

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)	
)	Docket No.: 40-9075-MLA
POWERTECH (USA), INC.)	Date: January 9, 2015
(Dewey-Burdock In Situ Uranium Recovery Facility))	

**POWERTECH (USA), INC'S PROPOSED FINDINGS OF FACT AND
CONCLUSIONS OF LAW**

Pursuant to 10 CFR § 2.1209 and the Atomic Safety and Licensing Board's (Licensing Board) Order Setting Briefing Dates dated December 10, 2014, the licensee Powertech (USA), Inc. (Powertech) hereby submits these proposed findings of fact and conclusions of law in the above-captioned proceeding. This proceeding involves seven (7) admitted contentions related to potential concerns associated with Powertech's United States Nuclear Regulatory Commission (NRC)-licensed Dewey-Burdock *in situ* leach uranium recovery (ISR) project in the State of South Dakota. These proposed findings support NRC Staff's issuance of Powertech's requested license and its accompanying record of decision (ROD) under 10 CFR Parts 40 and 51 and other applicable regulations, criteria, and guidance, as well as construction and operation of the Dewey-Burdock ISR Project.

I. INTRODUCTION

1.1. These findings and conclusions address the license application submitted by Powertech and NRC Staff's ROD authorizing the construction and operation of the Dewey-Burdock ISR Project in the State of South Dakota.

1.2. For the reasons set forth below, Powertech supports NRC Staff's issuance of a source and byproduct materials license under the Atomic Energy Act of 1954, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) (collectively the "AEA"), and asserts that none of the admitted contentions in this proceeding provide adequate evidence to warrant modification of the ROD or its associated decision documents.

II. BACKGROUND

2.1. Under the AEA and the Commission's implementing regulations at 10 CFR Part 40 and Appendix A Criteria, an entity seeking to construct and operate a source material (uranium) recovery project, such as an ISR facility, is required to submit an application for an initial operating license to possess and use such source material and 11e.(2) byproduct material generated by such project. Under NRC regulations, these combined source and 11e.(2) byproduct materials licenses are valid for a period of ten (10) years and, at that time, must be renewed.

2.2. NRC regulations at 10 CFR Part 40 and Appendix A Criteria require the submission of a detailed technical report (TR) addressing resource areas related to potential health and safety issues at facilities allowing possession and use of source and/or 11e.(2) byproduct material. NRC regulations at 10 CFR Part 51 also require a detailed environmental report (ER) addressing resource areas related to potential impacts to the environment pursuant to the National Environmental Policy Act of 1969 (NEPA).

2.3. NRC Staff's interpretation of these regulations addressing compliance with applicable safety and environmental requirements are contained in multiple guidance documents, including most notably, NUREG-1569 entitled *Standard Review Plan for In Situ Leach Uranium Extraction License Applications* (NUREG-1569)¹. The acceptance criteria in NUREG-1569 are intended to apply to both safety and environmental requirements under the aforementioned regulations.

2.4. NRC Staff's interpretation of the format and resource areas for an appropriate ER is contained in NUREG-1748 entitled *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NUREG-1748)².

2.5. Pursuant to 10 CFR § 51.20(b)(8), NRC Staff is required to evaluate the potential environmental impacts for a proposed ISR project, such as Powertech's Dewey-Burdock ISR Project, with an environmental impact statement (EIS) or supplemental environmental impact statement (SEIS).

2.6. For new ISR operating license applications, NRC Staff has created a programmatic or generic environmental impact statement (GEIS) in NUREG-1910 entitled *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities*³. This GEIS is intended to serve as a programmatic document off of which site-specific SEISs will be tiered. To date, NRC Staff has prepared and finalized five (5) site-specific SEISs or supplements to the GEIS.

2.7. Pursuant to this regulatory program, on February 25, 2009, Powertech submitted a license application for a combined source and 11e.(2) byproduct materials license to construct and operate its proposed Dewey-Burdock ISR Project in South Dakota.

¹ NRC Staff Exhibit NRC-013.

² NRC Staff Exhibit NRC-014.

³ NRC Staff Exhibit NRC-010-A-1 through NRC-010-B-2.

2.8. After completing its ninety day acceptance review, NRC Staff determined that Powertech's Dewey-Burdock license application required additional data and information prior to docketing it for detailed technical and environmental review. As a result, on June 19, 2009, Powertech voluntarily withdrew its license application pending re-submission of the required additional data and information.

2.9. On August 10, 2009, Powertech re-submitted its Dewey-Burdock license application with the additional data and information requested by NRC Staff. Powertech's resubmission of its license application provided additional data and information on some specific items such as breccia pipes, the Morrison Formation, location of proposed facilities, wastewater management, and existing wells. After completion of a second acceptance review, NRC Staff determined that Powertech's Dewey-Burdock license application was acceptable for detailed technical and environmental review and it was docketed on October 2, 2009.

2.10. After the Dewey-Burdock license application was made publicly available, on January 5, 2010, NRC Staff issued a Federal Register notice providing interested stakeholders and other members of the public with an opportunity to request a hearing on the application and to request access to sensitive unclassified non-safeguards information (SUNSI) associated with such application.⁴ SUNSI information in this instance dealt with historic and cultural resources information deemed confidential under 10 CFR § 2.390(a)(3).

2.11. On January 15, 2010, counsel for Petitioners submitted a request for access to SUNSI documentation. After reviewing this request, NRC Staff determined that Petitioners were not entitled to access to the SUNSI documentation.

2.12. On February 26, 2010, Petitioners submitted a motion for a ninety (90) day extension of time to file their request for a hearing based on a number of factors including a lack

⁴ See 75 Fed. Reg. 467 (January 5, 2010).

of time to review the Dewey-Burdock license application. On March 3, 2010, both Powertech and NRC Staff filed responses in opposition to Petitioners' motion and, on March 5, 2010, the Commission determined that Petitioners were not entitled to an extension of time.

2.13. On March 12, 2010, the Commission established an Atomic Safety and Licensing Board Panel (Licensing Board). On March 8, 2010, and April 6, 2010, Consolidated Intervenors (CI) and the Oglala Sioux Tribe (hereinafter the "Tribe") submitted requests for a hearing and proposed contentions. On April 12 and May 3, 2010, Powertech and NRC Staff submitted responses to CI's and the Tribe's requests respectively and argued that most, if not all, of the proffered contentions were not admissible under NRC regulations at 10 CFR Part 2.309.

2.14. On June 8 and 9, 2010, the Licensing Board conducted oral argument in Custer, South Dakota, where all parties' arguments on standing and admissible contentions were heard. In this proceeding, CI's and the Tribe's hearing requests proffered approximately twenty-one (21) contentions that raised a variety of safety and environmental issues of concern regarding Powertech's license application.

2.15. On August 5, 2010, the Licensing Board issued LBP-10-16 in which CI and the Tribe each were granted standing to intervene and several contentions for both parties were admitted. More specifically, the Licensing Board admitted several contentions related to historic and cultural resources, adequacy of baseline groundwater quality data, hydrogeological confinement in aquifers within which the proposed Dewey-Burdock Project is to occur, and groundwater consumption.

2.16. After an October 15, 2010, Joint Notice was filed by the parties, the Licensing Board agreed to delay discussions regarding merging the CI and Tribe contentions and thus the contentions remained as admitted on August 5, 2010: (1) CI Contention D (groundwater quality),

(2) CI Contention E (hydrogeological information), (3) CI Contention K (historic and cultural resources), (4) Tribe Contention 1 (historic and cultural resources), (5) Tribe Contention 2 (groundwater quality), (6) Tribe Contention 3 (hydrogeological information), and Tribe Contention 4 (groundwater quantity impacts).

2.17. On January 20, 2010, NRC issued a Federal Register notice indicating its Notice of Intent to prepare an SEIS for the proposed Dewey-Burdock Project.⁵ As part of the SEIS preparation process, NRC Staff contacted the United States Bureau of Land Management (BLM) and, per letter dated November 22, 2011, BLM agreed to serve as a cooperating agency and requested that NRC be designated as the lead agency for preparation of what would eventually become the Powertech FSEIS. By joining as a cooperating agency, BLM contributed expertise on a variety of resource areas including historic and cultural resources, land use, soils, and endangered species.

2.18. On May 19 and 28, 2010, NRC Staff issued requests for additional information (RAI) on its safety review of Powertech's technical report (TR). On April 14, 2010, NRC Staff issued its RAI on its environmental review of Powertech's environmental report (ER). On June 28, 2011 and August 12, 2010, respectively, Powertech submitted final responses to NRC Staff's RAIs regarding the ongoing safety and environmental reviews. These documents were made publicly available on NRC's ADAMS database on August 29, 2011 (ML112071064) and September 9, 2010 (ML102380530) respectively. Neither CI nor the Tribe filed a request for admission of a new or amended contention on any of Powertech's RAI responses.

2.19. On March 18, 2013, NRC Staff issued its Safety Evaluation Report (SER) detailing the analyses and conclusions of its safety review for all resource areas for the Project, including but not limited to groundwater quality and quantity issues. NRC Staff's final

⁵ See 75 Fed. Reg. 3261 (January 20, 2010).

conclusion regarding the safety review was that, absent an environmental concern to the contrary, Powertech's requested license should be issued as adequately protective of public health and safety. *See* NRC Exhibits NRC-134 and NRC-135. Neither CI nor the Tribe filed a request for a new or amended contention on the SER.

2.20. On November 26, 2012, NRC Staff issued the DSEIS for the Dewey-Burdock Project for public comment. By rule, CI and the Tribe were entitled to thirty (30) days to file new or amended contentions. In compliance with this opportunity and after receiving an extension from December 31, 2012 to January 25, 2013, both CI and the Tribe filed requests to admit several new or amended contentions. On March 11 and 7, 2013, respectively, both Powertech and NRC Staff submitted responses to these requests opposing the admission, amendment or migration of any new/amended contentions. On March 25, 2013, CI and the Tribe submitted replies to such responses.

2.21. On July 22, 2013, the Licensing Board issued LBP-13-09 granting the admission of three (3) new contentions to the proceeding regarding mitigation measures (Contention 6), connected actions (Contention 9), and Endangered Species Act consultation and impact analysis (Contentions 14A/B). The Licensing Board also rejected several contentions, many of which were brought forward from previous contentions on Powertech's license application, and consolidated the CI and Tribe contentions on related issues.

2.22. On January 29, 2014, NRC Staff issued the FSEIS which stated that, absent a safety-related concern to the contrary, its recommendation was that Powertech's requested license should be issued. *See* NRC Staff Exhibits NRC-008-A & 008-B. The FSEIS included an assessment of the environmental aspects of groundwater, hydrogeology, wildlife and historic and cultural resources at the Dewey-Burdock site, as well as mitigation measures.

2.23. Based on the FSEIS, on March 17, 2014, both CI and the Tribe submitted a request to admit new/amended contentions, including migration of existing admitted contentions, to the FSEIS. On April 4, 2014, both Powertech and NRC Staff submitted responses to these requests and, on April 11, 2014, both CI and the Tribe submitted replies to these responses.

2.24. On April 28, 2014, the Licensing Board issued LBP-14-5 allowing the previously admitted contentions to migrate from the DSEIS to the FSEIS with no changes in the substance of such contentions.

2.25. On July 15, 2014, the Licensing Board issued an Order granting the Tribe's request to voluntarily withdraw Contentions 14A/B. As a result, the complete list of contentions in this proceeding is detailed in Appendix A of the July 16, 2014, Notice of Evidentiary Hearing issued by the Licensing Board.

2.26. On April 8, 2014, NRC Staff issued notice to the Licensing Board that it had issued Powertech NRC License No. SUA-1600, stating that "the Staff finds that the application complies with the Atomic Energy Act and the NRC's regulations....The Staff has considered the safety-related arguments raised by the Intervenors in the hearing, but those arguments do not affect the conclusions in the Safety Evaluation Report."⁶ The license allows Powertech to possess and use source and byproduct materials in connection with the Dewey-Burdock Project.

2.27. Included in the ROD issued by NRC Staff was the Programmatic Agreement (PA), which was the culmination of the NHPA Section 106 compliance process for which NRC served as the lead agency. The PA was executed by the Advisory Council on Historic Preservation (ACHP) on April 7, 2014 and signed by NRC Staff, BLM, the South Dakota State Historic Preservation Office (SHPO) and Powertech. *See* NRC Staff Exhibits NRC-018-A through 18-H.

⁶ *See* ML14098A492.

2.28. On April 11, 2014, both NRC Staff and the Tribe submitted Motions for Summary Disposition of certain contentions or portions thereof. NRC Staff's summary disposition motion sought disposition of the safety-related components of Contentions 2 and 3 dealing with the adequacy of Powertech's groundwater quality and hydrogeological data, and the Tribe's summary disposition motion sought disposition of Contention 1A related to historic and cultural resources and Contention 6 on mitigation measures. On April 25, 2014, all parties submitted responses to these summary disposition motions with Powertech supporting NRC Staff's motion and opposing the Tribe's, NRC Staff opposing the Tribe's motion, the Tribe opposing NRC Staff's motion, and CI supporting the Tribe's motion and opposing NRC Staff's.

2.29. On June 2, 2014, the Licensing Board denied both NRC Staff's and the Tribe's summary disposition motions.

2.30. On April 14, 2014, both CI and the Tribe submitted Motions for a stay of the effectiveness of Powertech's NRC license, citing various claims associated with Powertech's and NRC Staff's review and assessment of historic and cultural resources at the Dewey-Burdock site and other claims. On April 24, 2014, both Powertech and NRC Staff submitted responses to these Motions opposing the grant of a stay of SUA-1600.

2.31. On April 30, 2014, the Licensing Board issued a temporary stay of SUA-1600 pending oral argument, which was held via teleconference on May 13, 2014. After completion of oral argument on CI's and the Tribe's motions for a stay, on May 20, 2014, the Licensing Board issued an Order lifting the temporary stay and denying a stay of the effectiveness of License No. SUA-1600.

2.32. On June 20, 2014, all parties submitted initial statements of position outlining their initial legal and factual arguments regarding all admitted contentions. These initial

statements of position included pre-filed testimony from expert witnesses on these admitted contentions and pre-filed exhibits.

2.33. On July 15, 2014, all parties submitted rebuttal statements of position and answering testimony and exhibits.

2.34. After submission of their initial and rebuttal position statements, on July 22, 2014, all parties submitted motions *in limine* to which each party submitted a response on July 29, 2014. The Licensing Board ruled on portions of the motions *in limine* on August 1, 2014, and deferred its ruling on other portions until the evidentiary hearing. In response to these motions, the Licensing Board reached final decisions regarding the admissibility of identified position statement argument and pre-filed testimony, thereby setting the stage for the evidentiary hearing.

2.35 On July 22, 2014, the Tribe submitted a motion for cross examination of Powertech's witnesses with regard to borehole log data Powertech had recently acquired. On August 1, 2014, the Licensing Board denied the Tribe's motion for cross examination.

2.36. Prior to the conduct of the evidentiary hearing, the Tribe filed a motion on August 16, 2014, to compel production of certain identified documents, including (1) borehole data referenced in Powertech's electronic mail message to the Licensing Board dated August 7, 2014 (Tribe Exhibit OST-020); (2) a "take" permit application submitted to the United States Fish and Wildlife Service (FWS) dated January 2014; (3) correspondence from the BLM dated July 8, 2014, requesting additional information regarding Powertech's Plan of Operations; and (4) a draft avian monitoring and mitigation plan. CI joined in the motion to compel during the evidentiary hearing. Powertech and NRC Staff submitted responses to the Tribe motion on August 26, 2014.

2.37. While the Tribe's motion to compel was pending, on August 18, 2014, the Licensing Board held two limited appearance statement sessions in Hot Springs, South Dakota. Members of the public were permitted to offer oral and/or written statements to the Licensing Board with counsel for all parties present. These limited appearance statement sessions were divided into two (2) three-hour sessions. Pursuant to 10 CFR § 2.315(a), limited appearance statements and information offered therein are not considered to be evidence in this proceeding.

2.38. On August 19-21, 2014, the Licensing Board held an evidentiary hearing on the remaining admitted contentions in Rapid City, South Dakota. The Licensing Board addressed the admitted contentions in three (3) separate panels of expert witnesses: (1) Panel 1 addressed historic and cultural resource issues under Contentions 1A and 1B; (2) Panel 2 addressed groundwater-related issues under Contentions 2, 3, and 4; and (3) Panel 3 addressed mitigation measures and connected actions issues under Contentions 6 and 9. During the evidentiary hearing, the Licensing Board admitted the pre-filed exhibits into evidence indicated on the exhibit list bound to the transcript of the evidentiary hearing. *See* Tr. at 713.

2.39. In addition to the three (3) aforementioned expert witness panels, on August 20, 2014, the Licensing Board heard additional oral argument on the relevancy of borehole log data discussed in a Powertech press release dated July 16, 2014 (Tribe Exhibit OST-019). At the conclusion of this oral argument, the Licensing Board ruled from the bench that the borehole log data discussed in the press release (i.e., borehole log data that Powertech recently acquired from Energy Fuels Resources (USA) Inc.) were "relevant" under 10 CFR § 2.336 and should be disclosed by Powertech.

2.40. On August 26, 2014, Powertech submitted a response to the Tribe's August 16, 2014, motion to compel. In this response, Powertech consented to disclosure of the requested

borehole log data (i.e., borehole log data that was already in Powertech's possession prior to the acquisition of additional borehole log data from Energy Fuels Resources (USA) Inc.) subject to a protective order. Powertech also argued that the requested information outside the scope of the requested borehole logs was not relevant to the admitted contentions under 10 CFR § 2.336's standard for relevance.

2.41. On September 8, 2014, the Licensing Board issued a post-hearing order containing logistical information regarding post-hearing briefs and additional data disclosure, including a directive to Powertech to disclose all of the requested data and information from the Tribe's August 16, 2014, motion to compel and additional borehole log data discussed in Powertech's August 7, 2014, electronic mail message to the Licensing Board. This Order further established a schedule for the parties to submit supplemental testimony and exhibits based on the date of disclosure of the data and information. Motions to admit additional testimony and exhibits were due within 30 days of disclosure.

2.42. On September 11, 2014, Powertech submitted a joint motion to amend the proceeding's Protective Order to include the borehole log data and documents or other information ordered to be disclosed by the Licensing Board in its September 8, 2014, post-hearing order. On September 12, 2014, the Licensing Board granted the joint motion to amend the Protective Order.

2.43. On September 12, 2014, Powertech disclosed all requested information via electronic mail, DVD or by making the information physically available at its Edgemont office. A representative of the Tribe, Dr. Hannan LaGarry, visited Powertech's Edgemont office for a period of three (3) days from September 12-14, 2014, to inspect the disclosed borehole log data. Dr. LaGarry and three assistants later returned to Powertech's Edgemont office to inspect the

disclosed borehole log data for portions of three (3) additional days on November 12, 14 and 15, 2014. On September 23, 2014, Staff from the Center for Nuclear Waste Regulatory Analyses (contractors for the NRC Staff working on the FSEIS) visited Powertech's Edgemont office to review the disclosed borehole log data.

2.44. On September 19, 2014, Powertech, NRC Staff and the Tribe submitted proposed transcript corrections to the Licensing Board for its consideration. On September 30, 2014, the Licensing Board issued an order adopting the transcript corrections set forth in Appendix A of its September 30, 2014 order.

2.45. On October 9, 2014, CI and the Tribe submitted a joint motion to extend the time within which to submit supplemental testimony on Contention 3 regarding the newly disclosed borehole log data for an additional ninety (90) days. On October 14, 2014, Powertech submitted its response in opposition to the Tribe's motion for an extension of time, and NRC Staff submitted its response on October 16, 2014. Powertech opposed the motion in its entirety, while NRC Staff opposed the motion but did not oppose a shorter extension. On October 22, 2014, the Licensing Board granted a thirty (30) day extension for submission of supplemental testimony by the Tribe or until November 21, 201. The newly disclosed borehole log data were therefore physically available for review and inspection at Powertech's Edgemont office for 70 days, from September 12, 2014, until November 21, 2014.

2.46. On October 9, 2014, the Licensing Board issued an order requesting an update on the status of mandatory disclosures. On October 14, 2014, Powertech submitted a response to this order and provided a full update on the status of disclosures.

2.47. On October 14, 2014, NRC Staff submitted its supplemental testimony regarding Powertech's disclosed data and information, including the disclosed borehole log data. NRC

Staff's submission included additional testimony and public and non-public exhibits. That same day, the Tribe submitted a motion to admit additional exhibits, including documents and data disclosed by Powertech on September 12, 2014, and a United States Environmental Protection Agency (EPA) report entitled *Preliminary Assessment Report Regarding the Darrow/Freezeout/Triangle Uranium Mine Site* (proffered Tribe Exhibit OST-026) and an accompanying EPA announcement on this report (proffered Tribe Exhibit OST-025). On October 24, 2014, Powertech and NRC Staff submitted responses to the Tribe's motion to admit additional exhibits. Both Powertech and NRC Staff opposed the admission of Tribe Exhibits OST-025 and OST-026 (i.e., the EPA preliminary assessment documents) but did not oppose the admission of the remaining exhibits. On October 30, 2014, the Tribe submitted a motion for leave to file a reply to Powertech's and NRC staff's responses to its motion to admit additional exhibits. On November 13, 2014, the Licensing Board denied the Tribe's motion for leave to file a reply and admitted the proffered Tribe exhibits, including admitting Exhibits OST-025 and OST-026 into evidence for Contention 3. At the same time the Licensing Board closed the evidentiary record on all admitted contentions except for Contention 3 pending completion of supplemental testimony filings on Powertech's disclosed borehole log data.

2.48. On November 21, 2014, the Tribe submitted its supplemental testimony and exhibits on Contention 3 regarding Powertech's disclosed borehole log data. This submission included additional testimony from Dr. Hannan LaGarry and accompanying exhibits. On December 4, 2014, Powertech submitted its response to the Tribe's supplemental testimony and exhibits on Contention 3, including additional expert testimony (Messrs. Frank Lichnovsky and Hal Demuth) and exhibits. On December 9, 2014, NRC Staff submitted its response to the Tribe's supplemental testimony and exhibits with additional expert testimony.

2.49. On October 24, 2014, Powertech submitted a response to NRC Staff's supplemental testimony and exhibits regarding the recently disclosed documents and borehole log data. Powertech's response included additional expert testimony (Messrs. Frank Lichnovsky and Errol Lawrence) and one additional exhibit.

2.50. On November 7, 2014, the Tribe submitted a motion for leave to file new contentions seeking to admit two new additional contentions regarding NRC Staff's supplemental testimony related to its review of the borehole log data and the EPA preliminary assessment. On December 2, 2014, Powertech and NRC Staff submitted responses to the Tribe's motion, opposing the admission of new contentions.

2.51. On December 10, 2014, the Licensing Board issued an order closing the evidentiary record on Contention 3 and establishing a final briefing schedule that set dates for proposed findings of fact and conclusions of law (January 9, 2015) and replies to such pleadings (January 29, 2015). The Licensing Board's order also directed all parties to provide legal argument on the non-public nature of the disclosed borehole logs and the supplemental testimony of Dr. Hannan LaGarry. On December 19, 2014, all parties submitted such legal argument.

III. STANDARDS OF LAW

A. HEARING RIGHTS

3.1. An NRC licensing action gives rise to hearing rights if it can be considered one of the circumstances specifically described in Section 189 of the AEA. Section 189a.(1)(A) states:

“In any proceeding under this Act, for the granting, suspending, revoking, or amending of any license or construction permit, or application to transfer control, and in any proceedings for the issuance or modification of rules and regulations dealing with the activities of licensees, and in any proceeding for the payment of compensation, an award, or royalties under section 153, 157, 186c., or 188, the Commission shall grant a hearing upon the request of any person whose interest

may be affected by the proceeding, and shall admit any such person as a party to such proceeding.”

Given that the licensing action in dispute here is the grant of Powertech’s combined source and 11e.(2) byproduct materials license, AEA hearing rights attach to licensing actions such as the instant case.

3.2. On August 10, 2009, Powertech submitted a license application for a combined source and 11e.(2) byproduct materials license under the AEA. On October 2, 2009, when NRC Staff formally docketed Powertech’s license application, AEA hearing rights attached to the license application.

B. ADMINISTRATIVE HEARING REGULATIONS

4.1. The applicable hearing regulations pursuant to the January 5, 2010, Federal Register Notice are found at 10 CFR Part 2, Subparts C and L. Under 10 CFR § 2.1206 & 2.1207, administrative hearings are to be conducted with an oral evidentiary hearing. 10 CFR § 2.1206 permits any party to request concurrence from all other parties to conduct the administrative evidentiary hearing solely through written pleadings, testimony, and evidence. No such requests were proffered by the parties in the course of this proceeding.

4.2 Under NRC regulations, an applicant generally has the burden of proof in a licensing proceeding. *See* 10 CFR § 2.325. In cases involving environmental contentions, NRC Staff bears the burden because it is the entity with the ultimate responsibility for NEPA compliance. *See e.g., Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), CLI-83-19, 17 NRC 1041, 1049 (1983). The applicant also may serve as a proponent of a particular position set forth in an EIS and, as a proponent, also has the burden on that matter. *Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 338-39 (1996) (citing *Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)), *rev’d on*

other grounds, CLI-97-15, 46 NRC 294 (1997).

