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Groundwater Monitoring Work Plan

RUBY PIPELINE LLC

November 2010

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List of Abbreviations and Acronyms

E & E	Ecology and Environment, Inc.
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
Project	Ruby Pipeline Project
QA	Quality Assurance
QC	Quality Control
ROW	right-of-way
Ruby	Ruby Pipeline, LLC
SOP	Standard Operating Procedures
USGS	U.S. Geologic Survey

1.0 Introduction

Ecology and Environment, Inc. (E&E) under contract to Ruby Pipeline, L.L.C. (Ruby), has prepared this Groundwater Monitoring Work Plan for Ruby or its assigned contractor to monitor groundwater quality and yield for [redacted] located approximately [redacted] of the project area.

With the [redacted] approval, Ruby or its assigned contractor will conduct groundwater monitoring on three separate occasions; once before construction, a second time within 30 days of the completion of construction in the area of the spring, and a final time one-year following completion of construction in the area of the spring. Execution of this groundwater monitoring plan is a voluntary action by Ruby; if the Tribe's conditions of approval are not reasonable or timely this plan will not be executed.

The purpose of the monitoring is to assess whether water supplies have been affected by pipeline construction activities. A technical memorandum authored by Mactec Engineering and Consulting, Inc., September 8, 2009, assessed the potential impacts of pipeline construction [redacted] This memorandum assesses the construction impacts from the original alignment which was located approximately 3,200 feet closer to the spring than the current alignment.

This work plan describes access and information needs from the Tribe, sampling methodologies and testing procedures, laboratory analytical methods, management of investigation-derived waste, and quality assurance procedures. As part of this plan, Ruby is requesting that the Tribe provide historic production rates and water quality. If no previous testing has occurred, then Ruby will rely on the current testing for water production and quality. The initial tests will help to determine a base level for production and quality, but since production fluctuates depending on seasonal conditions, Ruby's current testing will not be representative of the range of historical production.

1.1 Owner Contact and Surveys

Ruby proposes to test [redacted] for production and water quality. The testing is designed to assess if there are impacts from construction on the spring and not to determine potability. [redacted] should contact the local health department for more information regarding the potability of [redacted] if the water is fit for intended purposes.

2.0 Sampling Strategy

2.1 Methods of Sampling and Analysis

Sampling methods will adhere to the prevailing U.S. Environmental Protection Agency (EPA) and state sampling, analytical, data quality assurance, and quality control procedures. All samples will be collected and properly preserved so that they are delivered to a certified laboratory and tested within the holding times required by the EPA and applicable state groundwater quality standards. Upon consent of the Tribe, samples will be collected as close to the source as practicable.

Discharge of springs will be calculated using one of the following methods:

1. A flow meter shall be employed to measure the velocity of the spring. The spring velocity will be multiplied by the cross sectional area of the spring to arrive at a discharge value in volume per time.

2. A timer will be used to measure the amount of time required to fill a calibrated five-gallon bucket.

During water sampling E & E will also record the condition of the spring, date and time, location, weather (if outside), and number of samples taken.

Following sample collection, [redacted] will be restored to the condition in which it was found.

2.2 Sample Analysis

All water samples collected will undergo analytical testing. Laboratory analysis will be conducted by a certified water testing laboratory. The following sections describe the analytical methods for both field and laboratory analyses.

2.2.1 Field Analysis

Field analysis shall be accomplished using a field water quality meter such as the YSI 556 MPS or Horiba U-22 water quality meter. Parameters for field analysis shall include pH, conductivity, dissolved oxygen, turbidity, total dissolved solids, and temperature.

2.2.2 Laboratory Analysis

Laboratory samples shall be collected in laboratory-supplied containers immediately following field analysis. Laboratory analysis will consist of TAL metals (EPA Method 6010), diesel and gasoline range total petroleum hydrocarbons (EPA Method 8015); and oil and grease range total petroleum hydrocarbons (EPA Method 1664). Sample container requirements for each analysis are summarized in Table 2-1.

