Pre-Operational Sampling and Analysis Plan
Centennial and Indian Springs Uranium Projects
Weld County, Colorado

Prepared for:

Powertech (USA) Inc.
6200 S. Troy Circle, Suite 150
Centennial, Colorado 80112

POWERTECH (USA) INC.

Prepared by:

R Squared Incorporated
9034 E. Easter Place, Suite 201
Centennial, Colorado 80112

September 2007

Table of Contents

Figures

Tables

Plates

Appendices

List of Acronyms

cfm	Cubic Feet per Minute
cm	Centimeters
CPM	Consulting Project Manager
DO	Dissolved Oxygen
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
ELI	Energy Laboratories, Inc.
GPS	Global Positioning System
km	Kilometer
LIMS	Laboratory Information Management System
m	Meter
NRC	U.S. Nuclear Regulatory Commission
ORP	Oxidation Reduction Potential
Powertech	Powertech (USA) Inc, wholly owned subsidiary of Powertech Uranium Corporation
PM	Powertech Project Manager
PMP	Project Management Plan
QA	Quality Assurance
QC	Quality Control
R^2	R Squared Incorporated
SAP	Sampling and Analysis Plan
SC	Specific Conductivity
SHSO	Site Health and Safety Officer

1.0 INTRODUCTION

On behalf of Powertech (USA) Inc. (Powertech), R Squared Incorporated (R^2) has prepared this Sampling and Analysis Plan (SAP) to present the approach, procedures, and methods to be utilized by Powertech to collect and evaluate the data and information required to establish an environmental baseline for the Centennial and Indian Springs uranium recovery projects in Weld County, Colorado.

1.1 Site Description

Powertech plans to develop multi-phased uranium recovery projects in Weld County, Colorado: the Centennial project and the Indian Springs project. A vicinity map, showing the location of the projects in relation to major highways and landmarks, is provided in Figure 1. Both project areas are approximately 15 miles northeast of Fort Collins, and approximately four miles west of the town of Nunn, Colorado. The Centennial project will be contained within the following sections:

- Sections 3, 11, and 15 of T8N, R67W
- Section 34 section 35 of T9N, R67W

The Indian Springs Project will be located north of the Centennial project in the following sections:

- Sections 3, 4, and 15 of T9N, R67W
- Sections 20, 21, 28, 29, 33 and 34 of T10N, R67W

1.2 Project Background and General Approach to Mining

Uranium recovery in the Indian Springs project area will be accomplished using In Situ Recovery (ISR) techniques; in the Centennial project area either ISR or conventional open pit mining techniques or a combination of both will be utilized. A mine pre-feasibility study is being conducted on a sand and gravel deposit in the Centennial project area.

Both project areas were studied by Rocky Mountain Energy (RME) in the late 1970's and early 1980's. The focus of the RME studies was in the Centennial project area where uranium recovery using conventional open pit mining and milling techniques

were planned. Due to project economics and low uranium commodity prices, RME abandoned the project in 1984.

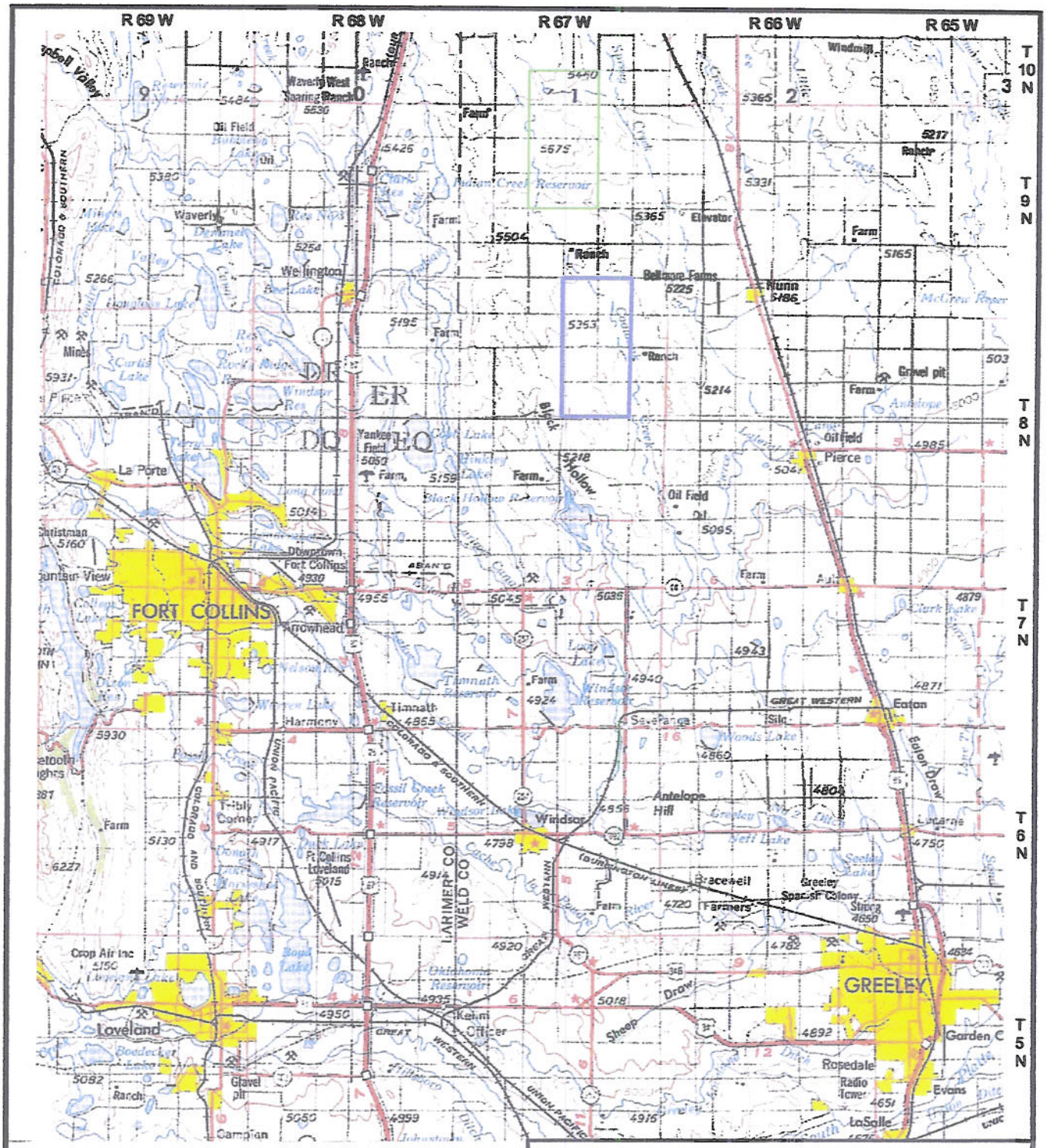
Environmental baseline information obtained for the Centennial and Indian Springs projects will be used to prepare the required regulatory documents. If the pre-feasibility Centennial sand and gravel mine plan is determined to be viable, Powertech will obtain a permit from the Colorado Division of Reclamation Mining and Safety.