4.3 The showing necessary to meet the burden of proof is the “preponderance of the evidence” standard.⁷ The Licensing Board therefore must consider the evidence and testimony and determine whether NRC Staff and Powertech have shown by a preponderance of the evidence that NRC Staff complied with NEPA in the SEIS and ROD. To the extent that an SEIS does not address an issue or does not adequately address a topic, the information presented at the hearing can be relied upon to satisfy NRC’s NEPA obligation. *Louisiana Energy Servs., L.P.* (Nat’l Enrichment Facility), LBP-06-08, 63 NRC 241, 285-286 (2006); *see also Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 53 (2001) (“[I]n an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in the FEIS, the FEIS is deemed modified by the decision.”).

4.4 In NRC licensing proceedings, “the ultimate NEPA judgments regarding a facility can be made on the basis of the entire record before a presiding officer, such that the [SEIS] can be deemed to be amended *pro tanto*.”⁸ Therefore, the Board may consider the full record before it, including the testimony and exhibits at the hearing, to conclude that “the aggregate is sufficient to satisfy the agency’s obligation under NEPA” to take a “hard look” at the potential environmental consequences of issuing a license.⁹

⁷ The definition of “preponderance of the evidence” in Black’s Law Dictionary, 6th ed. (p. 1182), is “[e]vidence which is of greater weight or more convincing than the evidence offered in opposition to it; that is, evidence which as a whole shows that the fact sought to be proved is more probable than not.”

⁸ *Louisiana Energy Servs., L.P.* (Nat’l Enrichment Facility), LBP-05-13, 61 NRC 385, 404 (2005) (emphasis in original).

⁹ *Louisiana Energy Servs., L.P.*, LBP-06-08, 63 NRC at 286.

4.5. The Licensing Board's evaluation of the merits of CI and the Tribe's environmental contentions (NEPA and NHPA-related contentions) are limited to issues pled with particularity by CI and the Tribe.¹⁰

4.6. It is well-understood that where a matter has been considered by the Commission, it may not be reconsidered by a Board. Commission precedent must be followed. *See e.g., Va. Elec. & Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), ALAB-584, 11 NRC 451, 463-65 (1980).

4.7. The legal standard used by the Commission in *Hydro Resources, Inc.* to evaluate license issuance is "reasonable assurance:"

"The intervenors are correct that "[p]ost-hearing resolution [of licensing issues] must not be [employed] to obviate the basic findings prerequisite to a license, including a reasonable assurance that the facility can be operated without endangering the health and safety of the public." But here the basic findings on groundwater protection necessary for a licensing decision have been made. The Presiding Officer in LBP-05-17 found reasonable assurance that groundwater at the Section 17, Unit 1, and Crownpoint sites will be adequately protected."

63 NRC at 11-12.

C. ISR OPERATING LICENSE APPLICATIONS: LAW AND REGULATIONS

1. General NRC ISR Regulatory Provisions: Environmental and Safety Reviews

5.1. NRC Staff has been delegated the authority to interpret the Commission's AEA regulations *inter alia* at 10 CFR Part 40 and Appendix A, as well as other regulations applicable to Powertech's requested and currently effective NRC combined source and 11e.(2) byproduct materials license pursuant to 10 CFR § 1.41(b)(18 & 19).

¹⁰ *See Southern Nuclear Operating Co.*(Early Site Permit for Vogtle ESP Site), CLI-10-05, 71 NRC 90, 100-01 (2010):

"The scope of a contention is limited to issues of law and fact pled with particularity in the intervention petition, including its stated bases, unless the contention is satisfactorily amended in accordance with our rules."

5.2. 10 CFR Part 40 regulations and its Appendix A Criteria govern the requests for and grant of combined source and 11e.(2) byproduct materials licenses for construction and operation of ISR facilities and the possession and use of such materials. Specifically, 10 CFR §§ 40.31 and 40.32 govern the application for and issuance of a specific license for the possession and use of source and 11e.(2) byproduct material at ISR facilities. These regulations and Criteria govern the safety review of ISR operating license applications.

5.3. 10 CFR § 40.32(e) governs the activities that can be undertaken towards constructing an ISR project site prior to the issuance of an NRC combined source and 11e.(2) byproduct materials operating license. Part 40.32(e), otherwise known as the “construction rule,” does not permit commencement of “construction” activities as defined in § 40.4 prior to license issuance.

5.4. 10 CFR § 40.4 includes in the definition of construction “the installation of wells associated with radiological operations (e.g., production, injection, or monitoring well networks associated with in-situ recovery or other facilities),” which are required for the acquisition of ISR wellfield-specific baseline groundwater quality and hydrogeological data gathering and analysis.

a. NRC Regulations for Environmental Reviews of ISR License Applications

5.5. 10 CFR Part 51 regulations represent the Commission’s interpretation of Council on Environmental Quality (CEQ) regulations under NEPA. As an independent regulatory agency, the Commission is not required to comply with portions of CEQ regulations that have some substantive impact on the manner in which the Commission performs its primary regulatory responsibilities. 10 CFR § 51.20(b)(8) specifically requires that source material milling operating licenses be subject to EIS-level environmental reviews, requiring either an EIS or SEIS.

5.6. NRC Staff has prepared, issued for public comment, and finalized a programmatic EIS or GEIS for ISR facilities that is intended to have SEISs tiered off of its programmatic findings. It is this GEIS that serves as the primary, programmatic basis for the Dewey-Burdock ISR Project SEIS. To date, five (5) SEISs have been prepared and finalized for ISR projects since the development of the GEIS, including the Dewey-Burdock ISR Project.

5.7. For environmental reviews, NRC Staff is required to take a “hard look” at the potential environmental impacts of a proposed action under NEPA. This “hard look” requirement is tempered by a “rule of reason” that requires agencies to address only impacts that are reasonably foreseeable—not remote or speculative.

5.8. If an admitted contention alleges that an environmental review document such as an SEIS is inadequate, “the ‘rule of reason’ by which NEPA is to be interpreted provides that agencies need not consider ‘remote and speculative’ risks or ‘events whose probabilities they believe to be inconsequentially small.’”¹¹

5.9. NEPA analyses often must rely upon imprecise and uncertain data, particularly when forecasting future technological developments, which should be judged on their reasonableness. When faced with uncertainty, NEPA only requires “reasonable forecasting.” In short, NEPA allows agencies “to select their own methodology as long as that methodology is reasonable.”¹²

5.10. NRC Staff’s environmental review is deemed to be adequate unless NRC Staff “has failed to take a ‘hard look’ at significant environmental questions –i.e., the Staff has unduly

¹¹ *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station, ALAB-919, 30 NRC 29, 44 (1989) (citation omitted).

¹² *See The Lands Council v. McNair*, 537 F.3d 981, 1003 (9th Cir. 2008) (finding that an EIS need not be based on the “best scientific methodology available”).

ignored or minimized pertinent environmental effects.”¹³ NEPA provides no guarantee that federally approved projects will not *have* adverse environmental impacts, nor does NEPA require agencies to select the most environmentally advantageous or benign option available.¹⁴

5.11. “NEPA does not require ‘a fully developed plan that will mitigate environmental harm before an agency can act,’ rather, NEPA requires only that ‘mitigation be discussed in sufficient detail to ensure that environmental consequences have been evaluated.’ *Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515, 1522 (10th Cir. 1992), *quoting Methow Valley*, 490 U.S. at 352-53; *see also Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-29, 64 NRC 417, 427 (2006) (discussing that an EIS need not contain “a complete mitigation plan” or even “a detailed explanation of specific [mitigation] measures which will be employed” and stating that mitigation measures “need not be legally enforceable, funded or even in final form to comply with NEPA’s procedural requirements.”)

5.12. “The discussion of effectiveness of mitigation measures does not need to be highly detailed.” *Moapa Band of Paiutes v. United States BLM*, No. 10-CV-02021-KJB-(LRL), 2011 U.S. Dist. LEXIS 116046 (D. Nev. Oct. 6, 2011); *see also Wilderness Society v. United States BLM*, 822 F. Supp. 2d 933, 943-44 (D. Ariz. 2011) *aff’d Wilderness Society v. BLM*, 526 Fed. Appx. 790, 2013 U.S. App. LEXIS 10708 (9th Cir. 2013) (providing examples of how courts assess mitigation measures).

5.13. NEPA does not require that NRC restrict its discussion of mitigation measures to a single FSEIS chapter, rather than discussing such measures throughout the FSEIS. This is how the NRC Staff typically prepares an EIS, and it is consistent with how other agencies prepare

¹³ *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (discussing what an intervenor must allege, with adequate support, to litigate a NEPA claim).

¹⁴ *See Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-29, 64 NRC 417, 429 (2006).

such documents. *See, e.g., Wilderness Soc'y v. United States BLM*, 822 F. Supp. 2d 933, 942–943 (D. Ariz. 2011).

5.14. NEPA does not require an agency to prove that the mitigation measures it identifies will be effective in reducing environmental impacts. *See Biodiversity Conservation Alliance v. Bureau of Land Management*, No. 09-CV-08-J, 2010 U.S. Dist LEXIS 62431 (D. Wyo. 2010).

5.15. Courts have confirmed that an agency need not assign an effectiveness rating to mitigation measures. *See North Alaska Env'tl. Ctr v. Norton*, 361 F. Supp 2d., 1069, 1080 (2005).

5.16. The rule for consideration of “connected actions” can be found at 40 CFR § 1508.25(a)(1) and exists to ensure that “proposals for...actions that will have cumulative or synergistic environmental impact upon a region...*pending concurrently before an agency...be considered together.*” *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976) (emphasis added). No such applications of this type are currently pending before NRC Staff.

5.17. A agency need only provide “[a] reasonably thorough discussion of the significant aspects of the probable environmental consequences[.]” *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974); *Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1026–27 (9th Cir. 1980). *See also Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005) (“NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.”) (emphasis in original).

b. NRC Regulations for Safety Reviews of ISR License Applications

5.18. Intervenors are not permitted to challenge the Commission's ISR regulations in this proceeding. *See* 10 CFR § 2.335.¹⁵

5.19. The Commission does not presume that a licensee will violate its license or its license conditions. *See Private Fuel Storage* (Independent Spent Fuel Storage Installation), 53 NRC 232, 235-36 (2001); *see also GPU Nuclear Inc.* (Oyster Creek Nuclear Generating Station), CLI-00-06, 51 NRC 193, 207 (2000).

5.20. NRC Staff safety reviews for ISR license applications are conducted with a particular focus on 10 CFR Part 40 regulations and Appendix A Criteria. *See* 10 CFR Part 40 & Appendix A. Part 40 regulations also extend additional safety review requirements to 10 CFR Part 20 radiological health and safety regulations and any other applicable requirements.

5.21. NRC Staff's AEA-based regulatory standard for issuance of an ISR operating license is a demonstration that there is "reasonable assurance" that issuance of said license will result in adequate protection of public health and safety and will not be inimical to the common defense or security. *See* 10 CFR § 40.32(c) & (d). At the end of its safety review, NRC Staff issues an SER memorializing its safety review and comprising the safety review component of the ROD.

5.22. Furthermore, under NRC case law, the Staff may give substantial weight to the findings of agencies acting within their authority. *See Public Serv. Co. of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 527 (1977) ("The fact that a competent and responsible state authority has approved the environmental acceptability of a site or a project after extensive and thorough environmentally sensitive hearings is properly entitled to

¹⁵ A challenge to "the basic structure of the Commission's regulatory process or is an attack on the regulations" is not permitted in this proceeding. *See Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974).

"substantial weight" in the conduct of our own NEPA analysis. . . . Such limited reliance is clearly acceptable under NEPA.") (citations omitted). *See also Western Farmers Elec. Coop., Inc.* (Black Fox Station, Units 1 and 2), LBP-78-28, 8 NRC 281 (1978) ("In the conduct of our NEPA analysis, we give substantial weight to [a permitting] action taken by a competent and responsible State authority.").

5.23. The NRC's Commission and Board have also found that it is appropriate for the Staff to incorporate the analyses of other agencies into a Staff-issued EIS. *Seabrook*, CLI-77-8, 5 NRC at 515, 527; *Black Fox Station*, LBP-78-28, 8 NRC at 282.

2. Specific NRC ISR Regulatory Provisions and Criteria

6.1. There are two phases of data gathering envisioned by the Commission under its 10 CFR Part 40, Appendix A Criteria and its Commission-endorsed performance-based licensing program. Criterion 7 envisions gathering and analysis of "baseline" data, such as groundwater quality, sufficient to obtain an NRC license under the AEA. "Baseline" data gathering applies to groundwater in that a license applicant is required to gather sufficient data to *characterize* the affected environment. This interpretation of Criterion 7 is supported by language in NUREG-1569 when it states:

"Reviewers should keep in mind that the development and initial licensing of an *in situ* leach facility is not based on comprehensive information. This is because *in situ* leach facilities obtain enough information to *generally locate the ore body and understand the natural systems involved*. More detailed information is developed as each area is brought into production....[R]eviewers should ensure that sufficient information is presented to reach only the conclusion necessary for initial licensing."

See NRC Staff Exhibit NRC-013 at 40 (emphasis added); *see also id.* at 36.

6.2. For purposes of groundwater quality data, the second phase of data gathering envisioned by the Commission under its 10 CFR Part 40, Appendix A Criteria and its

Commission-endorsed performance-based licensing program is Criterion 5B(5) “Commission-approved background” (CAB) groundwater quality standard, which is the basis for appropriate site-specific groundwater standards against which operational groundwater and restoration goals are set.

6.3. “Commission-approved background” cannot be determined until after an NRC ISR license is issued. This is consistent with the current 10 CFR § 40.32(e) “construction” rule which prohibits the installation of a complete wellfield, including monitor well network. *See* 10 CFR § 40.4 (definition of “construction,” “means the installation of wells associated with radiological operations (e.g., production, injection, or monitoring well networks associated with in-situ recovery or other facilities)...”). Violation of this provision would serve as grounds for NRC Staff to deny an ISR license application.¹⁶

6.4. NRC Staff has previously considered an industry request to translate 10 CFR Part 52 limited work authorization (LWA) site development activities to ISR project sites as preconstruction activities. In Regulatory Issue Summary (RIS) 2009-12, NRC Staff stated that they could not translate such requirements to 10 CFR Part 40 ISR project sites and that 10 CFR Part 40.14 specific exemptions were the proper route. However, this RIS also noted that NRC

¹⁶ Part 40.32(e)’s provisions specifically state that:

“In the case of an application for a license for a uranium enrichment facility, or for a license to possess and use source and byproduct material for uranium milling, production of uranium hexafluoride, or for the conduct of any other activity which the NRC determines will significantly affect the quality of the environment, the Director, Office of Federal and State Materials and Environmental Management Programs or his/her designee, before commencement of construction, on the basis of information filed and evaluations made pursuant to subpart A of part 51 of this chapter, has concluded, after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. **Commencement of construction prior to this conclusion is grounds for denial of a license to possess and use source and byproduct material in the plant or facility.**”

10 CFR § 40.32(e) (emphasis added).

Staff *would not* consider issuance of a specific exemption for “wellfield monitoring network installation.” See United States Nuclear Regulatory Commission, RIS-2009-12, *Uranium Recovery Policy Regarding Site Preparation Activities at Proposed, Unlicensed Uranium Recovery Facilities* (September 23, 2009) (emphasis added).

6.5. This phased approach to groundwater data gathering and analysis is consistent with the Commission’s holding in *Hydro Resources, Inc.* (CLI-06-01)¹⁷ and the Licensing Board is bound by this decision. CLI-06-01 specifically addresses the development of upper control limits (UCLs) and wellfield packages, including “Commission-approved background” post-license issuance.

6.6. The assessment of resource areas such as mitigation measures also involve the preparation of action plans after issuance of a license, which is consistent with the Commission’s approved policy of performance-based licensing. See *Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-99-22 (July 23, 1999).

3. National Historic Preservation Act Regulations

7.1. Pursuant to the NHPA, federal agencies are required to assess potential impacts to historic resources when reviewing new operating license applications. See 54 U.S.C. § 306108. As is the case with other resource areas, NRC new ISR operating license applicants are required to provide adequate, site-specific data for its consideration prior to approving a license application.

7.2. Regulations promulgated for use by federal agencies when evaluating historic resources by the ACHP are found at 36 CFR Part 800 *et seq.* More specifically, when evaluating

¹⁷ *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-01, 63 NRC 1, (2006).

new ISR operating license applications, NRC Staff follows the four (4) step process for historic resource reviews articulated in 36 CFR Part 800, Subpart B.¹⁸

7.3. Step one involves the identification of interested/consulting parties with whom the lead agency will consult during the Section 106 consultation process. *See* 36 CFR § 800.3. These consulting parties typically include the State Historic Preservation Officer (SHPO), federally recognized tribes, local governments, applicants for federal licenses, and others with a demonstrated interest in the effects on historic properties.

7.4. Step two (36 CFR § 800.4) involves the identification of historic properties in consultation with the consulting parties with the lead agency required to exercise a *reasonable and good faith effort* to identify such properties per 36 CFR § 800.4(b)(1).¹⁹ This step involves the delineation of the area of potential effect (APE), the review of existing information on properties within the APE, and, if necessary, additional identification of properties based on field studies and information from the consulting parties. As part of this identification effort and as is the case with ISR projects, ACHP regulations permit this identification effort to be phased by providing for future identification phases under the provisions of a PA as ISR projects are, by their nature, phased projects. *See* 36 CFR § 800.4(b)(2). The phased identification process for ISR projects has been endorsed by the Commission in the *Hydro Resources, Inc.* litigation.²⁰ Step two also involves determining whether the identified resources are eligible for inclusion on the National Register of Historic Places (NRHP) per 36 CFR § 800.4(c).

¹⁸ NRC Staff Exhibit NRC-015 entitled *Dewey-Burdock ISR Project Summary of Tribal Outreach* discusses all NRC Tribal outreach efforts.

¹⁹ *See* NRC Staff Exhibit NRC-047, *Meeting the Reasonable and Good Faith Identification Standard in Section 106 Review*.

²⁰ *See e.g., In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), LBP-05-26 (September 16, 2005); *see also* NRC Staff Exhibit NRC-047 at 2.

7.5. Step three of the process (36 CFR § 800.5) involves determining whether the federal undertaking will adversely affect any NRHP-eligible properties. The lead agency, in consultation with consulting parties, will determine whether adverse effects are present that need to be resolved or render a determination of no adverse effect. 36 CFR § 800.5(a)(2) provides a detailed list of potential adverse effects to historic resources including destruction or damage to the resources, alteration to those resources, and visual or auditory impacts to a resource's integrity. The determination of potential adverse effects also is permitted to be conducted in a phased manner. *See* 36 CFR § 800.4(a)(3). Section 106 agreement documents such as PAs represent an ongoing responsibility for Powertech and NRC Staff where potential effects cannot be fully determined prior to an undertaking's approval. *See* 36 CFR § 800.14(b)(1)(ii).

7.6. Step four involves the resolution of adverse effects in accord with 36 CFR § 800.6. Adverse effects are resolved using agreement documents such as memoranda of agreement (MOA) or PAs. In the instant case, a PA was finalized and signed by mandatory signatories including NRC, BLM, the State of South Dakota SHPO, and the ACHP. ACHP regulations do not require that a Section 106 agreement document such as a PA be evaluated in a NEPA analysis (e.g., SEIS).

7.7 As part of the 36 CFR § 800.6 resolution of adverse effects (step four) process, the lead agency is required to afford the ACHP the opportunity to participate in consultation regarding the resolution of adverse effects. If the ACHP chooses to participate, they are a required signatory to the agreement document, and the ACHP signature on the document indicates that the agencies have met the statutory requirements for Section 106, taking into account the effects of the undertaking and providing the ACHP with an opportunity to comment. . In the instant case, ACHP participation was solicited and its approval of PA indicates that NRC

has met the statutory requirements for the Section 106 compliance process. *See* Powertech Exhibit APP-001 at 14, ¶ A.43 *citing* NRC Staff Exhibit NRC-018-A at 14.

7.8. Lead agencies, such as NRC, are permitted under 36 CFR § 800.8 to conduct NHPA-related processes in concurrence with its environmental reviews under NEPA (10 CFR Part 51). 36 CFR § 800.8 encourages the lead agency to coordinate their Section 106 compliance and their NEPA compliance by initiating the Section 106 compliance process during the early stages of the NEPA process and ensuring that effects on historic properties are considered as part of the NEPA analysis. At the beginning of the “undertaking’s” review, the lead agency is permitted to combine these processes, but they are not as a matter of law, mandated to do so. In the instant case, completion of the Section 106 compliance process prior to issuance of the ROD demonstrates appropriate coordination between NEPA and Section 106. *See generally* 36 CFR § 800.8. *See also* NRC Staff Exhibit NRC-048 at 17.

7.9. License applicants or licensees, such as Powertech, do not have the legal authority to enter into Section 106 consultations with federally-recognized Tribes, as the NHPA applies to federal agencies.

7.10. Powertech’s license application submission included reports from a Level III (i.e., one hundred (100) percent pedestrian survey) of the license area designed to identify archeological sites and historic structures.. When comparing Level I and II surveys with the intensity of a Level III survey, federal courts have discussed why Level III surveys are much more intensive. *See Mont. Wilderness Ass’n v. Connell*, 725 F.3d 988, 1005-1006 (9th Cir. 2013) (summarizing differences between Class I, II, and III surveys); *see also Southern Wilderness Alliance v. Burke*, 981 F. Supp 2d, 1099, 1108 (D. Utah 2013).

7.11. In addition to the Level III survey of archeological sites and historic structures, NRC Staff required Powertech to provide information identifying any historic properties of religious and cultural significance to federally recognized tribes per 36 CFR § 800.4(a)(4). As with other Section 106 identification efforts, the agency is required to make a reasonable and good faith effort to identify such properties. The specific process for identifying these properties is not specified in ACHP regulations or guidance. As stated above in ¶ 7.7, ACHP’s execution of the PA should, as a matter of law, demonstrate compliance with all ACHP regulations.

7.12. ACHP has published guidance on the “reasonable and good faith effort” standard entitled *Meeting the “Reasonable and Good Faith” Identification Standard in Section 106 Review (ACHP)*. See NRC Staff Exhibit NRC-047. ACHP states that a “reasonable and good faith effort” “may consist of one or more methodologies and should be designed so that the federal agency can ensure that it produces enough information, in enough detail, to determine what the undertaking’s effects will likely be on historic properties.” *Id.* at 2.

D. ISR OPERATING LICENSES: NRC GUIDANCE

8.1. NRC Staff has prepared several guidance documents associated with AEA-licensed ISR combined source and 11e.(2) byproduct material licenses for the possession and use of such materials. As discussed above, NRC Staff’s review of ISR operating license applications, such as that proffered by Powertech, including detailed TRs and ERs, is required to address potential impacts in resource areas to public health and safety and the environment.

8.2. NUREG-1569 sets forth the acceptance criteria for safety and environmental reviews of ISR operating license applications.

8.3. NUREG-1569 includes Table 1, which contains a comparison chart listing all sections of its guidance, including acceptance criteria, and identifying which sections apply

directly to 10 CFR Part 40 *et al* safety reviews and 10 CFR Part 51 environmental reviews. *See* NRC Staff Exhibit NRC-013 at 29-31. This Table 1 shows that the acceptance criteria associated with evaluations of ISR facilities associated with potential groundwater impacts per NUREG-1569 establish the basis for compliance with both safety and environmental review requirements.

8.4. NUREG-1569 was issued for public comment in October of 1997 and, again, in February of 2002 and was finalized as formal Commission guidance in June of 2003²¹ specifically to identify a permissible licensing approach for new ISR operating license applications.

8.5. NUREG-1748 sets forth the formatting and content requirements for environmental reports and EIS-level documents.

8.6. While they are not binding on the Licensing Board, the Commission has stated in its decisions in *Seabrook* and *Private Fuel Storage* that Commission guidance documents are nonetheless entitled to special weight. *See Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC 301, 314, n.78 (2012); *see also In the Matter of Private Fuel Storage* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001). In its 2005 *Yankee* decision, the Commission further elaborated on the role of NRC Staff guidance with respect to regulatory compliance:

“We recognize, of course, that guidance documents do not have the force and effect of law. Nonetheless, guidance is at least implicitly endorsed by the Commission and therefore is entitled to correspondingly special weight.”

Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-05-15, 61 NRC 365, 375, n.26 (2005); *see also Consumers Power Co.* (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC

²¹ *See* United States Nuclear Regulatory Commission, *Staff Requirements-SECY-02-0204-Update of Uranium Recovery Guidance Documents* (May 7, 2003).

562, 568 & n.10 (1983) (finding that NUREGs are entitled to considerable prima facie or special weight).

8.7. The Commission has indicated that conformance with regulatory guides is likely to result in compliance with specific regulatory requirements, though nonconformance with such guides does not mean noncompliance with the regulations. *See Petition for Emergency & Remedial Action*, CLI-78-6, 7 NRC 400, 406-407 (1978). Thus, in the absence of other evidence, adherence to guidance may be sufficient to demonstrate compliance with the regulatory requirements. *Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1)*, ALAB-698, 16 NRC 1290, 1299 (1982), *rev'd in part on other grounds*, CLI-83-22, 18 NRC 299 (1983).