Table 2-1 Sample Analysis Summary

Matrix	Quantity[a]	Analytical Parameters/ Methods	Sample Preservation	Technical Holding Time[b]	Sample Container(s)
Water	6	TAL Metals/ EPA 6000/7000 Series or CLP SOW ILM05.4	Cool to 4°C ± 2°C, Nitric acid to pH ≤ 2	180 days from collection; mercury 28 days from analysis	One 1-Liter polyethylene bottle
	6	TPH as Diesel/EPA 8015	Cool to 4°C ± 2°C, Hydrochloric acid to pH ≤ 1	7 days from collection	Two 32-oz Amber glass jars
	6	TPH as Gasoline/EPA 8015	Cool to 4°C ± 2°C, Hydrochloric acid to pH ≤ 2	14 days from collection	Three 40-milliliter glass VOA vials
	6	TPH as Oil and Grease/EPA 1664	Cool to 4°C ± 2°C, Hydrochloric acid to pH ≤ 2	28 days from collection	Two 32-oz Amber glass jars

Notes:

[a] The number of samples presented is an estimate; the actual number of samples to be collected will be determined in the field.

[b] Technical holding times have been established only for water matrices. Water technical holding times were applied to sediment and soil samples; in some cases recommended sediment/soil holding times are listed.

Key:

°C = Degrees Celsius; EPA = Environmental Protection Agency; oz = ounce; TAL = Target Analyte List; TPH = Total Petroleum Hydrocarbons; VOA = volatile organic analytes;

2.3 Sampling Schedule

Pre-construction baseline sampling will take place as soon as practicable (November 2010, if the Tribe allows) at a time convenient to the Tribe and in a manner that does not damage the resource.

Water samples will be collected prior to construction to obtain baseline water quality and water system flow data. Ruby will conduct post-construction sampling, within 30 days of the completion of construction in the area of the spring and one year after completion of construction in the area of the spring to assess if there are any effects of construction on the water source. Sampling methods, locations, and analytical parameters of the post-construction sampling will be consistent with that of the pre-construction sampling.

3.0 Investigation-Derived Waste

Investigation-derived wastes generated during the course of the field activities are expected to be non-hazardous and will be managed according to the criteria established in the Management of Investigation-Derived Wastes During Site Inspections (EPA/540/G-91/009). It is expected that the investigation-derived wastes generated during site activities will be limited to latex gloves and other personal protective equipment. Solid waste will be rinsed before disposal and sent to a municipal sanitary landfill. The decontamination water will be returned to the ground so as not to migrate off site.

4.0 Quality Assurance Procedures

4.1 Quality Assurance/Quality Control Samples

Quality Assurance (QA) samples will be collected to verify that the project QA objectives are met. QA/Quality Control (QC) samples will include matrix spike/matrix spike duplicate samples and field duplicate samples. Table 4-1 presents a summary of the number and type of QA/QC samples to be collected.

The following QA/QC samples will be collected depending on the number of samples collected from wells and springs identified on Tribal land. At a minimum, one field duplicate will be collected.

One matrix spike/matrix spike duplicate sample will be submitted to the laboratory for analysis. Matrix spike samples reveal information about sample preparation and analytical methodology. They can provide information about sample homogeneity, extent of matrix bias, or interference with analyte recovery; they also can indicate the accuracy of the method.

One field duplicate sample will be submitted to the laboratory for analysis. The field duplicate samples will be submitted to the laboratory as blind duplicates, and will be labeled using a fictitious sample number.