1.3 Objectives

Powertech's overall goal is to construct and operate uranium recovery operations at the Centennial and Indian Springs sites that minimize impacts to human health and the environment, that return a reasonable return on the investment and provide future sustainable redevelopment of the project area. To realize this goal, the following objectives have been established by Powertech and R^2:

- Obtain the necessary licenses and permits from the appropriate Federal, State, and County regulatory agencies within a reasonable timeframe and budget
- Keep stakeholders and the public informed during the licensing and permitting activities

The purpose of this SAP is to describe the methods to be used to obtain baseline environmental data to adequately characterize the existing natural environment in the project areas and in a manner that is consistent with applicable regulatory guidance, current standards of practice, and defensible science. Data generated during this program will be used to define the "baseline" against which any potential or perceived environmental impacts of project activities can be measured and compared. This SAP describes sample collection field measurement methods, frequencies, analytical requirements and establishes sample locations and associated rationale for assessment of environmental media and related natural conditions.



POWERTECH (USA) INC.

Figure 1
Site Vicinity Map
Sampling and Analysis Plan
Weld County, Colorado

Date: 9/20/07	Drawn by: CSM	Drawing: S&A-Site-Vic.dwg	XXXX

M:\CLIENTS\POWERTECH\SAMPLING & ANALYSIS\S&A-SITE-VIC.DWG-LAYOUT1 09/20/2007 1:37PM

1.4 Regulatory Basis and References

This SAP has been prepared to be consistent with the regulatory intent and technical guidance provided in the following documents:

1. Colorado Department of Health and Environment, Hazardous Materials and Waste Management Division, Radiation Control, 6 CCR 1007-1, Part 18, " Licensing Requirements for Uranium and Thorium Processing"
2. Colorado Department of Heath and Environment, Colorado Clean Water Act
3. Mineral Rules and Regulations of The Colorado Mine Land Reclamation Board for Hard Rock, Metal and Designated Mining Operations, May 1977, amended August 2006.
4. NRC Regulatory Guide 4.14, " Radiological Effluent and Environmental Monitoring at Uranium Mills," 1980
5. NRC Regulatory Guide 3.46, "Standard Format and Content of License Applications, Including Environmental Reports, for In Situ Uranium Solution Mining", 1982
6. NUREG 1569, " Standard Review Plan for In Situ Leach Uranium Recovery License Applications", 2003
7. NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination", J D Berger, 1992
8. NUREG 1575, "Multi Agency Radiological Site Survey and Investigation Manual" (MARSSIM), 2000
9. USEPA "Manual for Chemical Analysis of Water and Wastes" EPA-625-/6-74-003a, 1974

2.0 TECHNICAL APPROACH

This section describes the technical approach utilized in establishing proposed environmental baseline sampling locations for the following.

- Groundwater monitoring
- Domestic well water monitoring
- Surface water monitoring
- Radionuclide particulates in air
- Radon in air
- Radon flux from surface soils
- Radiological and non-radiological parameters from soil profiles
- Direct radiation measurements
- Vegetation and food products important to the human food chain

Each of these components of the environmental baseline is described in the following paragraphs. An overview of the baseline sampling program is provided in Table 2.1. Sampling locations are shown in Plates 1 through 3.

2.1 Groundwater Monitoring

General guidance from Nuclear Regulatory Commission (NRC) Regulatory Guide 4.14 for collecting data from wells to establish a groundwater baseline that includes performing quarterly groundwater sampling and analysis on (a) at least six wells located around the tailings area; (b) existing wells within 2 km of tailings area that could be used for potable water, livestock or irrigation; and (c) at least one well located hydraulically up gradient from tailings area as control/background.

2.1.1 Number and Location of Sampling Locations

A total of 52 wells have been drilled and completed. During 2007, Powertech completed 14 groundwater sampling wells and 9 aquifer test observation wells; RME installed 29 groundwater sampling wells in the early 1980s in the Centennial project area. Groundwater samples will be collected quarterly from as many as 43 monitoring wells, shown in Plates 1 and 2.

Figure 2 is a generalized geologic cross section through both the Centennial and Indian Springs project areas. Mineralized zones to be mined in the Centennial project