8.8. NUREG-1569's Response to Comments provides evidence that its guidance is an acceptable pathway to obtaining an ISR operating license. In the Notice of Availability of NUREG-1569, NRC states:

“The review plan provides general guidance on acceptable methods for compliance with the existing regulatory framework.²² As described in an NRC white paper on risk-informed, performance-based regulation (SECY-98-144), however, the applicant has flexibility to propose other methods as long as it demonstrates how it will meet regulatory requirements.”²³

See NRC Staff Exhibit NRC-013 at 3.

This portion of NUREG-1569 states that it prescribes “standard practices that have been found acceptable in demonstrating compliance at *in situ* leach uranium extraction facilities have been placed in the standard review plan as one approach that the staff may use in determining

²² *See Gulf States Utilities Co. (River Bend Station, Units 1 and 2)*, ALAB-444, 6 NRC 760 (1977).

²³ To this point, NUREG-1569 also states “the Commission directed the staff to update its regulatory guidance related to *in situ* leach uranium extraction facilities, and in doing so, to provide guidance on use of risk-informed, performance-based regulatory philosophies. NUREG-1569 incorporates this direction from the Commission.” NUREG-1569, *Notice of Availability of a Standard Review Plan (NUREG-1569) for Staff Reviews for In Situ Leach Uranium Extraction License Applications* at 4.

compliance.” *Id.* at 64. NUREG-1569 also is an official NRC document created after multiple ISR Licensing Board/Commission decisions in the *Hydro Resources, Inc.* Subpart L proceeding (e.g., LBP-99-30, CLI-00-12)²⁴ regarding license conditions that “will allow particular determinations to be made post-licensing” but prior to operations in a wellfield to provide clarity to the ISR licensing process per the *Hydro Resources, Inc.* proceeding.²⁵

8.9. Accordingly, NUREG-1569 should be accorded special weight when addressing Powertech’s and NRC Staff’s compliance with NRC regulations for ISR facilities in this proceeding.

8.10. NUREG-1569 is divided into two distinct sections (Chapter 2 entitled *Site Characterization* and Chapter 5 entitled *Operations*) separating the two phases of data gathering and analysis contemplated by NRC Staff prior to and after issuance of an ISR operating license and envisioned in light of the 10 CFR § 40.32(e) “construction” rule.

8.11. As stated in the NUREG-1569 Response to Comments regarding a comment on construction of ISR facilities prior to license issuance lest the applicant run the risk of having its requested license denied, “NRC considers this statement to be consistent with the requirements of 10 CFR 40.32(e) and believes it to be appropriate for the agency’s responsibilities to protect public health and safety and the environment.” *See* NRC Staff Exhibit NRC-013 at 7.

8.12. Chapter 2 of NUREG-1569 addresses the sections of *license applications* related to site-specific groundwater conditions, including the development of pre-license issuance, “baseline” groundwater quality as mandated by 10 CFR Part 40, Appendix A, Criterion 7.

²⁴ *See In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-00-12, 52 NRC 1 (2000); *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), LBP-99-30, 50 NRC 77 (1999).

²⁵ It is also worth noting that Phase II of the *Hydro Resources, Inc.* Subpart L proceeding was briefed and decided after finalization of NUREG-1569 in 2003 and affirmed by the Commission. Thus, many of the resource areas discussed in NUREG-1569 are representative of this line of cases and should be considered binding as Commission precedent.

8.13. Chapter 5 of NUREG-1569 entitled *Operations* addresses ISR operations, including the development of Criterion 5 “Commission-approved background,” which is the foundation for development of all other operational and restoration standards for groundwater at a *licensed* ISR site.

8.14. Chapters 2 and 5 are representative of the Phases I and II *Hydro Resources, Inc.* line of cases (*Compare In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-01, 63 NRC 1, (2006)), and the Licensing Board should be bound by the Commission precedent articulated in those cases.

8.15. NUREG-1569 also sets forth additional requirements for license application levels of detail regarding historic and cultural resource investigation. *See* NRC Staff Exhibit NRC-013 at 29, 47-51.

E. MISCELLANEOUS LEGAL DOCTRINE

9.1. 40 CFR § 124.9(b)(6) prohibits the preparation of an EIS in conjunction with a UIC permit, which Powertech has requested.

9.2. Liquid waste injected into a Class V UIC permit cannot qualify as hazardous waste. *See* 40 CFR § 144.3.

IV. PROPOSED FINDINGS OF FACT

A. CONTENTION 1A: PROTECTION OF HISTORIC & CULTURAL RESOURCES

1. The Level III Archeological Survey Satisfied All Applicable Regulations and Guidelines

10.1 Powertech witness Dr. Hannus testified that the Level III archeological survey, documentation of sites, site evaluations and technical reports were conducted according to state-of-the art criteria for performing Level III surveys and to comply with established federal and state regulations and guidelines. *See* Powertech Ex. APP-003 at 7-8, ¶ A.6, *citing* Powertech

Exs. APP-006, APP-007 and APP-008. Dr. Hannus testified that the Archeology Laboratory at Augustana College (ALAC) conducted the Level III survey as defined by the South Dakota State Historic Preservation Office (SHPO) based on federal standards. *See id.*, citing Powertech Ex. APP-008 at 9.

10.2 Powertech witness Dr. Hannus testified that the Level III survey consisted of a 100 percent pedestrian survey (visual inspection) of the entire proposed project area (more than 10,000 acres) using transects spaced 30 meters or less apart. *See* Powertech Ex. APP-003 at 8-9, ¶ A.7. Dr. Hannus testified that the initial survey was conducted in 2007, with additional survey and evaluative testing done in 2008 and additional evaluative testing done in 2011. *See id.* *See also* NRC Staff Ex. NRC-001 at 5-6, ¶ A1.3 (Yilma and Jamerson).

10.3 Powertech witness Dr. Hannus testified that the project area had been in a drought during the Level III survey, which resulted in excellent visibility of the ground surface due to scant vegetation. *See* Powertech Ex. APP-003 at 8-9, ¶ A.7. *See also* Tr. at 760-761 (Dr. Hannus). Dr. Hannus testified that the survey transect spacing was reduced in areas where cultural resources sites were discovered and in other areas possessing higher site potential such as those in an advanced erosional state and those situated on high terraces or terrace remnants above established waterways. *See* Powertech Ex. APP-003 at 8-9, ¶ A.7. *See also* Tr. at 760, lines 3-18 (Dr. Hannus). Dr. Hannus testified that areas adjacent to surface water, including fossil or active water sources, were examined using reduced transect spacing. *See* Powertech Ex. APP-003 at 15, ¶ A.18. *See also* Tr. at 761, lines 4-15.

10.4 Powertech witness Dr. Hannus testified that the Level III survey was conducted by experienced and qualified personnel. *See* Powertech Ex. APP-003 at 3, 5-6, 10-11, ¶¶ A.1-A.2, A.4, A.10. Dr. Hannus testified that the fact that a Native American tribe did not

conduct the study does not mean that an adequate archeological study was not completed by qualified investigators. *See id.* at 12, ¶ A.12.

10.5 Powertech witness Fosha testified that he worked closely with Powertech in his role as the Assistant State Archeologist in determining the appropriate methodology for the identification of archeological sites. *See Tr.* at 865-866. Mr. Fosha also testified that he worked closely with ALAC personnel during the Level III survey. *See Tr.* at 866, lines 6-19. Mr. Fosha also testified that he coordinated with Powertech to determine areas of potential impact in order to identify areas requiring subsurface testing. *See Tr.* at 866-867.

10.6 Powertech witness Fosha testified that the Level III survey exceeded the applicable state standards. *See Tr.* at 875, lines 1-5. Mr. Fosha testified that the South Dakota State Historical Society, Archeological Research Center has determined that it has no further reservations concerning the granting of Powertech's large scale mine permit application, since "the lands within the ... project have been fully inventoried with additional archeological testing on sites that may be impacted during the current phase of construction." *See Powertech Ex. APP-010* at 3-4, ¶ A.6, *citing Powertech Ex. APP-012*. During the evidentiary hearing Mr. Fosha testified that his initial reservations were all archeologically focused and were resolved through working with Powertech and ALAC to complete the Level III survey and associated evaluative testing. *See Tr.* at 864-867.

10.7 NRC Staff witness Yilma testified that the Staff reviewed the Level III survey and determined the need for additional testing in areas of potential disturbance in order to make eligibility determinations for sites potentially eligible for listing on the National Register of Historic Places (NRHP). *See Tr.* at 783, lines 2-18.

10.8 Powertech witness Dr. Hannus testified that subsurface testing (i.e., evaluative testing) was performed as part of the Level III survey, including 18 sites in 2008 and 20 sites in 2011. *See* Powertech Ex. APP-003 at 8, 13-15, ¶¶ A.7, A.15. Dr. Hannus testified that erosion is so severe in much of the project area that artifacts were found on exposed shale or bedrock in areas with virtually no intact soil and that subsurface testing is not necessary for these areas. *See id.* at 13, ¶ A.16. *See also* Tr. at 819, lines 17-21.

10.9 NRC Staff witnesses Yilma and Jamerson testified that ALAC performed evaluative testing at 43 sites during 2007-2008 and an additional 20 sites in 2011. *See* NRC Staff Ex. NRC-001 at 5, ¶ A1.3, *citing* NRC Staff Exs. NRC-136-A through NRC-136-C. *See also* NRC Staff Ex. NRC-151 at 6, ¶ A1.4 (Yilma, Jamerson, Hsueh and Luhman), *citing* NRC Staff Exs. NRC-008-A-1 at 248, NRC-018-A and NRC-136-A through NRC-136-C. *See also* Tr. at 787, lines 18-22 (Yilma).

10.10 NRC Staff witness Dr. Luhman testified that subsurface testing was only required at sites where there was the potential for impact as a result of the proposed project activities; Dr. Luhman testified that testing of sites that are not going to be impacted is not in the interest of preservation and protection. *See* Tr. at 788, lines 2-16 and Tr. at 818, lines 10-18. *See also* Tr. at 819-820 (Dr. Hannus). *See also* Powertech Ex. APP-063 at 3, ¶ A.1 (Dr. Sebastian).

10.11 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that the FSEIS documents NRC Staff's independent analysis to determine the recommended NRHP eligibility status and SD SHPO's review and concurrence with the eligibility recommendations. *See* NRC Staff Ex. NRC-151 at 6, ¶ A1.4 *citing* FSEIS Sections 3.9.3 and 4.9.

2. The Number of Sites Documented in the Level III Archeological Survey Is Typical for the Region

10.12 Powertech witness Dr. Hannus provided testimony on the number of sites documented during the Level III archeological survey and ALAC's recommendations for NRHP eligibility. *See* Powertech Ex. APP-003 at 9, ¶ A.8. Dr. Hannus testified that ALAC has completed comparable surveys near the Dewey-Burdock Project. *See id.* at 9-10, ¶ A.9. Dr. Hannus testified that the density of sites identified at the Dewey-Burdock Project is typical for the region. *See* Tr. at 855, lines 2-22.

3. Section 106 of the NHPA Required NRC Staff to Make a Reasonable and Good Faith Effort to Identify Potentially Eligible Historic Properties

10.13 Powertech witness Dr. Sebastian testified that the purpose of Section 106 of the National Historic Preservation Act (NHPA) is "to ensure informed federal agency decision-making, insofar as agency actions may affect 'historic properties,' defined as places listed on or eligible for listing on the National Register of Historic Places (NRHP)." *See* Powertech Ex. APP-001 at 3-4, ¶ A.4. Dr. Sebastian testified that the regulation implementing Section 106 of the NHPA (36 CFR Part 800) further defines the purpose of the Section 106 process as "seek[ing] to accommodate historic preservations concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties." *See id.*, citing 36 CFR § 800.1(a).

10.14 Powertech witness Dr. Sebastian testified that the statutory requirements of Section 106 include: (1) a federal agency taking into account the effects of its undertakings, including issuance of licenses and permits, on historic properties, and (2) the federal agency affording the ACHP a reasonable opportunity to comment on the undertaking. *See* Powertech Ex. APP-001 at 4, ¶ A.5. Dr. Sebastian testified that there are six activities and decisions to be

carried out by the federal agency during the Section 106 process, including: (1) determining the area of potential effects (APE), (2) making a reasonable and good faith effort to identify historic places within that area, (3) determining which properties are eligible for listing on the NRHP, (4) evaluating the potential effects of the undertaking on the identified historic properties, (5) identifying measures to avoid, minimize or mitigate any adverse effects on historic properties, and (6) preparing and executing an agreement document indicating what measures will be taken to resolve the adverse effects. *See id.* at 4, ¶ A.6.

10.15 Powertech witness Dr. Sebastian testified that NRC Staff was required under Section 106 to make a reasonable and good faith effort to identify historic properties, including properties of religious and cultural significance to tribes. *See id.* at 7, ¶ A.17. NRC Staff witnesses Yilma and Jamerson also testified that under the NHPA the Staff must make a reasonable and good faith effort to identify properties that are eligible or potentially eligible for listing on the NRHP. *See* NRC Staff Ex. NRC-001 at 4, ¶ A1.1, *citing* NRC Staff Ex. NRC-047. NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that ACHP guidance makes it clear that an agency determines how to identify historic properties after taking into account the proposed project parameters and available cultural resources information. *See* NRC Staff Ex. NRC-151 at 7, ¶ A1.5, *citing* NRC Staff Ex. NRC-047 at 1-2. Powertech witness Dr. Sebastian testified that there is no requirement that an agency identify all possible historic properties that may be affected by an undertaking, only that the agency make a reasonable and good faith effort to identify such properties. *See* Powertech Ex. APP-063 at 4, ¶ A.4. Dr. Sebastian testified that NRC has the authority to determine when it has made a reasonable and good faith effort to consult with tribes regarding properties of religious and cultural significance to the tribes. *See id.* at 12, ¶ A.23.

4. The Tribal Field Survey Allowed Each Tribe to Evaluate the Entire Project Area in a Manner Culturally Appropriate for Each Tribe

10.16 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that identification of historic properties under the NHPA and its implementing guidance may involve a variety of research approaches, including reviewing archeological, ethnographic and academic literature; tribal consultation; ethnological or ethnographic studies; oral histories; sample field investigations; or field surveys. *See* NRC Staff Ex. NRC-151 at 4-5, ¶ A1.3, *citing* NRC Staff Ex. NRC-047 at 1. *See also* NRC Staff Ex. NRC-001 at 9, ¶ A1.6 (Yilma and Jamerson), *citing* 36 CFR § 800.4(b)(1) and Powertech Ex. APP-006. Powertech witness Dr. Sebastian testified that identifying traditional cultural properties (TCPs), or places of religious and cultural significance, depends on the views of the community about how it should happen and may be done in many different ways, including ethnographic studies and field surveys. *See* Tr. at 758, lines 5-24.

10.17 NRC Staff witnesses Yilma, Jamerson and Hsueh testified that the Staff decided to use an individual tribal survey approach to identify sites of cultural and historical significance to the tribes based on requests by the Oglala Sioux Tribe and many other tribes for the opportunity to identify such sites. *See* NRC Staff Ex. NRC-151 at 7, ¶ A.1.6. *See also* Tr. at 776-777 (Yilma). Ms. Yilma testified that six tribes were present at the initial face-to-face meeting during which the tribes requested the opportunity to identify sites of religious and cultural significance to them, including the Oglala Sioux, Standing Rock Sioux, Flandreau Santee Sioux, Sisseton Wahpeton and Cheyenne River Sioux. *See* Tr. at 810, lines 16-22.

10.18 Powertech witness Dr. Sebastian testified that ethnographic studies were discussed during early consultations with the tribes, but the interested tribes expressed very strongly the view that field surveys rather than ethnographic studies were the preferred way to

identify properties of religious and cultural significance in the Northern Plains region. *See* Powertech Ex. APP-001 at 10, ¶ A.28. *See also* Powertech Ex. APP-063 at 6, ¶ A.7. *See also* Tr. at 847, lines 3-8 (Yilma). NRC Staff witnesses Yilma and Jamerson testified that none of the consulting tribes expressed an interest in participating in the collection of oral histories. *See* NRC Staff Ex. NRC-001 at 8, ¶ A1.5.

10.19 Powertech witness Dr. Sebastian testified that the tribes indicated during the February 2012 face-to-face meeting that they would provide a scope of work to identify sites of significance to them, but that they failed to do so after several months, at which point NRC Staff asked the SRI Foundation to provide a draft scope of work. *See* Tr. at 793, lines 1-15. Dr. Sebastian testified that the tribes did not respond to the draft scopes of work prepared by SRI Foundation. *See* Tr. at 793, lines 16-23.

10.20 NRC Staff witnesses Yilma and Jamerson testified that two tribal field survey proposals were received by NRC Staff: one by the Makoche Wowapi/Mentz-Wilson Consultants on behalf of the Sioux Tribes, and one by SRI Foundation on behalf of Powertech. *See* Tr. at 804-806.

10.21 NRC Staff witnesses Yilma, Jamerson and Hsueh testified that the Staff reviewed comparative information on costs and methodologies used in tribal surveys conducted by other federal agencies to satisfy ACHP requirements and used this information when reviewing tribal survey proposals submitted by two tribes and Powertech. *See* NRC Staff Ex. NRC-151 at 7-8, ¶ A.1.6, *citing* NRC Staff Exs. NRC-015 at 9-13, NRC-023 and NRC-018-B at 19. Witnesses Yilma, Jamerson and Hsueh testified that the Staff considered alternative identification methods and ultimately selected the individual tribal survey approach because the proposals submitted by the tribes and Powertech differed significantly in scope, level of effort,

cost and methodology. *See id.* Ms. Yilma testified that the proposal submitted by the tribes' contractor was significantly higher in cost and longer in duration than the proposal submitted by the SRI Foundation on behalf of Powertech. *See Tr.* at 805, lines 12-22. Ms. Yilma testified that the cost of the tribes' proposal was approximately \$1 million, while the cost of the SRI Foundation proposal was approximately \$110,000 or \$120,000. *See Tr.* at 807, lines 9-16.

10.22 NRC Staff witnesses Yilma, Jamerson and Hsueh testified that the individual survey approach selected by NRC Staff allowed each tribe "to evaluate the entire project area in a manner culturally appropriate for each tribe," stating that a number of tribes had advised the Staff that only their members could identify sites of significance to them. *See NRC Staff Ex. NRC-151* at 8, ¶ A1.6, *citing* NRC Staff Exs. NRC-064, NRC-066 and NRC-067. *See also NRC Staff Ex. NRC-001* at 10-11, ¶ A1.8 (Yilma and Jamerson). Witnesses Yilma and Jamerson testified that the individual survey approach has been used by other federal agencies to identify historic properties of interest to tribes. *See id.* at 11, ¶ A1.8, *citing* NRC Staff Exs. NRC-060 and NRC-071.

10.23 Powertech witness Dr. Sebastian testified that NRC Staff offered the opportunity for any tribe that wished to do so to carry out field investigations within the proposed license area. *See Powertech Ex. APP-063* at 4, ¶ A.4. NRC Staff witness Yilma testified that Powertech covered the expenses of the tribal field surveys, including paying travel expenses and a per diem for up to three representatives from each tribe. *See Tr.* at 848, lines 2-18. Ms. Yilma also testified that Powertech covered additional travel expenses and per diem for tribes that invited their Tribal Historic Preservation Officers (THPOs) to participate along with three other representatives. *See Tr.* at 849, lines 6-14. Powertech witness Dr. Sebastian testified that in addition to paying the travel and per diem expenses, Powertech provided a \$10,000 grant

to each participating tribe, which they could use to pay wages, prepare reports or for whatever purpose they decided. *See* Tr. at 848-849.

10.24 NRC Staff witness Yilma testified that seven tribes participated in the field survey, including two Sioux tribes. *See* Tr. at 820-821. Ms. Yilma testified that the field survey was conducted over approximately 1 month, during which the tribes had access to 100 percent of the project area, or the entire approximately 10,500 acres, and covered about 95 percent of the site during the field surveys. *See* Tr. at 874, lines 3-25. *See also* NRC Staff Ex. NRC-001 at 6, 11, ¶¶ A1.3, A1.9, *citing* NRC Staff Exs. NRC-018-B at 11, NRC-008-A-1 at 259 and NRC-008-B-2 at 491-492. NRC Staff witnesses Yilma, Jamerson and Hsueh testified that the tribal representatives participating in the field survey developed priorities and methods prior to beginning the field surveys. *See* NRC Staff Ex. NRC-151 at 8, ¶ A1.8, *citing* NRC Staff Ex. NRC-008-B-2 at 492-494. Ms. Yilma testified that three of the seven tribes who participated in the field survey provided reports and eligibility recommendations, which NRC Staff included in its eligibility determination. *See* Tr. at 820-821. NRC Staff witnesses Yilma, Jamerson and Hsueh also testified that the results of the field surveys were published in December 2013 in a summary report for public comment. *See* NRC Staff Ex. NRC-151 at 9, ¶ A1.9, *citing* NRC Staff Exs. NRC-019 and NRC-056 through NRC-063.

10.25 NRC Staff witnesses Yilma and Jamerson testified that the seven tribes who participated in the field survey included the Northern Arapaho Tribe, Northern Cheyenne Tribe, Turtle Mountain Band of Chippewa Indians, Crow Creek Sioux Tribe, Cheyenne and Arapaho Tribes of Oklahoma, Crow Nation, and Santee Sioux Tribe. *See* NRC Staff Ex. NRC-001 at 10, ¶ A1.7. Mss. Yilma and Jamerson testified that detailed written reports with NRHP eligibility recommendations were received from the Northern Arapaho Tribe, Northern Cheyenne Tribe

and the Cheyenne and Arapaho Tribes of Oklahoma and that the Crow Nation provided field notes identifying sites of interest to its members. *See id.* Mss. Yilma and Jamerson testified that the Oglala Sioux Tribe initially accepted the Staff's invitation to participate in the field surveys but later informed the Staff that they would be unable to attend due a scheduling conflict. *See id.* at 12, ¶ A1.11. *See also* NRC Staff Ex. NRC-151 at 8, ¶ A1.7 (Yilma, Jamerson and Hsueh).

10.26 Regarding the allegation that the tribal field survey methodology was not “scientific,” Powertech witness Dr. Sebastian testified that most places of religious and cultural significance to Native American tribes are “outside of the realm of western scientific methods” and information about such places is maintained within the traditional knowledge of the tribes. *See* Powertech Ex. APP-063 at 6, ¶ A.7. Dr. Sebastian testified that identification of places of religious and cultural significance “depends on the knowledge of traditional cultural practitioners, not on the exercise of some scientific discipline or method.” *See id.* at 7, ¶ A.9. Dr. Sebastian testified that NRHP and ACHP guidance makes it clear that each tribe or other traditional community will have its own views on appropriate methods of identification and NRC Staff did not try to impose a uniform set of methods on identification of places of religious and cultural significance:

NRC did not try to impose a uniform set of methods on the identification of properties of religious and cultural significance. Instead, the agency made the assumption that each tribe would know best how to identify the properties of significance to their people and offered all of the tribes the opportunity to come to the project area, with financial and logistical support from the applicant, and carry out whatever identification activities were deemed culturally appropriate by that tribe.

See id.

5. Visual and Auditory Impact Assessments Were Conducted Based on Consultation with Federal and State Agencies

10.27 NRC Staff witnesses Yilma and Jamerson testified that the Staff conducted a visual impact assessment on properties listed on or eligible for listing on the NRHP. *See* NRC Staff Ex. NRC-001 at 6-7, ¶ A1.3, *citing* NRC Staff Exs. NRC-008-A-1 at 263-265, NRC-008-A-2 at 177-181 and NRC-018-B at 4, 6. Mss. Yilma and Jamerson testified that the visual impact assessment considered the location, design, setting, materials, workmanship, feeling and association of each historic property consistent with NHPA regulations at 36 CFR § 800.5(a)(1). *See id.* Mss. Yilma and Jamerson testified that the visual impact assessment evaluated historic properties within 4.8 kilometers (3 miles) of the tallest or most prominent building within each of the proposed processing areas (Dewey and Burdock) based on consultation with South Dakota SHPO, BLM, Wyoming SHPO and consideration of a previous visual assessment completed for a nearby project. *See id.*

10.28 NRC Staff witnesses Yilma and Jamerson testified that the Staff conducted an auditory impact assessment to determine whether auditory changes resulting from the Dewey-Burdock Project could affect historic properties located within 1,000 feet (305 meters) from noise-generating activities. *See* NRC Staff Ex. NRC-001 at 7, ¶ A1.3, *citing* NRC Staff Ex. NRC-008-A-2 at 181-182. Mss. Yilma and Jamerson testified that the FSEIS documents the Staff's conclusion that auditory impacts would be small due to the distance between historic properties and the nearest proposed processing facility. *See id.*

6. NRC Staff Appropriately Evaluated Archeological and Tribal Survey Results As Required by NEPA and NHPA

10.29 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that the Staff conducted a comprehensive environmental review of cultural, archeological and tribal

resources at the Dewey-Burdock Project that is documented in the FSEIS and went “well beyond merely relying on archeological data submitted by Powertech” in its license application. *See* NRC Staff Ex. NRC-151 at 5-7, ¶ A1.4. Witnesses Yilma, Jamerson, Hsueh and Luhman testified that the Staff “used a wide-ranging body of data in identifying historic properties, developing the cultural resources impact determination, and making NRHP-eligibility determinations,” including Powertech’s Level III cultural resources report, the subsurface testing evaluation reports, tribal field surveys, visual and auditory impact assessments, an extensive review of ethno-historical literature and SRI Foundation’s ethnographic report. *See id.*; *see also* NRC Staff Ex. NRC-001 at 4-5, 8-10, ¶¶ A1.2, A1.5-A1.6 (Yilma and Jamerson).