Table 4-1 QA/QC Analytical Summary and Fixed Laboratory Methods

					QA/QC Sample Summary						
Laboratory	**Matrix**	**Analytical Parameters/ Methods**	**Method Description/ Detection Limits**	**Total Field Samples[a]/ Containers**	**Organic MS/MSD[b]**	**Inorganic MS/D[b]**	**Trip Blanks[c]**	**Rinsates**	**Analyses/ Containers[d]**	**Precision and Accuracy[e]**	
TBD	Water	TAL Metals/ EPA 6000/7000 Series or CLP SOW ILM05.4	ICP & AA / 0.2 µg/L	100/100	NA	5/5	NA	4/4	109/109	20%	75% - 125%
		TPH as Diesel/EPA 8015	GCS/FID / 0.25 mg/L	100/200	5/10	NA	NA	4/8	109/218	35%	60% - 140%
		TPH as Gasoline/EPA 8015	GCS/FID / 0.25 mg/L	100/200	5/10	NA	5/10	4/8	114/228	35%	60% - 140%
		TPH as Oil and Grease/EPA 1664		100/200	5/10	NA	NA	4/8	109/218	35%	60% - 140%
		VOCs/EPA 8260	GC/MS / 0.01µg/L	100/300	5/15	NA	5/15	4/12	114/342	20%	60% - 140%
		SVOCs/EPA 8270	GC/MS / 5µg/L	100/200	5/10	NA	NA	4/8	109/218	35%	60% - 140%

Notes:

[a] Total number of field samples is estimated

[b] No extra volume is required for soil/sediment or products samples; for water samples, triple volume is required for organic analyses, and double volume is required for inorganic analysis. Sample numbers are based on MS/MSD per 20 samples per matrix.

[c] Rinsate blanks are not applicable for dedicated sampling equipment. The total number of trip blanks could vary depending on the total number of sample shipments. This number is based on the estimated number of days in the field. Note that trip blanks consist of water aliquots for both soil and water field samples.

[d] Total analyses and containers include both field and QA/QC aliquots to be submitted for fixed laboratory analysis. Note that trip blanks and rinsate blanks consist of water aliquots for both soil and water field samples.

[e] Advisory limits are shown. Laboratory- and method-specific QC limits will be used.

Key:

EPA = United States Environmental Protection Agency; FID = Flame ionization detector; GC = Gas chromatography; GCS = gas chromatographic separation; HRGC = High Resolution Gas Spectrometry; HRMS = High Resolution Mass Spectrometry; ICP = Inductively coupled argon plasma; mg/kg = milligrams per kilogram; mg/L = milligrams per liter; MS = Mass spectrometric detection; MS/D = Matrix spike/duplicate; MS/MSD = Matrix spike/matrix spike duplicate; NA = not applicable; ng/kg = nanograms per kilogram; ng/L = nanograms per liter; QA = quality assurance; QC = quality control; SVOCs = semivolatile organic compounds ; TAL = Target Analyte List; TBT = Tributyltin; TPH = total petroleum hydrocarbons; µg/L = micrograms per liter; VOCs = volatile organic compounds.

4.2 Sample Analytical and Handling Procedures

This section describes procedures for sample identification and chain-of-custody that will be used for the field activities. The purpose of these procedures is to maintain the quality of samples during collection, transportation, storage, and analysis. All chain-of-custody requirements shall comply with Ruby's standard operating procedures (SOPs) for sample handling. Samples will be collected in the field following Ruby's SOPs and sent to the laboratories for analysis.

4.2.1 Sample Identification and Documentation

Sample documentation for custody purposes includes:

- Sample identification numbers;
- Sample labels;
- Custody seals;
- Chain-of-custody records;
- Field logbooks; and
- Analytical records.

During the field effort, the field team leader or delegate is responsible for maintaining an inventory of these sample documents. This inventory will take the form of a cross-referenced matrix of the following:

- Sample location;
- Sample identification number;
- Analyses requested and request form number(s);
- Chain-of-custody record number; and
- Air bill numbers.

Brief descriptions of the major sample identification and documentation records and forms are provided below.

