POWERTECH (USA) INC.

JOHN M. MAYS
Chief Operating Officer

September 25, 2014

Mr. Ronald A. Burrows, Project Manager
Office of Federal and State Materials and
Environmental Management Programs
U.S. Nuclear Regulatory Commission
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852
SENT VIA EMAIL

Re: Response to Completeness Review Comments
Portions of Restoration Action Plan (RAP) Addressing License Condition (LC) 12.23
Dewey-Burdock Project; Docket No. 40-9075; SUA-1600

Dear Mr. Burrows:

Powertech (USA) Inc. (Powertech) hereby submits the following responses to the completeness review comments dated September 2, 2014, regarding information in the RAP addressing LC 12.23 (ML14247A184). Following are the completeness review comments in bold, italics followed by Powertech's responses. Attached are a change index and RAP replacement pages.

Information in RAP Section 3.2

Comment: ***In Section 3.2 of the RAP (Pre-Reclamation Radiological Surveys), Powertech relies on a known relationship between gamma radiation levels and radionuclide concentrations in soil. However, as previously communicated to Powertech (refer to ML13343A116), Powertech has not demonstrated that Ra-226 soil concentrations are correlated with gamma dose rates. In addition, no other radionuclide soil concentrations (e.g., U-nat) have been demonstrated to be correlated with gamma dose rates.***

5575 DTC Parkway, Suite 140
Greenwood Village, CO 80111 USA
Telephone: 303-790-7528
Facsimile: 303-790-3885
Website: www.powertechuranium.com
Email: info@powertechuranium.com

Response: Powertech understands that LC 12.11 requires submittal, no later than 30 days prior to construction, of additional statistical analysis of the soil sampling data and gamma measurements to establish sufficient statistical relationships. Powertech is committed to submitting the additional statistical analysis as required by LC 12.11. Section 3.2 of the RAP has been revised to clarify that the pre-decommissioning radiological surveys will be used as a tool to focus soil sampling efforts and not to evaluate whether land areas meet the site soil cleanup criteria.

With respect to correlating other radionuclides (specifically U-nat) with gamma dose rates, Section 3.2 of the RAP has been revised to indicate that the nominal minimum detectable concentration (MDC) for U-nat in soil using the planned radiological survey instruments is much lower than the established cleanup level, as recommended by MARSSIM. Further, Powertech commits to establishing site-specific MDCs for U-nat and other radionuclides, if necessary, in the Decommissioning Plan.

Information in RAP Sections 3.6 and 5.0

Comment: ***Sections 3.6 (Surface Soil Cleanup Verification and Sampling Plans) and 5.0 (Radiological Survey and Environmental Monitoring) rely on gamma surveys to guide soil remediation efforts. As indicated above, Powertech has not demonstrated that concentrations of Ra-226 or other radionuclides in soil are correlated with gamma dose rates. Therefore, it is not clear to the NRC staff how remediation efforts will be evaluated for principal radionuclides.***

Response: Again, Powertech is committed to submitting the additional statistical analysis required by LC 12.11 in accordance with the timing requirements in LC 12.11. Sections 3.6 and 5.0 of the RAP have been updated to indicate that radiological surveys will be used as a tool to focus soil sampling efforts and not to evaluate whether land areas meet the site soil cleanup criteria.

Information in RAP Section 3.8

Needed: ***Please define the terms "ephemeral" and "intermittent" as used in the Powertech RAP.***

Response: Section 3.8 of the RAP has been updated to clarify that (1) there are no intermittent stream channels in the license area, and (2) Powertech does not plan to disturb Pass Creek, which is considered an ephemeral stream channel within the license area.

South Dakota defines perennial, intermittent and ephemeral stream channels in the Administrative Rules of South Dakota (ARSD) 74:29:01:01 as follows:

- Perennial stream channel: a stream or reach of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff
- Intermittent stream channel: a stream or reach of a stream that flows for at least some part of the year and obtains its flow from both surface runoff and groundwater discharge
- Ephemeral stream channel: a stream or reach of a stream that flows only in direct response to precipitation in the immediate watershed or to the melting of a cover of snow or ice

Beaver Creek is the only perennial stream channel in the license area. Portions of Pass Creek upstream of the license area may be considered intermittent, but Powertech considers the portion of Pass Creek within the license area as an ephemeral stream, since there is no groundwater component and flows occur only in response to precipitation or snowmelt events. All tributaries of Beaver Creek and Pass Creek within the license area are ephemeral stream channels for the same reasons.

The first paragraph in Section 3.8 of the RAP has been revised to indicate that Powertech does not plan to disturb the only perennial stream channel in the license area (Beaver Creek), nor does Powertech plan to disturb Pass Creek, which is considered to be an ephemeral stream channel within the license area.