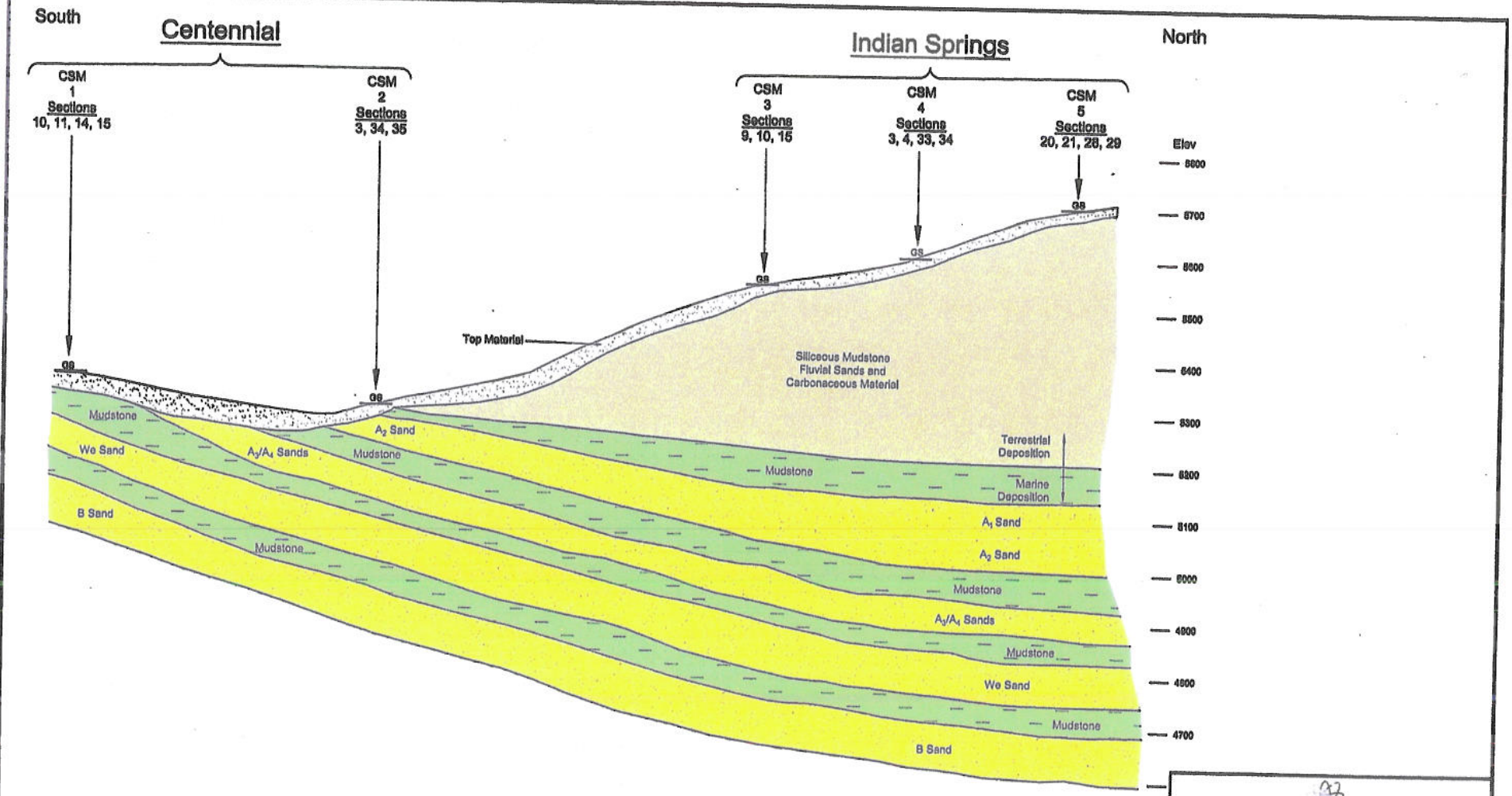
area are in the "WE" Sand (Sections 11 and 15) and "A_2" Sand (Sections 3 and 35); in the Indian Springs project area, mineralized zones proposed for mining include the "A_2" Sand. In addition to monitoring water quality in the mineralized zones, the monitoring well network monitors water quality in the aquifers above and below the zones to be mined. For example in Section 11, monitoring wells are screened in the zone to be mined (the "WE" Sand), the aquifer below (the "B" Sand), and the aquifer above (the "A_2" Sand). Table 2.2 presents well depths, well screen intervals, locations, and other available information about the project wells.

2.1.2 Sample Collection Method and Frequency

Grab samples will be collected quarterly from new and existing monitoring wells. Minimum sample volumes, preservation requirements, and holding times are presented in Table 2.3. SOP 22, "Purging and Sampling Monitoring Wells" describes groundwater collection methods. Water quality parameters will be collected in accordance with SOP 8, "Field Parameter Measurements." Reusable equipment will be decontaminated after each sample collected in accordance with SOP 10, "Decontamination of Sampling Equipment."

2.1.3 Analytical Program

The analytical program for groundwater samples from monitoring wells is presented in Table 2.3.



Note: Horizontal Axis Not To Scale

Powertech (USA) Inc.

Figure 2
Generalized Geologic Cross-Section
Sampling and Analysis Plan
Weld County, Colorado

Date:9/20/07 | Drawn by:CSM | Drawing:Site-Geo-X-Sec.dwg | XXXX

As part of groundwater sampling procedures, pH, temperature, specific conductivity (SC), dissolved oxygen (DO), and oxidation reduction potential (ORP) measurements will be collected. SOP 8 describes the procedures to calibrate the water quality meter(s) and correctly measure the necessary water quality parameters.

2.2 Domestic Well Water Monitoring

When granted authorization from the domestic well owner, groundwater samples will be collected from as many as 43 wells that are or could be used for drinking water, watering of livestock, or crop irrigation within 2 km of the project areas.

2.2.1 Number and Location of Sampling Locations

Samples from as many as 43 domestic water wells will be collected once as part of the baseline monitoring program. The sampling locations, shown in Plates 3, are within the 2 km zone discussed in Regulatory Guide 4.14; are up-gradient and down-gradient of the planned mining operations; and draw water from the aquifers within, above, and/or below the zone to be mined.

