APPENDIX A

WATER QUALITY MONITORING
QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) PLAN
GROUND WATER QUALITY DISCHARGE PERMIT UGW450002
FOR BARRICK RESOURCES (USA) INC.
MERCUR MINE RECLAMATION PROJECT

January 17, 2024

Prepared By:

Global Environmental Technologies, LLC
SALT LAKE CITY, UTAH

TABLE OF CONTENTS

1.0 INTRODUCTION

This Quality Assurance Plan presents the basic procedures for ground and surface water quality monitoring for the permit. The QA/QC Plan is to be implemented in accordance with monitoring requirements as per the State of Utah Department of Environmental Quality, Division of Water Quality (DWQ), as an Appendix for applicable Ground Water Quality Discharge Permit at the Barrick Mercur Mine that is currently in closure. This plan is attached as Appendix A to Permit No. UGW450002 for the Barrick Mercur Mine Reclamation Project.

2.0 PROJECT DESCRIPTION

2.1 Purpose

The specific objectives of this QA/QC plan for the subsurface and surface water quality investigations and monitoring at the permitted facilities are to:

1. Evaluate background ground water and surface water quality for each facility.

2. Establish ground water protection levels for each monitoring location.

3. Establish ground water and surface water compliance monitoring procedures.

The specific activities that will be carried out to achieve the above objectives are:

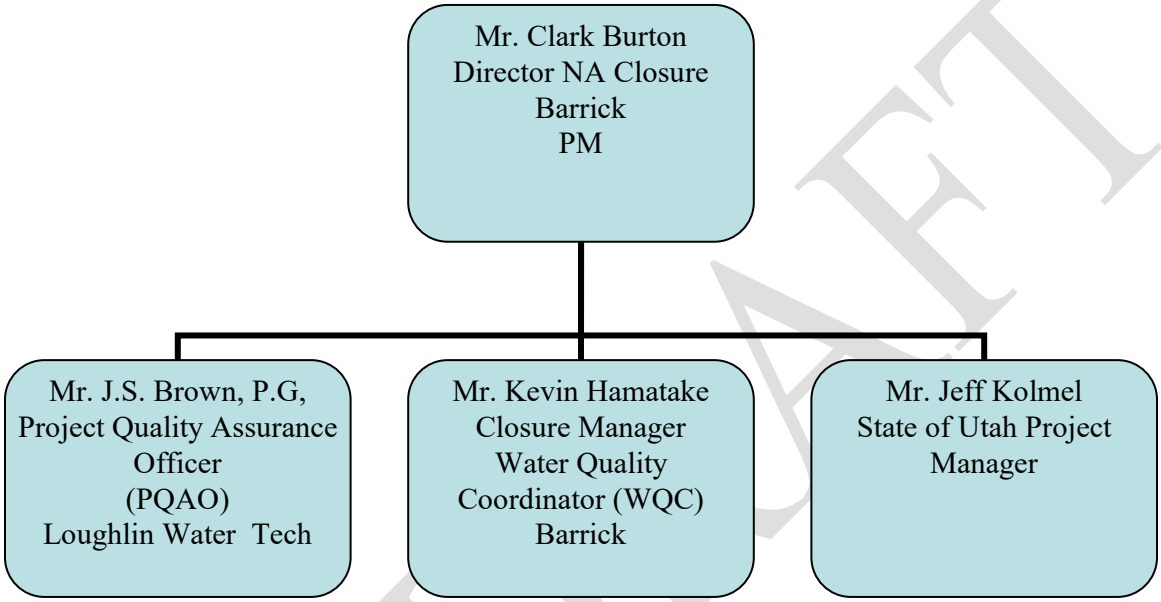
1. Measure static ground water levels at all monitor well sites.

2. Collect and analyze ground water quality samples from the monitor wells for compliance monitoring on a semiannual basis. Analytes are presented in Table A-1. Monitor well water quality data and surface water quality data reporting frequency will be completed as required by the permit.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

3.1 Organization

The organization for the activity is as follows:



3.2 Responsibilities

The project manager (PM) will have overall responsibility for direction of the project quality control and reporting and will prepare QA plans for review.