10.30 NRC Staff witnesses Yilma and Jamerson testified that the Staff used all of the methods stated in 36 CFR § 800.4(b)(1) for identifying historic properties under NHPA except oral history interviews (i.e., background research, consultation, sample field investigation and field surveys were all used). *See* NRC Staff Ex. NRC-001 at 9, ¶ A1.6.

10.31 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that the record demonstrates that the Staff made a reasonable and good faith effort to identify and evaluate properties eligible for inclusion on the NRHP. *See* NRC Staff Ex. NRC-151 at 5, ¶ A1.3.

10.32 Mss. Yilma and Jamerson testified that the Staff applied the four criteria at 36 CFR § 60.4(a)-(d) in making its NRHP eligibility recommendations, including (A) association with significant events in history, (B) association with the lives of persons significant in the past, (C) embodiment of distinctive characteristics of type, period, or construction, and (D) sites or places that have yielded or are likely to yield important information. *See* NRC Staff Ex. NRC-001 at 7, ¶ A1.4, *citing* NRC Staff Exs. NRC-027 and NRC-145.

10.33 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that NRC's NRHP eligibility determinations have since been reviewed and concurred with by the South Dakota SHPO. *See* NRC Staff Ex. NRC-151 at 6, ¶ A1.4, *citing* NRC Staff Ex. NRC-155.

10.34 NRC Staff witness Yilma testified that the Staff's NEPA review was not limited to eligible or potentially eligible historic properties protected under NHPA, but that the NEPA review considered such properties to be a subset of the broader cultural resources that were evaluated in the NRC Staff's NEPA review. *See* Tr. at 785, lines 14-19. *See also* NRC Staff Ex. NRC-151 at 5-7, ¶ A1.4 (Yilma, Jamerson, Hsueh and Luhman).

10.35 NRC Staff witness Yilma testified that FSEIS Chapter 4 includes information from the April to May 2013 tribal field surveys. *See* Tr. at 879, lines 12-19. NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman further testified that documentation of information reviewed and evaluated during identification of historic properties, assessment of potential cultural resources impacts, and determinations of NRHP eligibility was incorporated into FSEIS Sections 3.9.3 and 4.9. *See* NRC Staff Ex. NRC-151 at 6, ¶ A1.4, *citing* NRC Staff Exs. NRC-008-A-1 at 244-265 and NRC-008-A-2 at 156-189.

10.36 Powertech witness Dr. Sebastian testified that the NHPA and NEPA review process conducted by the NRC Staff for the Dewey-Burdock Project met the specific regulatory requirements for NEPA and Section 106 coordination and is also consistent with guidance provided by CEQ and ACHP. *See* Powertech Ex. APP-063 at 10-11, ¶ A.21.

7. A Phased Approach to Comply with the NHPA Is Allowed under Federal Regulations

10.37 Powertech witness Dr. Hannus testified that a "phased identification and evaluation" approach to determining the NRHP eligibility status of archeological sites is allowed under 36 CFR § 800.4(b)(2) and was recommended by ALAC in its original Level III cultural

resources survey report. *See* Powertech Ex. APP-003 at 13, ¶ A.14. *See also* Tr. at 726, lines 8-12 (Pugsley).

10.38 NRC Staff witnesses Yilma and Jamerson testified that a phased approach to comply with the NHPA is allowed under the ACHP's regulations at 36 CFR § 800.14(b) and was used for the Dewey-Burdock Project due to the phased approach to developing ISR wellfields. *See* NRC Staff Ex. NRC-001 at 12, ¶ A1.12. *See also* 36 CFR § 800.5(a)(3) and ¶ 7.5, *supra*. Powertech witness Dr. Sebastian testified that the use of a programmatic agreement to complete the Section 106 process was appropriate based on the need to develop a future utility corridor in a currently unknown location and the uncertainty as to the wastewater disposal mechanism. *See* Powertech Ex. APP-001 at 6, ¶ A.14. Dr. Sebastian testified that the use of a programmatic agreement does not assume or require that identification of all historic properties has been completed. *See* Tr. at 871-872.

10.39 NRC Staff witness Yilma testified that the Programmatic Agreement specifies how unevaluated properties will be evaluated for NRHP eligibility in the future should the need arise before any ground disturbing activities occur. *See* Tr. at 875, lines 15-20. NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that Stipulation 3 in the Programmatic Agreement sets forth the mechanisms for the protection and evaluation of unevaluated sites and that unevaluated sites will be treated as eligible for the NRHP until an eligibility determination is completed. *See* NRC Staff Ex. NRC-151 at 11-12, ¶¶ A1.11-A1.12.

8. Historic and Cultural Resources Will Be Adequately Protected

10.40 NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that the Programmatic Agreement provides significant protection for cultural resources and that Powertech must comply with all applicable provisions in the Programmatic Agreement as a

condition of both its NRC license and the BLM Plan of Operations. *See* NRC Staff Ex. NRC-151 at 10-11, ¶ A1.11. Witnesses Yilma, Jamerson, Hsueh and Luhman testified that the Programmatic Agreement includes stipulations to ensure that Powertech manages cultural resources properly and allows interested tribes the opportunity to participate in protecting such resources. *See id.* Witnesses Yilma, Jamerson, Hsueh and Luhman testified that Stipulation 3 of the Programmatic Agreement sets forth the mechanisms for identifying and protecting currently unevaluated properties, Stipulation 5 describes the steps to be taken to resolve adverse effects and Stipulations 9 and 10 describe procedures that must be followed if unanticipated cultural resource discoveries or human remains are found. *See id.*

10.41 NRC Staff witnesses Yilma and Jamerson testified that the following consulting parties participated in the drafting of the Programmatic Agreement: the ACHP, the South Dakota SHPO Project Review Officer, the BLM Montana Office, the BLM South Dakota Field Office, EPA Region 8, the Oglala Sioux Tribe, the Northern Cheyenne Tribe, the Cheyenne River Sioux Tribe, the Cheyenne and Arapaho Tribe, the Standing Rock Sioux Tribe, Powertech and Powertech's consultant (SRI Foundation). *See* NRC Staff Ex. NRC-001 at 15, ¶ A1.17, *citing* NRC Staff Ex. NRC-018-B at 24. *See also* Powertech Ex. APP-063 at 10, ¶ A.19 (Dr. Sebastian).

10.42 NRC Staff witnesses Yilma and Jamerson testified that the Programmatic Agreement was changed in response to written comments received from the Standing Rock Sioux Tribe and the Oglala Sioux Tribe, including changing NRHP eligibility recommendations and revising Stipulation 1 to allow tribes to revisit unevaluated sites where tribal features are identified before ground-disturbing activities occur. *See* NRC Staff Ex. NRC-001 at 15, ¶ A1.18. *See also* Tr. at 821-822, 824 (Yilma).

10.43 NRC Staff witnesses Yilma and Jamerson testified that the Programmatic Agreement for the Dewey-Burdock Project was executed on April 7, 2014 with the signature of John Fowler, Executive Director of the ACHP. *See* NRC Staff Ex. NRC-001 at 12, ¶ A1.12, *citing* NRC Staff Exs. NRC-018-A through NRC-018-H. In addition to the ACHP, the Programmatic Agreement was signed by NRC, BLM, SD SHPO and Powertech. *See* NRC Staff Exs. NRC-018-C and NRC-018-F through NRC-018-H. Powertech witness Dr. Sebastian testified that under Section 106 regulations at 36 CFR § 800.6(c)(1)(2), the required signatories for a programmatic agreement where ACHP participates in consultation include the federal agency, the ACHP and the SHPO. *See* Powertech Ex. APP-001 at 14, ¶ A.44, *citing* 36 CFR § 800.6(c)(1)(2). Dr. Sebastian testified that Powertech was asked by NRC Staff to be an invited signatory to the Programmatic Agreement, since Powertech will be “responsible for funding and carrying out virtually all of the protection and mitigation measures committed to in the Programmatic Agreement.” *See id.* at 14, ¶ A.45.

10.44 NRC Staff witnesses Yilma and Jamerson testified that the Programmatic Agreement will protect not only those historic and cultural properties that may be affected during the initial phase of the Dewey-Burdock Project, but also properties that potentially may be affected by future project phases. *See* NRC Staff Ex. NRC-001 at 12, ¶ A1.12. Powertech witness Dr. Sebastian testified that the Programmatic Agreement also provides for extensive consultation with interested tribes about measures to avoid, minimize or mitigate adverse effects on properties of religious, historic or cultural significance to them as future evaluation procedures and treatment plans are developed during the course of the project. *See* Powertech Ex. APP-001 at 6-7, ¶ A.16.

10.45 Powertech witness Dr. Sebastian testified that “[u]nder the terms of the Programmatic Agreement, all unevaluated properties will be protected from disturbance for the duration of the project.” *See* Powertech Ex. APP-063 at 3, ¶ A.2. Dr. Sebastian further testified that prior to disturbing any unevaluated property, that property will be subjected to testing or other evaluation procedures to determine its eligibility and a treatment plan will be prepared to resolve potential adverse effects to the property. *See id.* Dr. Sebastian testified that tribes will be consulted about protection, evaluation and treatment plans for all unevaluated sites. *See id.* Dr. Sebastian testified that all tribes will have the opportunity to participate in these future consultations regardless of whether they participated in development of or signed the Programmatic Agreement:

Under the provisions of the Dewey- Burdock Project programmatic agreement, all of the tribes, whether they chose to participate in developing the programmatic agreement or not, whether they choose to sign the agreement as concurring or not, will have opportunities to participate in future consultations about identification of additional historic properties, the protection and evaluation of currently unevaluated properties, and plans for measures to avoid, minimize, and mitigate adverse effects.

See Powertech Ex. APP-063 at 9, ¶ A.14.

10.46 In addition to the protection measures included in the Programmatic Agreement, License Condition (LC) 9.8 of Powertech’s source and byproduct materials license requires Powertech to: (1) administer a cultural resources inventory before engaging in any development activity not previously assessed by the NRC, if such inventory has not been previously conducted and submitted to the NRC; (2) to cease any work resulting in the discovery of previously unknown cultural artifacts until such artifacts are inventoried and evaluated in accordance with 36 CFR Part 800 and until authorization to proceed has been issued by NRC, the SD SHPO and the BLM; and (3) to comply with the terms and conditions of the

Programmatic Agreement. *See* NRC Staff Ex. NRC-012 at 5-6 (LC 9.8). *See also* Tr. at 726-727 (Pugsley).

10.47 Powertech witness Fosha testified that Powertech also has a memorandum of agreement (MOA) with the State of South Dakota that requires Powertech to provide the State Historical Society, Archeological Research Center with routine updates on project activities. *See* Tr. at 867, lines 6-11. *See also* Tr. at 727, lines 1-3 (Pugsley). *See also* Tr. at 856-857 (Pugsley). The MOA is provided in Powertech’s license application as Appendix 2.4-B to the Technical Report (TR) and provides protections for unanticipated discoveries, including immediately stopping work in the event that historic or archeological sites are discovered or unanticipated effects on historic or archeological sites are found during any project phase. *See* Powertech Ex. APP-015-I at 395-401.

B. CONTENTION 1B: ADEQUACY OF CONSULTATION

1. Execution of the Programmatic Agreement by ACHP and SD SHPO Demonstrates that NRC Staff Met the Regulatory Requirements for Consultation under Section 106

10.48 NRC Staff witnesses Yilma and Jamerson testified that the Staff “consulted extensively, and in good faith, with interested tribes concerning historic resources at the Dewey-Burdock site.” *See* NRC Staff Ex. NRC-001 at 13, ¶ A1.13. Mss. Yilma and Jamerson testified that the chronology of consultations under the NHPA since 2010 is provided in NRC Staff Ex. NRC-015. *See id.* Mss. Yilma and Jamerson testified that the Staff’s consultation efforts began in March 2010 with the transmittal of initial consultation letters to 17 tribes and ended on April 7, 2014, with the finalization and execution of the Programmatic Agreement. *See id.* at 13-14, ¶ A1.14, *citing* NRC Staff Ex. NRC-015.

10.49 NRC Staff witness Yilma testified that the list of tribes with which the Staff consulted was originally provided by the SD SHPO. *See* Tr. at 768. *See also* Tr. at 771-772 (Dr. Hannus). Ms. Yilma testified that no attempt was made to prioritize the Tribes, because any tribe with historical ties to the area was viewed as having the same importance. *See* Tr. at 770-771. However, Ms. Yilma testified that the Staff recognized that the Oglala Sioux Tribe is in closest proximity to the Dewey-Burdock Project and therefore attempted to meet with them during an initial site visit in December 2009. *See* Tr. at 791, lines 1-7.

10.50 NRC Staff witnesses Yilma and Jamerson testified that consultation was carried out on a government-to-government basis. *See* NRC Staff Ex. NRC-001 at 14, ¶ A1.15. Mss. Yilma and Jamerson testified that the Staff consulted “only with individuals whom the tribes had designated as their representatives on issues arising under the NHPA.” *See id.* *See also* Tr. at 778, lines 12-23 (Yilma). In addition, Mss. Yilma and Jamerson testified that the Staff held a consultation meeting in Rapid City, SD for the purpose of meeting with tribal leaders in person. *See* NRC Staff Ex. NRC-001 at 14, ¶ A1.15.

10.51 NRC Staff witnesses Yilma and Jamerson testified that the Staff consulted extensively with the tribes during development of the Programmatic Agreement. *See* NRC Staff Ex. NRC-001 at 14-15, ¶ A1.16. Mss. Yilma and Jamerson testified that this began with notification of the intent to develop a programmatic agreement in December 2012 and continued with webinars to discuss the draft Programmatic Agreement. *See id.* *See also* Tr. at 828-829 (Dr. Luhman). *See also* Tr. at 830 (Dr. Sebastian). Mss. Yilma and Jamerson testified that many of the Programmatic Agreement revisions were made to address concerns raised by tribal representatives during the webinars. *See* NRC Staff Ex. NRC-001 at 14-15, ¶ A1.16-A1.17. *See also* ¶ 10.42, *supra*.

10.52 Consultation does not require agreement or signature by all consulting parties; consultation is defined as “the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.” *See* NRC Staff Ex. NRC-048 at 15. *See also* Tr. at 830, lines 1-6 (Dr. Sebastian).

10.53 Mss. Yilma and Jamerson testified that the ACHP, the agency charged with administering the NHPA, signed the Programmatic Agreement because it found that NRC Staff had met the consultation requirements under the NHPA. *See* NRC Staff Ex. NRC-001 at 13, ¶ A1.13, *citing* NRC Staff Ex. NRC-018-D. Mss. Yilma and Jamerson testified that the ACHP further documented its acceptance of the Staff’s consultation efforts in a letter to the Standing Rock Sioux Tribe, which states:

Based on the background documentation, the issues addressed during consultation, and the processes established in the [Programmatic Agreement], the ACHP has concluded that the content and spirit of the Section 106 process has been met by the NRC.

See id., *citing* NRC Staff Ex. NRC-031. *See also* Tr. at 837-840 (Dr. Hsueh).

10.54 Intervenor witness CatchesEnemy acknowledged that the ACHP is the principal agency charged with administering the NHPA and making determinations whether an agency has properly consulted under Section 106:

JUDGE COLE: Just a couple of questions. This is for Mr. CatchesEnemy. Do you acknowledge that the Advisory Council on Historic Preservation is the principal agency charged with administering the National Historic Preservation Act and in making determinations on whether an agency has properly consulted under Section 106?

MR. CATCHESENEMY: I acknowledge that is their role.

See Tr. at 860-861:

10.55 Powertech witness Dr. Sebastian testified that the statutory requirements of Section 106 require a federal agency to afford the ACHP a reasonable opportunity to comment

on the undertaking. *See* Powertech Ex. APP-001 at 4, ¶ A.5, *citing* 36 CFR Part 800. Dr. Sebastian testified that the execution statement for the Programmatic Agreement states that ACHP had the opportunity to comment. *See id.* at 14, ¶ A.43. Dr. Sebastian testified that execution of the Programmatic Agreement by the ACHP, which is the federal agency authorized in law to promulgate the regulations for Section 106, indicates that NRC has met the regulatory requirements for compliance with Section 106. *See id.* *See also* Powertech Ex. APP-063 at 9, ¶ A.16. *See also* Tr. at 870-871.

10.56 NRC Staff witnesses Yilma and Jamerson testified that the SD SHPO also signed the Programmatic Agreement, demonstrating that it also found acceptable the Staff's consultation efforts under the NHPA. *See* NRC Staff Ex. NRC-001 at 13, ¶ A1.13, *citing* NRC Staff Ex. NRC-018-G.

10.57 NRC Staff Ex. NRC-048, which is joint guidance published by CEQ and ACHP on integrating NEPA and Section 106, explains that an EIS is not a NEPA decision document; only the ROD is the decision document. *See* Tr. at 750, lines 15-18 (Clark), *citing* NRC Staff Ex. NRC-048 at 28. *See also* NRC Staff Ex. NRC-048 at 17: "Only the ROD is a decision document under the CEQ regulations." *See also id.* at 9: "When an EIS is prepared, the NEPA review process is concluded when a record of decision (ROD) is issued." NRC Staff witnesses Yilma and Jamerson testified that the Staff did not issue the ROD for the Dewey-Burdock Project, which is the NEPA decision document, until after the Programmatic Agreement was finalized. *See* NRC Staff Ex. NRC-001 at 88, ¶ A6.14.

C. CONTENTION 2: ADEQUATE DETERMINATION OF BASELINE GROUNDWATER QUALITY

1. Phased Acquisition of Baseline Groundwater Quality Data Is Provided for and Required by NUREG-1569

10.58 NUREG-1569 entitled *Standard Review Plan for In Situ Leach Uranium Extraction Facilities* (NRC Staff Ex. NRC-013) was issued for public comment in October 1997, was subsequently revised and a second draft issued for public comment in February 2002, and was finalized in June 2003. *See* Powertech Initial Position Statement at 9; *see also* NRC Staff Ex. NRC-013 at 3.

10.59. Powertech witness Lawrence testified that phased acquisition of baseline groundwater quality is consistent with NUREG-1569, which recognizes that certain site-wide data are required prior to license issuance in accordance with NUREG-1569 Section 2, while additional information will be obtained for each wellfield prior to operations in accordance with NUREG-1569 Section 5. *See* Powertech Ex. APP-037 at 11, ¶ A.26, *citing* NRC Staff Ex. NRC-013 at 36.

10.60 Powertech witness Demuth testified that in order to license an ISR facility, the applicant must demonstrate the adequacy of site characterization baseline groundwater quality in conformance with NUREG-1569 Section 2 and demonstrate appropriate procedures for establishing future baseline groundwater quality for each wellfield in conformance with NUREG-1569 Section 5. *See* Powertech Ex. APP-013 at 7, ¶¶ A.12-A.13.

10.61 Mr. Demuth further testified that the purpose of the future baseline groundwater quality that is obtained for each wellfield in conformance with NUREG-1569 Section 5 is not for site characterization, but (i) to define the primary aquifer restoration goal of returning each wellfield to its pre-operational water quality conditions (i.e., Commission-

approved background or CAB) and (ii) to provide a standard for determining when an excursion has occurred (i.e., to establish upper control limits or UCLs in monitoring wells). *See id.* at 8, ¶ A.17.

10.62 Mr. Demuth also testified that Powertech's procedures for establishing CAB, target restoration goals (TRGs) and UCLs for each wellfield are described in the license application and FSEIS. *See id.* at 9-10, ¶¶ A.18-A.19, *citing* Powertech Ex. APP-043 and NRC Staff Ex. NRC-008-B-1 at 86, 88-89. NRC Staff witnesses Prikryl and Lancaster testified that the wellfield-specific groundwater monitoring program described in FSEIS Section 7.3.1.1 is different from the baseline groundwater monitoring program described in FSEIS Section 3.5.3.5. *See* NRC Staff Ex. NRC-001 at 28, ¶ A.2.11.

10.63 Powertech witness Demuth testified that the procedures for establishing wellfield-specific CAB, TRGs, and UCLs are enforceable through license conditions (LC) 11.3 and 11.4, which require Powertech to follow the procedures in Section 5.7.8 of the approved license application. *See* Powertech Ex. APP-013 at 10, ¶ A.20, *citing* NRC Staff Ex. NRC-012 at 10 (LC 11.3 and 11.4) and Powertech Ex. APP-015-C at 350-370 (Revised TR Section 5.7.8).

10.64 Mr. Demuth testified that NRC Staff reviewed and documented its approval of the procedures for establishing wellfield-specific CAB, TRGs, and UCLs in the SER. *See* Powertech Ex. APP-013 at 10-11, ¶ A.21, *citing* NRC Staff Ex. NRC-134 at 181.

10.65 Intervenors have not challenged the procedures for establishing CAB, TRGs, and UCLs for each wellfield. *See* Tr. at 1302, lines 3-7 (Clark).

10.66 NRC Staff witnesses Prikryl and Lancaster testified that the data used to establish CAB and UCLs in individual wellfields for aquifer restoration and excursion monitoring purposes will be provided in wellfield hydrogeologic data packages to NRC Staff for

review and evaluation in accordance with LC 10.10. *See* NRC Staff Ex. NRC-001 at 51, ¶ A.3.9, *citing* NRC Staff Ex. NRC-012 at 8-9 (LC 10.10).

10.67 Powertech witness Lichnovsky testified that LC 10.10 specifies that the hydrogeologic data packages for wellfields B-WF6, B-WF7, and B-WF8 must be submitted to NRC Staff for review and approval, which requires a license amendment and an opportunity for a public hearing, while the remaining wellfield packages must be submitted for review and written verification. *See* Powertech Ex. APP-074 at 12, ¶ A.19, *citing* NRC Staff Exs. NRC-012 at 8-9 (LC 10.10) and NRC-008-A-2 at 69 (FSEIS). *See also* Tr. at 1131-1133 (Clark).

10.68 All wellfield hydrogeologic data packages and other data submitted to NRC Staff will be made available for public review unless portions are determined to be proprietary and withheld from public view consistent with 10 CFR 2.390; the vast majority of the data will be publicly available on the NRC's Agency-wide Documents Access Management System (ADAMS). *See* Tr. at 1134, lines 10-15 (Clark). Powertech witness Demuth testified that to his knowledge, post-license, pre-operational groundwater quality data for each wellfield will be publicly available. *See* Tr. at 1012, lines 4-8.

10.69 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 2.1.1.1.2.3.4 documents the procedures that Powertech will follow to prepare and submit wellfield hydrogeologic data packages and that it is standard practice for operators of NRC-licensed ISR facilities to submit the data packages after license issuance but prior to operating each wellfield. *See* NRC Staff Ex. NRC-001 at 51, ¶ A3.9.

10.70 Powertech witness Demuth testified that the same phased process for baseline data acquisition has been used throughout the U.S. uranium ISR industry for years and has been recently approved by the NRC in source and byproduct materials licenses issued for the Moore

Ranch Project (SUA-1596, issued 2010), Nichols Ranch Project (SUA-1597, issued 2011), and Lost Creek Project (SUA-1598, issued 2011). *See* Powertech Ex. APP-013 at 11, ¶ A.23.

10.71 Mr. Demuth testified that NRC Staff's well-documented position is that pre-license construction of a wellfield monitoring network necessary to establish CAB, TRGs, and UCLs is prohibited under 10 CFR 40.32(e). *See id.* at 11, ¶ A.22, *citing* NRC Staff Ex. NRC-013 at 28 and Powertech Ex. APP-024 at 1. *See also* Tr. at 1029-1030 (Demuth).

2. The FSEIS and SER Demonstrate that the License Application Satisfied Applicable NUREG-1569 Acceptance Criteria

10.72 NUREG-1569 serves as NRC Staff's interpretation of its 10 CFR Part 40 regulations and Appendix A Criteria as applied to ISR license applications. *See* Powertech Initial Position Statement at 10. NRC Staff has provided legal citations to Commission precedent demonstrating that guidance such as NUREG-1569 is to be accorded special weight and treatment when evaluating the adequacy of NRC-approved licensing actions. *See* Tr. at 1301-1302 (Clark), *citing* *Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC at 314, Note 78; *Private Fuel Storage*, CLI-02-22, 50 NRC at 264; and *Yankee Atomic Electric Co.*, CLI-05-15, 61 NRC at 375, Note 26.

10.73 Furthermore, NUREG-1569 was unanimously approved by the Commission on May 7, 2003, and therefore should be considered official Commission guidance. *See* United States Nuclear Regulatory Commission, *Staff Requirements-SECY-02-0204-Update of Uranium Recovery Guidance Documents* (May 7, 2003).