4.2.1.1 Sample Identification

Each sample will be assigned a unique number describing the sample location. The sample number will be recorded on a sample label, which will be affixed to the sample jar. Sample labeling for this investigation is summarized in Table 4-2.

Table 4-2 Sample Coding

Digits	Description	Code	Example
1,2	Matrix	GW	Groundwater
		RI	Rinsate
3,4,5	Team Number	000	500
6,7,8	Unique Number	000	250

4.2.1.2 Sample Labels

Sample labels attached to or fixed around the sample container will be used to identify all samples collected in the field. The sample labels will be placed on bottles so as not to obscure any QA/QC lot numbers on the bottles, and sample information will be printed legibly. Field identification will be sufficient to enable cross-reference with the project logbook. For chain-of-custody purposes, all QA/QC samples will be subject to exactly the same custodial procedures and documentation as site samples.

To minimize handling of sample containers, labels will be filled out before sample collection. Each sample label will be written in waterproof ink, attached firmly to the sample containers, and protected with Mylar tape. The sample label will contain the following information:

- Sample number;
- Sample location number;
- Date and time of collection;
- Analysis required; and
- pH and preservation (when applicable).

4.2.1.3 Custody Seals

Custody seals are preprinted, adhesive-back seals with security slots designed to break if the seals are disturbed. Sample shipping containers (e.g., coolers, drums, and cardboard boxes, as appropriate) will be sealed in as many places as necessary to promote data security. Seals will be signed and dated before use. Upon their arrival at the laboratory, the custodian will check that seals on shipping containers are intact and certify their condition by completing the package receipt log.

4.2.1.4 Chain-of-Custody Records

The chain-of-custody records will be completed fully, at least in duplicate, by the field technician designated by the site manager as being responsible for shipping the samples to the laboratory. Information specified on the chain-of-custody record will contain the same

level of detail found in the site logbook, except that the on-site measurement data will not be recorded. The custody record will include, at least, the following information:

- Name and company or organization of person collecting the samples;
- Date of sample collected;
- Type of sampling conducted (composite/grab);
- Location of sample;
- Number and type of containers shipped;
- Analysis requested;
- Signature of the person relinquishing samples to the transporter, with the date and time of transfer noted; and
- The signature of the designated sample custodian at the receiving facility.

If samples require rapid laboratory turnaround, the person completing the chain-of-custody record will note these or similar requirements in the remarks section of the custody record.

The relinquishing individual will record all shipping data (e.g., air-bill number, organization, time, and date) on the original custody record, which will be transported with the samples to the laboratory and retained in the laboratory's file. Original and duplicate custody records with the air bill or delivery note constitute a complete custody record. It is the site manager's responsibility to maintain consistent records and that they are made part of the permanent project file.

4.2.1.5 Field Logbooks and Data Forms

Field logbooks (or daily logs) and data forms are necessary to document daily activities and observations. Documentation will be sufficient to enable participants to accurately and objectively reconstruct events that occurred during the project. All daily logs will be kept in a bound notebook containing numbered pages, and all entries will be made in waterproof ink, dated, and signed. No pages will be removed for any reason.

If corrections are necessary, they will be made by drawing a single line through the original entry (so that the original entry is still legible) and writing the corrected entry alongside it. The correction will be initialed and dated. Corrected errors may require a footnote explaining the correction.

4.2.1.6 Photographs

Photographs will be taken of the spring to document pre- and post-construction condition. Documentation of a photograph is crucial to verify that it represents an existing situation.

The following information concerning photographs will be noted in the project or task logbook:

- Date, time, and location photograph was taken;
- Weather conditions;
- Description of photograph;
- Reasons photograph was taken;
- Sequential number of the photograph; and
- Direction.

After the photos are processed, the information recorded in the field logbook will be summarized in captions in the digital photo log.