The PM will be responsible for execution of the activity in accordance with the plan. The PM and the Project Quality Assurance Officer (PQAO) will review all data generated from the monitoring or investigation and will be responsible for validating the data.

The PM and the PQAO will 1) review and approve the QA/QC plan, 2) review all quality control data, and 3) identify problems and recommend corrective action as necessary. The PQAO will report directly to the PM.

The State of Utah Project Manager (UPM) will be advised of any proposed changes to be made to this plan, and will advise the PQAO and Barrick PM of any comments or objections to this plan, its implementation or any proposed changes to the plan.

4.0 ANALYTICAL PARAMETERS AND QA OBJECTIVES

Analytical parameters, their detection limits, methods of analysis and holding times are given in Table A-1. Specific conductance, temperature and pH will be measured in the field. Sample collection will proceed in the following order:

1. Non-filtered, non-preserved bottles
2. Non-filtered preserved bottles
3. Filtered, non-preserved bottles
4. Filtered, preserved bottles

As a check on field measurements, pH and specific conductance will be run in the lab.

Chemical analysis will be performed by a lab certified by the State of Utah, a laboratory certified under either the Clean Water Act, Safe Drinking Water Act and the Resource Conservation and Recovery Act, for the required parameters listed in Table A-1. The internal quality assurance program for this project will be in accordance with the State of Utah Department of Environmental Quality protocol. Laboratory certification will be monitored by the PM and PQAO.

Routine analysis of samples will be performed in accordance with standard EPA procedures; special analyses will be performed according to EPA methods for chemical analyses of water and wastes. Specific analytical methodologies and references are listed in Table A-1. These methodologies specify the documentation needed to complete and evaluate the data. They also define acceptable accuracy and precision criteria that must

be set for the data to be judged valid. Accuracy is defined by the EPA as the percent recovery of a spiked sample. Laboratory matrix spikes are actual field samples spiked in the laboratory with a representative group from the list of required parameters as per Table A-1. The lab may specify the additional volume required from a sampled location in order to perform both matrix spike and matrix spike duplicate analysis. Matrix spikes and matrix spike duplicates will be performed at the rate of 10 percent of all samples obtained from the permit on an annual basis. As part of the monitoring program, a minimum of two samples per year will be split for matrix spike analysis. No well will be sampled consecutively during the same year for a matrix spike. Precision is defined by the EPA as the relative percent difference of duplicate sample analysis of similar matrix. Duplicate samples will be performed at the rate of 10 percent of all samples obtained from each permit. As part of the semiannual monitoring program, two samples minimum per year will be split for duplicate analysis from wells regulated under Permit UGW450002. No well will be sampled consecutively during the same year for a duplicate analysis. Only the required parameters as per Table A-1 will be analyzed in the laboratory.

An assessment of laboratory blank analytical results is required to verify the existence and magnitude of contamination problems that may be identified during analysis. Blanks verify that there is no or minimal contamination in the prep method procedure. A method blank is prepared with every analytical batch and is processed and analyzed in the same manner as the samples. The maximum permissible level of an analyte in the method blank is method specific and is stated in each individual method and procedure.

4.1 Data Quality Objectives

The data collected as part of this investigation is intended for use by the State of Utah Project Manager (the State of Utah Department of Environmental Quality, UDWQ), and by Barrick and its consultants. Laboratory and field procedures have been selected to ensure a high confidence level in the analytical results based on precision, accuracy, representativeness, completeness, and comparability.

The quality control of field data will be managed by the WQC and the PM for each type of data as defined in this report. Field data will be compared to other data at the site for reasonableness. The historic data will also be assessed for accuracy during this process to evaluate consistency and compatibility of all data taken at the site. Data will be compared to assess if the results are reasonable and consistent. Unreasonable results will be evaluated by technical personnel who will decide if retesting is required. Table A-1 presents the list of analytes for water quality samples with the laboratory analytical method shown for each analysis.