10.74 NUREG-1569 includes guidance for determining whether an applicant has provided enough environmental information for the Staff to comply with NEPA; NUREG-1569 Table 1 identifies which sections are relevant to the Staff's safety and environmental reviews. *See* Tr. at 1300, lines 5-14 (Clark), *citing* NRC Staff Ex. NRC-013 at 29-31.

10.75 Powertech witness Demuth testified that NUREG-1569 Section 2 contains acceptance criteria for adequate site-wide baseline groundwater quality characterization that is performed as part of the license application. *See* Powertech Ex. APP-013 at 7, ¶¶ A.12-A.13.

10.76 Powertech witness Lawrence testified that NUREG-1569 Section 2.7.1(4) specifies that a license application should contain an assessment of groundwater quality within and adjacent to the proposed project boundary, including quantitative description of chemical and radiological characteristics, and should describe potential changes in groundwater quality caused by operations. *See* Powertech Ex. APP-037 at 5, ¶ A.9, *citing* NRC Staff Ex. NRC-013 at 59. Mr. Lawrence testified that the FSEIS and license application describe baseline groundwater quality for 31 wells sampled for baseline groundwater quality assessment, including 22 wells inside the project boundary and 9 wells outside of the project boundary, and that the FSEIS also addresses potential changes in water quality caused by operations. *See id.* at 6-7, ¶¶ A.10-A.15, *citing* NRC Staff Exs. NRC-008-A-1 at 124-125, 195, 210-213 and NRC-008-A-2 at 62, 64, 109 and Powertech Exs. APP-016-M at 926-1072, APP-016-N through APP-016-Q, and APP-021-C at 75.

10.77 Powertech witness Lawrence testified that NUREG-1569 Acceptance Criterion 2.7.3(4) specifies that a license application should contain “reasonably comprehensive” chemical and radiochemical groundwater quality analyses. *See* Powertech Ex. APP-037 at 7, ¶ A.17, *citing* NRC Staff Ex. NRC-013 at 62. Mr. Lawrence testified that “reasonably comprehensive” refers to the list of constituents analyzed in baseline groundwater quality samples, that NUREG-1569 Table 2.7.3-1 provides a list of constituents accepted by NRC Staff for ISR license applications, and that Powertech analyzed samples for all 34 parameters in this table plus many additional parameters. *See id.* at 8, ¶¶ A.18-A.20, *citing* NRC Staff Ex. NRC-

013 at 63 and Powertech Ex. APP-016-M at 926-1072. NRC Staff witnesses Prikryl and Lancaster also testified that Powertech’s license application includes analyses of all of the chemical constituents in Table 2.7.3-1 of NUREG-1569 and that the Staff considered all of the data when preparing the FSEIS, and thus complied with NEPA without needing to summarize all of the data in the FSEIS. *See* NRC Staff Ex. NRC-001 at 23, ¶ A2.7.

10.78 Powertech witness Lawrence testified that NUREG-1569 Acceptance Criterion 2.7.3(4) specifies that a license application should describe groundwater quality within and at locations away from the mineralized zone. *See* Powertech Ex. APP-037 at 7, ¶ A.17, *citing* NRC Staff Ex. NRC-013 at 62. Mr. Lawrence testified that the license application depicts the locations of the sampled wells with respect to the generalized uranium recovery areas; indicates which wells are upgradient, near or downgradient of proposed ISR activities; and provides sample results for all of these wells. *See id.* at 8, ¶ A.21, *citing* Powertech Exs. APP-015-B at 348 and APP-016-M at 926-1072.

10.79 Powertech witness Lawrence testified that NUREG-1569 Acceptance Criterion 2.7.3(4) specifies that a license application should show that water samples were collected by acceptable sampling procedures such as ASTM D4448. *See* Powertech Ex. APP-037 at 7, ¶ A.17, *citing* NRC Staff Ex. NRC-013 at 62. Mr. Lawrence testified that the sampling methods that are described in the license application are consistent with ASTM D4448 methodology and are “standard environmental sampling procedures commonly used at uranium ISR facilities and other industrial sites undergoing environmental monitoring of groundwater or surface water.” *See id.* at 9, ¶¶ A.23-24, *citing* Powertech Exs. APP-015-B at 347, 349-350 and APP-015-C at 91-93. NRC Staff witnesses Prikryl and Lancaster testified that Powertech’s

sampling methods “were consistent with standard industry practice.” *See* NRC Staff Ex. NRC-001 at 24, ¶ A2.8.

10.80 Powertech witness Lawrence testified that the SER documents NRC Staff’s determination that Powertech’s license application satisfied NUREG-1569 Section 2.7.3 acceptance criteria. *See* Powertech Ex. APP-037 at 10, ¶ A.25, *citing* NRC Staff Ex. NRC-134 at 63. NRC Staff witnesses Prikryl and Lancaster also testified that the information in Powertech’s license application is consistent with acceptance criteria in NUREG-1569 Section 2.7.3(4). *See* NRC Staff Ex. NRC-001 at 36-37, ¶ A2.18.

10.81 Intervenors have not challenged NRC Staff’s application of various sections of NUREG-1569 “to determine that Powertech did in fact provide enough information in support of its application” to satisfy applicable NUREG-1569 acceptance criteria. *See* Tr. at 1301, lines 2-7 (Clark).

3. The License Application Demonstrates Compliance with 10 CFR Part 40, Appendix A, Criterion 7

10.82 Powertech witness Lawrence testified that NUREG-1569 Sections 2.7.3 and 2.9.3 acceptance criteria are used by NRC Staff as the guidance for complying with the pre-operational baseline groundwater quality characterization requirements in 10 CFR Part 40, Appendix A, Criterion 7 and that Powertech has complied with the requirement in Criterion 7 to provide “complete baseline data on a milling site and its environs” by demonstrating conformance with applicable NUREG-1569 acceptance criteria. *See* Powertech Ex. APP-037 at 10-11, ¶ A.26.

10.83 NRC Staff witnesses Prikryl and Lancaster testified that Powertech’s license application complied with Criterion 7:

Based on the information provided, Powertech's approach for defining preoperational baseline water quality meets Criterion 7 in 10 C.F.R. Part 40, Appendix A. Under Criterion 7, at least one full year prior to any major site construction, the applicant or licensee must conduct a preoperational monitoring program to provide complete baseline data on a milling site and its environs.

See NRC Staff Ex. NRC-001 at 17, ¶ A2.3.

4. The License Application Properly Considered Regulatory Guide 4.14

10.84 Powertech witness Lawrence testified that Powertech has committed in its license application to conduct pre-operational and operational monitoring for private water supply wells within two kilometers (2 km) of wellfield boundaries and that this commitment is enforceable by LC 12.10. *See* Powertech Ex. APP-037 at 11, ¶ A.27, *citing* NRC Staff Ex. NRC-012 at 13 (LC 12.10).

10.85 NRC Staff witnesses Prikryl and Lancaster testified that Powertech's approach for defining preoperational baseline water quality is consistent with Regulatory Guide 4.14, which recommends that groundwater samples "be collected quarterly from each well within two kilometers of the tailings area that is or could be used for drinking water, water for livestock, or crop irrigation." *See* NRC Staff Ex. NRC-001 at 18, ¶ A2.3, *citing* NRC Staff Ex. NRC-074 at 5.

10.86 Powertech witness Lawrence testified that NRC Staff's justification for applying the 2-km guidance in Regulatory Guide 4.14 to ISR wellfields is documented in the SER and validated in NUREG/CR-6705. *See* Powertech Ex. APP-037 at 12, ¶¶ A.28-A.29, *citing* NRC Staff Ex. NRC-134 at 61-62. NRC Staff witnesses Prikryl and Lancaster similarly testified that the 2-km guideline was validated in NUREG/CR-6705 based on examination of radiological plume dispersion from mill tailings disposal areas at Uranium Mill Tailings Remedial Action

(UMTRA) sites in the U.S. *See* NRC Staff Ex. NRC-001 at 29, ¶ A.2.12, *citing* NRC Staff Ex. NRC-076.

10.87 Powertech witness Lawrence testified that applying the 2-km radius from Regulatory Guide 4.14 to the perimeter monitor well ring rather than the wellfield pattern area is a conservative application of the guidance, since it is ISR injection wells and not the perimeter monitoring wells that are the potential temporary source of groundwater contamination. *See* Powertech Ex. APP-037 at 12, ¶ A.30. Mr. Lawrence also testified that application of the 2-km radius to the Dewey-Burdock Project is consistent with other recently issued NRC licenses. *See id.*

10.88 NRC Staff witnesses Prikryl and Lancaster testified that the 2-km radius for sampling private water supply wells is sufficient based on data from NRC-licensed ISR facilities that show there are no reported instances of groundwater contamination beyond 2 km from any ISR wellfields. *See* NRC Staff Ex. NRC-001 at 29-30, ¶ A.2.12, *citing* NRC Staff Ex. NRC-075.

5. NRC Staff Evaluated Baseline Groundwater Quality Data in Accordance with NEPA Requirements

10.89 NRC Staff witnesses Prikryl and Lancaster testified that data considered when preparing the FSEIS, which is summarized in FSEIS Section 3.5.3.5, allowed NRC Staff to characterize the affected environment and assess the project's reasonably foreseeable impacts as required by NEPA. *See* NRC Staff Ex. NRC-001 at 18, ¶ A.2.3.

10.90 NRC Staff witnesses Prikryl and Lancaster testified that satisfaction of NUREG-1569 Section 2.7.3 acceptance criteria provided sufficient groundwater quality information to assess the project's potential environmental impacts on groundwater resources as required by NEPA:

The Staff also found that the sampling and analytical methods used to determine baseline groundwater quality were consistent with Section 2.7.3 of NUREG-1569 (Ex. NRC-013). Section 2.7.3 of NUREG-1569 provides guidance that is relevant to an ISR applicant's submittal of both its Technical Report and Environmental Report. In particular, Section 2.7.3 explains how an applicant can comply with 10 C.F.R. § 51.45(b), which requires that the applicant submit an Environmental Report that provides, among other information, 'a description of the environment affected.' Because Powertech's sampling and analytical methods were consistent with those described in Section 2.7.3, the Staff found that the quality of the baseline groundwater data presented in the FSEIS was adequate for use in assessing the Dewey-Burdock Project's environmental impacts on groundwater resources.

See NRC Staff Ex. NRC-001 at 25, ¶ A.2.8.

10.91 Regarding the presentation of baseline groundwater quality data in the FSEIS, NRC Staff witnesses Prikryl and Lancaster testified that the purpose of FSEIS Table 3.5-4 is "not to comprehensively address all groundwater constituents" but instead "to present pertinent information on constituents that are most likely to impact environmental health and safety." See NRC Staff Ex. NRC-001 at 22, ¶ A2.6. Further, Messrs. Prikryl and Lancaster testified that Powertech's license application "does include analyses of all of the chemical constituents listed in Table 2.7.3[-]1 of NUREG-1569 and FSEIS Table 7.3-1." See *id.* at 23, ¶ A2.7. As previously described, Messrs. Prikryl and Lancaster testified that NRC Staff considered all of the data when preparing the FSEIS, and thus complied with NEPA without needing to summarize all of the data in the FSEIS. See *id.*

6. Potential Groundwater Quality Impacts from Historical Mining Were Assessed to the Extent Required

10.92 NRC Staff witnesses Prikryl and Lancaster testified that "[p]reoperational baseline is a general description of the *existing* environmental conditions within and adjacent to a project area" and "[t]he purpose of defining preoperational baseline water quality is not to evaluate the impacts of *past* uranium mining activities on water resources." See NRC Staff Ex. NRC-001 at 19, ¶ A2.4 (emphasis added). Messrs. Prikryl and Lancaster further testified that

FSEIS Chapter 5 addresses potential environmental impacts from past uranium mining activities in accordance with CEQ regulations, which specify that environmental impacts from past actions are assessed as “cumulative effects” as defined in 40 CFR § 1508.7. *See id.* at 20, ¶ A2.4. *See also* NRC Staff Ex. NRC-151 at 13-14, ¶ A2.1 (Prikryl and Lancaster). *See also* NRC Staff Ex. NRC-174 at 7, ¶ A14 (Prikryl and Lancaster), *citing* NRC Staff Ex. NRC-008-A-2.

10.93 Powertech witness Lawrence testified that Powertech’s license application presents a comparison between historical and recent groundwater quality data sets from nine wells in the Fall River and/or Chilson aquifers that were sampled by the Tennessee Valley Authority in 1979-1984 and by Powertech in 2007-2008. *See* Powertech Ex. APP-066 at 3, ¶ A.1. Mr. Lawrence testified that a statistical and graphical comparison between the historical and recent data sets does not provide any indication of widespread groundwater quality degradation within or near the project area as a result of historical mining and exploration activities. *See id.*

10.94 Powertech witness Lawrence testified that the Keene (1973) report in Tribe Ex. OST-008 provides further evidence that water quality in the project area has not been degraded, since the range of total dissolved solids (TDS) values observed in the Fall River and Chilson aquifer wells sampled by Powertech within the project area is consistent with the range observed in these aquifers in other areas where no uranium mining took place. *See id.* at 3-4, ¶ A.1.

7. Potential Impacts from Black Hills Army Depot Were Assessed to the Extent Required

10.95 Powertech witness Lawrence testified that the NRC Staff evaluated the potential impacts from the Black Hills Ordnance Depot (also referred to as the Black Hills Army Depot) and concluded in the SER and FSEIS that any contamination from the Depot has not and

will not impact groundwater quality at the Dewey-Burdock Project, since the Depot is 14 miles hydraulically downgradient from the Dewey-Burdock Project and groundwater impacts from the Depot are limited to shallow aquifers that are hydraulically separated from the Fall River Formation by over 1,000 feet of low-permeability shales. *See* Powertech Ex. APP-066 at 4, ¶ A.1, *citing* NRC Staff Exs. NRC-134 at 44-46 (Section 2.3.3.6), NRC-008-A-2 at 600-601, and NRC-008-B-2 at 610-611.

10.96 NRC Staff witnesses Prikryl and Lancaster testified that the Staff evaluated activities at the Black Hills Army Depot and assessed the potential environmental impacts from these activities in Chapter 5 of the FSEIS. *See* NRC Staff Ex. NRC-151 at 13-14, ¶ A2.1. Mr. Prikryl testified that the FSEIS concluded that there will not be any impacts to or from the Depot based on its distance from the Dewey-Burdock Project, the fact that it is downgradient and consideration of the monitoring and mitigation measures that will be implemented at the Dewey-Burdock Project, including the requirement to maintain an inward hydraulic gradient. *See* Tr. at 1280-1281, *citing* NRC Staff Ex. NRC-008-A-2 at 294-295.

10.97 NRC Staff witness Lancaster testified that the SER documents the Staff's evaluation of whether the Dewey-Burdock Project could mobilize contamination from the Black Hills Army Depot and that the findings in the SER were considered when preparing the FSEIS. *See* Tr. at 1286, lines 13-22, *citing* NRC Staff Ex. NRC-134 at 44-46. NRC Staff witness Yilma also testified that this was the case, stating that "the safety review informs the NEPA review, the environmental review so, therefore, yes, we did consider the impacts." *See* Tr. at 1286-1287.

10.98 Intervenors have not submitted any evidence that the Black Hills Army Depot near Igloo, South Dakota has impacted the baseline groundwater quality at the Dewey-Burdock Project:

DR. MORAN: We have not submitted any information about the -- what will we call it, the Igloo site. What's the other term for that site? Yes. Well, we don't have any specific data. I do not anyway. We haven't submitted any for that.

See Tr. at 1010, lines 15-19.

8. Complete Historical and Recent Groundwater Quality Data Were Included in the License Application

10.99 Powertech witness Lawrence testified that tables providing complete baseline field and laboratory groundwater quality data for sampling conducted by Powertech and its contractors are provided in the license application. *See* Powertech Ex. APP-037 at 13-14, ¶ A.33, *citing* Powertech Ex. APP-016-M at 926-1072. Mr. Lawrence further testified that historical data collected by TVA in 1979-1984 are provided in TR Appendix 2.7-J. *See id.*, *citing* Powertech Ex. APP-021-DD at 285-295. Mr. Lawrence also testified that baseline groundwater quality laboratory analytical results are provided in Appendix 2.7-H of the license application, stating that:

In all, results are reported for over 19,000 chemical and radiological parameters for groundwater samples (not including duplicate and split samples), which represents a site-wide, quantitative description of baseline groundwater quality within and adjacent to the project boundary.”

See id. at 6, ¶ A.12, *citing* Powertech Ex. APP-016-N through APP-016-O.

10.100 NRC Staff witnesses Prikryl and Lancaster testified that Powertech reported groundwater quality values in the format requested by NRC Staff to “present the minimum, maximum, and mean concentrations for each parameter at each sample location” and to “report the mean, standard deviation, minimum, and maximum values for each constituent in four water-bearing zones monitored for preoperational baseline water quality.” *See* NRC Staff Ex. NRC-001 at 27, ¶ A2.10.

9. Baseline Groundwater Quality Data Are Presented as Unbiased, Factual Values

10.101 Powertech witness Lawrence testified that the “pre-license baseline water quality data are presented in the license application as factual data” by providing all baseline groundwater quality sample results and summaries of all results by well and by formation in Appendix 2.7-G of the license application. *See* Powertech Ex. APP-037 at 14, ¶ A.34, *citing* Powertech Ex. APP-016-M at 926-1072.

10.102 Powertech witness Lawrence testified that FSEIS Section 3.5.3.5 describes baseline groundwater quality sample results from the various aquifers and describes which sample results exceeded EPA maximum contaminant levels (MCLs) and secondary standards. *See* Powertech Ex. APP-037 at 14. Mr. Lawrence testified that “[t]he fact that over 90% of the sampled wells across all aquifers exceed one or more EPA primary drinking water standard is supported by the data presented in the license application.” *See id.*

10.103 NRC Staff witnesses Prikryl and Lancaster testified that the Staff’s comparison of groundwater quality results with MCLs in FSEIS Section 3.5.3.5 is “logical to inform the public as to whether existing conditions are such that the water might be used as a source of drinking water for public or private use.” *See* NRC Staff Ex. NRC-001 at 20-21, ¶ A2.5. Further, NUREG-1569 recommends comparing groundwater quality sample results to EPA MCLs for ease of comparison to common standards:

All water quality data submitted to NRC should ...[b]e submitted in tabular form with the appropriate standards (i.e., EPA national interim primary drinking water regulations, livestock standards, baseline or excursion levels, or 10 CFR Part 20, Maximum Permissible Concentrations) listed in the same table, for ease of data comparison.

See NRC Staff Ex. NRC-013 at 71 (footnote omitted).

10.104 Powertech witness Lawrence testified that it is not necessary to demonstrate that baseline groundwater quality exceeds EPA MCLs in order to permit/license the Dewey-

Burdock Project, since Powertech's requested aquifer exemption from EPA is not based on groundwater quality but on the basis that 1) the proposed exempted aquifer does not currently serve as a source of drinking water, and 2) the proposed exempted aquifer is capable of producing minerals and contains minerals that are expected to be commercially producible. *See* Powertech Ex. APP-037 at 15, ¶ A.35, *citing* Powertech Ex. APP-042-D at 56.

10.105 NRC Staff witnesses Prikryl and Lancaster similarly testified on the basis for the aquifer exemption and testified that the aquifer exemption is permanent:

As the Staff explains in FSEIS Section 2.1.1.1.2.3.1, before ISR operations begin, the portion of the aquifer(s) designated for uranium recovery must be exempted from the Underground Source of Drinking Water (USDW) designation, in accordance with the Safe Drinking Water Act (SDWA) and pursuant to 40 CFR Part 146. An aquifer or aquifer portion that meets the criteria for an USDW may be determined to be an "exempted aquifer" if (i)(a) it does not currently serve as a source of drinking water and (b) it cannot now and will not in the future serve as a source of drinking water because it is mineral-, hydrocarbon- or geothermal-energy-producing; or (ii) it can be demonstrated by an applicant as part of a permit application for a Class III operation to contain minerals that, considering their quantity and location, are expected to be commercially producible. Hence, groundwater in exempted aquifers cannot be considered a source of drinking water even after aquifer restoration is complete.

See NRC Staff Ex. NRC-151 at 42, ¶ A3.15.

10.106 Regarding the allegation that the historical TVA groundwater quality data should have been included to establish the pre-operational baseline groundwater quality, NRC Staff witnesses Prikryl and Lancaster testified that pre-operational baseline describes existing environmental conditions and should not include historical data, which might bias the data set. *See* NRC Staff Ex. NRC-001 at 26, ¶ A2.10. *See also* Tr. at 1036, lines 5-17 (Prikryl).

10.107 Regarding the allegation that groundwater quality data are not reliable because they were collected by Powertech and its contractors, Powertech witness Lawrence testified that the USGS conducted an independent analysis of 28 groundwater samples from monitor wells in and around the project area in 2011 and "[d]id not find any major differences" from Powertech's

groundwater quality evaluation. *See* Powertech Ex. APP-037 at 10, ¶ A.24, *citing* Powertech Exs. APP-022 and APP-023 at 14.

10. The License Application Includes a Detailed Inventory of Wells within 2 km of the License Boundary

10.108 NRC Staff witnesses Prikryl and Lancaster testified that Powertech’s license application provides detailed information on wells within 2 km of the license area, including well location, well use, and the aquifer within which each well is screened. They further testified that the well inventory is summarized in FSEIS Section 4.5.2.1.1.2.2. *See* NRC Staff Ex. NRC-001 at 35, ¶ A2.16, *citing* Powertech Ex. APP-016-B at 58-67 and NRC Staff Ex. NRC-008-A-2 at 60.

11. The FSEIS Appropriately Distinguishes between Baseline and Background Groundwater Quality

10.109 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS appropriately distinguishes between the terms “background” and “baseline” in that “baseline” is used to “describe the environmental conditions defined by preoperational monitoring and sampling programs,” while “background” describes “the establishment of Commission-approved background water quality prior to commencing operations in individual wellfields.” *See* NRC Staff Ex. NRC-001 at 30-31, ¶ A2.13. Messrs. Prikryl and Lancaster further testified that the wells used to establish CAB are not part of Powertech’s pre-operational baseline sampling program. *See id.* at 36, ¶ A2.17.

D. CONTENTION 3: HYDROGEOLOGICAL CHARACTERIZATION

1. Phased Acquisition of Hydrogeologic Data is Provided for and Required by NUREG-1569

10.110 Powertech witness Demuth testified that license applicants must provide site-wide hydrogeologic characterization data in accordance with Section 2 of NUREG-1569 along with the procedures for establishing hydrogeologic information for each wellfield in accordance with Section 5 of NUREG-1569, noting that “[t]he latter information is not required to assess the potential impacts to groundwater but instead to confirm that proper operational and monitoring procedures are followed to prevent groundwater contamination.” *See* Powertech Ex. APP-013 at 13, ¶ A.27.

10.111 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS distinguishes between the project-wide hydrogeologic information in FSEIS Sections 3.4 and 3.5 and the procedures described in FSEIS Section 2.1.1.1.2.3.4 for collection and submission of wellfield-specific data associated with wellfield hydrogeologic data packages. *See* NRC Staff Ex. NRC-001 at 41, ¶ A3.4. Messrs. Prikryl and Lancaster further testified that it is standard practice for operators of NRC-licensed ISR facilities to submit the data packages after license issuance but prior to operating each wellfield and that the submission of such data packages is required by LC 10.10 of Powertech’s license. *See id.* at 42, ¶ A3.4. Messrs. Prikryl and Lancaster testified that “[b]ased on the current information and this license condition, the Staff is able to comply with NEPA by assessing the reasonably foreseeable effects of the Dewey-Burdock Project on groundwater resources.” *See id.*

2. Site Hydrogeology is Adequately Characterized

10.112 Powertech Witness Lawrence testified that the license application was significantly updated with the June 2011 TR RAI responses with respect to four key issues identified by NRC Staff, including:

- Potential for surface water to be spring fed with production zone groundwater through unplugged exploratory drill holes.
- Potential hydraulic influence of operations on newly identified underground mine workings within or in close proximity to revised wellfield areas.
- Potential inadequate hydraulic containment of production fluids from proposed operations.
- Potential inadequate hydraulic containment of production fluids from the hydraulic effects of potential breccia pipes.

See Powertech Ex. APP-037 at 16, ¶ A.37, *citing* Powertech Ex. APP-044 at 1. Mr. Lawrence further testified that “[w]ith the added information, the license application addresses all of the allegations that were made by intervenors under this contention in 2010 and subsequently applied to the DSEIS in 2013 and FSEIS in 2014.” *See id.*

10.113 NRC Staff witness Prikryl testified that the “Staff addressed the hydrologic characteristics of regional aquifer systems, aquifer systems in the vicinity of the proposed Dewey-Burdock project site, and uranium-bearing aquifers at the project site in FSEIS Sections 3.5.3.1, 3.5.3.2, and 3.5.3.3, respectively.” *See* NRC Staff Ex. NRC-001 at 40, ¶ A3.3.

