

Standard Operating Procedure No. 67

COLLECTION OF SOLID SAMPLES FOR ANALYSIS OF NITRATE, NITRITE, AMMONIA, ALKALINITY, PHOSPHATE, AND SULFATE - SAMPLING, STORAGE, AND SHIPPING

REVISION LOG		
Revision Number	Description	Date
67.0	Original SOP by Jack Adams	10/10/2004
67v1	Finalized by LMK for posting to Molycorp project website and to send to George Robinson for lab audit; LMK did not edit this SOP.	4/3/07
67v2	Editorial by SKA	10/27/08

STANDARD OPERATING PROCEDURES

Prepared by: Jack Adams **Date:** 10/10/2004

Reviewed by: _____ **Date:** _____

Approved by: _____ **Date:** _____

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) provides technical guidance and methods that will be used for field collection of solid materials analysis of nitrate, nitrite, ammonia, alkalinity, phosphate, and sulfate - sampling, storage, and shipping during environmental investigations at the Molycorp mine. This SOP is a supplement to the site-wide and investigation area specific workplans and field sampling plans (FSPs), and should be used in conjunction with the other SOPs in this volume.

2. RESPONSIBILITIES AND QUALIFICATIONS

The Project Manager and Characterization Team will have the overall responsibility for implementing this SOP. They will be responsible for assigning appropriate staff to implement this SOP and for ensuring that the procedures are followed.

All personnel performing these procedures are required to have the appropriate health and safety training. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP, and receive specific training regarding these procedures, if necessary.

All environmental staff and assay laboratory staff are responsible for reporting deviations from this SOP to the Project Manager.

3. DATA QUALITY OBJECTIVES

- Trench/Pit sample collected for correlation with site geochemistry and mineralogy
 - Obtain a representative sample from a freshly exposed, moist area.
 - A clean plastic or stainless steel spoon or spatula is required
 - Latex gloves must be worn during sample collection to prevent contamination of the sample from your hands
 - Identify the sample according to the SOP for sample labeling – it should correlate with the sample collected for geochemistry
 - Sampled area will have the same geochemical and geophysical makeup, color, and texture as is represented in the NMT moisture and/or geochemistry sample - this may actually be a sample over a large site surface and contain several different types of solid materials
 - Samples will be collected to a depth of 2 to 6 inches
 - Collect ~250 grams of material and correlate this sample with the sample collected for geochemistry and the samples collected for microbial analysis – this is one sample and will have the same sample number as the geochemistry samples and the microbial sample collected from the same site
 - The label must correspond with the location, initials, and geochemistry or moisture content samples
- Additional samples representative of various site areas
 - Pit areas, crustal surfaces, or hot spot materials may also be collected
 - Always try to collect a moist sample from a freshly exposed area as soon as possible after exposure
 - All areas sampled will be correlated with a geochemistry sample

- Additional co-samples samples may also be collected in ½ to 1 gallon plastic zip-lock bag if a larger sample volume is desired – this would also be considered as part of the sample above and labeled with the same sample number
- All samples will be stored, **double-bagged**, in an insulated ice chest during the day and transferred to a refrigerator at the end of the day
- All samples will be shipped, **double bagged**, in an insulated ice chest to the NMT Analytical Group by next day delivery

4. RELATED STANDARD OPERATING PROCEDURES

The procedures set forth in this SOP are intended for use with the following SOPs:

- SOP 1 Data management (including verification and validation)
- SOP 2 Sample management (chain of custody)
- SOP 3 Surveying (GPS)
- SOP 4 Taking photographs
- SOP 6 Drilling, logging, and sampling of subsurface materials (solid)
- SOP 7 Decontamination of sampling equipment
- SOP 8 Sample preparation (solids)
- SOP 9 Test pit excavation, logging, and sampling (solid)
- SOP 36 Sample preservation, storage, and shipment
- SOP 55 Microbial Sampling, Storage, and Shipping - Solids
- SOP 56 Classical Microbial Analysis-Solids
- SOP 57 Microbial Laboratory Safety
- SOP 58 Microbial Metabolic Profiles – BIOLOG
- SOP 59 Microbial Nucleic Acid Analysis
- SOP 60 Slurry pH-Redox-Conductivity-Temperature

5. EQUIPMENT LIST

- ziploc sample bags
- sampling spoons -spatula
- shovels, trowels
- latex gloves
- spray bottle with distilled water or clean bottled drinking water for cleaning sampling device between each sample
- paper towels

6. COLLECTION OF SAMPLES

The following are the types of samples to be collected in this project and sampling procedures are described in this SOP.