5.0 SAMPLING PROCEDURES

This section presents details on water quality sampling water level measurements, and flow rate measurement methods.

5.1 Ground Water Sampling

Ground water sampling locations are specified in Part I.G.2 in Permit No. UGW450002. Samples will be taken from monitoring wells MW-1, MW-2, MW-9, MW-10, MW-11, MW-13, MW-15, MW-16, MW-17, MW-18 and MW-19.

Prior to the sampling event, sample bottles of the appropriate size and with the required preservative as per the EPA-RCRA Ground Water Monitoring Enforcement Guidance Document (September 1986) or subsequent revisions, will be obtained from the laboratory.

5.1.1 Water Level Measurements

Static water level measurements are to be made in all monitor wells during this investigation. Ground water level measurements are to be made with an electrical water level meter graduated in 0.01- foot increments. Before each measurement, the instrument probe is to be thoroughly washed with distilled water. Measurements are to be made to a standard reference point, usually the top of the north side of the steel casing. Care will be taken to make sure that the water level measurement is reproducible. Ground water level elevation measurements relative to mean sea level will also be reported.

Measurements will be recorded on the water level measurement log as shown on Figure A-1 and transcribed to the water level records.

5.1.2 Chemical Samples

Upon arrival at each well, water level measurements will be made prior to sampling as specified above. The height of the column of water in the wells will be used to determine the volume of water inside the well casing and three casing volumes of water will be evacuated during the well purging process. Dedicated submersible pumps are installed in all of the wells. Pumping shall be conducted to ensure that the static water column is evacuated and three casing volumes are removed from the well during the purging process. Pump discharge will be captured in a calibrated bucket to verify the discharge rate and measured periodically to ensure that the discharge rate has not diminished as the result of well drawdown.

Before purging begins at each well, field instrument for pH, specific conductivity, and temperature will be calibrated according to manufacturer's directions and documented on the sampling form. Orion pH and conductivity meters, or their functional equivalents will be used. Calibration buffers for pH will be selected which bracket the sample pH, if possible, and conductivity standards will be selected which are the same order of magnitude as sample conductivity. Lot numbers and expiration dates will be documented on the field sampling form. Instrument calibrations will be checked after sample collection and all calibration procedures will be documented on the sampling field log.

During evacuation of the three casing volumes, pH, conductivity and temperature measurements of ground water will be made at the beginning and just prior to final purging of the last casing volume. Field measurements and observations will be recorded in a bound notebook or field logs (Field Log forms are shown on Figure A-1). Monitor well evacuation will be complete after three casing volumes have been purged. Data from the field sheets are entered into a database to track water levels over time.

In the event that three well casing volumes cannot be evacuated, samples will be obtained

in accordance with criteria for sampling of low-yielding wells (EPA, 1986). If not enough sample volume is available to extract a sample following a 48-hour period after purging, then the well is to be considered dry for that sampling event and will not be sampled until the next scheduled sampling event.

Ground water samples will be bottled directly from the discharge of the pump. Samples for total metals will not be filtered and samples for dissolved trace metals will be filtered in the field immediately upon collection. A new 0.45-micron filter and new silicon tubing will be used for filtering each sample for dissolved metals analysis. An in-line, pre-filter may also be used for excessively turbid samples. To prevent aeration of sample water, bottles will be filled with the tubing outlet just under the water surface in the bottle. Bottles will be properly labeled prior to filling and stored on ice immediately after filling. Sample bottles of the appropriate size and with the required preservative, as per the EPA-RCRA Ground-Water Monitoring Enforcement Guidance Document (September 1986), or subsequent revisions will be obtained from the laboratory. Pump discharge for each well should be restricted so that drawdown does not exceed the depth to the top of pump. If any well is noted to be pumping air during the purging stage, the discharge rate must be immediately reduced. Any sampling equipment contacting water samples will be decontaminated prior to utilization at another site. Decontamination will include cleaning with a non-phosphate detergent, a rinse with 0.1 N HCl acid solution, a rinse with tap water and a final rinse with de-ionized or distilled water and a thorough air drying in a location not susceptible to mine facility dust.