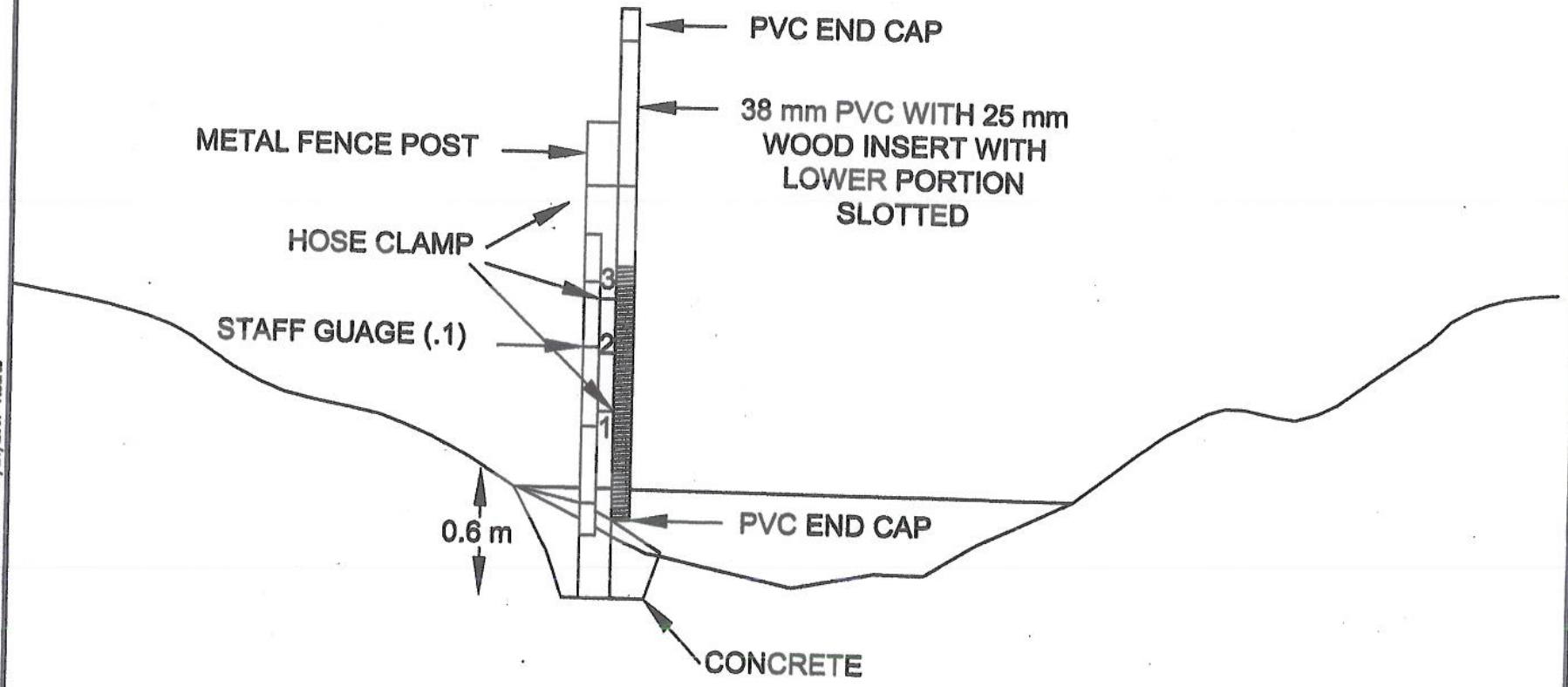
2.2.2 Sample Collection Method and Frequency

Grab samples will be collected from domestic water wells only once. Minimum sample volumes, preservation requirements, and holding times are presented in Table 2.4. Samples will be obtained in a manner similar to that described in SOP 22 with the following exception: Rather than purging 3 well volumes as described in SOP 22, samples from domestic wells will be taken from a tap close to the well allowing the water to flow for approximately 5 minutes prior to obtaining the sample. Reusable equipment will be decontaminated after each sample collected in accordance with SOP 10.

2.2.3 Analytical Program

The analytical program for domestic well water samples is presented in Table 2.4. The proposed analyses are in accordance with NUREG 1569, section 2.7 and USEPA "Manual for Chemical Analysis Water and Wastes" EPA-625-/6-74-003a, 1974.

As part of domestic well water sampling procedures, pH, temperature, SC, DO, and ORP.



M:\CLIENTS\POWERTECH\SAMPLING & ANALYSIS\STORM WATER FLOW SAMPLERS.DWG-LAYOUT1 09/21/2007 7:38AM

POWERTECH (USA) INC.

Figure 3
Schematic of Passive Stormwater Flow Samplers
Sampling and Analysis Plan
Weld County, Colorado

Date: 9/20/07	Drawn by: CSM	Drawing: Storm Water Flow Samplers.dwg	XXXX

will be measured. SOP 8 describes the procedures to calibrate the water quality meter and correctly measure the necessary water quality parameters.

2.3 Surface Water and Sediment

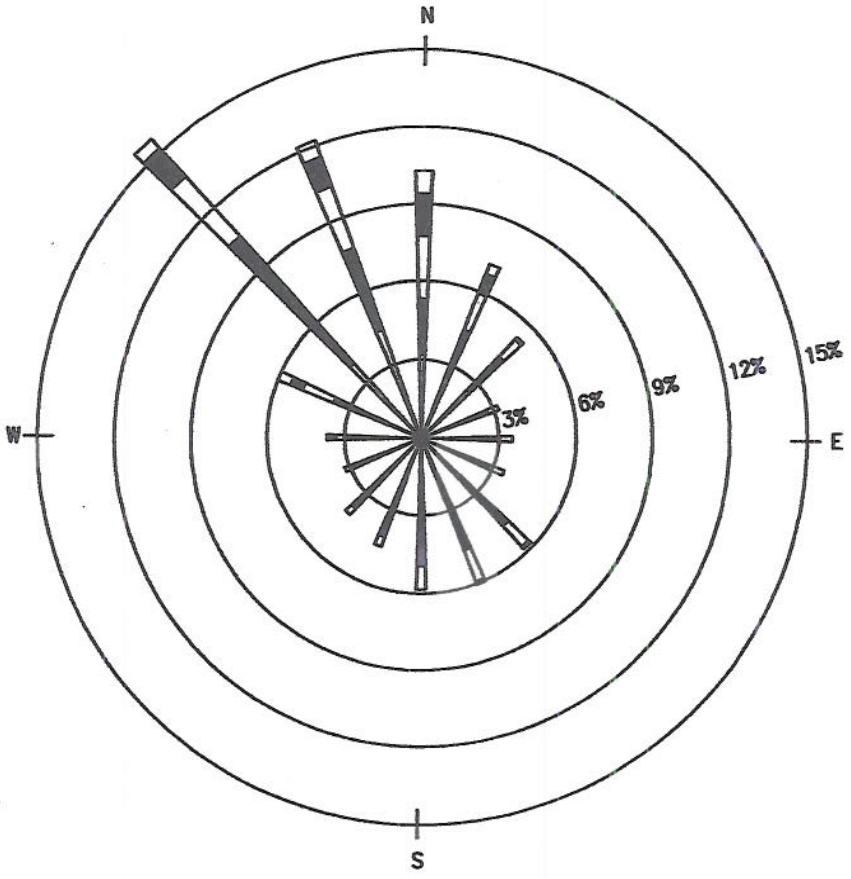
NRC Regulatory Guide 4.14 indicates that surface water samples should be obtained from the following locations: (a) large, permanent water impoundments on-or offsite that could be impacted by direct surface drainage from contaminated areas; when water is present one grab sample from each body, quarterly; (b) surface water passing through site or offsite surface waters (e.g., "streams") that could be impacted by surface drainage.