4.2.2 Custody Procedures

The primary objective of chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is considered to be in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

4.2.2.1 Field Custody Procedures

The following guidance will be used to properly control samples during fieldwork:

- As few people as possible will handle samples;
- Coolers or boxes containing cleaned bottles will be sealed with a custody tape seal during transport to the field or while in storage before use. Sample bottles from unsealed coolers or boxes will not be used, nor will bottles that appear to have been tampered with;
- The sample collector will be responsible for the care and custody of samples until they are transferred to another person or dispatched properly under chain-of-custody rules;
- The sample collector will record sample data in the field logbook; and
- The site team leader will determine whether proper custody procedures were followed during the fieldwork and decide whether additional samples are required.

When transferring custody (e.g., releasing samples to a shipping agent), the following will apply:

- The coolers in which the samples are packed will be sealed and accompanied by two chain-of-custody records. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer;
- Samples will be dispatched to the laboratory for analysis with separate chain-of-custody records accompanying each shipment. Shipping containers will be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information will be entered in the chain-of-custody record;
- All shipments will be accompanied by chain-of-custody records identifying their contents. The original record will accompany the shipment. The other copies will be distributed appropriately to the site team leader and site manager; and
- If sent by common carrier, a bill of lading will be used. Freight bills and bills of lading will be retained as part of the permanent documentation.

4.2.2.2 Laboratory Custody Procedures

A designated sample custodian at the laboratory will accept custody of the shipped samples from the carrier and enter preliminary information about the package into a package or sample receipt log, including the initials of the person delivering the package and the status of the custody seals on the coolers (i.e., broken versus unbroken).

4.2.3 Sample Handling, Packaging, and Shipping

The transportation and handling of samples must be accomplished in a manner that protects their integrity, maintains the proper sample temperature, and maintains the sample's chain-of-custody.

4.2.3.1 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample package requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers;
- The sample volume level can be marked by placing the edge of the label at the appropriate sample height or by using a grease pencil. This will assist the laboratory in determining whether any leakage occurred during shipment. The label should not cover any bottle preparation QA/QC lot numbers;

- All sample bottles will be placed in a plastic bag to minimize leakage in case a bottle breaks during shipment;
- The samples will be cooled by placing ice in sealed plastic bags. Ice is not to be used as a substitute for packing materials;
- Any remaining space in the sample shipping container should be filled with inert packing material. Under no circumstances should material such as sawdust, newspaper, or sand be used; and
- The custody record must be sealed in a plastic bag and placed in the shipping container. Custody seals must be affixed to the sample cooler.

4.2.3.2 Shipping Containers

The appropriate shipping container will be determined in accordance with U.S. Department of Transportation (DOT) or International Air Transport Association (IATA) regulations for the anticipated level of suspected contaminants.

Shipping containers are to be custody-sealed for shipment as appropriate. The custody seals will be affixed in such a way that access to the container can be gained only by breaking a seal.

Field personnel will make arrangements for transportation of samples to the laboratory. When custody is relinquished to a shipper, field personnel will telephone the laboratory sample custodian to inform him or her of the expected time of arrival of the sample shipment and to advise him or her of any time constraints on sample analysis.

4.2.3.3 Marking and Labeling

Suggested guidelines for marking and labeling shipping containers are presented below. In all cases, DOT or IATA regulations should be consulted for appropriate marking and labeling requirements, which include the following:

- Use abbreviations only where specified;
- The words “This End Up” or “This Side Up” must be printed clearly on the top of the outer package. Upward-pointing arrows should be placed on the sides of the package; and
- After a shipping container is sealed, two chain-of-custody seals will be placed on the container, one on the front and one on the back. If the shipping container is a drum, one seal will be placed on each side (opposite of each other) of the drum. To protect the seals from accidental damage, clear strapping tape will be placed over them.

4.3 Calibration Procedures and Frequency

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations, as well as criteria set forth in the applicable analytical methodology references. Documentation of all routine and special maintenance and calibration information will be maintained in an appropriate logbook or reference file, and will be available on request.