5.2 Surface Water Monitoring and Sampling

Surface water and process effluent samples for laboratory analyses will not be collected during closure monitoring as a result of cessation of milling and leaching activities. Tailing pond water quality will be monitored by Barrick for informational purposes during closure and will be subject to field and laboratory analytical procedures detailed in this plan. Field measurements for pH, conductivity and temperature will be made prior to filling sample bottles and will be recorded in the field log. East bay or incidental draindown solution surface water samples will first be collected using a pre-cleaned Teflon bailer or in a pre-cleaned 1-gallon plastic container and the sample bottle will be filled from this container. A 0.45 micron filter will be used for filtering samples for dissolved metals analysis. Container filling order will proceed as specified in Section 4.0.

Bottles will be properly labeled prior to filling and stored on ice immediately after filling.

5.3 Sample Handling

Table A-1 lists specific requirements for proper handling of samples including types of containers, preserving agents, temperature control, and holding times. Sample bottles will be obtained from the lab with the proper preservative already included. Upon sample collection, the sample containers will be placed on ice out of direct sunlight, shipped and analyzed within the maximum allowable holding times as specified in Table A-1.

6.0 SAMPLE CUSTODY

6.1 Field Operations

Documentation of field operations from sample collection to data reporting is an essential part of sampling procedures. Documentation of sample possession assures that it will be possible to trace the possession and handling of the samples from the time of collection through analysis and final disposition. This documentation of the history of the sample is referred to as chain-of-custody. The following records and actions will be taken.

1. Sample Labels - Sample labels are necessary to prevent misidentification of samples. The sample label or equivalent shown on Figure A-2 will be completely filled out and attached to each sample bottle before sample collection.

2. Field Sampling and Analysis Record - Pertinent field measurements and observations will be recorded. Equipment used to measure field parameters shall be calibrated before the collection of each sample. To facilitate these records, the appropriate form shown on Figure A-1 will be filled out for each sample site. Documentation of the sources (lot numbers and expiration dates) of buffers, standards, reagents, sample containers, etc., will be recorded on these forms.

3. Chain-of-Custody-Record - To establish the documentation necessary to trace sample possession from the time of collection, the chain-of-custody record as shown on Figure A-3 will be filled out in duplicate with one copy to accompany every sample shipment from the time of collection through receipt by the analytical laboratory. The WQC will sign and date the COC record and assure that the receiving person signs and dates it when he relinquishes control of the container. One copy of the form will be retained by the field sampler. The samples will be delivered to the laboratory for analysis as soon as possible, usually within one day after sampling. Maximum holding times are shown on Table A-1. Copies of the form sent to the laboratory with the samples will be returned to the PM and PQAO with the analytical results and will be included in the report.

4. Sample Seals - Will be placed on each shipping container (e.g., each ice chest) to verify the integrity of the samples.

6.2 Laboratory Operations

The analytical laboratory will acknowledge receipt of the samples by signing and dating in the appropriate box in the form shown on Figure A-3. This form will be returned to the PM and the PQAO with the analytical results.

The laboratory will maintain internal chain-of-custody control in accordance with protocol as per the Utah Department of Environmental Quality.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 General

Meters used to measure pH and specific conductance will be calibrated as outlined below prior to and during use. Source and identification (Lot No., etc.) of standards used to calibrate and expiration date will be recorded on the form as presented in Figure A-1.

7.2 Field pH

Field pH is to be performed with the following:

Orion, Model SA-250, or equivalent.

The meter that will be used should have automatic temperature correction.

Follow manufacturer's instructions for operation and standardization of instruments. Perform two-buffer standardization with buffers approximately 3 pH units apart and spanning the anticipated measurement values, if possible. The meter will be standardized at the beginning of each sample collection day and checked against the standard after each sample collection day. However, if sample pH values vary widely during purging, the meter will be re-standardized with a buffer having a pH within 1 or 2 units of that sample.