2.3.1 Number and Location of Samples

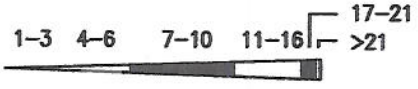
There has been no permanent water impoundments identified on or within one mile of the project areas nor are there any perennial streams that could be impacted by planned project activities. Passive storm water samplers have been emplaced at locations most likely to experience flow during storm events. The passive samplers to be installed are shown in Figure 3; their prospective locations are shown in Plates 1 and 2. In addition, surface water and sediment samples will be obtained from the Black Hollow Reservoir located approximately 3-4 miles South/Southwest of project boundaries (Figure 1). Although generally fed by streams from the Northwest/West (and therefore not impacted by project activities), this reservoir will be sampled since it represents a major repository for surface water systems in the region.

2.3.2 Sample Collection Method and Frequency

Potential ephemeral streams (storm water channels/grass swales) will be monitored for flow via passive samplers. Stream flow measurements will be obtained in accordance with SOP 2, "Streamflow Measurements". Sampling will be conducted in accordance with SOP 1, "Surface Water and Seep Sampling". The frequency of sample collection and analysis will be dictated by storm events generating sufficient flow from which a sample can be obtained. Passive samplers will be monitored and samples collected following such events. Nalgene Storm Water Samplers or equivalent will be used.



NOTES:
DIAGRAM OF THE FREQUENCY OF OCCURRENCE FOR EACH WIND DIRECTION.
WIND DIRECTIONS IS THE DIRECTION FROM WHICH THE WIND IS BLOWING.
EXAMPLE–WIND IS BLOWING FROM THE NORTH 10.3 PERCENT OF THE TIME



WIND SPEED CLASSES
(KNOTS)

POWERTECH (USA) INC.

Figure 4
Project Wind Rose
Sampling and Analysis Plan
Weld County, Colorado

Date: 9/20/07	Drawn by: CSM	Drawing: Project Wind Rose.dwg	XXXX

M:\CLIENTS\POWERTECH\SAMPLING & ANALYSIS\PROJECT WIND ROSE.DWG–LAYOUT1 09/20/2007 1:41PM

Regarding Black Hollow Reservoir, samples of both water and sediment will be obtained twice, once in the fall and once following spring snowmelt.

2.3.3 Analytical Program

Water and sediment samples will be analyzed for the parameters summarized in Table 2.5.

2.4 Radionuclide Particulate in Air

NRC Regulatory Guide 4.14 suggests three air monitoring stations be installed at/near site boundary, at the nearest residence within 10 km of the site representing "highest predicted concentration", and one control location. Continuous sampling is further suggested, with quarterly composites of weekly samples (or as necessary based on dust loading) be submitted for analysis.

2.4.1 Sampling Locations

Two high volume air sampling stations will be installed in Centennial (Plate 1) and three sampling stations will be installed in Indian Springs (Plate 2). Additionally, an "offsite control" location has been selected that will not be impacted by project activities. It will be located North/Northwest ("upwind") of the project site, in the general direction of Wellington, Colorado (Figure 1).

Placement of particulate air samplers considered (a) site boundary locations that during operations, will represent "points of compliance" relative to permissible releases of radioactive materials in air to unrestricted (public) areas; (b) in directions from project activities representative of prevailing/highest frequency wind; (c) the location of nearby residence(s) that would represent the potentially "maximally exposed offsite individual" from project airborne releases under normal operations and/or accidental releases.

A wind rose, generated from data collected in 1983 from an on-site meteorological station, was utilized to locate the sampling stations (Figure 4)[1]. Dominant winds are from North through Northwest, particularly at night when they are most stable. Thus, the highest predicted air concentrations resulting from project activities will be at South/Southeast site boundary locations. Additionally, the Section 15, T9N, R67W (Plate 2) was chosen as the nearest residence (i.e., "maximally exposed offsite individual")

[1] The former meteorological station was located at Weld County Rd (CR) 100 just east of CR 19 and approximately 6 miles east of the Wellington exit off Interstate 25.

since that area is South/Southeast of the planned mining activities and is expected to be at/near a site boundary.

2.4.2 Sample Collection Methods and Frequency

High volume air sampling pumps with flow rates greater than 10 cubic feet/minute (cfm) will be utilized to ensure minimum detectable activities are achieved. Units will be enclosed in weather resistant housings and will consist of Hi–Q Environmental Product 4300 series automatic flow control units. Continuous air sampling will be via filter paper collection.

Sampling will be conducted in accordance with SOP 69, "High Volume Air Sampler," continuously for 12 months; quarterly composites from each station will be separately analyzed. Filters will be changed weekly or as necessary based on dust loading.

2.4.3 Analytical Program

Air particulate samples will be analyzed for Uranium[2], Th 230, Ra 226, and Po 210.

2.5 Radon in Air

NRC Regulatory Guide 4.14 suggests radon measurements be taken at locations where air particulates are monitored and where a continuous or one week per month (at about same time of the month) sample will be obtained.

2.5.1 Number and Location of Samples

Radon samples will be collected at the air monitoring station locations. The number and location of radon air samplers and the rationale for these locations is described in Section 2.4.