Needed: ***Please provide clarification on access roads in regards to the placement of culverts and the removal of culverts during reclamation.***

Response: Culverts will be provided in locations where access roads cross ephemeral stream channels. The culverts will be sized and constructed in accordance with SD DENR requirements to avoid plugging, collapsing and minimize erosion at the inlet and outlet of the culverts. During access road reclamation, culverts will be

removed and the stream channel geometry restored to approximate original condition.

The second paragraph in Section 3.8 on the RAP has been revised to describe how culverts that are sized and constructed in accordance with SD DENR requirements will be provided where access roads cross ephemeral stream channels, and that the culverts will be removed during decommissioning and the original stream channel geometry restored to approximate original condition.

Needed: ***In regards to the discussion on diversion channels, please address any dams or weirs built across streams.***

Response: The third paragraph in Section 3.8 of the RAP has been revised to clarify that "dikes or berms" refer to earthen embankments used to divert ephemeral flows into diversion channels. During reclamation all earthen embankments that were placed across the original stream channel (including dikes, berms or sediment pond embankments), will be removed and the stream channel geometry restored to approximate original condition.

We hope these comment responses and the enclosed replacement pages clarify the completeness issues identified in your September 2, 2014 review. Should there be any questions or concerns regarding this transmittal, please contact me at your earliest convenience.

Sincerely,

John Mays

John Mays, P.E.
Chief Operating Officer

Encl: Change Index
RAP Replacement Pages

cc: R. Clement, Powertech (USA) Inc.
R. Blubaugh, Powertech (USA) Inc.
L. Scheinost, Powertech (USA) Inc.
J. Fritz, WWC Engineering

Dewey-Burdock Project
Restoration Action Plan
Revision Index

Response to September 2, 2014 Completeness Review Comments

Page(s) to Be Removed	Page(s) to Be Added	Description of Change
6.6-A-iii	6.6-A-iii	Updated Table of Contents for Section 3.3.
6.6-A-14	6.6-A-14, 14a	Revised Section 3.2 to commit to establishing site-specific MDCs in the Decommissioning Plan. Also revised to clarify that pre-decomissioning radiological surveys will be used as a tool to focus soil sampling efforts and not to evaluate whether land areas meet the site soil cleanup criteria.
6.6-A-17, 18	6.6-A-17, 17a, 18	Revised Section 3.6 to reference commitment to establish site-specific MDCs in the Decommissioning Plan. Also revised to clarify that radiological surveys will be used as a tool to focus soil sampling efforts and not to evaluate whether land areas meet the site soil cleanup criteria. Revised Section 3.8 to clarify that Powertech does not plan to disturb the only perennial stream channel in the license area (Beaver Creek), nor does Powertech plan to disturb Pass Creek, which is considered to be an ephemeral stream channel within the license area. Also revised to describe culvert design, construction and removal. Also revised to clarify reclamation procedures for any earthen embankments placed in ephemeral stream channels, including dikes, berms or sediment ponds.
6.6-A-19	6.6-A-19	Revised Section 5.0 to reference commitment to establish site-specific MDCs in the Decommissioning Plan. Also revised to clarify that radiological surveys will be used as a tool to focus soil sampling efforts and not to evaluate whether land areas meet the site soil cleanup criteria.

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different background radionuclide concentration is warranted, it will propose one with its final decommissioning plan.

3) Attachment RAP-5 presents the modeling and assumptions used to derive a standard for thorium-230 in soil. The thorium-230 soil standard is 165 pCi/g.
4) TR Section 6.4.1.2 presents the modeling and assumptions used to derive a standard for natural uranium in soil. The natural uranium soil standard is 537 pCi/g.
5) Lastly, the survey method for cleanup operations, derived from MARSSIM, will be designed to provide 95% confidence that any residual radionuclides on the project area will be identified and cleaned up. Powertech (USA) will apply appropriate statistical tests for analysis of survey data.

A potential limitation of the pre-reclamation radiological survey using gamma radiation detectors as described above is the ability to detect process-impacted land areas where the presence of gamma emitting radionuclides are limited or absent. An example would be land areas impacted by material containing predominantly natural uranium such as yellowcake or uranium-rich solutions. Land impacts from these materials are unlikely, since tanks and processing equipment will be located within secondary containment structures. Nevertheless, an assessment of the ability of the pre-reclamation radiological survey to detect the cleanup level for natural uranium is evaluated below.