Notes:

1. If oil gets on the electrodes, the electrodes shall be cleaned with methanol or hydrochloric acid as necessary.

2. The pH electrode will be stored in pH 7 or pH 4 buffer, or probe storage solution depending on the manufacturer's recommendations.

7.3 Field Specific Conductance

Field specific conductance measurements are to be done with the following:

Oakton PC-10, or equivalent.

This meter automatically indicates specific conductance corrected to 25°C. Calibration is to be done before each sample measurement as per manufacturer's instructions.

7.4 Temperature

Temperature will be measured using the internal thermometer function of the pH meter or a good grade mercury-filled thermometer. Temperature should be reported to the nearest 0.1°C.

7.5 Water Level Meters

Water level measurements will be made with an electrical interface probe capable of accuracy to within 0.01 feet. This probe will be checked annually against a calibrated tape and will be repaired or re-calibrated, if necessary, prior to reuse. Water levels will be recorded in the field on the form shown on Figure A-1, along with all pertinent observations.

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 Field Operations

During each sampling event, at least one blind field ground water duplicate sample will be prepared and submitted to the laboratory. Splitting of water samples for duplications will be done by simultaneously filling sample containers.

If non-dedicated sampling equipment is used, one field equipment blank will be collected per sampling event. The field equipment blank sample will be prepared by pumping distilled water through the peristaltic pumping system into sample containers in the same manner as is done for a typical sample.

8.2 Laboratory Operations

The laboratory will conduct quality control checks in accordance with the State of Utah's certification requirements. This quality control check will include initial calibration blanks, lab duplicate and matrix spike and matrix spike duplicate samples. The laboratory will summarize the results of these quality control checks and submit them with the analytical results, to be included with each data report submitted to the DWQ.

One ground water sample from each sampling event will be designated for laboratory matrix spike duplicate. Field personnel will ensure that sufficient sample material is provided to the laboratory and indicate on the chain-of-custody which sample is designated for the matrix spike.

9.0 DATA MANAGEMENT REDUCTION, VALIDATION AND REPORTING

All field data and chain-of-custody forms generated from sampling will be appropriately identified and included in each water quality data report. Standardized data collection forms will be used by all personnel collecting field data during the project. Standardized data forms will be used for laboratory data during this project. Use of such forms will enable consistent presentation of the data throughout the project.

Validation of all analytical data will be performed. Laboratories will be required to submit results which are supported by sufficient backup data and QA/QC results to enable the reviewer to determine the quality of the data. Validity of all data will be determined based on the precision and accuracy assessments outlined in Section 4.0 of this report. All data will be stored and maintained according to the procedures outlined.

Data will be processed through an orderly, easily traceable and logical sequence. Field data will be assessed for accuracy. Subsequent analysis, interpretation and reporting of results will be conducted by appropriate professional staff, using documents which are initialed and dated whenever necessary. Any calculations will be checked. All assumptions necessary for calculations will be approved by the PQAO. No results will be reported without the required supporting documentation and proper review.

10.0 AUDIT PROCEDURES

The PM and the PQAO will monitor and audit performance of the QA procedures outlined in this report. The PM will conduct random field and office audits which will assure that the information being gathered is reliable and of good quality. The PQAO will ensure independent evaluation and compliance with the QA procedures. The PQAO will report to the PM responsible for the project.

10.1 Field Audits

The PM will conduct unscheduled audits of field activities during each of the sampling events to evaluate the execution of sample identification, sample control, chain-of-custody procedures, field documentation, equipment calibration and sampling operations.

An evaluation will be based on the extent to which the applicable standard operating procedures are being followed. Field documents pertaining to sample identification and control will be examined for completeness and accuracy. Field data sheets will be reviewed to see that all entries are dated and signed and that the contents are legible, written in waterproof ink or pencil and contain accurate and inclusive documentation of project activities. Because the field data sheets form the basis for reports, they will contain

all measurements and observations.

The PM will also check to see that chain-of-custody procedures are being followed and that samples are being kept in secure custody at all times.