2.5.2 Sample Collection Methods and Frequency

Continuous samples will be collected in accordance with SOP 66, "Radon Concentrations in Air", via passive alpha track detectors using CR 39 (allyl diglycol carbonate) substrate designed for outdoor extended use. Instruments to be utilized include a Landauer Radtrak Long Term Radon Monitor or its equivalent. Detectors will be exchanged and analyzed on a quarterly basis.

[2] Uranium means "natural Uranium" i.e., combination of Uranium isotopes in mass % as occurs in nature: U238 (99.3), U 235 (0.72) and U 234 (0.005).

2.5.3 Analytical Program

Detectors will be analyzed by the supplier. Sensitivities are typically in the 20 - 40 pCi/l/day range. Assuming a quarterly (90 day) exposure period, sensitivities should be 0.2 - 0.4 pCi/l in air.

2.6 Surface Soil

NRC Regulatory Guide 4.14 suggests, for mills and tailings disposal sites, that surface soil samples be collected between the ground surface and a depth of 15 cm at 300 m intervals out to 1,500 m, in the 8 cardinal directions from a point representing the geometric center of onsite processing activities. Surface soil samples should also be obtained at the air monitoring stations. NRC further recommends that samples be obtained once prior to construction.

2.6.1 Number and Location of Samples

Surface soil samples will be collected at each of the air particulate sampling locations (Section 2.1) and at the locations shown in Plates 1 and 2.

Regulatory Guide 4.14 assumes a centralized continuous site. ISR activities at the site will occur over the orebodies which are generally long, narrow, and discontinuous. In addition, with ISR, uranium processing takes place below grade and therefore no dust is generated under routine operations. Thus the only potential releases from these mining activities would be liquids from leaks and spills and potentially radon gas[3]. We have adjusted the sampling requirements to reflect the inherent difference between conventional mining/milling operations and ISR. Specifically, rather than locating samples radially from a single point out 1500 m, the proposed sampling grid extends from an axis through the center of a given plan view of the orebody out approximately ¼-mile or approximately 400 m. Several sample lines extend the full 1500 m from the axis.

A virtual axis was constructed through a plan view of the orebodies around which a grid was drawn around the virtual axis 300 m from the axis (Plates 1 and 2). The number of sample locations in each 300 m radius of the traditional circular/polar grid was used to establish a basis of sample location density (meters^2/sample) for each radial segment which was then translated mathematically to an equivalent sample location

[3] Radon gas emissions, if any, will be continuously monitored at the air monitoring stations.

density for the grid around the axis. The resultant number of samples per segment was then used to determine equal spacing of samples along the perimeters of each grid segment and along the central axis.

2.6.2 Sample Collection Method and Frequency

Surface soil samples will be field-located using a hand-held Global Position System (GPS) unit. A soil sample will be obtained at each location from the top 30 cm or at the bedrock surface, wherever is shallower. Sampling will be conducted in accordance with SOP 26, "Surface Soil Sampling". Surface soil samples will be collected once prior to site construction.

2.6.3 Analytical Program

Surface soil samples will be analyzed for Uranium, Ra 226, gross alpha, and gross beta. Additionally, 10 percent of the samples will be analyzed for Th 230, and Pb 210.

2.7 Subsurface Soil

To obtain a radiological profile of subsurface soils in the project areas, NRC Regulatory Guide 4.14 suggests subsurface soil samples be obtained at the center of operations and at 750 m in 4 cardinal directions. Three samples at each location should be obtained one time prior to construction to depth of one meter. In addition, NUREG 1569 suggests that a general description of the site soils and their properties be provided to support an evaluation of the environmental effects of construction and operation on erosion.

2.7.1 Number and Location of Samples

Samples will be collected at the locations shown in Plates 1 and 2. The rationale for the proposed sample locations is essentially the same as for surface soil (Section 2.6) except, rather than 'circular' grids at 300 m spacing, soil profile sample grids will generally be at 750 m spacings.

2.7.2 Sample Collection Method and Frequency

Sample locations will be established via a hand-held GPS unit. At each location, three samples will be collected at the following depth intervals:

- 0-30 cm
- 30-60 cm,
- 60-100 cm or at refusal

The sample holes will be obtained as described in SOP 33, "Soil Sampling for Radionuclides and Baseline Analyses".

2.7.3 Analytical Program

The samples will be analyzed for the parameters listed in SOP 33.

2.8 Direct Radiation Measurements

NRC Regulatory Guide 4.14 suggests direct radiation measurements be obtained at 150 m intervals out to 1500 m in 8 cardinal directions from center of milling area plus at air particulate stations one time to determine average exposure rate.

2.8.1 Number and Location of Measurements

Measurements will be made at the air particulate stations (Section 2.1) and, at a minimum, at surface soil sampling locations identified in Plates 1 and 2. The rationale for measurement locations is similar to the approach for surface soil.

2.8.2 Sample Collection (Measurement) Method and Frequency

At each location, a direct radiation measurement will be made at approximately 18 inches above the ground surface. Direct radiation measurements will be obtained in accordance with SOP 67, "Direct Radiation (Gamma) Measurements" via a NaI (Tl) detector (Ludlum Model 44-10 or equivalent) and rate meter (Ludlum Model 12 or equivalent) calibrated to a pressurized ion chamber. Date, time, direct radiation measurement results and location coordinates will be recorded utilizing the hand-held GPS unit. Measurements will be obtained once prior to commencement of construction.

2.8.3 Analytical Program

None Required

2.9 Radon Flux Measurements

NRC Regulatory Guide 4.14 suggests obtaining radon flux measurements at the center of operations and at locations 750 m and 1500 m from the center of operations in 4 cardinal directions on a quarterly basis.

2.9.1 Number and Location of Measurements

Measurement locations are shown in Plates 1 and 2. Measurement points were located in a manner similar to that to be utilized for surface soil (Section 2.6). Mathematical translation of sample location density from the NRC-contemplated circular to a rectangular grid again utilized a virtual axis along the ore bodies and extending the rectangular grid to 750 and 1500-meter distances.