The soil cleanup level for natural uranium in soil is 537 pCi/g based on the radium benchmark dose evaluation in TR Section 6.4.1.2. Table 6.7 of MARSSIM provides some typical scan Minimal Detectable Concentrations (MDCs) for 2" by 2" NaI detectors for a variety of radionuclides in soil. For natural uranium, the nominal MDC is approximately 80 pCi/g. This is well below the cleanup level for natural uranium and meets the recommendation within Section 6.2.2.6 of MARSSIM to have scanning measurement techniques capable of measuring levels below 50% of the established cleanup levels. Powertech (USA) understands these scanning MDCs are not specific to the site but expects site-specific MDCs to be well below the natural uranium soil cleanup level as well since similar equipment is intended to be used. Site-specific, *a priori* scanning MDCs for natural uranium and other radionuclides, if necessary, will be presented in the final Decommissioning Plan, which will be submitted to the NRC no less than 12 months prior to any planned decommissioning.

The pre-reclamation radiological survey is intended to be used as a tool, coupled with operational reports and descriptions of spills or releases, if any, to 1) identify areas potentially

affected by licensed activities, 2) provide information on how to classify or re-classify land areas as described in Section 4.4 of MARSSIM, as applicable, and 3) to focus soil sampling efforts.

The pre-reclamation radiological survey will not be used to evaluate whether land areas meet the site soil cleanup criteria This decision will be based on definitive soil concentration data reported by a third party laboratory. The soil sampling strategy and design to demonstrate that site soil cleanup criteria have be met will be provided in the final Decommissioning Plan, which will be submitted to the NRC no less than 12 months prior to any planned decommissioning.

3.3 Removal of Process Buildings and Equipment

Powertech (USA) will develop plans for the strategic removal of process building and equipment, based on inventory, the results of the radiological surveys, decontamination options and available methods, reuse/disposal pathways, and information obtained during the effort. This will include the use of an approved standard operating procedure (SOP) for release of items to unrestricted use and thoroughly documenting all items eligible for release to unrestricted use. This SOP will incorporate methods described in Section 6.6 and 6.7 of NUREG-1575, Rev 1, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," including equations to calculate Minimum Detectable Concentrations (MDCs) and Scan MDCs to ensure the equipment being used has adequate detection sensitivity to make decisions regarding release. To the extent possible, Powertech (USA) intends to decontaminate salvageable equipment for unrestricted release. Decontamination methods may include a combination of washing, high pressure sprays, or steam cleaning. Cleaned surfaces will be air-dried prior to radiological monitoring. The ALARA principle applies to decommissioning activities. As such, surface contamination will be reduced to levels as far below applicable limits as practical.

Powertech (USA) will document the results of radiological surveys for all building materials, systems, and equipment. These items will be sorted as follows:

- Salvageable and contaminated above release limits (not releasable but potentially disposable or transferrable),
- Salvageable and contaminated below release limits (releasable) for unrestricted use,
- Not salvageable and contaminated above release limits (offsite disposal at a facility licensed to accept 11e.(2) byproduct material), and

material and equipment, and areas associated with liquid waste disposal. Consistent with NUREG-1569, Acceptance Criterion 6.4.3(5), the survey method for verification of soil cleanup will be designed to provide 95% confidence that the survey units will meet the cleanup guidelines. See Section 3.2, which describes Powertech (USA)'s commitment to establish site-specific scanning MDCs for field survey instruments in the final Decommissioning Plan. Field surveys employing gamma-ray measurements will not be used to evaluate whether land areas meet the site soil cleanup criteria. This decision will be based on definitive soil concentration data reported by a third party laboratory.

A calculation of the potential peak annual total effective dose equivalent (TEDE) within 1,000 years to the average member of the critical group that would result from applying the radium standard (not including radon) on the site will be submitted to NRC for approval. Details will be provided in the decommissioning plan to be submitted for review at least 12 months prior to decommissioning activities. A key component of the plan would be that 11e.(2) byproduct material containing concentrations of radionuclides, other than radium in soil, and surface activity on remaining structures, must not result in a TEDE exceeding the dose from cleanup of radium contaminated soil to the radium benchmark dose, and must be at levels which are ALARA. Powertech (USA) is aware that the use of decommissioning plans with radium benchmark doses which exceed 100 mrem/yr, before application of ALARA, requires the approval of the Commission after consideration of the recommendation of the NRC staff.

3.7 Grading, Topsoil Replacement and Revegetation

Disturbed areas will be regraded, topsoil replaced, and revegetated according to SD DENR requirements. The seed mixture selected will be compatible with the SD DENR-approved post-reclamation land use.

3.8 Stream Channel Reclamation

Powertech (USA) does not plan to disturb the only perennial stream channel in the license area (Beaver Creek). Powertech (USA) also does not plan to disturb Pass Creek, which is considered to be an ephemeral rather than intermittent stream channel within the license area, since it does not have a groundwater flow component and flows only in direct response to precipitation or snow melt events. Although one or more plant-to-plant pipelines may be

constructed across Pass Creek, it is anticipated that these would be bored underneath the creek and would not result in any surface disturbance of the ephemeral stream channel. The instances where stream channels are anticipated to be disturbed are for the installation of pipelines, access roads, sediment ponds, and diversion channels on tributaries to Beaver Creek or Pass Creek, which are all ephemeral stream channels.

