# STANDARD OPERATING PROCEDURE NO. 66 GAS ANALYZER

REVISION LOG							
Revision Number	sion Number Description						
66.0	Original SOP – PXW, KMD	10/27/2004					
66v1	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					
66v2	Editorial by SKA	10/27/08					

# 1.0 PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) serves as a supplement to the Quality Assurance Project Plan (QAPP) and provides technical guidance and methods that will be used for measuring gas concentrations on the Molycorp Site.

Gas analyzers measure the relative volume of specific gases within the total volume of air or gas being measured. These instruments can be used as safety devices to alert workers to the presence of hazardous gasses, explosive gasses, or lack of oxygen in a work environment. Gas analyzers can also be used for scientific pursuits where researchers want to know the content of gases flowing from vents, fractures, or rubble zones where the gas content may be different from that of fresh air.

## 2.0 **RESPONSIBILITIES AND QUALIFICATIONS**

The Project Manager or Field Manager has the overall responsibility for implementing this SOP. They will be responsible for assigning appropriate environmental staff to implement this SOP and for ensuring that all personnel follow the procedures.

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 field staff are responsible for reporting deviations from this SOP to the RI Project Manager or Field Manager.

## **3.0 DATA QUALITY OBJECTIVES**

This SOP addresses safety concerns when working in trenches. It also helps to address objectives 1 and 7 in the data quality objectives outline by Virginia McLemore for the "Geological and Hydrological Characterization at the Molycorp Questa Mine, Taos County, New Mexico".

- Determine how the hydrogeochemistry and water balance dynamics influence rock pile weathering and stability.
- Determine if pyrite oxidation, moisture content, and microbe populations affect rock pile weathering and stability.

## 4.0 RELATED STANDARD OPERATING PROCEDURES

Related SOPs include:

- SOP 1 Data management (including verification and validation)
- SOP 9 Test pit excavation, logging, and sampling (solid)

## 5.0 EQUIPMENT LIST

The following materials and equipment listed will be needed to analyze gases:

- RKI Eagle gas analyzer with hydrophobic and resin filter attachments
- RKI Gas calibration kit
- (2) "D" batteries
- Waterproof pens
- Field map
- GPS
- Field book

#### 5.0 **PROCEDURES**

#### 5.1 Calibration

The RKI Eagle gas analyzer (EAGLE) must be calibrated once per month using the RKI Gas calibration kit. A CD with video instruction and a manual are included in the box containing the gas analyzer. A copy of the manual is attached in Appendix II. There is also a calibration schedule in the Eagle box (see Appendix I).

#### 5.2 Purpose

For safety purposes, the EAGLE will be used during trench inspections to ensure that no harmful gasses are present and that there is enough oxygen in the trench. The EAGLE will also be used to measure gas concentrations from vents, fractures, and rubble zones that are found within rock piles at the Molycorp mine.

### 5.3 Normal use

The EAGLE is set up to measure concentrations of the following six gases:  $O_2$ ,  $CO_2$ ,  $CO_3$ ,  $CH_4$ ,  $H_2S$ , and  $SO_2$ . It can also measure percentage of lower explosive limits (%LEL) for hydrocarbons, but it must be calibrated to do this. The manual in Appendix II explains how to assemble the system. The probe tip should be held near the gas source so that measurements are made for approximately 30 seconds to ensure that the gas has reached the analyzer.

A hydrophobic filter, which is included in the box, must be attached if water vapor is present or if conditions are exceptionally humid (e.g. fog). Water should not enter the analyzer. It is suggested to reset the analyzer to fresh-air conditions with the filter attached if the filter is to be used (see p. 41 of manual in Appendix II).

Batteries must be replaced before their voltage falls below 4.5 V. Battery voltage can be checked by pressing the DIPS/ADJ button until the battery voltage Screen is displayed.

## 6.0 **DOCUMENTATION**

Documentation of observations and data acquired in the field will provide information on the activities concluded and also provide a permanent record of field activities. The observations and data will be recorded with waterproof ink in a permanently bound weatherproof field logbook with consecutively numbered pages, and on field data sheets.

Project and subcontractor staff are responsible for documenting logging activities. Field notes will be kept during logging activities. The following information will be recorded in a bound field log book:

- Names of personnel
- Weather conditions
- Date, time, description and location of feature being measured
- Documentation of any problems encountered and any deviation from this SOP
- Calibration information
- Other applicable information

The following data fields should be captured in the project database:

Date and time

Personnel
Weather conditions
Station ID
Location fields (Feature ID, UTM coords, elevation of ground level, location description)
SOP
Calibration information
Deviation from SOP
Measurement values for each gas
Notes, observations or other measurements taken

## 8.0 **REFERENCES**

- RKI Eagle website: <u>http://www.rkiinstruments.com/pages/eagle.htm</u>, accessed October, 13, 2004.
- RKI Instraments, 2001, Instruction Manual: Eagle Series, Portable Multi-Gas Detector, 74 pp.

Initials	Date	Time	<b>O</b> <sub>2</sub>	CO	CO <sub>2</sub>	CH <sub>4</sub>	SO <sub>2</sub>	H <sub>2</sub> S

**APPENDIX I. Calibration schedule** 

APPENDIX II. RKI Eagle manual (See CD for a copy of Appendix II)