2.9.2 Sample Collection (Measurement) Method and Frequency

Placement and handling of radon canister will be in accordance with SOP 25, "Radon Flux Measurements". Large area charcoal canisters (typically 25 cm in diameter PVC end cap) or electret ionization chambers will be utilized to obtain radon flux measurements.

2.9.3 Analytical Program

Charcoal removed from the canisters will be analyzed for radon via gamma spectroscopy. Electret ion chambers will be analyzed via a self-reader or returned to supplier for analysis.

2.10 Vegetation and Food Products

NRC Regulatory Guide 4.14 suggests that vegetation and food products be sampled three times during growing season and in grazing areas in sectors near the site with highest expected air particulate concentrations.

2.10.1 Number and Location of Samples

As discussed above, air particulate generation from ISR operations is expected to be negligible. In any event, R^2 will collect samples of each crop (see below) - three times during the cattle grazing season. Sampling locations will be generally South/Southeast of site boundaries to extent possible (see Section 2.6). These sectors would be expected to have the highest predicted air particulate concentrations during project operations; however, because particulate emissions from ISR operations are not anticipated, it is likely unnecessary to collect and analyze animal tissue as part of establishing an environmental baseline for the site. Similarly, no fish samples will be obtained as there are no perennial streams in the immediate project vicinity.

2.10.2 Sample Collection Method and Frequency

Vegetation and food crop samples will be collected three times during the cattle grazing season. Grassland vegetation (grasses such as blue grama, western wheat grass and buffalo grass will be sampled by clipping above ground stems. One kilogram samples will be collected for each major species and bagged for analysis. Small grain dry land crops, wheat and oats, have been observed as potential local food crops and will be collected. Additionally, field corn has been observed in private irrigated fields and sampling should be performed if accessible.

Occurrence of game animals and potential availability of cattle meat are not expected to be a significant pathway. Animals will be sampled only on contingency when vegetation or crop sampling indicate significant radionuclide uptake. Fish are not available for sampling since there are no perennial streams or bodies of water in the immediate project vicinity (see Section 2.3).

2.10.3 Analytical Program

Vegetation samples will be analyzed for Uranium, Th 230, Ra 226, Po 210, and Pb 210. Sample amount for food crops and vegetation is approximately one kilogram, and the maximum allowable holding time is 6 months.

3.0 SAMPLING, ANALYTICAL, AND QUALITY ASSURANCE PROCEDURES

3.1 Data Quality Objectives

The overall objective of the study is to establish baseline environmental conditions of the Centennial and Indian Springs project areas. Data Quality Objectives (DQOs) will be used to accomplish the baseline environmental sampling activities such that the data acquired is valid and defensible.

The DQOs established for this baseline monitoring plan follow:

Assess the quality of data generated to assure that all data are scientifically valid and of known and documented quality. This is largely accomplished by establishing acceptance limits for parameters such as precision, accuracy, completeness, representativeness, and comparability, and by testing generated data against acceptance criteria established for these parameters.

Achieve an acceptable level of confidence in the decisions that are made from data by controlling the degree of total error permitted in the data using quality control (QC) checks. Data that fail the QC checks or do not fall within the acceptance criteria established will be evaluated for usability in meeting project objectives during data review.

Standard operating procedures (SOPs –see Appendix A) for field sampling, sample custody, equipment operation and calibration, laboratory sample analysis, data reduction, and data reporting will assure the consistency and thoroughness of data generation and meet DQO's.

3.2 Project Organization

This section presents the organizational structure for pre-operational sampling and analysis.

3.2.1 Consultant Project Manager

R^2 has assigned George M.L. Robinson to serve as the consulting project manager (CPM) for the permitting and licensing efforts, including the execution of the baseline monitoring plan. He will be responsible for all facets of the sampling and analysis

program. Mr. Robinson has over 30 years experience in providing engineering and environmental services to natural resource industries, including experience in permitting uranium recovery facilities. He will have the overall responsibility for performing the work required to obtain the necessary licenses and permits on time, within budget, and within the quality standards defined for the project. This includes executing the baseline environmental monitoring plan. Mr. Robinson will report to Powertech's project manager (PM), Mr. Lane Douglas.

3.2.2 Health/Safety and Radiation Safety Officer

Steve Brown, CHP will serve as the project Health and Radiation Safety Officer. In this capacity, he will review and approve SOPs related to the collection of radiological baseline data and review and validate radiological sampling results. Mr. Brown is certified by the American Board of Health Physics and has over 35 years of experience in the Uranium industry. The project Site Specific Health and Safety Plan provides additional information and requirements regarding to industrial and radiation safety programs and procedures.

3.2.3 Field Manager/Site Health and Safety Supervisor

Patricia Spaine will serve as the Field Manager and Site Health and Safety Officer (SHSO). She will report directly to the CPM and will be responsible for the personnel working in the field. Her specific responsibilities include the following:

- Oversee the implementation of the field sampling and health and safety
- Ensure that all field activities adhere to this SAP and associated SOPs
- Inform the CPM of any decisions that involve changes to the SAP

She will also be responsible to the CPM for the required progress reports, tracking the field budget against the milestones set forth in the scope of work, requesting change orders, and all other matters relating to the implementation of the baseline monitoring plan. The CPM will act as the sole interface between Powertech and R^2 unless otherwise directed by the CPM.

3.2.4 Field Crew

The Field Crew will implement sample collection, handling, storage, and shipping activities among others. They will maintain the field sampling logs and notebooks and will be responsible for properly labeling sample containers. They will also obtain the

required safety training and read and understand the health and safety and quality assurance plans.

All field crew members will report to the Site Manager. It is the responsibility of field staff to notify the Site Manager of any problems or potential changes to the SAP.

3.2.5 Data Management

Jim Budde will serve as the data management coordinator for the project. Validated data will be stored in a relational data base that is accessible to approved project staff via the World Wide Web. Mr. Budde will also assure that the project web site/FTP site is the central hub for project information exchange. In addition to maintaining the project bulletin board, Mr. Budde in collaboration with the CPM will post general information on project status and will post project news and house all project data. Authorized project personnel will have space on the web site where project data will be posted for use by others. The site will be secure; the CPM will control access codes so that only authorized personnel can access the downloadable "read-only" data. In addition, at Powertech's discretion, a public-access web site will be created or supported where approved information will be made available to the public.