The PM will check to see that any field instruments which require calibration are current in their calibration status and that the calibration documents are traceable. Sampling operations will be evaluated to determine if they are performed as stated in Section 6.0 or directed by the project manager. The proper number of samples will be collected at the assigned locations. The PM and WQC will check to determine that the samples are in proper containers and are properly labeled and preserved. The PM and WQC will also determine if the required field measurements and quality assurance checks are being performed and documented as directed.

10.2 Office Audits

Once a field project has been completed, the individual files will be assembled, organized and securely stored. The documents will be examined to determine that all necessary items such as signatures, dates and project numbers are included. The PM will examine all documents and determine if they have been handled and stored in the proper manner. Such files will be maintained at Barrick Mercur Mine.

The PM will review product quality to assure that the project is being performed in accordance with approved quality assurance procedures. All work products will undergo review by the PQAO. This will include review of calculations, test analysis, graphs, tables, computer input/outputs of any document that involves generating information from the field data. These reviews will be documented.

11.0 CORRECTIVE ACTION

Appropriate corrective action will be undertaken if sample collection deficiencies or unreliable analytical results prevent QA objectives for the project from being met. The criteria for acceptable sample collection data are given in Section 4.0 and the laboratory's

QA program provides the criteria for acceptable analytical results.

Analytical results supplied by the laboratory will have been subjected to the laboratory's Quality Control reporting and will be considered by the PQAO and the PM to be acceptable unless the results significantly contradict prior knowledge of the site conditions. When this situation occurs, the PQAO will request that the laboratory review the quality control documentation for the sample or analysis in question. Further corrective action will be based on the specific details of the situation.

The principal appropriate action that will be required as a result of deficiencies in sample collection is resampling if one or more of the following problems occur:

1. Sample contamination is suspect due to sample results which do not represent known site conditions.
2. Sample is lost in transit to the laboratory.
3. Holding times are violated for required parameters.

Variation between duplicate analyses for all protection level parameters in Table A-1 including trace metals or pH which are outside control limits (greater or less than 2 standard deviations of concentration mean) will be evaluated by the PM, PQAO and by the UPM to determine if re-sampling may be required. Re-analysis may be substituted for re-sampling if the holding time has not expired and the sample condition is satisfactory. A request for appropriate action may be initiated by the PM, the PQAO or the UPM.

12.0 QA REPORTS

Water quality data reports will be submitted as specified in the permit, to the State of Utah Department of Environmental Quality, (UDWQ). If re-sampling and/or re-analysis are required and the results are unavailable at the time of the data report submittal deadline, these will be forwarded to the UPM as soon as they are available following QA review of the data. Specifically, QA reports will address the following areas:

- Results of system and/or performance audits of sample collection activities.

- Summary of the laboratory QA report, including notation of QA modifiers.
- Listing and basis for any unacceptable data.
- Significant QA problems and recommended solutions.

The QA report will be prepared by the PQAO and the PM and distributed to the UPM.

13.0 REFERENCES

U.S. Environmental Protection Agency, September 1986. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, OSWER-9950.1.

Dames & Moore , January 1990. Ground Water Assessment For Dump Leach Area #3, Barrick Mercur Gold Mine, Utah For Barrick Resources (USA), Inc.

State of Utah, Department of Health, March 20, 1990. "Written Notice to Apply For a Ground Water Discharge Permit: Tailings Pond" addressed to Mr. Eurick, signatory Don A. Ostler, Executive Secretary.

State of Utah, Department of Health, June 1990. Ground Water Quality Discharge Permit for Dump Leach #3, for Barrick Resources (USA) Inc., Mercur Mine.

State of Utah, Department of Environmental Quality, August 1994. Ground Water Quality Discharge Permit No. UGW450001, Renewal for the Reservation Canyon Tailings Impoundment; Barrick Resources (USA), Inc., Mercur Mine.

State of Utah, Department of Environmental Quality, December 1994. Ground Water Quality Discharge Permit UGW450001, renewal, for Valley Fill Leach Area No. 3, Barrick Resources (USA) Inc., Mercur Mine.