USEPA Emergency Response Section (ERS) And Superfund Technical Assessment and Response Team (START)

Emergency Response and Time Critical Quality Assurance Sampling Plan For Soil Matrix Sampling

Response Location: Cordero Mercury Mine Site, Fort McDermitt, Nevada

(TDD#) TDD No.: TO2-09-10-06-0002

Date: October 13, 2010

Prepared by: David Neil Ellis

Reviewed by: H. Edwards

Approved by:

This sampling plan was prepared and delivered to the EPA OSC (select one):
X Prior to Sampling ❑ **Post Sampling (within one month of sampling)**

This emergency sampling plan is intended to be used in conjunction with the EPA's Region 9 Emergency Response Section's Generic Data Quality Objectives (DQOs) for Emergency Responses and Time Critical Evaluations. This sampling plan has been designed to assist field responders in their preparation for collecting, analyzing, shipping, storing and handling samples collected during an emergency response. The use of this generic sampling plan will involve forethought and planning that should help direct the sampling and analytical work. It is meant to be used in the case of emergency responses or time-critical responses when sampling teams may not have the opportunity to write a more thorough sampling plan. Sampling teams should always reference standard quality procedures, standard operations procedures, standard methods for sampling and analytical guidance.

The development of this generic plan will improve the documentation, communication, planning, and overall quality associated with the sampling and analysis by:

1) encouraging field teams to consider their goals and objectives before the generation of environmental data,
2) documenting predetermined information in a standardize format,
3) increasing the communication between sampling personnel and decision makers, and
4) detailing expectations and objective before samples are collected.

1.0 Introduction and Background. ***Describe the site and specify the geographic boundaries for the site and any specific areas of concern***. *What is the problem, what precipitated the response, which agencies and other entities (e.g., contractors) are on site, who has taken the lead for the response and for environmental clean-up actions?*

The United States Environmental Protection Agency (U.S. EPA) directed Ecology and Environment, Inc.'s (E & E's) Superfund Technical Assessment and Response Team (START) to prepare objectives and a Sampling and Analysis Plan (SAP) for a removal assessment of the Cordero Mine Site in Fort McDermitt, Nevada. These planning activities are in response to a coordinated effort between the U.S. EPA Superfund Division, through Federal On-Scene Coordinator (FOSC) Tom Dunkelman, and the Paiute Shoshone Indian Reservation (PSIR).

The Cordero Mercury Mine is located approximately eight miles to the southwest of Fort McDermitt, Nevada. Mining operations occurred at the Cordero Mine between 1935 and the 1980s. The site was originally brought to the attention of the U.S. EPA by Mr. Duane Masters, Sr., the Paiute Shoshone Tribal Environmental Coordinator who reported that the two roadways were built using mine waste in approximately 1970. During a December 2009 site reconnaissance, U.S. EPA personnel conducted screening-level in-situ X-Ray Fluorescence (XRF) analysis of soil on the surface of AOC-1 and detected a maximum concentration of mercury of 60 milligrams per kilogram (mg/kg). In September 2010, START conducted an assessment of two dirt roadways suspected of being build using Cordero Mine waste in approximately 1970.

FOSC Dunkelman tasked the START to conduct additional assessment activities in the vicinity of the Cordero Mine Site, including soil sampling at a school suspected of being built on mine waste, additional roads, and waste rock piles present at the Cordero Mine site. Additional locations may be identified and sampled at the discretion of the FOSC.

2.0 Objectives. *Brief statement on the general project objective. What is the overall goal or objective? Specific objectives are summarized in Table D.*

This assessment is being conducted to evaluate whether metals in soil and/or waste rock at the school, roads, waste rock piles, and other miscellaneous locations in the vicinity of the Cordero Mine are present at concentrations of concern (i.e., exceeding relevant action levels) and may therefore pose a threat to human health or the environment.

DQO Study Questions:
What is the general area (areal extent) of soil contamination?
What are the estimated contaminant concentrations within the contaminated area?

2.1 Data Use Objectives. (How will the data be used?)

Data that are generated will be used:

1	X	To be compared with a background or reference sample(s).
2	X	To be compared with site-specific action levels or risk-based action levels (e.g., EPA RSLs) to assist in determination if health threats exist.
3	☐	Other objectives:

2.2 Sampling Objectives.

1	X	Sampling to estimate: Contamination levels within an area of concern. Contamination area(s) within a site.
2	X	Sampling to determine the location of hot spots within the area of concern.

2.3 Sample Matrices

1 X Surface soils

2 X Subsurface soil

2.4 Data Type

In general, data type and data needs should be decided prior to data generation. The data can be generally divided into three categories: definitive methodology data (generally data generated using standardize methods), non-definitive methodology data (also referred to as screening data) and screening data with at least 10% definitive conformation. The generation of definitive data is preferable, however in emergency and time critical situations where definitive data is not available, non-definitive data should be generated. Note that the data type is not an indicator of precision, accuracy or documentation completeness, or quality! Reported data should be verified (by a party other than the laboratory) as meeting specific quality control and data category requirements by following a verification or validation procedure. Refer to the START or ERS Quality Assurance Plans for specific quality parameters and requirements.