10.114 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS portrays the groundwater flow direction in various aquifers by evaluating potentiometric surface maps for the Fall River and Chilson aquifers presented in Powertech’s license application. *See id.* at 43, ¶ A3.5(1), *citing* Powertech Ex. APP-015-B at 288-289 (Figures 2.7-16 and 2.7-17). Powertech witness Lawrence testified that the February 2012 numerical groundwater model provides additional information on regional and local flow patterns in the Fall River and Chilson aquifers, including updating potentiometric surface maps and evaluating regional flow patterns based on

published USGS studies. *See* Powertech Ex. APP-037 at 32, ¶ A.74, *citing* Powertech Ex. APP-025 at 2, 36-37.

10.115 Powertech witness Lawrence testified that the license application complies with applicable NUREG-1569 acceptance criteria with respect to hydrogeologic characterization. *See* Powertech Ex. APP-037 at 16-19, ¶¶ A.38-A.43. Mr. Lawrence testified that the FSEIS and numerical groundwater model describe the hydraulic properties of the aquifers in and around the project area in conformance with NUREG-1569 Section 2.7.1(3). *See id.* at 16-17, ¶A.38, *citing* NRC Staff Ex. NRC-008-A-1 at 202-208 and Powertech Ex. APP-025 at 15-17. Also with respect to NUREG-1569 Section 2.7.1(3), Mr. Lawrence testified that the FSEIS and license application describe hydrogeologic information relative to the control and prevention of excursions. *See id.* at 17-18, ¶ A.39. With respect to NUREG-1569 Section 2.7.2, Mr. Lawrence testified that the SER and FSEIS document NRC Staff’s review of Powertech’s conceptual and numerical groundwater models. *See id.* at 18-19, ¶¶ A.40-A.43.

10.116 Powertech witness Lawrence testified that the SER documents NRC Staff’s determination that the hydrogeologic information presented in Powertech’s license application satisfied NUREG-1569 Section 2.7.3 acceptance criteria. *See* Powertech Ex. APP-037 at 37, ¶ A.87, *citing* NRC Staff Ex. NRC-134 at 67.

3. The License Application and FSEIS Demonstrate Adequate Hydrogeological Isolation of the Production Zone Aquifers

10.117 Powertech witness Demuth testified that “[i]nformation in the license application and FSEIS demonstrates that the Fall River and Chilson aquifers are sufficiently isolated hydrologically such that ISR operations can be safely conducted in accordance with the NRC license.” *See* Powertech Ex. APP-013 at 14, ¶ A.31.

10.118 Powertech witness Demuth testified that the FSEIS and license application describe the three major confining units with respect to the Inyan Kara aquifer, including: 1) the overlying Graneros Group, which is up to 550 feet thick and present across the project area except where eroded in the eastern edge of the project area, 2) the Fuson Shale between the Fall River and Chilson aquifers, which is 20 to 80 feet thick throughout the project area, and 3) the underlying Morrison Formation, which is 60 to 140 feet thick throughout the project area. *See id.* Powertech witness Lawrence provided citations to the FSEIS and license application for descriptions of the thickness and confining properties of these major confining units. *See* Powertech Ex. APP-037 at 17-18, ¶ A.39. NRC Staff witnesses Prikryl and Lancaster testified that they closely reviewed the structure contour and isopach maps of the geologic units presented in Powertech’s revised Technical Report as part of the Staff’s “hard look” to assess the potential environmental impacts that “site-specific geologic and hydrologic features could have on groundwater resources.” *See* NRC Staff Ex. NRC-175 at 13, ¶ A 23. Messrs. Prikryl and Lancaster testified that the Staff’s review of the borehole log data disclosed by Powertech in September 2014 allowed them to “evaluate the validity of structure maps presented in Powertech’s revised Technical Report” and to “evaluate potential displacement and thickness variations in the Fuson Shale.” *See id.* at 15, ¶ A27, *citing* NRC Staff Ex. NRC-158 at 6-12.

10.119 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS addresses the potential for regional hydraulic communication between aquifers in Sections 3.4.1.2 and 3.4.3, the potential for hydraulic communication between the Inyan Kara and Minnelusa aquifers through breccia pipes in FSEIS Section 3.5.3.1, and the extent of potential long-term hydraulic connections between geologic units at the project site in response to public comments in Section E5.21.2. *See* NRC Staff Ex. NRC-001 at 43-44, ¶ A3.5(2). Messrs. Prikryl and Lancaster

testified that the FSEIS considers various potential pathways for groundwater movement including “[h]istorical exploration borings, abandoned mine pits, and breccia pipes.” *See id.*

They conclude that:

The aforementioned information is sufficient to characterize the Dewey-Burdock hydrogeology and predict the extent of long-term hydraulic connections between geologic units, both within and outside the Dewey-Burdock area.

See id.

10.120 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS considers the “interbedded and inter-fingering nature of sediments” within the Fall River and Chilson aquifers and that “groundwater may flow between the interbedded sediments when stressed by long-term pumping.” *See id.* at 50, ¶ A3.9. Powertech witness Lawrence testified that the effects of inter-fingering sediments are accounted for in the numerical groundwater model on a site-wide basis, since “[i]f any such features had significant effects on the site-wide hydrogeology it would not have been possible to calibrate and verify the model as was done in this case.” *See* Powertech Ex. APP-037 at 39-40, ¶ A.95.

10.121 Powertech witness Lawrence testified that the Fall River Formation and Chilson Member of the Lakota Formation, which are the targets for uranium ISR, are of fluvial depositional origin typical of other ISR facilities in Wyoming, Nebraska and Texas. *See id.* at 20-21, ¶ A.46. Mr. Lawrence further testified that the ISR GEIS (NUREG-1910) provides supporting information that the fluvial depositional systems found at the Dewey-Burdock Project are also found at most or all ISR facilities in Wyoming, South Dakota, Nebraska, and New Mexico. *See id.*, citing NRC Staff Ex. NRC-010-A-2 at 8.

10.122 Powertech witness Demuth testified that hydraulic isolation between the Fall River and Chilson aquifers due to the intervening Fuson Shale is demonstrated by differing potentiometric water level elevations in paired wells completed in the two aquifers, since the

water level elevations should be similar if there were a strong hydraulic connection between the aquifers. *See* Powertech Ex. APP-013 at 15, ¶ A.32, *citing* Powertech Ex. APP-017 at 3.

10.123 Powertech witness Lawrence provided testimony regarding the confining properties of the Fuson Shale with respect to historical and recent aquifer pump test results. *See* Powertech Ex. APP-037 at 34-36, ¶¶ A.80-A.83. Mr. Lawrence testified that the reported “leaky aquifer” response in the 1979 TVA tests in the Burdock area and 2008 Powertech test in the Chilson aquifer is attributed to: (1) a nearby well completed in both the Fall River and Chilson aquifers, and/or (2) unplugged or improperly plugged boreholes in a limited area near the tests. *See id.* at 35, ¶¶ A.81-A.82. Mr. Lawrence testified that the authors of the TVA pumping test report specifically state that the response in the Fall River aquifer to pumping in the Chilson aquifer must be indicative of direct flow from one to another:

The fact that a greater pumping response is observed in [the] Fall River formation than in the Fuson during the early part of the test indicates that direct (though restricted) avenues through the Fuson must exist. This condition was suspected before the test, and is believed to be the result of numerous old, unplugged uranium exploration boreholes in the test vicinity.

See id. at 35, ¶ A.80, *citing* Powertech Ex. APP-016-R at 26. Mr. Lawrence further testified that Powertech confirmed that well 668, which was installed by TVA for the pumping tests, is screened across the Chilson and Fall River aquifers and that a difference in potentiometric head between the two aquifers was observed when Powertech placed a temporary plug between the Fall River and Chilson completion intervals in this well. *See id.* at 35-36, ¶ A.83, *citing* Powertech Ex. APP-015-C at 299. Mr. Lawrence further testified that the use of an inflatable packer to isolate the Fall River and Chilson aquifers during the TVA pump tests may have resulted in flawed results. *See* Tr. at 1052-1053.

10.124 Powertech witness Demuth testified that the TVA pumping tests were used to evaluate the potential for underground mining and were conducted at much higher pumping rates

than are proposed for ISR operations. *See* Tr. at 1053, lines 15-22. *See also* Tr. at 1060-1061 (Lawrence).

10.125 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 3.5.3.2 documents Powertech's conclusion based on numerical groundwater modeling results that the hydraulic connection between the Fall River and Chilson aquifers through the Fuson Shale that was observed in historical and recent pumping tests is caused by improperly installed wells or improperly abandoned boreholes. *See* NRC Staff Ex. NRC-001 at 60-61, ¶ A3.24.

10.126 Powertech witness Demuth testified that it is not necessary that the Fuson Shale be a completely impermeable barrier in order to safely conduct ISR, only that it sufficiently restricts flow such that ISR operations can be safely conducted. *See* Tr. at 1054-1055. *See also* Tr. at 1062, lines 2-9 (Lawrence). Mr. Demuth further testified that NRC Staff will review the results of pumping tests in wellfield hydrogeologic data packages and confirm that the Fuson Shale sufficiently restricts flow such that ISR operations can be conducted safely. *See* Tr. at 1062, lines 11-19.

10.127 With regard to the confining properties of the Fuson Shale with respect to the Inyan Kara aquifer as a whole (including the Fall River and Chilson aquifers), Powertech witness Demuth testified that "the Fuson Shale is an internal member of the Inyan Kara aquifer and does not affect its overall confinement." *See* Powertech Ex. APP-013 at 15-16, ¶ A.32.

10.128 Powertech witness Demuth testified that USGS research at the project site demonstrates that there are water quality differences between the various aquifers, which provide "evidence that there is not a significant transfer of water across the confining units between the aquifers." *See id.* at 16, ¶ A.33. Mr. Demuth testified that the USGS researcher concluded that

based on the geochemistry, there is “no evidence of natural groundwater flow across units in the project area.” *See id.*, citing Powertech Ex. APP-026 at 77.

10.129 Powertech witness Demuth testified that there is evidence presented in the FSEIS that deeper aquifers including the Minnelusa and Madison aquifers are hydraulically isolated within the project area, including differences in potentiometric surfaces between the two aquifers observed in South Dakota Department of Environment and Natural Resources (SDDENR) regional observation wells. *See* Powertech Ex. APP-013 at 16-17, ¶ A.34, *citing* NRC Staff Ex. NRC-008-A-2 at 294. Mr. Demuth also testified that the license application presents evidence that there are water quality differences between the Minnelusa and Madison aquifers in the project vicinity that “strongly suggests the two aquifers are hydraulically isolated beneath the project area.” *See id.* at 17-18, ¶ A.37.

4. There is Sufficient Evidence to Demonstrate that Faults or Fractures Will Not Affect Powertech’s Ability to Contain Fluid Migration

10.130 Powertech witness Lawrence testified that the Dewey-Burdock Project is located within a structurally “quiet zone” that is south of the Dewey Fault Zone, southwest of the Barker Dome Anticline and north of the Long Mountain Structural Zone. *See* Powertech Ex. APP-037 at 21, ¶ A.48, *citing* Powertech Exs. APP-016-F and APP-015-B at 174. NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS discusses faults near the project area and describes how the Dewey Fault is approximately 1 mile north of the project boundary, the Long Mountain Structural Zone is approximately 7 miles southeast of the project boundary and no faults have been identified within the project area based on USGS mapping. *See* NRC Staff Ex. NRC-001 at 48-49, ¶ A3.8, *citing* FSEIS Section 3.4.3 and NRC Staff Ex. NRC-082.

10.131 Intervenor witness Dr. LaGarry acknowledged that there are not any mapped faults within the project area:

JUDGE COLE: So they're not contained within the mining area [Dewey Fault and Long Mountain Structural Zone].

DR. LaGARRY: Yes.

See Tr. at 1064, lines 16-18.

10.132 Powertech witness Lawrence testified that no faulting was observed in the project area “[b]ased on detailed subsurface mapping (based on thousands of drill holes) of the Fall River Formation, Fuson Shale, Chilson Member of the Lakota Formation and the Morrison Formation.” *See* Powertech Ex. APP-037 at 22, ¶ A.48. Powertech witnesses Lichnovsky and Demuth provided further testimony regarding Powertech’s evaluation of geophysical logs to determine the presence and continuity of the major confining units across the project area:

Powertech developed the site conceptual hydrogeologic model based on interpretation of thousands of geophysical logs, including approximately 1,890 that were used to demonstrate the thickness and continuity of the Fuson Shale (the confining unit between the Fall River Formation and Chilson Member of the Lakota Formation) across the entire license area. Hundreds of logs were used to develop the numerical groundwater model, which was calibrated to match current water level measurements and recent pumping test data. Dozens of geophysical logs were included in the nine geologic cross sections presented as Plates 2.6-12a through 2.6-12h and 2.6- 12j in the revised TR (Ex. APP-015-E at 8-16).

See Powertech Ex. APP-074 at 3, ¶ A.5.

10.133 NRC Staff witnesses Prikryl and Lancaster testified that geologic cross sections included as Exhibits 2.7-1a through 2.7-1j in the license application, potentiometric surfaces, and ore locations “indicate that no faults or major joints are present in the project area.” *See* NRC Staff Ex. NRC-001 at 49, ¶ A3.8, *citing* Powertech Ex. APP-016-G at 5-13. *See also* NRC Staff Ex. NRC-151 at 31-32, ¶ A3.6. *See also* Tr. at 1107, lines 11-14 (Prikryl).

10.134 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 3.4.3 documents the Staff’s review of the USGS Quaternary Fault and Fold Database to evaluate active faults with surface expression within and surrounding the project area. *See* NRC Staff Ex.

NRC-001 at 57-58, ¶ A3.19, *citing* FSEIS Section 3.4.3 and NRC Staff Ex. NRC-139. *See also* NRC Staff Ex. NRC-151 at 36, ¶ A3.10. Messrs. Prikryl and Lancaster further testified that the Staff's review of potential faults and its conclusion that no faults are found within the project area is documented in Section 2.3.3.2.2 of the SER. *See id.* at 36, ¶ A3.10, *citing* NRC Staff Ex. NRC-134 at 39. Powertech witness Lawrence similarly testified that NRC Staff's documentation of the lack of faults and low seismic potential of the project area is found in FSEIS Section 3.4.3 and in the SER. *See* Powertech Ex. APP-037 at 22, ¶¶ A.49-A.50.

10.135 Powertech witness Lawrence testified that while faults and fractures are present on a regional basis, there is no evidence that there are faults or fractures in the license area that would substantially impact groundwater flow. *See* Powertech Ex. APP-066 at 6, ¶ A.3.

10.136 NRC Staff witnesses Lancaster, Prikryl, Bertetti and McGinnis testified that the Staff's evaluation of transects using closely spaced borehole logs, including transects selected to bisect a potential fault alleged by Tribe witness Dr. Moran, did not indicate the presence of faulting or fracturing. *See* NRC Staff Ex. NRC-158 at 9-11, ¶ A7.

10.137 Powertech witness Lawrence testified that Powertech will be required to demonstrate to NRC and EPA that faults or fractures with the potential to impact the control and containment of ISR solutions are not present within each wellfield prior to operating each wellfield. *See* Powertech Ex. APP-037 at 22-23, ¶ A.51.

10.138 Powertech witness Demuth testified that while there is extensive evidence supporting the continuity of the groundwater system at the Dewey-Burdock Project, ISR facilities have operated successfully even with faults in the orebody. *See* Tr. at 1079, lines 8-21.

10.139 Powertech witness Lichnovsky testified that none of the eight exhibits that Intervenor witness Dr. LaGarry alleges provide evidence of faulting within the project area

actually provides such evidence. *See* Powertech Ex. APP-074 at 11-16, ¶¶ A.17-A.25, *citing* Tribe Exs. OST-033 through OST-040. Regarding the allegation that a hand-drawn sketch on the back of the DS178 lithology log (Ex. OST-029) depicts faults and a sinkhole, Mr. Lichnovsky testified that the hand-drawn sketch “appears to depict a domal feature cut by two faults with down throw away from each other, leaving a structurally high ‘horst’ structure,” which he testified has not been observed at the project site. *See id.* at 11-12, ¶ A.17. Regarding the allegation that the word “offset” indicates a potential fault in the DS392 and IHM32 lithology logs (Exs. OST-034 and OST-036), Mr. Lichnovsky testified that the word “offset” is mistakenly thought by Dr. LaGarry to be associated with a fault (i.e., vertical offset), when it actually refers to horizontal offset from another borehole. *See id.* at 12-14, ¶¶A.20, A.22. Mr. Lichnovsky testified that Powertech performed a field investigation and subsurface evaluation of four borehole locations (IHK2, IHM61, TRR17 and TRT16; Exs. OST-035 and OST-037 through OST-039) and determined that there is not any evidence of faulting in these areas. *See id.* at 13-16, ¶¶ A.21, A.23-A.24, *citing* Powertech Exs. APP-078 through APP-085. Mr. Lichnovsky also testified that the word “caving” on the FBM95 lithology log (Ex. OST-040) indicates that material from the borehole walls was sloughing into the bottom of the hole during exploration drilling and does not provide evidence of faulting. *See* Powertech Ex. APP-074 at 16, ¶ A.25. Mr. Lichnovsky further testified that one of the geologic cross sections submitted with Powertech’s license application “is essentially cut through the FBM95 borehole location” and does not provide any evidence of faulting. *See id.*

10.140. Powertech witnesses Lichnovsky and Demuth testified that Intervenor witness Dr. LaGarry’s broad allegations regarding lack of confinement are based on “drillers’ notes,” which are lithological descriptions handwritten on lithology logs or handwritten notes at the top

of geophysical logs. *See* Powertech Ex. APP-074 at 2-3, ¶ A.5. Messrs. Lichnovsky and Demuth testified that the drillers' notes are subjective observations by persons with unknown qualifications. *See id.* Messrs. Lichnovsky and Demuth testified that the disregard for geophysical logs by Dr. LaGarry is noteworthy, since it was geophysical logs that were discussed during the evidentiary hearing and that provide the "hard data" used to develop the site conceptual and groundwater models and to evaluate the presence and continuity of the major confining units across the project area. *See id. See also id.* at 18, ¶ A.30 (Lichnovsky).

10.141 During the evidentiary hearing, Intervenor witness Dr. LaGarry testified that geophysical logs could be used to identify whether or not faults are present in the project area. *See* Tr. at 1075, lines 3-12. However, NRC Staff witnesses Prikryl and Lancaster testified that Dr. LaGarry did not attempt to use geophysical logs to support the Tribe's allegations regarding lack of confinement. *See* NRC Staff Ex. NRC-175 at 2, ¶ A4.

5. There Is No Evidence of Breccia Pipes in the License Area

10.142 Powertech witness Lawrence testified that the license application contains a detailed analysis of the potential for breccia pipes that "provides clear evidence that breccia pipes do not exist in the project area." *See* Powertech Ex. APP-037 at 23-24, ¶ A.53, *citing* Powertech Ex. APP-016-B at 69-82. Mr. Lawrence testified that the source of Black Hills breccia pipes is dissolution of anhydrite and gypsum within the upper portion of the Minnelusa Formation, which is limited to areas within a few miles downgradient from the Minnelusa outcrop. *See id., citing* Powertech Ex. APP-042-C at 34. Mr. Lawrence testified that the probable downgradient limit of dissolution in the Minnelusa Formation (i.e., the "dissolution front") has been mapped by the USGS and is more than 6 miles northeast of the project area. *See id., citing* Powertech Exs. APP-016-E at 6 and APP-016-F. Powertech witness Demuth also testified that the dissolution front is

upgradient from the license area and that conditions are not present within the license area for breccia pipe formation. *See* Tr. at 1111-1112 (Demuth).

10.143 Powertech witness Lawrence testified that NRC Staff’s evaluation of the potential for breccia pipes is documented in the FSEIS and SER. *See* Powertech Ex. APP-037 at 24, ¶¶ A.54-A.55. Mr. Lawrence testified that the FSEIS concludes that:

Based on information on breccia pipes presented in SEIS Section 3.4.1.2, NRC agrees that the limit of collapsed breccia in the Minnelusa Formation does not extend into the Inyan Kara Group either regionally or within the proposed project area. Text in SEIS Section 3.5.3.1 was revised to include information from SEIS Section 3.4.1.2, which indicates that the probable maximum downgradient limit of collapsed breccias is approximately 8 km [5 mi] northeast of the proposed project area (Braddock, 1963).

See id. at 24, ¶ A.54, *citing* NRC Staff Ex. NRC-008-B-2 at 374. Mr. Lawrence testified that the SER similarly concludes that:

The staff reviewed information from the applicant and outside sources to assess the potential for breccia pipes to occur at the Dewey-Burdock Project. According to USGS Professional Paper 763, breccia pipes do not occur at the Dewey-Burdock Project (Garland B. Gott, D. E. W., and C. Gilbert Bowles, 1974). Furthermore, detailed isopach maps, structure maps, and cross sections provided by the applicant do not indicate the presence of collapse structures on the Dewey-Burdock Project (see SER Section 2.3.3.2). Considering these varying sources of information, the staff concurs with the applicant’s assessment that breccia pipes do not occur at the Dewey-Burdock Project.

See id. at 24, ¶ A.55, *citing* NRC Staff Ex. NRC-134 at 41.

10.144 NRC Staff witnesses Prikryl and Lancaster testified that Intervenor witness Dr. Moran’s allegation that USGS Professional Paper 763, Plate 4 mapped areas near the Dewey-Burdock Project as “probable locations of solution features, such as breccia pipes” is without merit, stating:

[I]f the USGS authors considered areas described and mapped as being “topographic depressions” or “structures of possible solution origin” as being probable locations of solution features, such as breccia pipes, they would have clearly mapped these features as being “collapse features or breccia pipes.” They did not.

See NRC Staff Ex. NRC-001 at 62-63, ¶ A3.26. Powertech witness Demuth also testified that USGS Professional Paper 763 does not map breccia pipes within the license area. See Tr. at 1110-1111. Intervenors admitted during the evidentiary hearing that even these other features not indicated as breccia pipes but referenced in USGS Professional Paper 763 as “topographic depressions” or “structures of possible solution origin” are not indicated within the license area:

MR. PARSONS: Well, it is outside of the, that is to say that the map does not show any of those depressions within that box.

See Tr. at 1178, lines 7-9 (Parsons).

10.145 NRC Staff witnesses Prikryl and Lancaster testified that the Staff considered a number of published sources in addition to USGS Professional Paper 763 to evaluate the potential for breccia pipes in the license area. See NRC Staff Ex. NRC-001 at 57-58, ¶ A3.19, citing NRC Staff Exs. NRC-008-A-1 at 191, NRC-081, NRC-083, NRC-085 and NRC-086. Messrs. Prikryl and Lancaster further testified that the Butz, et al. (1980) reference cited by Dr. Moran was taken primarily from USGS Professional Paper 763, which was considered when evaluating the potential for breccia pipes in the FSEIS. See *id.* See also NRC Staff Ex. NRC-151 at 31, ¶ A3.6.

10.146 Powertech witness Lawrence testified that Intervenor witness Dr. Moran frequently cites regional studies with a much lower data density than the site-specific information in Powertech’s license application when drawing conclusions about breccia pipes. See Powertech Ex. APP-066 at 7-8, ¶A.5.

10.147 NRC Staff witnesses Prikryl and Lancaster testified that the allegation by Intervenor witness Dr. Moran that there is a possible collapse feature in the project area “is speculative without ground tr[u]thing.” See NRC Staff Ex. NRC-151 at 32, ¶ A3.6. Dr. Moran testified that he has not ground truthed the potential collapse feature or faults alleged in his

testimony. *See* Tr. at 1100, lines 7-15. With regard to the alleged sinkhole or breccia pipe, Powertech witness Lichnovsky testified that he has ground truthed the alleged sinkhole and determined that it is an erosional feature through which a drainage passes and not a sinkhole. *See* Tr. at 1125-1126. Mr. Lichnovsky further testified that it would not be possible to map a uranium orebody through the alleged breccia pipe, since it would have caused the mineralized horizon to drop down, disrupting the sands. *See* Tr. at 1127-1128.

10.148 Powertech witness Lawrence and NRC Staff witness Lancaster testified that if there were a breccia pipe in the location alleged by Dr. Moran, it would be apparent in the potentiometric surface, which it is not. *See* Tr. at 1105, lines 1-22.

10.149 Powertech witness Lawrence testified that it was unnecessary to perform additional review of satellite imagery in the license application to search for breccia pipes, since color infrared imagery and data from thousands of boreholes were evaluated in the license application. *See* Tr. at 1106-1107.

10.150 Powertech witness Lichnovsky testified that he has seen no evidence of breccia pipes in his evaluation of thousands of geophysical logs throughout the license area. *See* Powertech Ex. APP-072 at 4, ¶ A.8, *citing* Powertech Ex. APP-016-B at 72. NRC Staff witnesses Prikryl and Lancaster testified that Powertech's license application (TR RAI responses) include an evaluation of exploratory drilling data, which does not indicate the presence of breccia pipes. *See* NRC Staff Ex. NRC-001 at 51-52, ¶ A3.10, *citing* Powertech Ex. APP-016-B at 72.

