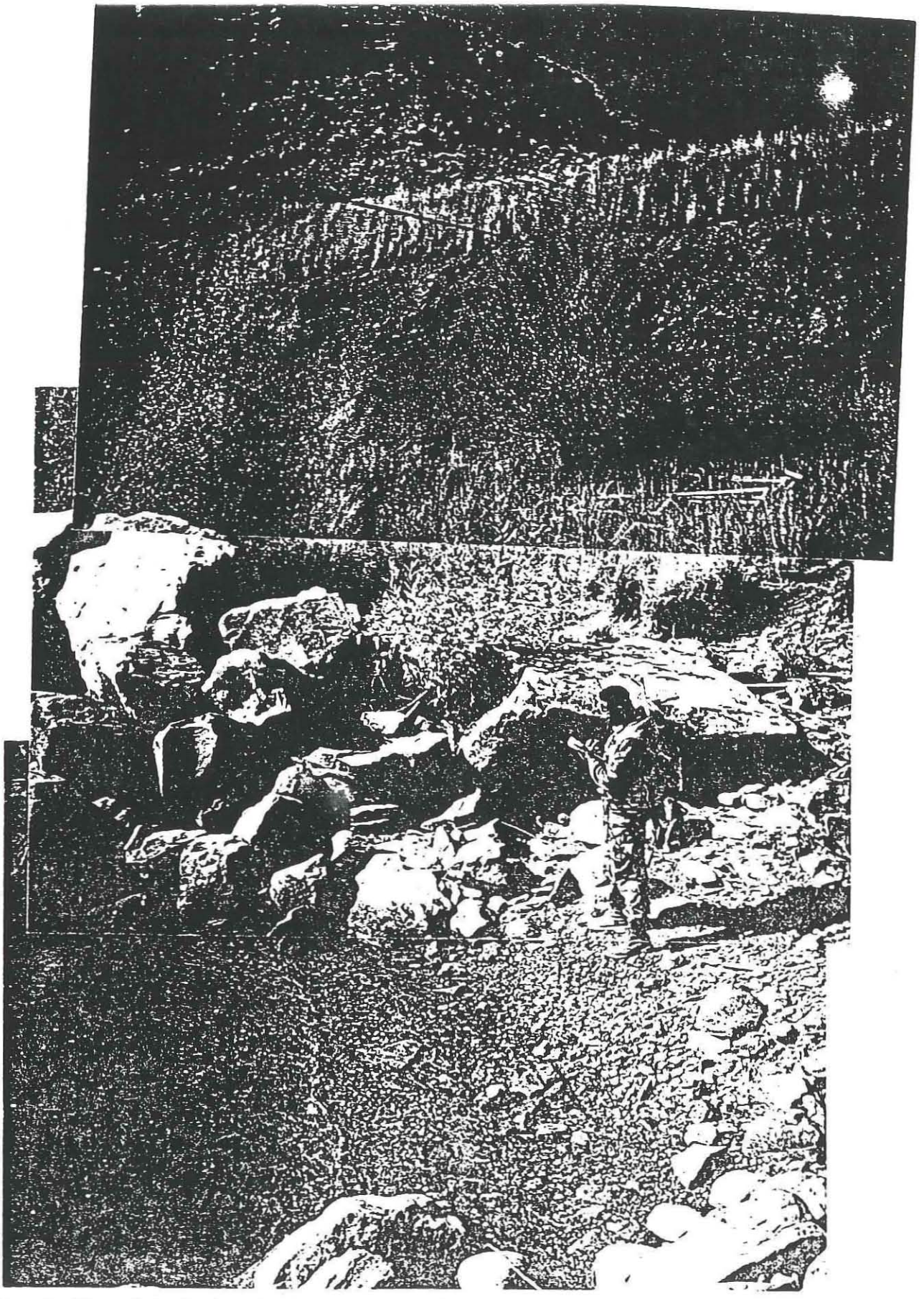


Photo 3. View of slag bank at the site along Animas River where slag material (grey layer beneath grass) is eroded and transported by the Animas River. C. Terry of UOS in foreground along river bank.