3.2.6 Laboratory Services

Energy Laboratories Inc. (ELI) of Casper, Wyoming will perform soil, water and sediment analyses. Analyses conducted by ELI will be in accordance with EPA methodology as defined in *Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020* or *Standard Methods for the Examination of Water and Wastewater, 20th Edition, EPA SW-846*, and *40 Code of Federal Regulations (CFR) 136*. Mr. Roger Garling will be the ELI Project Manager.

3.3 Field Sampling Procedures

Specific field sampling procedures for groundwater, domestic water, surface water, radionuclide particulate in air, radon in air, surface soil, and subsurface soil sampling as well as direct radiation and radon flux measurements are described in the following SOPs which are provided in Appendix A.

3.4 Analytical Methods and Procedures

3.4.1 Laboratory Analytical and Measurement Procedures

Laboratory analytical and measurement procedures will be provided to the CPM by ELI.

3.4.2 Method Detection Limits and Method Reporting Limits

Reporting limits for constituents of interest are provided in Tables 2.2 through2.6.

3.4.3 Sample Preservation, Containers, and Holding Times

This section summarizes the proper sample preservatives, containers, and holding times for each analysis. Tables 2.2 through 2.6 summarize the information contained in this section and include the sample holding times for each analysis.

Certified, commercially clean sample containers will be obtained from ELI. If appropriate, the bottles will be labeled by the laboratory to indicate the type of sample to be collected. Required preservatives will be added to the bottles by ELI for aqueous analyses in the field.

Samples will be stored on ice in an insulated cooler immediately following sample collection to maintain a temperature of less than or equal to 4°C. Soil and sediment samples do not require additional preservation. As noted above, sample containers and the appropriate preservatives for aqueous samples will be obtained from ELI.

The holding time is specified as the maximum allowable time between sample collection and analysis and/or extraction, based on the analyte of interest, stability factors, and preservation methods. Allowable holding times for chemical analysis parameters are listed in Table 2.2 through 2.6. Samples will be sent to the laboratory after collection in sufficient time to allow the laboratory to meet holding time requirements.

3.4.4 Sample Preparation

Samples will be prepared for analyses in accordance with EPA methodology as defined in *Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020* or *Standard Methods for the Examination of Water and Wastewater, 20th Edition, EPA SW-846*, and *40 Code of Federal Regulations (CFR) 136*. Sample preparation requests will be noted on the chain of custody form.

3.5 Quality Control Checks

3.5.1 Internal

Field personnel will review and verify 100 percent of the data generated in the field. The CPM will be responsible for ensuring field and laboratory data is validated and verified in accordance with SOP 28, "Analytical Data Validation".

3.5.2 External

ELI will be responsible for reviewing and validating data generated at the laboratory.

4.0 DATA VALIDATION, REDUCTION, AND REPORTING

Data validation, reduction, management, and reporting procedures as well as data/information exchanges must ensure that complete documentation is maintained, transcription and reporting errors are minimized, and data including that received from laboratories are properly verified and validated.

4.1 Data Validation

The analytical data review process for chemical analyses to be conducted will consist of two levels of review. The analytical laboratory performs the first level of review. The laboratory review program is designed to ensure that the laboratory has provided analytical data of known and acceptable quality. The second level of review is the responsibility of the CPM. The review of data packages received from the laboratory is designed to evaluate whether the data generated are of sufficient quality for their intended use. The data validation process will be used to make an overall assessment of the data set and the usability of each analytical result. SOP 28 describes procedures to be used to conduct an independent review of environmental analytical laboratory data.

4.2 Data Reduction

4.2.1 Non-Laboratory Data Reduction

The procedures below describe steps for verifying the accuracy of data reduction. Data will be reduced either manually on calculation sheets or by computer. The following responsibilities will be delegated in the data reduction process:

Technical personnel will document and review their own work and are accountable for its correctness.

Major calculations will receive both a method and an arithmetic check by an independent checker. The checker will be accountable for the correctness of the checking process.

The CPM will be responsible for assuring that data reduction is documented and performed in a manner that produces quality data through review and approval of calculations.

As data are reduced, care shall be taken so that critical data are not lost.

4.2.2 Laboratory Data Reduction

The specific data reduction, verification, and reporting procedures and assigned personnel vary between laboratories; however, equivalent procedures must be performed by each laboratory to assure that accurate and consistent data handling, review, and reporting are achieved.

The laboratory analyst performing analyses is responsible for the reduction of raw data generated at the laboratory bench to calculate sample concentrations, and his name will be indicated with laboratory data. The data reduction procedures are described in the laboratory's method SOPs, which will be furnished to the CPM. For many methods, data reduction software is included with the instrument or Laboratory Information Management System (LIMS). In those cases, the analyst must verify that the data reduction was correct. The system may require manual manipulation to correctly calculate sample concentrations. All manual manipulations must be documented.

The analytical process includes verification or a QA review of the data. Specific requirements, acceptance criteria, and corrective actions for each analysis are included in the analytical method. The QC checks are reviewed at several levels by laboratory analysts, supervisors, designated QC specialists, document control staff, or by a combination of the above. After the data have been reviewed and verified, the laboratory reports are signed by QA reviewer or team members and retained by the laboratory project manager in his or her permanent project files.

Laboratories should use a LIMS to electronically track and report sample and QC data. The data are reported electronically from the LIMS to the project staff using pre-established formats. The LIMS files must also undergo a QC check under the direction of the responsible project manager to verify that the results are complete and correct, and that the files are properly formatted.

4.2.3 Data Reporting

Personnel will record sampling activities in accordance to SOP 27, "Note taking and log book entries." ELI will be responsible for reporting laboratory data under its standard operating procedures. Data will be provided to data recipients within 30 days of receipt of the last

sample for a sampling event. Data will be reported in the standard laboratory reporting format in both hard copy and electronic data deliverable (EDD) files.

Appendix A

Sampling and Analysis Plan
Applicable Standard Operating Procedures