- Rock outcrops
- Alteration scars
- Soils (unconsolidated to consolidated waste rock samples)
- Test pit, trenches, and high wall selected and/or composite samples
- Drill cuttings and core materials
- Rock pile channel or transect sampling
- Other selected site samples for general microbial analyses

REPRESENTATIVE ~250 GRAM SAMPLES WILL BE COLLECTED INTO AT LEAST (1) ZIPLOC BAG – REMOVE THE AIR BEFORE SEALING, SEAL IN A SECOND ZIP-LOCK BAG.

IF AN ADDITIONAL BAG SAMPLE IS COLLECTED, LABEL WITH THE SAME SAMPLE NUMBER, REMOVE ALL AIR FROM THE SAMPLE BAG BEFORE SEALING THEN SEAL THE SAMPLE BAG, SEAL BAG IN A SECOND ZIP-LOCK BAG REMOVING ALL AIR BEFORE SEALING. BEFORE SHIPPING OR TRANSPORT, SEAL THE SAMPLES IN A THIRD ZIP-LOCK BAG (IF SHIPPING USING ICE), AGAIN REMOVING ALL AIR FROM THE THIRD BAG. SHIP THE SAMPLES OVERNIGHT.

7. SAMPLING PROCEDURES – STEPS

1. Wash the PLASTIC OR STAINLESS STEEL sampling device with distilled water – spray bottle – or from a new unused bottle of drinking water. Clean and dry the sampling tool between each sample collected – collection of multiple tubes or bags of material representing the same sample may be collected with one cleaning.
2. Use latex gloves during sample collection
3. Collect the ~250 grams of material into (1) zip-lock bag as without the sample coming into contact with exposed skin. Label the sample bag according to the SOP for sampling as a sample split of the microbial samples and the geochemical sample.
4. Remove as much air as possible from each bag as they are sealed – this will help prevent moisture loss from the sample. Double bag the samples removing excess air before sealing.
5. Store the labeled bags in an shaded insulated container during the sampling day – transfer the bags collected during the day to the refrigerator or iced cooler as soon as possible at the end of each day - **if storing on ice triple bag all samples. DO NOT LET THE SAMPLES SIT IN WATER IN THE COOLER.**
6. Transport the collected samples at ~4° C within 1 day to the NMT Analytical Group.
7. When shipping the samples, seal bags in three separate plastic bags removing the air from each bag before it is sealed in the next bag. Pack the bags in an ice chest for overnight shipping. **Make sure that the NMT Analytical Group is expecting the samples.**
8. Paste pH, Eh, Conductivity, and Temperature should be conducted on the sample as soon as possible after opening the refrigerated sample at NMT as per appropriate SOP.

8. INSTRUMENT CALIBRATION AND STANDARDIZATION

As required

9. DATA ANALYSIS AND CALCULTIONS

As per NMT Analytical Group SOPs as required

10. DATA AND RECORDS MANAGEMENT

Each sample is assigned a unique field identification number. A chain of custody form will be completed and sent with each sample batch. Samples will be tracked through completion of microbial analysis and destruction at the end of the study.

The field identification (ID) number for samples will be comprised of three components, separated by dashes, for example SSW-HRS-0001.

11. DOCUMENTATION - Field notes

Documentation of observations and data acquired in the field will provide information on the acquisition of samples and also provide a permanent record of field activities. The observations and data will be recorded with waterproof ink in a permanently bound field logbook with consecutively numbered pages and entered into the NMT data base.

The information in the field logbook will include the following as a minimum, unless information is recorded in the NMT database. Additional information is included in the specific SOPs regarding the appropriate data sheets.

- Project name
- Location of sample
- Sampler's signature
- Date and time of sample collection
- Sample identification numbers and sample depth (if applicable)
- Description of samples (matrix sampled), composite or grab sample
- Analysis to be performed
- Number and volume of sample containers
- Description of QA/QC samples (if collected)
- Sample methods or reference to the appropriate SOP
- Sample handling, including filtration and preservation, as appropriate for samples
- Field observations
- Results of any field measurements
- Decontamination information
- Calibration information
- Personnel present
- Method of shipment
- Any deviations from SOPs

If samples are held for an extended period of time field personnel will document all sample handling and custody in the field logbook and NMT database.

Samples in the field are assigned a field identification number that will be carried through all biological analysis. Field laboratory notes will be transferred to appropriate computer files as testing on each sample as is convenient.

All analytical samples collected will utilize the data in the NMT database associated with the moisture and/or geochemistry sample(s) collected instead of field notes, unless noted otherwise.