Check appropriate box(es):

1 ☐ Screening data will be generated. The data by itself may not be verifiable. **Due to the time critical situation, the data must be reported and may be used to make decisions.**

2a ☐ Screening data with at least 10 percent definitive data will be generated. Data using non-definitive analytical methodologies will be generated. **Due to the time critical situation, the data must be reported and may be used to make decisions prior to generation of definitive data.** The screening data by itself may not be verifiable. Screening data will be evaluated and reported with definitive data at a later time.

2b ☐ Screening data with 10 percent definitive data will be generated. Data using non-definitive analytical methodologies will be generated. **Data will not be reported until it is evaluated against definitive data.**

3a ☐ Definitive data will be generated. The sampling and analysis must be done on an emergency basis. **Due to the time critical situation, the preliminarily data must be reported and used for comparison without validation. Analytical data packages will be required**. **However, since the data was not used or intended for decision making, validation of the data package will not be performed.** (Document generic DQO deviation in Section 4.4)

3b ☐ Definitive data will be generated. The sampling must be done on an emergency basis. **Due to the time critical situation, preliminary data must be reported and may be used to make decisions without validation. The generated analytical documentation packages will be reviewed and validated. Qualified data will be reported after validation.**

3c X Definitive data will be generated. **Full documentation will be required. Analytical data packages will be reviewed and validated prior to reporting.**

2.5 Contaminants of Concern

Contaminants of potential concern (COPC), proposed analytical methods, proposed action levels and available reporting limits are summarized in Table A.

Table A **Contaminants of Concern**				
Potential COC	**Proposed Analytical Method**	**Proposed Action Level** **May 2010 RSL**		**Available Reporting Limit**
California Title 22 (CAM 17) Metals in Soil (Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc)	EPA Method 6010B/ 7471B	**Residential RSL** Antimony (31 mg/kg), Arsenic (0.39 mg/kg), Barium (15,000 mg/kg), Beryllium (160 mg/kg), Cadmium (70 mg/kg), Chromium (120,000 mg/kg), Cobalt (23 mg/kg), Copper (3,100 mg/kg), Lead (400 mg/kg), Mercury (23 mg/kg) Molybdenum (390 mg/kg), Nickel (1,500 mg/kg), Selenium (390 mg/kg), Silver (390 mg/kg), Thallium (NA), Vanadium (390 mg/kg), Zinc (23,000 mg/kg)	**Industrial RSL** Antimony (410 mg/kg), Arsenic (1.6 mg/kg), Barium (190,000 mg/kg), Beryllium (2,000 mg/kg), Cadmium (800 mg/kg), Chromium (1,500,000 mg/kg) Cobalt (300 mg/kg), Copper (41,000 mg/kg), Lead (800 mg/kg), Mercury (310 mg/kg) Molybdenum (5,100 mg/kg), Nickel (20,000 mg/kg), Selenium (5,100 mg/kg), Silver (5,100 mg/kg), Thallium (NA), Vanadium (5,200 mg/kg), Zinc (310,000 mg/kg)	Antimony (0.5 mg/kg), Arsenic (0.25 mg/kg), Barium (0.25 mg/kg), Beryllium (0.1 mg/kg), Cadmium (0.25 mg/kg), Chromium (0.25 mg/kg), Cobalt (0.25 mg/kg), Copper (0.25 mg/kg), Lead (0.25 mg/kg), Mercury (0.02 mg/kg) Molybdenum (0.25 mg/kg) Nickel (0.25 mg/kg), Selenium (0.5 mg/kg), Silver (0.25 mg/kg), Thallium (0.5 mg/kg), Vanadium (0.25 mg/kg), Zinc (1 mg/kg)
Other Data Collection Activity (non-chemical) *(circle all that apply)*	**GPS** **Visual** Interviews Magnetometer Other Geophysical Modeling **Photography** File Search			

3.0 Approach and Sampling Methodologies

3.1 Sampling Approach

1 X Judgmental:
Due to the lack of site information the approach will be determined in the field based on professional judgment of the USEPA, START, and local regulators.

2 X Systematic:
Due to the lack of site information the sampling area (approximate dimensions) will determined in the field and the appropriate sampling scheme will then be developed through the USEPA Visual Sample Plan (VSP) program for accurate data collection methods.

3 X Search-Grid:
Due to the lack of site information the sampling area (approximate dimensions) will determined in the field and the appropriate sampling scheme will then be developed through the USEPA Visual Sample Plan (VSP) program for accurate data collection methods.