10.151 NRC Staff witnesses Lancaster, Prikryl, Bertetti and McGinnis testified that they reviewed the recently disclosed borehole log data along with available literature and found no evidence of breccia pipes or collapse features. *See* NRC Staff Ex. NRC-158 at 16, ¶ A10. Messrs. Lancaster, Prikryl, Bertetti and McGinnis further testified that they constructed and

evaluated a geologic cross section (fence diagram) perpendicular to the potential sinkhole alleged by Dr. Moran and found “no evidence of a sinkhole-like structure or any discontinuity that might result from brecciation.” *See id.* at 16-17, ¶ A10.

10.152 Regarding Tribe witness Dr. LaGarry’s allegation that a hand-drawn sketch on the back of the DS178 lithology log (Ex. OST-033) depicts a sinkhole, Powertech witness Lichnovsky testified that the hand-drawn sketch depicts a domal feature rather than a sinkhole and that no such feature has been observed within the project area. *See* Powertech Ex. APP-074 at 12, ¶¶A.17-A.18. *See also* ¶ 10.139, *supra*.

6. Potential Impacts from Exploration Boreholes Will Be Mitigated

10.153 Powertech witness Lawrence testified that ISR facilities commonly contain hundreds or thousands of historical exploration boreholes yet have successfully prevented impacts to groundwater outside of the exempted aquifer. *See* Powertech Ex. APP-037 at 24-25, ¶ A.56. Powertech witness Demuth testified that the Dewey-Burdock Project is not unique with respect to the presence of historical exploration drilling. *See* Tr. at 1166, lines 15-19. Mr. Demuth testified that there are several advantages at the Dewey-Burdock Project that make it even less likely that historical exploration boreholes will impact control of ISR solutions, including: (1) documentation that State regulations were in place during historical exploration drilling of all TVA test holes, (2) documentation that TVA plugged historical exploration boreholes in compliance with existing State requirements, (3) flowing artesian conditions in the Fall River and Chilson aquifers throughout much of the project area, which makes it easier to identify unplugged or improperly plugged boreholes, and (4) documentation of the location of historical exploration boreholes. *See* Powertech Ex. APP-074 at 5-6, ¶ A.6b.

10.154 Powertech witness Lawrence testified that a letter from TVA to SDDENR documents that “the vast majority of historical drill holes within the project area were plugged and abandoned in accordance with State of South Dakota requirements effective during drilling.” *See* Powertech Ex. APP-037 at 25, ¶ A.57, *citing* Powertech Ex. APP-045 at 166-168.

10.155 Mr. Lawrence testified that Powertech conducted extensive evaluation of the potential for surface water to be spring fed with production zone groundwater through unplugged exploration boreholes, including conducting an alluvial drilling program along Beaver Creek and Pass Creek and evaluating color infrared imagery. *See id.* at 25-26, ¶ A.58. Mr. Lawrence further testified that field investigations and potentiometric surface evaluations were used evaluate potential groundwater discharge to surface water or shallow groundwater (alluvium). *See id.* at 27, ¶ A.62.

10.156 Mr. Lawrence testified that there is only one isolated area, known as the “alkali area,” where seepage to the ground surface is attributed to historical exploration boreholes. *See* Powertech Ex. APP-037 at 25, ¶ A.57. NRC Staff witness Prikryl and Lancaster testified that this area “demonstrated the signature of leaking boreholes.” *See* NRC Staff Ex. NRC-001 at 61, ¶ A3.24.

10.157 Powertech witness Lawrence testified that Powertech has committed to following specific procedures to identify unplugged or improperly plugged exploration boreholes in the vicinity of each wellfield, including (1) using historical records, (2) evaluating color infrared imagery, (3) performing field investigations, and (4) performing potentiometric surface evaluation and pumping tests within each wellfield. *See* Powertech Ex. APP-037 at 26, ¶ A.60, *citing* Powertech Ex. APP-016-B at 55-57. Mr. Lawrence testified that Powertech has committed to plugging and abandoning or otherwise mitigating any unplugged exploration boreholes or

wells that have the potential to impact the control and containment of wellfield solutions. *See id.*
See also Powertech Ex. APP-074 at 9, ¶ A.13 (Demuth).

10.158 Powertech witness Lawrence testified that NRC Staff documented its review of the procedures to identify and mitigate unplugged or improperly plugged exploration boreholes in the SER, which concludes that Powertech “has presented a satisfactory plan for identifying and addressing unplugged borings during operations to avoid potential cross contamination.” *See* Powertech Ex. APP-037 at 26-27, ¶ A.61, *citing* NRC Staff Ex. NRC-134 at 41. NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS Section 4.5.2.1.1.2.2 considers potential groundwater flow through exploration boreholes when assessing the potential environmental impacts of the project. *See* NRC Staff Ex. NRC-151 at 30-31, ¶ A3.5, *citing* NRC Staff Ex. NRC-008-A-2 at 64.

10.159 Powertech witness Lichnovsky testified that the FSEIS describes Powertech’s commitment to follow South Dakota regulations for plugging exploration boreholes and wells using bentonite or cement grout. *See* Powertech Ex. APP-074 at 10, ¶ A.14, *citing* NRC Staff Ex. NRC-008-A-1 at 136. *See also* Tr. at 1022, lines 12-17 (Lancaster).

10.160 NRC Staff witness Lancaster testified that communication through an unplugged or improperly plugged exploration borehole would be manifested during a wellfield-scale pumping test. *See* Tr. at 1021-1022.

7. Potential Impacts from Flowing Artesian Wells Are Readily Discovered and Will Be Mitigated

10.161 Powertech witness Lawrence testified that flowing artesian conditions in the Fall River and Chilson aquifers throughout much of the license area are advantageous in identifying potential unplugged boreholes or wells, since surface discharge would be readily

identifiable at these locations. *See* Powertech Ex. APP-037 at 28, ¶ A.64, *citing* Powertech Ex. APP-016-C at 75-76.

10.162 Powertech witness Demuth also testified on the advantage of flowing artesian conditions in evaluating the presence of unplugged or improperly plugged exploration boreholes, adding that artesian conditions are impossible without overlying confinement. *See* Powertech Ex. APP-074 at 8-9, ¶ A.13.

10.163 NRC Staff witnesses Prikryl and Lancaster testified that the presence of artesian wells in and around the license area is documented in FSEIS Section 4.5.2.1.1.2.2. *See* NRC Staff Ex. NRC-151 at 39, ¶ A3.13, *citing* NRC Staff Ex. NRC-008-A-2 at 60. *See also* NRC Staff Ex. NRC-175 at 6, ¶ A11 (Prikryl and Lancaster).

10.164 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS documents Powertech's procedures to mitigate potential impacts regarding flowing artesian wells, including removing all domestic wells within the project area from private use prior to beginning operations, removing all stock wells within 0.25 mile of any wellfield from private use prior to operation of that wellfield, and monitoring all domestic, livestock and crop irrigation wells within 2 km of the boundary of any wellfield during operations. *See* NRC Staff Ex. NRC-175 at 6, ¶ A12, *citing* NRC Staff Exs. NRC-008-A-2 at 360, 366, 599 and NRC-012 at 13 (LC 12.10). Messrs. Prikryl and Lancaster also testified that Powertech's routine excursion monitoring program, required by LC 11.5, and Powertech's requirement to maintain a net inward hydraulic gradient, required by LC 10.7, will further minimize potential impacts from flowing artesian conditions. *See* NRC Staff Ex. NRC-151 at 39-40, ¶ A3.13.

8. Excursions at ISR Facilities Occur Infrequently and Are Corrected before Environmental Impacts Occur

10.165 Powertech witness Demuth testified that excursions are not indicators of environmental impacts but are “the early detection of nonhazardous indicator parameters (alkalinity, chloride and electrical conductivity in Powertech’s case) within the exempted aquifer that provide early warning that corrective actions are needed to prevent groundwater contamination outside of the exempted aquifer.” *See* Powertech Ex. APP-013 at 25-26, ¶ A.53, *citing* NRC Staff Ex. NRC-087 at 479. *See also* Tr. at 1087, lines 2-25 (Lawrence).

10.166 NRC Staff witness Prikryl testified that information on excursions that have occurred at NRC-licensed ISR facilities is available in the ISR GEIS (NUREG-1910). *See* Tr. at 1115, lines 4-5, *citing* NRC Ex. NRC-010-A-1 at 141. NRC Staff witness Lancaster testified that excursions do not occur frequently at the operating ISR facility with which he is working, stating “it’s more like maybe two every three years that we have excursions reported ... it’s relatively small. It’s not every day.” *See* Tr. at 1115, lines 11-17.

10.167 Powertech witness Demuth testified that historical information on excursions that have occurred at operating ISR facilities also is provided in the FSEIS, which cites information in the ISR GEIS concluding that most horizontal excursions can be recovered quickly by fixing and reconditioning wells and adjusting wellfield pumping rates, while vertical excursions may be more difficult to recover, but these historically have been associated with improperly abandoned wells from earlier exploration programs before UIC regulations were established. *See* Powertech Ex. APP-013 at 27, ¶ A.54, *citing* NRC Staff Ex. NRC-008-B-2 at 324. Mr. Demuth further testified that the FSEIS documents NRC staff’s conclusion in the July 2009 *Staff Assessment of Groundwater Impacts from Previously Licensed ISR Facilities* that excursions at NRC-licensed ISR facilities have not resulted in impacts to the non-exempted

portions of the aquifer. *See id.*, *citing* NRC Staff Exs. NRC-008-A-2 at 64, NRC-008-B-2 at 325 and NRC-091.

10.168 Powertech witness Demuth testified that NUREG/CR-6733 addresses the history of excursions at U.S. ISR facilities and documents NRC Staff's conclusion that "there were no reports of extraction fluid excursions being detected in off-site water supplies in any of the documentation for U.S. uranium ISL sites reviewed for this report." *See id.* at 26, ¶ A.53, *citing* Powertech Ex. APP-030 at 83. Mr. Demuth further testified that the Texas Commission on Environmental Quality (TCEQ) documented that the TCEQ Executive Director "is not aware of a documented case in over 30 years of *in situ* mining of off-site groundwater contamination from *in situ* mining in South Texas." *See id.* at 27, ¶ A.53, *citing* Powertech Ex. APP-031 at 48.

10.169 Intervenor witness Dr. LaGarry indicated that he is not aware of any exhibits in the record of this proceeding that contradict the statement in NRC Staff Ex. NRC-091 that "The Staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded, (2) the use of a water supply well has been discontinued, or (3) a well has been relocated because of impacts attributed to an ISR facility." *See* Tr. at 1091, lines 2-10.

9. Potential Impacts from Excursions Will Be Mitigated

10.170 Powertech witness Lawrence testified that the FSEIS documents NRC Staff's evaluation of the potential for horizontal excursions at the Dewey-Burdock Project and its conclusion that potential environmental impacts will be small due to regulatory and operational controls, including: (1) the requirement to exempt the uranium-bearing production aquifers from USDWs under 40 CFR § 146.4, (2) the requirement to submit wellfield hydrogeologic data packages to NRC and EPA, (3) the requirement to maintain an inward hydraulic gradient, and (4)

the requirement to monitor for and correct potential excursions. *See* Powertech Ex. APP-037 at 34, ¶ A.79, *citing* NRC Staff Ex. NRC-008-A-2 at 73-74. Mr. Lawrence testified that the FSEIS also documents NRC Staff's evaluation of the potential for vertical excursions in the following passage:

Impacts from vertical excursions will be SMALL because (i) uranium-bearing production zones in the Fall River and Chilson aquifers are hydrologically isolated from adjacent aquifers by thick, low permeability shale layers (i.e., the overlying Graneros Group and underlying Morrison Formation); (ii) a prevailing upward hydraulic gradient occurs across the major aquifers; (iii) the applicant's required mechanical integrity testing program will mitigate the impacts of potential vertical excursions resulting from borehole failure; and (iv) the applicant commits to properly plugging and abandoning or mitigating any previously drilled wells and exploration holes that may potentially impact the control and containment of wellfield solutions within the proposed project area.

See id. at 17-18, ¶ A.39, *citing* NRC Staff Ex. NRC-008-A-2 at 74.

10.171 NRC Staff witness Lancaster testified that excursion monitoring is required every 2 weeks in accordance with LC 11.5. *See* Tr. at 1089, lines 2-7. Powertech witness Lawrence testified that confirmation sampling is required if an initial sample indicates a potential excursion has occurred. *See* Tr. at 1090, lines 8-17.

10.172 NRC Staff witness Lancaster testified that Powertech is required by LC 11.5 to notify the NRC project manager by telephone or email within 24 hours of confirming an excursion and follow this up with a letter within 7 days and a follow-up report describing corrective actions within 60 days. *See* Tr. at 1095, lines 12-23. Mr. Lancaster further testified that if an excursion is not corrected within 60 days, Powertech will be required by LC 11.5 to either terminate lixiviant injection or increase the financial assurance amount to cover the cost of a third party correcting and cleaning up the excursion. *See* Tr. at 1096, lines 16-24.

10.173 NRC Staff witnesses Prikryl and Lancaster testified that Powertech will be required by LC 10.7 to maintain a net inward hydraulic gradient at each wellfield, which will help minimize the potential for excursions, and that this requirement is described in FSEIS

Section 4.5.2.1.1.2.2. *See* NRC Staff Ex. NRC-151 at 40, ¶ A3.13. Intervenor witnesses Drs. Moran and LaGarry acknowledged that the requirement to maintain a net inward hydraulic gradient will reduce the likelihood of fluids migrating away from the production zone. *See* Tr. at 1167.

10.174 Powertech witness Lawrence testified that operational controls are available to control and correct an excursion, including adjusting wellfield balance, and that these have proven effective over many years of successful implementation. *See* Tr. at 1088, lines 3-17. NRC Staff witness Lancaster testified that Powertech will be required by LC 11.5 to implement corrective actions for excursions and submit a follow-up report documenting the corrective actions taken and the results of the corrective actions. *See* Tr. at 1095, lines 20-23.

10. The Horizontal Flow Rate in the Production Zone Aquifer Is Typical of Operating ISR Facilities

10.175 Powertech witness Lawrence testified that the average groundwater velocity in the Fall River and Chilson aquifers is approximately 6 to 7 feet per year and that Intervenor witness Dr. LaGarry's allegation that the velocity is much higher is based on "faulty conclusions drawn from the data presented in Powertech's license application." *See* Powertech Ex. APP-037 at 32-33, ¶ A.76.

10.176 Mr. Lawrence testified that the average groundwater velocity in the Fall River and Chilson aquifers was calculated using "site-specific measurements of hydraulic conductivity and hydraulic gradient and an estimate of effective porosity." *See id.* at 33, ¶ A.77. Mr. Lawrence further testified that the calculated velocities are typical for ISR facilities and consistent with an independent estimate by the USGS. *See id.* at 33, ¶ A.78, *citing* Powertech Ex. APP-041 at 36.

11. The Portion of the Production Zone Aquifer Designated for Uranium Recovery Must be Permanently Exempted from USDW Designation

10.177 NRC Staff witnesses Prikryl and Lancaster testified that “the portion of the aquifer(s) designated for uranium recovery must be exempted from the underground source of drinking water (USDW) designation, in accordance with the Safe Drinking Water Act and pursuant to 40 C.F.R. Part 146” and that this requirement is described in FSEIS Section 3.5.3.5. *See* NRC Staff Ex. NRC-001 at 20, ¶ A2.5.

10.178 Powertech witness Demuth testified that aquifer exemptions pursuant to 40 CFR Part 146 are permanent exemptions, but Powertech’s requested aquifer exemption boundary does not occupy the entire license area. *See* Tr. at 1094, lines 12-21. Mr. Demuth further testified that the water quality within the exempted aquifer is not currently suitable and will not be suitable in the future for drinking. *See* Tr. at 1094-1095.

12. Confinement by the Fuson Shale Has Been Adequately Demonstrated

10.179 Powertech witness Demuth testified that the Fuson Shale confining unit occurs between the Chilson Member of the Lakota Formation (below) and the Fall River Formation (above) and geologically confines the Chilson throughout the entire license area. *See* Powertech Ex. APP-013 at 5, ¶ A.9.

10.180 Powertech witness Lichnovsky testified that the thickness of the Fuson Shale, which is depicted on the Fuson isopach map, ranges from 20 to 80 feet across the entire license area, based on interpretation of approximately 1,890 geophysical logs. *See* Powertech Ex. APP-074 at 18, ¶ A.30, *citing* Powertech Ex. APP-015-D at 18. Mr. Lichnovsky testified that Powertech provided data to NRC Staff in November 2010 on the Fuson Shale thickness based on geophysical logs and that these data are provided in Powertech Ex. APP-088 at 9-47. *See id.*

10.181 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 3.5.3.2 documents the thickness of the Fuson Shale as ranging from 20 to 80 feet across the project area. *See* NRC Staff Ex. NRC-151 at 37, ¶ A3.11. Messrs. Prikryl and Lancaster further testified that FSEIS Section 4.5.2.1.1.2.2 documents the fact that NRC Staff independently constructed isopach maps for the Fuson Shale that were in good agreement with the map prepared by Powertech. *See id.*, *citing* NRC Staff Ex. NRC-008-A-2 at 64. Messrs. Prikryl and Lancaster testified that the FSEIS acknowledges that the Fuson Shale thins in a portion of the Burdock portion of the license area, but this area is approximately 1,000 feet outside of the initial planned Burdock wellfield. *See id.* at 37-38, ¶ A3.11, *citing* FSEIS Section 3.5.3.2 and FSEIS Figure 3.5-6 (Ex. NRC-008-A-1 at 206-208).

10.182 NRC Staff witnesses Lancaster, Prikryl, Bertetti and McGinnis testified the Staff's review of the recently disclosed borehole log data focused on the Fuson Shale, since Intervenor argued during the evidentiary hearing that hydraulic communication through the Fuson Shale results from structural features such as faults, fractures or breccia pipes. *See* NRC Staff Ex. NRC-158 at 4-5, ¶ A6. Messrs. Lancaster, Prikryl, Bertetti and McGinnis testified that the Staff's review included: (1) evaluating the top, bottom and thickness of the Fuson Shale in 34 randomly selected drill hole logs, (2) comparing the results of the spot check analysis with Powertech's Fuson structure contour map, (3) constructing and analyzing four transects using geophysical logs from closely spaced drill holes across selected portions of the project area to evaluate whether displacement of the Fuson Shale due to faulting or fracturing is present, and (4) constructing and analyzing a fifth transect using geophysical logs from closely spaced boreholes across the area alleged by Tribe witness Dr. Moran to contain a "sinkhole." *See id.* at 7-12, 15-17, ¶¶ A7, A10. Messrs. Lancaster, Prikryl, Bertetti and McGinnis testified that their

analysis supports the Staff's findings in the FSEIS regarding the adequacy of the Fuson Shale to function as a hydraulic barrier. *See id.* at 13, ¶ A8.

10.183 Powertech witness Demuth testified that hydraulic isolation between the Fall River and Chilson aquifers due to the intervening Fuson Shale is demonstrated by differing potentiometric water level elevations in paired wells completed in the two aquifers. *See* Powertech Ex. APP-013 at 15, ¶ A.32, *citing* Powertech Ex. APP-017 at 3. *See also* ¶ 10.122, *supra*.

10.184 Powertech witness Lawrence provided testimony regarding the confining properties of the Fuson Shale with respect to historical and recent aquifer pump test results, including that the reported "leaky aquifer" response in the 1979 TVA tests in the Burdock area and 2008 Powertech test in the Chilson aquifer is attributed to: (1) a nearby well completed in both the Fall River and Chilson aquifers, and/or (2) unplugged or improperly plugged boreholes in a limited area near the tests. *See* Powertech Ex. APP-037 at 34-36, ¶¶ A.80-A.83. Mr. Lawrence further testified that the use of an inflatable packer to isolate the Fall River and Chilson aquifers during the TVA pump tests may have resulted in flawed results. *See* Tr. at 1052-1053. *See also* ¶ 10.123, *supra*.

10.185 Powertech witnesses Demuth and Lawrence testified that the TVA pumping tests were used to evaluate the potential for underground mining and were conducted at much higher pumping rates than will be used for ISR operations. *See* Tr. at 1053, lines 15-22 (Demuth) and Tr. at 1060-1061 (Lawrence). *See also* ¶ 10.124, *supra*.

10.186 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 3.5.3.2 documents Powertech's conclusion based on numerical groundwater modeling results that the hydraulic connection between the Fall River and Chilson aquifers through the Fuson

Shale that was observed in historical and recent pumping tests is “caused by improperly installed wells or improperly abandoned boreholes.” *See* NRC Staff Ex. NRC-001 at 60-61, ¶ A3.24.

Messrs. Prikryl and Lancaster further testified that the Staff documented its review of Powertech’s numerical groundwater model in the SER, including Powertech’s determination that the Fuson Shale is not leaky through the rock matrix itself:

The NRC staff reviewed the development and calibration of Powertech’s groundwater model. The Staff concluded that the model was appropriately developed and sufficiently calibrated. (Exs. NRC-134 and NRC-135.) Therefore, the Staff found the model sufficient to use as a predictive tool.

One significant conclusion resulting from the groundwater model is that the Fuson Shale is not leaky through the rock matrix itself. Powertech drew this conclusion because the model could not duplicate observed drawdown in the Fall River Aquifer as the Chilson Aquifer was pumped. Consequently, as the Staff explains in FSEIS Section 3.5.3.2, Powertech concluded that any leakage through the Fuson Shale is caused by improperly completed wells or improperly abandoned boreholes.

See id. at 64-65, ¶ A3.27. *See also* ¶ 10.125, *supra*. Mr. Lancaster provided further testimony on the Staff’s review of the numerical groundwater model during the evidentiary hearing, stating that the leakiness can only be explained by a “leaky borehole situation.” *See* Tr. at 1057, lines 12-19 (Lancaster).

10.187 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 4.5.2.1.1.2.2 considers the potential communication through the Fuson Shale in its assessment of potential environmental impacts:

In FSEIS Section 3.5.3.2, the Staff discusses pumping tests conducted at the Dewey-Burdock site in 1979 and 2008, which suggested a direct connection between the Fall River and Chilson Aquifers through the Fuson Shale. The Staff took this information into account when assessing the environmental impacts of the Dewey-Burdock Project, as reflected in FSEIS Section 4.5.2.1.1.2.2 at page 4-64.

See NRC Staff Ex. NRC-001 at 53, ¶ A3.13.

10.188 Powertech witnesses Demuth and Lawrence testified that it is not necessary that the Fuson Shale act as a completely impermeable barrier in order to safely conduct ISR, only

that it sufficiently restricts flow such that ISR operations can be conducted safely. *See* Tr. at 1054-1055 (Demuth) and Tr. at 1062, lines 2-9 (Lawrence). Mr. Demuth further testified that NRC Staff will review the results of pumping tests in wellfield hydrogeologic data packages and confirm that the Fuson Shale sufficiently restricts flow such that ISR operations can be conducted safely. *See* Tr. at 1062, lines 11-19. *See also* ¶ 10.126, *supra*. Mr. Demuth also testified that pumping test results in the one area where communication across the Fuson Shale is attributed to improperly completed wells or improperly plugged exploration boreholes will be subject to additional scrutiny:

MR. DEMUTH: Okay. Well, in this case, our data indicates that there is not sufficient flow across the Fuson where it's an issue, except in one area where we have a well which is completed in both zones and allows it to communicate. There may be one or two unplugged exploration boreholes which are identified in the application. So in that area, the wellfield, any wellfield test is going to have to be examined very carefully. Other areas of the site we don't see the same issues.

See Tr. at 1054, lines 9-19. Powertech Lawrence similarly testified that wellfield-scale pumping tests and other information in the wellfield hydrogeologic data packages will be required to demonstrate that there is adequate confinement available to safely conduct ISR in each wellfield:

MR. LAWRENCE: That goes back to the development of the wellfield data package. If you run a specific test in the area that you plan to mine, and identify leakage that is occurring, particularly if you can identify that it is an improperly abandoned borehole or improperly constructed well, as was the case in these tests, you can remedy that situation, plug that borehole, rerun the tests and show that basically you have retained confinement.

See Tr. at 1051-1052.

10.189 Powertech witness Lawrence testified that the horizontal hydraulic conductivity in the ore zone is much higher than the vertical hydraulic conductivity or permeability of the Fuson Shale, such that groundwater flow will be predominantly horizontal.

See Tr. at 1058-1059 (Lawrence).

10.190 With regard to the confining properties of the Fuson Shale with respect to the Inyan Kara aquifer as a whole (including the Fall River and Chilson aquifers), Powertech witness Demuth testified that “the Fuson Shale is an internal member of the Inyan Kara aquifer and does not affect its overall confinement.” *See* Powertech Ex. APP-013 at 15-16, ¶ A.32. *See also* ¶ 10.127, *supra*.

10.191 Powertech witness Demuth testified that USGS research at the project site demonstrates that there are water quality differences between the various aquifers, which provide “evidence that there is not a significant transfer of water across the confining units between the aquifers.” *See* Powertech Ex. APP-013 at 16, ¶ A.33. *See also* ¶ 10.128, *supra*.

10.192 Powertech witness Lawrence testified that ISR injection and production wells will be screened discretely within mineralized sands within the larger Fall River and Chilson aquifers. *See* Tr. at 1048, lines 10-19. Mr. Lawrence further testified that there are local confining units within the Fall River and Chilson that may vertically restrict groundwater flow. *See* Tr. at 1042, lines 2-19.