Pipelines and access roads will cross ephemeral stream channels perpendicular to the flow direction as practicable to minimize disturbance. Culverts will be provided where access roads cross ephemeral stream channels. Culverts will be sized and constructed in accordance with SD DENR requirements to avoid plugging and collapsing, and to minimize erosion at the culvert inlets and outlets. Interim revegetation will be used to stabilize disturbed areas that are scheduled to be re-disturbed during final site decommissioning. Except for the installation of culverts, the stream channel geometry will not be affected by access road and pipeline crossings. During reclamation, culverts will be removed, the original stream geometry channel will be restored to approximate original condition, and all disturbed areas will have topsoil replaced and will be revegetated according to SD DENR requirements.

During the reclamation of diversion channels and sediment ponds, spoil that was stockpiled during construction will be replaced in lifts and compacted as necessary to match the original topography. Earthen embankments that were placed across the original stream channel (including dikes or berms used to divert ephemeral flows into the diversion channels and sediment pond embankments) will be removed and the stream channel geometry restored to approximate original condition. Topsoil that was stockpiled during construction will be redistributed over the disturbed area and graded to blend with the adjacent topography as required by SD DENR. Following topsoil replacement, disturbed areas will be revegetated according to SD DENR requirements.

4.0 WELL FIELD RECLAMATION

Decommissioning and reclamation of the well fields will include removal of the header houses and all pipes and utilities connecting the wells to the header houses and the CPP or SF, disposing of these materials in an appropriately permitted landfill or licensed 11e.(2) byproduct disposal site as appropriate, and reclaiming the surface as described for the other surface facilities.

4.1 Well Plugging and Abandonment

Prior to plugging, each well will undergo mechanical integrity testing (MIT) to demonstrate the integrity of casing and cement that will be left in the ground after closure. Alternatively, cementing records or other evidence (such as cement bond logs) will be used to show that an adequate quantity of cement is present to prevent upward fluid movement within the borehole outside of the casing.

Powertech (USA) will plug all wells with bentonite or cement grout. The weight and composition of the grout will be sufficient to control artesian conditions and meet the well abandonment standards of the State of South Dakota, including Chapter 74:02:04:67 (Requirements for Plugging Wells or Test Holes Completed into Confined Aquifers or Encountering More than One Aquifer) of the South Dakota Administrative Rules. Cementing

will be completed from total depth to surface using a drill pipe. Records will be kept of each well cemented including at a minimum the following information:

- well ID, total depth, and location,
- driller, company, or person doing the cementing work,
- total volume of cement placed down hole, and
- viscosity and density of the slurry used.

Powertech (USA) will remove surface casing and set a cement plug to a depth 6 ft below the ground surface on each well or borehole plugged and abandoned.

5.0 RADIOLOGICAL SURVEY AND ENVIRONMENTAL MONITORING

Gamma surveys will be relied on to guide soil remediation efforts. At least 12 months prior to commencing reclamation, Powertech (USA) will submit a decommissioning plan that will contain descriptions of methodology for both pre- and post-reclamation gamma ray surveys. It will also include site-specific scanning MDCs for field survey instruments as described in Section 3.2. The gamma ray surveys for excavation control monitoring and final cleanup status will be designed to be consistent with NUREG-1569, Acceptance Criteria 6.4.3(1), 6.4.3(3) and 6.4.3(5), including the use of a methodology for gamma-ray surveys for excavation control monitoring and final status surveys that will provide 95% confidence that the survey units will meet the cleanup guidelines. As described in Section 3.2, field surveys employing gamma-ray measurements will not be used to evaluate whether land areas meet the site soil cleanup criteria. This decision will be based on definitive soil concentration data reported by a third party laboratory.

The pre-decommissioning radiological survey will consist of an integrated area gamma survey and confirmation soil sampling and analysis to verify that the required cleanup standard(s) are met. The areas that will receive particular attention are those that are expected to have higher readings than surrounding areas and include diversion ditches, surface impoundment areas, well fields (particularly those areas where spills or leaks may have occurred), process structures, storage areas, and on-site transportation routes for contaminated material and equipment. Areas associated with liquid waste disposal will also receive close attention. The surveys will identify soil contamination that exceeds the cleanup criteria and will be used to guide the cleanup efforts. After cleanup, the surveys will be used, in conjunction with surface soil sample analyses, to verify cleanup to the site cleanup criteria. Gamma surveys and action levels are discussed in more detail in TR Section 6.4.2.