If a search-grid, specify grid type (circle one): (Square) Triangle Rectangle

Size of contamination hot-spot to be detected:

Shape of hot-spot (circle one): Circle Elliptical Elongated-Elliptical

Required Grid Spacing:

Acceptable probability of missing hot-spot (circle one): 5 % 10 % 20% 40%

3.2 Field Analysis Equipment

Field analysis equipment requirements are summarized in Table B1.

Table B1
Field Analytical Equipment

Analysis Equipment Specify the field analytical procedures to be used. Select the appropriate boxes.	**Model**	**Analyses**	**Matrix**	**Resource/Contractor**
■ X-Ray Fluorescence (XRF) Device [for metals]	Innov-x (XRF)	Metals (6200)	Soil	USEPA
■ Lumex (XRF) Mercury Instrument	Lumex	Mercury Vapor	Soil	USEPA
☐ Oil Analysis Kit [for oils]				
☐ Immunoassay Test Kits [pesticides, oils, chlorinated substances]				
☐ Chlor-N-Soil/Chlor-N-Oil test kits[PCBs, chlorinated substances]				
☐ pH Meter				
☐ Other field test kits [for pesticides]				
☐ Radiation Meter (such as Victoreen)				
☐				
☐				

3.3 Field Sampling Equipment

Field equipment requirements are summarized in Table B2.

Table B2
Field Sampling and Decontamination Equipment

Analyses and Matrix	Sampling Equipment	Dedicated or Reusable	Decontamination Solution	Resource/ Contractor
Metals in Soil	1- Trowels 2- Hand Augur	Reusable	Alconox and DI Water	START

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3.4 Field Methods and Procedures

3.4.1 Sample Locations. Sampling location name, describe location, and indicate rationale for each sample location chosen.

McDermitt School; Soil samples will be collected at Areas of Concern potentially constructed from mine waste (playground, roads); AOCs will be sampled to determine whether potential elevated metals concentrations exist and to evaluate potential human exposure routes.

Cordero Mine Site Waste Rock Pile and Drainage Areas; Soil samples will be collected at the Cordero Mine Site from the waste rock pile area and potential surface water drainage routes; AOCs will be sampled to determine whether potential elevated metals concentrations exist and to evaluate potential human and/or environment exposure routes.

Roadway Areas; Soil samples will be collected at identified roadway areas potentially constructed from mine waste; AOCs will be sampled to determine whether potential elevated metals concentrations exist and to evaluate potential human and/or environment exposure routes.

Sketch a map of the site and any areas of concern. Indicate sampling locations or sampling areas in Figure A and included names. Use a scale that is meaningful for the sampling work covered under this plan. Sketch out where the samples will be collected and include sampling location names. Attach a local map to this plan if it is available.

Figure A
Sample Location Map

SAMPLE LOCATIONS WILL BE DOCUMENTED AND IDENTIFIED AT EACH AOC THROUGH A GPS SURVEY DURING FIELD SAMPLING ACTIVITIES

3.4.2 Sample Labeling and Documentation

Sample Jar Labels

Sample labels will clearly identify the particular sample and should include the following:

1. Site name
2. Time and date samples were taken
3. Sample preservation
4. Analysis requested
5. Sample location and/or identification number

Sample labels will be securely affixed to the sample container.

Chain of Custody Record

A chain of custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples (or groups of samples) are not under direct control of the individual responsible for them, they must be stored in a secured container sealed with a custody seal.

The chain of custody record should include (at minimum) the following:

1. Sample identification number
2. Sample information
3. Sample location
4. Sample date and time
5. Names(s) and signature(s) of sampler(s)
6. Signature(s) of any individual(s) with control over samples

Custody Seals

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the samples' packaging, should be noted in the field book.

All sample documents will be completed legibly in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error. These include the logbooks, the chain of custody forms, this field QASP and any other tracking forms.

Field Logbook

The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. All entries will be dated and signed by the individuals making the entries and will include the following:

1. Site name and project number
2. Names of sampling personnel
3. Dates and times of all entries (military time preferred)
4. Descriptions of all site activities, especially sampling start and ending times. Include site entry and exit times
5. Noteworthy events and discussions
6. Weather conditions
7. Site observations
8. Identification and description of samples and locations
9. Subcontractor information and names of on-site personnel
10. Date and time of sample collections, along with chain of custody information
11. Record of photographs
12. Site sketches
13. Exact times of various activities and occurrences related to sampling
14. Deviations from standard procedures or methods and the rational for the deviations.

3.4.3 Sample Containers and Preservatives

Containers and preservatives are summarized in Table C.

Table C
Containers and Preservatives

Analyses and Matrix	Container Type (per sample)	Preservation Method	Holding Time
California Title 22 Metals in Soil (Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc)	4 oz jar	Ice	Mercury 28 days, All other metals 6 months

3.5 Analytical Methods and Procedures

The analytical methods per sample and sample location are presented in Table D. General field QC considerations and requirements are presented in Table E.