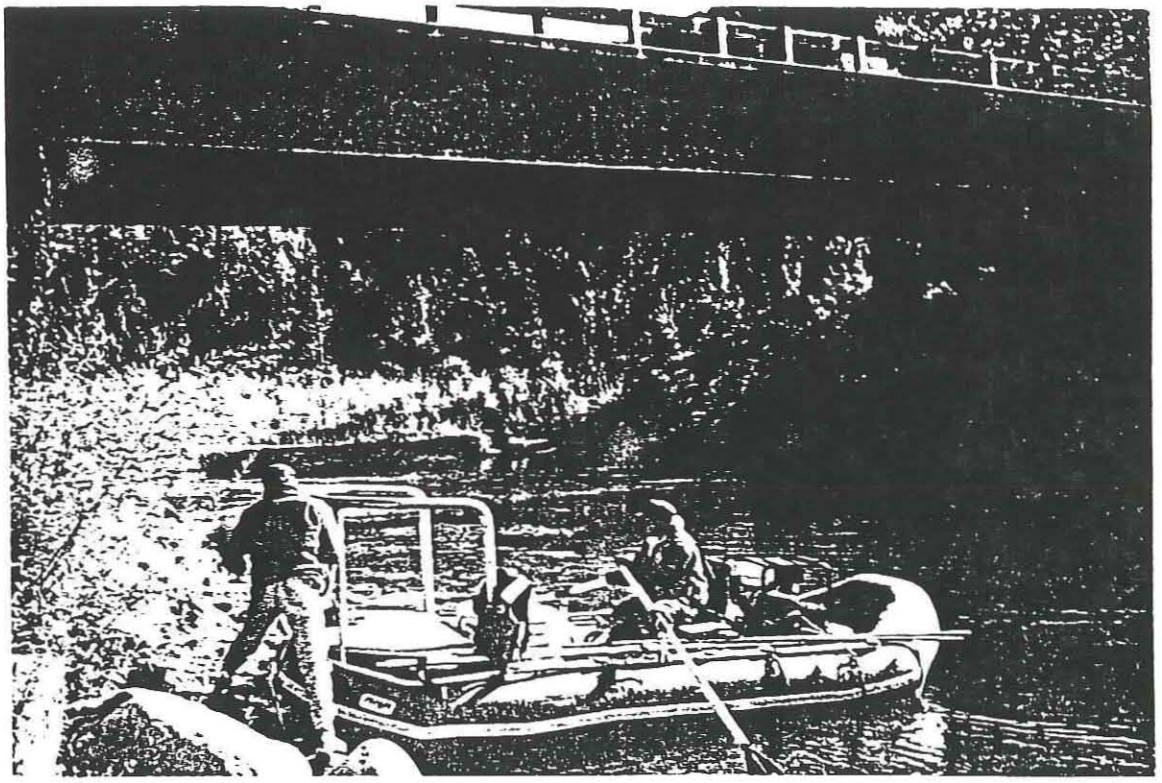
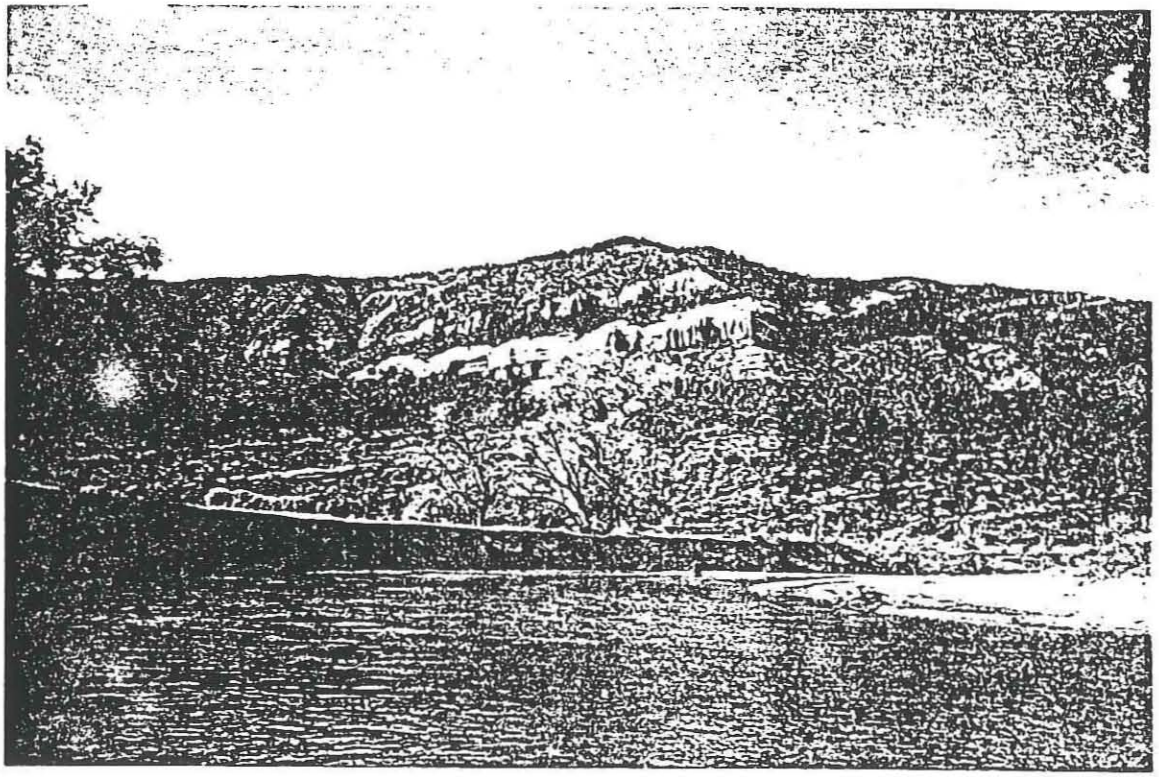
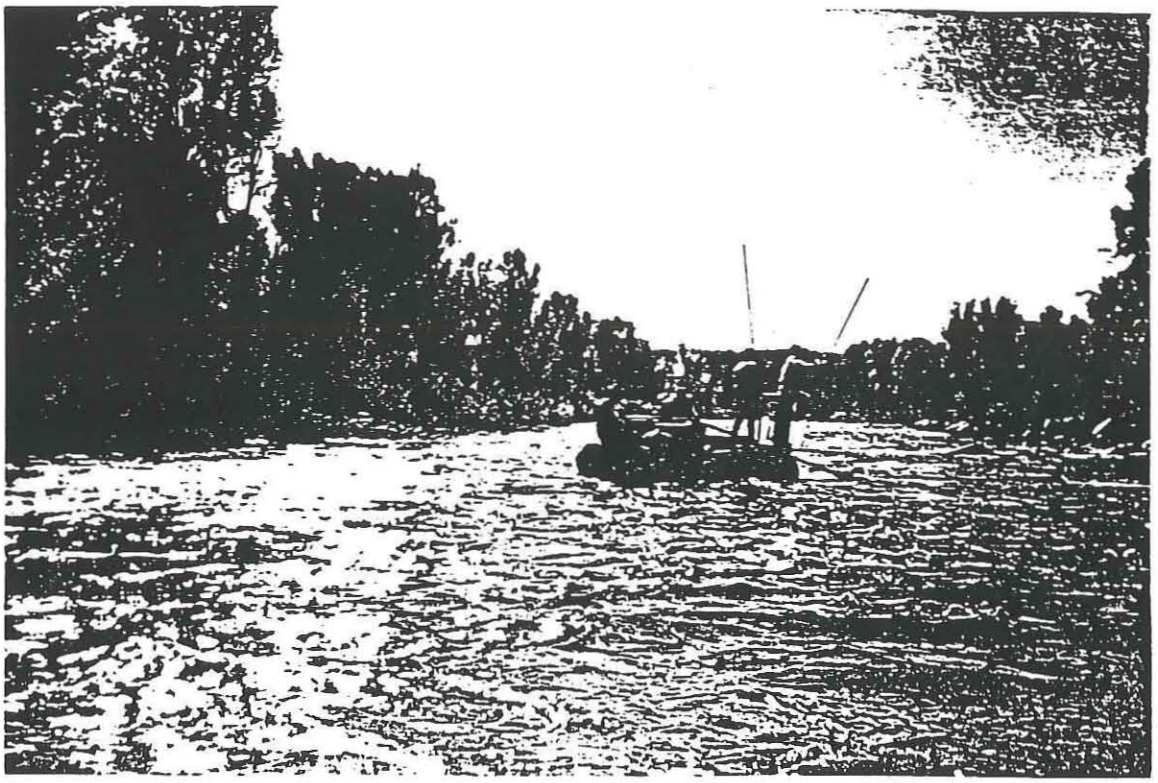


Photo 4. Raft with fish shocking equipment being launched into the Animas River.



Photograph No. 5. Upper fish tissue sampling reach along the Animas River north of Durango, Colorado.



Photograph No. 6. Fish shocking raft along downstream fish tissue collection reach.

APPENDIX C

Validation Reports and Laboratory Data
(under separate cover)