Table D
Sample Locations and Data Objective Summary

Sampling Locations and Identifiers should correspond to location indicated on Figure A

Sample Location(s)	Sample Identifiers	Analytical Method Refer to Table A	Data Use Objective(s) Refer to Section 2.1	Data Category Refer to Section 2.4	Samples Matrix
McDermitt School	COR-SCHL-01	EPA Methods - 6010B, 7471B, 6200	Compare with risk-based action levels	Definitive Data	Soil
Cordero Mine Site					
A) Waste Rock Pile	COR-WR-01	EPA Methods - 6010B, 7471B, 6200	Compare with risk-based action levels	Definitive Data	Soil
B) Drainage Routes	COR-DRG-01	EPA Methods - 6010B, 7471B, 6200	Compare with risk-based action levels	Definitive Data	Soil
Roadway Areas	COR-RDWY-01	EPA Methods - 6010B, 7471B, 6200	Compare with risk-based action levels	Definitive Data	Soil

Add additional pages if necessary.

3.6 Quality Assurance and Quality Control

General field QA/QC considerations and requirements are presented in Table E.

Table E
Quality Control Samples and Data Quality Indicator Goals

QC Sample	Number/Frequency	Data Quality Indicator Goals & Evaluation Criteria	Comments/Exceptions *Site specific remarks:*
FIELD SPECIFIED QA/QC			
Background or reference sample	At least one sample should be collected from an area believed to be unaffected by source contamination.	Source samples should be at least 3 times background.	Surface soil: up-slope. Surface water: upstream. *: 1-5 Background Samples will be collected at each AOC*
Field Blanks	1 per SDG[1], per matrix, per method	Source samples should be at least 3 times the blank.	Water only. *: None*
Travel Blanks	1 per SDG, per matrix, per method	Source samples should be at least 3 times the blank.	Volatile analytes, water only. *: None*
Equipment Blanks	1 per SDG, per matrix, per method	Source samples should be at least 3 times the blank.	Only when the use of decontaminated non-dedicated equipment is involved. *: 1 Field Blank will be collected per field day that non-dedicated sampling equipment will be used.*
Field Duplicates or Replicates	1 per SDG, per matrix, per method	Water - 25% RPD[2] Soil - 35% RPD[2] Other - 35%	As needed by sampling objectives. The procedure for collecting duplicate samples can greatly effect the reproducibility. *: 10% Field Duplicates will be collected*
Performance Standards	1 per project, per matrix, per method	75 -125 %R[3]	If available. *:NA*
SELECTED LABORATORY QA/AC			
Method Blank	1 per SDG, per matrix, per method	Stds and samples should be at least 3 times the blank.	Mandatory.
Matrix Spike	1 per SDG, per matrix, per method on field designated sample.	75 -125 %R	Designate sample on COC.
Matrix Spike Duplicate or Replicate	1 per SDG, per matrix, per method on field designated sample.	≤50 RPD for organics; ≤20 RPD for metals	Designate sample on COC.
Reference Standards	1 per SDG, per matrix, per method	75 -125 %R	If available.
Internal Standards	All samples	50 -200 %R	All GC/MS and some GC analyses only.
Laboratory Control Standards	1 per SDG, per matrix, per method	75 - 125 %R	Per method for organic analyses.

[1] SDG = Sample Delivery Group (Maximum 20 samples)
[2] RPD = Relative Percent Difference
[3] %R = Percent Recovery

4.0 Project Organization and Responsibilities

4.1 Schedule of Sampling Activities

Sampling activities are summarized in Table F.

Table F
Proposed Schedule of Work For Sampling Activities

Activity	Start Date	End Date
Soil Sampling	October 19, 2010	October 21, 2010

4.2 Project Laboratories

Laboratories used for this project are summarized in Table G.

Table G
Laboratories

Lab Name/ Location	Methods
EPA Region 9 Laboratory, Richmond, CA	California Title-22 Metals (CAM-17) by EPA Method 6010/7471

4.3 Project Personnel and Responsibilities

Personnel and responsibilities are summarized in Table H.

Table H
Sample Team(s) Personnel

Personnel (Agency)	Responsibility
Tom Dunkelman	USEPA - FOSC
Neil Ellis	Project Manager/ START Member
Sara Dwight	START Member

4.4 Modification or Additions to the Generic Data Quality Objective for Emergency and Time Critical Sampling

Project specific modification to the generic DQO statements for this are summarized in Table I. Also indicate which DQO step corresponds to the addition or modification.

Table I
DQO Modifications and Additions

Additions or Modifications to the Generic DQO Output Statements	DQO Step
None	

Attachment A:
Standard Operating Procedures