10.193 Powertech’s license application demonstrates that whether or not the Fuson Shale is needed as a confining unit depends on the location of the mineralized sand within the Fall River or Chilson aquifers. This is demonstrated in TR Figure 3.1-9, which shows that for the initial Burdock wellfield, production zones in the Lower Chilson are anticipated to have overlying monitor wells for detection of potential vertical excursions that are completed in two hydrogeologic units above the production zone but below the Fuson Shale (i.e., the Middle and Upper Chilson). *See* Powertech Ex. APP-015-C at 146.

10.194 Powertech witness Demuth testified that there are operational controls such as maintaining an inward hydraulic gradient that are used in addition to geologic controls to contain fluid migration. *See* Tr. at 1045, lines 1-14 (Demuth).

13. The Numerical Model Has Been Demonstrated to Be an Adequate Predictive Tool for Assessing Potential Environmental Impacts

10.195 Powertech witness Lawrence testified that the numerical groundwater model in Powertech Ex. APP-025 “was designed to serve as a site-wide, predictive model to estimate cumulative drawdown impacts, etc. from the entire ISR project.” *See* Powertech Ex. APP-037 at 39-40, ¶ A.95. Mr. Lawrence testified that the model was constructed using site-specific geologic structure and hydrologic data, calibrated to potentiometric surface data from baseline monitor wells and verified using the results of historical and recent pumping tests conducted within and adjacent to the project area. *See id.* at 41, ¶¶ A.97-A.98.

10.196 NRC Staff witnesses Prikryl and Lancaster testified that the Staff reviewed the development and calibration of the numerical groundwater model and deemed it sufficient to use as a predictive tool. *See* NRC Staff Ex. NRC-001 at 64, ¶ A3.27, *citing* NRC Staff Exs. NRC-134 and NRC-135. Messrs. Prikryl and Lancaster also testified that the model is a reliable predictive tool for assessing the reasonably foreseeable impacts of the Project. *See id.* at 47, ¶ A.6. Powertech witness Lawrence testified that NRC Staff’s detailed review of the numerical groundwater model is found in Appendix B of the SER. *See* Powertech Ex. APP-037 at 19, ¶ A.42, *citing* NRC Staff Ex. NRC-134 at 250-258.

10.197 Powertech witness Lawrence testified that the numerical groundwater model in Powertech Ex. APP-025 provides a reasonable representation of site hydrologic conditions without introducing such unsubstantiated features as faults, fractures, breccia pipes or open boreholes. *See* Powertech Ex. APP-037 at 38, ¶ A.91. Mr. Lawrence also testified that the model

addresses the effects of “complex interfingering of Inyan Kara sediments” on a site-wide basis using zones of varying hydraulic conductivity in the model calibration. *See id.* at 39-40, ¶ A.95.

14. Potential Impacts from Historical Mines Will Be Adequately Mitigated

10.198 Powertech witness Lawrence testified that information was added to the license application in the June 2011 TR RAI responses providing additional evaluation of historical mine workings and strong evidence against the allegation that lack of confinement for uranium ISR will result from historical mining activities. *See* Powertech Ex. APP-037 at 29-30, ¶ A.68, *citing* Powertech Ex. APP-016-B at 28-41. Mr. Lawrence testified that the RAI responses describe how all historical mine workings are open-pit surface mines and shallow underground mines, all of which are limited to near-surface Fall River sandstones. *See id.* Mr. Lawrence testified that Powertech’s evaluation of TVA maps and interviews with people directly involved in the historical mining operations confirm that mining was limited to the Fall River and did not compromise the underlying Fuson Shale. *See id.*

10.199 Mr. Lawrence testified that Powertech has committed to avoid development of ISR wellfields in the Fall River Formation in the vicinity of the historical mine workings, and therefore there are no flow pathways for ISR wellfield solutions to migrate from the production zone through historical mine workings. *See* Powertech Ex. APP-037 at 30, ¶ A.71, *citing* Powertech Ex. APP-016-B at 28 and NRC Staff Ex. NRC-134 at 42. NRC Staff witnesses Prikryl and Lancaster testified that this commitment is documented in FSEIS Section 3.2.3 and Powertech’s ER RAI responses. *See* NRC Staff Ex. NRC-001 at 49, ¶ A 3.8, *citing* FSEIS Section 3.2.3 and Powertech Ex. APP-050. Intervenor witness Dr. LaGarry also acknowledged this commitment during the evidentiary hearing:

JUDGE BARNETT: Back to my original question though, are you aware that the application states that Powertech does not propose ISR operations in the Fall River areas and areas where the Fall River is geologically unconfined?

DR. LaGARRY: Yes.

See Tr. at 1109, lines 9-14.

10.200 Powertech witness Lawrence testified that NRC Staff's evaluation of the potential impacts from historical mine workings is documented in the SER, which concludes that "the staff is reasonably assured that the proposed ISR operations at the Dewey-Burdock Project will not be affected by the presence of historic surface and underground mines." *See* Powertech Ex. APP-037 at 31, ¶ A.72, *citing* NRC Staff Ex. NRC-134 at 42.

10.201 Powertech witness Demuth testified that the FSEIS evaluates the potential impacts from historical mining and concludes that "mitigation measures will be in place to ensure that drawdown-induced migration of potential contaminants [from the historical mine pits] does not affect aquifer restoration goals." *See* Powertech Ex. APP-013 at 28, ¶ A.55, *citing* NRC Staff Ex. NRC-008-B-2 at 365-366. Mr. Demuth testified that the FSEIS lists five mitigation measures to prevent potential drawdown-induced migration of potential contaminants from the historical mine pits, including:

(1) hydrogeological characterization and pumping tests in each wellfield to examine the hydraulic integrity of the Fuson Shale, (2) the license requirement to provide results of hydrogeological characterization and pumping tests to NRC prior to operating each wellfield, (3) Powertech's commitment to locating unplugged or improperly plugged boreholes and wells through pump testing, (4) Powertech's commitment to plugging and abandoning unplugged or improperly plugged boreholes or wells, and (5) NRC's requirement by license condition that Powertech develop a monitoring well network for the Fall River aquifer for those wellfields in which the Chilson aquifer is the production zone.

See id.

10.202 Powertech witness Lichnovsky testified that LC 10.10(B) requires NRC Staff review and approval of the wellfield hydrogeologic data packages for ISR wellfields in the

vicinity of the historical mine pits, meaning that approval will require a license amendment and NEPA evaluation. *See* Powertech Ex. APP-074 at 12, ¶ A.19, *citing* NRC Staff Exs. NRC-012 at 9 (LC 10.10) and NRC-008-A-2 at 69.

15. Potential Impacts from Pond Leaks Will Be Adequately Mitigated

10.203 NRC Staff witness Prikryl testified that the FSEIS describes the pond lining systems that have been designed to meet NRC requirements to prevent vertical migration of fluids from the ponds. *See* Tr. at 1138-1139. Mr. Prikryl testified that the FSEIS describes the pond lining system components, including an 80-mil HDPE (high density polyethylene) primary liner, 60-mil HDPE secondary liner, geonet leak detection system and clay liner for the radium settling, spare and central plant ponds. *See id.*

10.204 Regarding the allegation by Intervenor witness McLean that manufacturers only warrant polyethylene for 2 years (Tr. at 1135, lines 16-21), the pond liner construction specifications in the NRC license application specify that the contractor installing the HDPE liners “shall provide a written material guarantee covering the HDPE liner materials, including degradation due to UV light, for a minimum warranty period of 20 years.” *See* Powertech Ex. APP-015-V at 68.

10.205 NRC Staff witness Lancaster testified that LC 12.25 requires a shallow groundwater monitoring network surrounding the ponds, which will supplement the pond leak detection systems. *See* Tr. at 1139, lines 17-20, *citing* NRC Staff Ex. NRC-012 at 15.

16. Adequate Procedures Have Been Described to Conduct Wellfield Pumping Tests and Prepare Wellfield Hydrogeologic Data Packages

10.206 Powertech witness Demuth testified that FSEIS Section 2.1.1.1.2.3.3 describes the methodology and performance criteria for the pumping tests that will be conducted prior to

operating each wellfield to demonstrate production zone confinement and monitoring network adequacy. *See* Powertech Ex. APP-013 at 30-31, ¶ A.60, *citing* NRC Staff Ex. NRC-008-A-1 at 111-112. Mr. Demuth testified that additional information regarding pumping test procedures and wellfield hydrogeologic data package contents is found in Powertech’s license application. *See id.*, *citing* Powertech Ex. APP-016-D at 282-285. Mr. Demuth testified that the SER documents NRC Staff’s review of the adequacy of Powertech’s pumping test procedures and the Staff’s determination that the procedures “are adequate to determine production zone confinement and monitoring network adequacy.” *See id.*, *citing* NRC Staff Ex. NRC-134 at 196.

10.207 Powertech witness Demuth provided further testimony during the evidentiary hearing describing the typical procedures involved in conducting a wellfield-scale pumping test, including: (1) designing the pumping test, commonly with interaction with NRC Staff, (2) performing numerical modeling to determine the test duration based on aquifer hydraulic properties, (3) designing and installing monitor wells and production wells used during the test, (4) conducting the test by pumping one or more production wells and measuring responses or lack thereof in monitor wells, and (5) correcting problems if encountered (e.g., plugging improperly plugged wells or relocating monitor wells) and repeating the test, if needed. *See* Tr. at 1026-1030. Mr. Demuth testified that some of the pumping tests with which he has been involved have identified issues, which were corrected prior to operating the wellfield. *See* Tr. at 1029, lines 6-15.

10.208 NRC Staff witnesses Prikryl and Lancaster testified that the procedures to prepare and submit wellfield hydrogeologic data packages are described in FSEIS Section 2.1.1.1.2.3.4. *See* NRC Staff Ex. NRC-001 at 41-42, ¶ A3.4, *citing* NRC Staff Ex. NRC-008-A-1

at 111-112. Messrs. Prikryl and Lancaster testified that the wellfield hydrogeologic data packages provide the following wellfield-specific information:

(i) detailed information on production and injection well patterns and locations of monitor wells; (ii) documentation of wellfield geology (*e.g.*, geologic cross sections and isopach maps of production zone sand and overlying and underlying confining units); (iii) pumping test results for each wellfield; and (iv) water quality data for each wellfield.

See id. Messrs. Prikryl and Lancaster further testified that Powertech is required by LC 10.10 to submit the wellfield hydrogeologic data packages to NRC Staff for review and evaluation prior to operating ISR wellfields. *See id.* Messrs. Prikryl and Lancaster testified that “[b]ased on the current information and this license condition, the Staff is able to comply with NEPA by assessing the reasonably foreseeable effects of the Dewey-Burdock Project on groundwater resources.” *See id.*

10.209 NRC Staff witness Prikryl provided testimony on the scope of NRC Staff’s review of the wellfield hydrogeologic data packages, which includes verifying that the perimeter monitor wells are in hydrologic communication with the production zone and overlying and underlying monitor wells are hydrologically isolated from the production zone. *See Tr.* at 1020-1021. NRC Staff witness Lancaster further testified that NRC Staff’s review will focus on whether unplugged or improperly plugged boreholes cause communication between the production zone and overlying or underlying monitor wells. *See Tr.* at 1021, lines 15-21. Mr. Lancaster also testified that NRC Staff will review the results of pumping tests to verify that they support the conceptual model defined under the licensing action pursuant to NUREG-1569 Acceptance Criterion 5.7.8.3(4). *See Tr.* at 1023-1024.

10.210 Intervenor witness Dr. Moran testified that he has not reviewed the pumping test procedures in detail:

JUDGE BARNETT: Based on the procedures that they've outlined, do you have any concerns with the tests that they've proposed doing other than they should have been done now?

DR. MORAN: I don't know the details of all of what they're proposing to do in the future. *See Tr.* at 1082, lines 13-18. However, Dr. Moran acknowledged that the pumping tests must be run for sufficient duration to verify hydraulic isolation of the production zone from overlying monitoring intervals:

JUDGE COLE: They're going to have an established connection and they'll run the test for so long to see if there is any hydraulic connection between the monitoring wells and the upper aquifers.

DR. MORAN: Right.

See Tr. at 1019, lines 5-9. Intervenor witness Dr. LaGarry similarly testified that he has not reviewed the procedures required to develop the wellfield hydrogeologic data packages:

JUDGE COLE: Yes, just one more question. This is both Dr. Moran and Dr. LaGarry. In your previous testimony you indicated that Powertech needs to provide additional hydrogeological data on specific wellfields in the Dewey and Burdock area. Mr. Clark was talking about special conditions in the permit and he talked about special conditions in Permit 10.10(b), but are you aware that Special Permit Condition 10.10(a) has 11 specific items pertaining to hydro-geochemical testing and actions that are necessary for the well package design and operation?

DR. LaGARRY: Oh, am I aware of that? I don't recall the details of that.

See Tr. at 1140-1141.

10.211 All wellfield hydrogeologic data packages will be reviewed, at a minimum, by NRC Staff, which means that the Staff will review the package to determine whether it satisfies applicable license conditions; if the Staff cannot confirm that it satisfies the license conditions, Powertech will be in violation of its license and subject to enforcement action if it proceeds with operation of that wellfield. *See Tr.* at 1132, lines 11-19 (Clark). Further, wellfield packages for Burdock wellfields 6, 7 and 8 will require NRC Staff review and approval, which means that a license amendment will be needed to approve these wellfield packages; in order to approve the

license amendment, there will be further NEPA review and an opportunity for a public hearing. *See* Tr. at 1131-1132 (Clark). *See also* Powertech Ex. APP-074 at 12, ¶ A.19 (Lichnovsky), *citing* NRC Staff Exs. NRC-012 at 8-9 (LC 10.10) and NRC-008-A-2 at 69 (FSEIS). *See also* ¶ 10.67, *supra*.

10.212 NRC Staff will apply 10 CFR 2.390 and Management Directive 3.4 to determine whether information in wellfield hydrogeologic data packages will be publicly available; the vast majority of information is anticipated to be made publicly available. *See* Tr. at 1130-1131 (Clark). *See also* ¶ 10.68, *supra*.

17. NRC Staff Reviewed the Recently Disclosed Borehole Log Data and Determined That It Supports the Findings in the FSEIS

10.213 NRC Staff was invited by Chairman Froehlich to review the borehole log data to determine whether it confirmed information already reviewed by the Staff during the licensing process:

On the other hand, if the data, you know, merely reinforces what's already been reviewed or reviewed by the Staff and I guess the company, well then I'll hear from them that, you know, upon additional review there's nothing new that will come in.

See Tr. at 1321-1322 (Chairman Froehlich).

10.214 NRC Staff witnesses Lancaster, Prikryl, Bertetti and McGinnis testified that the Staff's review of the borehole log data included: (1) evaluating the locations of approximately 3,076 digitized geophysical logs provided on CD by cross-referencing with Appendix 2.6-A of the revised TR; (2) comparing drill hole locations in TR Appendix 2.6-A with maps in Powertech's revised TR; (3) reviewing selected drill hole plugging reports containing independent drill hole location information with the locations presented in TR Plate 2.6-8 and Appendix 2.6-A; (4) conducting a spot-check analysis of randomly selected geophysical logs to evaluate the validity of the structure and isopach maps presented in

Powertech's revised TR; (5) analyzing closely spaced geophysical logs by constructing fence diagrams to evaluate whether displacement of the Fuson Shale due to faulting or fracturing is present; and (6) analyzing closely spaced geophysical logs by constructing fence diagrams to evaluate potential displacement and thickness variations that could be indicative of a breccia pipe or collapse feature in the area alleged by Intervenor witness Dr. Moran to contain a potential sinkhole. *See* NRC Staff Ex. NRC-158 at 3-4, 7-12, 15-17, ¶¶ A5, A7, A10. *See also* NRC Staff Ex. NRC-175 at 13-14, ¶¶ A23-A24 (Prikryl and Lancaster). *See also* Powertech Ex. APP-074 at 21, ¶ A.32 (Lichnovsky).

10.215 NRC Staff witnesses Prikryl and Lancaster testified that the Staff had previously reviewed borehole log data that Powertech submitted with its license application as part of the Staff's "hard look" to assess potential environmental impacts on groundwater resources. *See* NRC Staff Ex. NRC-175 at 13, ¶ A23. *See also* Tr. at 944-945 (Prikryl).

Powertech witnesses Lichnovsky and Demuth testified that Powertech's evaluation of the site hydrogeological information included interpretation of thousands of geophysical logs, use of hundreds of geophysical logs to develop the numerical groundwater model, inclusion of dozens of geophysical logs in nine geologic cross sections, and evaluation of groundwater quality information, potentiometric surfaces and historical and recent pumping tests. *See* Powertech Ex. APP-074 at 3, ¶ A.5.

10.216 NRC Staff witnesses Lancaster, Prikryl, Bertetti and McGinnis testified that the purpose of the Staff's review of the borehole log data was "to determine if information from drill hole logs that were recently acquired by Powertech from Energy Fuels Nuclear could affect interpretations of site hydrogeological characteristics presented in the FSEIS (Ex. NRC-008)."

See NRC Staff Ex. NRC-158 at 2, ¶ A3. Messrs. Lancaster, Prikryl, Bertetti and McGinnis testified that the Staff’s review of the borehole log data supports the findings in the FSEIS:

Our analysis of the TVA drill hole log information supports the findings in the FSEIS. As described previously in A.7, we conducted a spot check and analysis of randomly selected digital and paper drill hole logs to evaluate the validity of the structure map of the top of the Fuson Shale in Powertech’s revised TR ... The results of the spot check confirm that structure maps representing geologic strata at the Dewey-Burdock site, in this case the top of the Fusion Shale, do not indicate the presence of faults, fractures, and geologic bed displacements within the site boundary.

We also analyzed and correlated drill hole log information along transects of closely spaced drill holes across selected portions of the Dewey-Burdock site ... The information clearly indicates that the Fuson Shale does not undergo significant thickening or thinning and does not exhibit significant vertical offset, both of which would be indications of possible faulting ...

In summary, our analysis of TVA drill hole log information confirms the validity of the structure and isopach maps and cross-sections presented in Powertech’s revised TR. Accordingly, our analysis supports the findings in the FSEIS with respect to the Fuson Shale’s ability to function as a hydraulic barrier.

See *id.* at 12-13, ¶ A8.

18. Dr. LaGarry Had the Opportunity to Review the Borehole Log Data and Did Not Submit Evidence Refuting Findings in the FSEIS

10.217 NRC Staff witnesses Prikryl and Lancaster testified that Intervenor witness Dr. LaGarry’s review of drillers’ notes from 4,177 boreholes only resulted in 12 records, or less than 0.3 percent, that Dr. LaGarry alleges show evidence of faulting. See NRC Staff Ex. NRC-175 at 9, ¶ A17. Regarding the eight records submitted by the Tribe as evidence of potential faulting, Powertech witness Lichnovsky testified that one is a hand-drawn sketch of a domal feature with no indication of where it is located (if even in the license area); two are misinterpretations of the word “offset”; four were investigated by Powertech geologists, who determined there is no evidence of surface expression nor subsurface evidence of potential faults

in these areas; and one was a misinterpretation of the word “caving” on the lithology log. *See* Powertech Ex. APP-074 at 11-16, ¶¶ A.17-A.25. *See also* ¶ 10.139, *supra*.

10.218 Regarding Dr. LaGarry’s allegation that a hand-drawn sketch on the back of the DS178 lithology log depicts a sinkhole, Powertech witness Lichnovsky testified that the hand-drawn sketch depicts a domal feature rather than a sinkhole; Mr. Lichnovsky further testified that no such feature has been observed at the project site. *See* Powertech Ex. APP-074 at 11-12, ¶¶ A.17-A.19. *See also* ¶¶ 10.139 and 152, *supra*.

10.219 Regarding Dr. LaGarry’s allegation that the geophysical log for borehole TRJ111 (Tribe Ex. OST-041) contains masking or redaction of borehole log data, Powertech witness Lichnovsky testified that the black square visible on the photocopy “is simply the drift survey that was taped to the original log.” *See id.* at 17, ¶ A.27. Mr. Lichnovsky testified that exhibits showing the original geophysical log with the drift survey attached and the same geophysical log with the drift survey removed demonstrate that there was nothing behind the drift survey. *See id.*, *citing* Powertech Exs. ¶¶ APP-086 and APP-087.

10.220 Regarding Dr. LaGarry’s allegation that the presence of water at various levels suggests there are multiple aquifers at the site, NRC Staff witnesses Prikryl and Lancaster testified that the presence of multiple aquifers is described and visually depicted in the FSEIS. *See* NRC Staff Ex. NRC-175 at 10, ¶ A.20. *See also* Powertech Ex. APP-074 at 17, ¶ A.28 (Demuth).

10.221 Regarding Dr. LaGarry’s allegation that uncased boreholes provide evidence of communication between aquifers, Powertech witness Lichnovsky testified that it is standard practice to conduct geophysical logging in uncased exploration holes and that logging through the drill pipe or “through steel” is only done rarely. *See* Powertech Ex. APP-074 at 4, ¶ A.6a.

Powertech witness Demuth also testified that logging using uncased boreholes is the standard method in the mining and oil/gas industries. *See id.* at 4, ¶ A.6.b. Mr. Demuth further testified that drilling mud provides a filtercake across permeable formations, which reduces flow into or out of the formations, and exerts hydraulic pressure that further reduces or eliminates flow out of the permeable formations. *See id.* Mr. Demuth testified that State of South Dakota hole plugging standards apply “regardless of whether the borehole was constructed completely as an open hole, or whether surface casing was used in specific intervals.” *See id.* at 5, ¶ A.6.b. NRC Staff witnesses Prikryl and Lancaster testified that they “fully considered the issue Dr. LaGarry raises [regarding potential communication through unplugged or improperly plugged exploration boreholes] when we were preparing the FSEIS.” *See* NRC Staff Ex. NRC-175 at 11, ¶ A20.

10.222 Powertech witnesses Lichnovsky and Demuth testified that Dr. LaGarry’s review primarily consisted of examination of “drillers’ notes,” which they testified are handwritten, subjective observations made by persons with unknown qualifications. *See* Powertech Ex. APP-074 at 3, ¶ A.5. Messrs. Lichnovsky and Demuth testified that it was geophysical logs and not drillers’ notes that were used to evaluate the presence and continuity of the major confining units across the project area, since geophysical logs provide more accurate and reliable information. *See id.* *See also id.* at 18, 23, ¶¶ A.30, A.36. *See also* ¶ 10.140, *supra*.

10.223 NRC Staff witnesses Prikryl and Lancaster also testified that geophysical logs provide more accurate and reliable information than drillers’ notes. *See* NRC Staff Ex. NRC-175 at 11, ¶ A21. Messrs. Prikryl and Lancaster further testified that Dr. LaGarry did not create stratigraphic cross sections or geologic maps supporting the Intervenors’ position on Contention 3, despite indicating during the evidentiary hearing that he may do so and despite having an extended period of time available. *See id.* at 12, ¶ A22.

E. CONTENTION 4: POTENTIAL GROUNDWATER QUANTITY IMPACTS

1. Water Usage Is Quantified in the FSEIS

10.224 Powertech witness Fritz testified that the FSEIS contains consistent estimates of groundwater consumption from the Inyan Kara and Madison aquifers, including up to 170 gallons per minute (gpm) from the Inyan Kara aquifer and up to 551 gpm from the Madison aquifer. *See* Powertech Ex. APP-046 at 5-6, ¶¶ A.8-A.9. Mr. Fritz testified that water consumption from the Madison aquifer will depend on whether deep disposal wells or land application is used; Powertech’s proposed maximum usage from the Madison aquifer is up to 160 gpm in the deep disposal well option or 551 gpm in the land application option. *See id.* at 6, ¶ A.9. Mr. Fritz further testified that the volume of wastewater requiring disposal will depend on the wastewater disposal option; reverse osmosis will be used if deep disposal wells are available, thereby reducing the amount of wastewater requiring disposal and the amount of water consumed from the Madison aquifer. *See* Tr. at 1158, lines 4-21.

10.225 NRC Staff witnesses Prikryl and Lancaster testified that the FSEIS addresses the misconception that Powertech will use up to 8,500 gpm from the Inyan Kara aquifer by explaining that while Powertech has requested authorization from SDDENR to pump up to 8,500 gpm from the Inyan Kara aquifer, almost all of this would be recirculated, such that the net withdrawal (consumptive use) would not exceed 170 gpm. *See* NRC Staff Ex. NRC-151 at 47-48, ¶ A4.3, *citing* NRC Staff Ex. NRC-008-B-2 at 355-363. Powertech witness Fritz explained that the net diversion limited by Powertech’s requested Inyan Kara water right will be 274.2 acre-feet per year, which is equivalent to 170 gpm. *See* Tr. at 1153, lines 2-10.

10.226 Regarding the allegation that the water consumption from the Inyan Kara aquifer will be “massive,” Powertech witness Fritz testified that one of the Consolidated Intervenor, Dayton Hyde, requested and was granted a water right to use up to 278 acre-feet per year from the Inyan Kara or other aquifers to irrigate 139 acres of land. *See* Powertech Ex. APP-046 at 7, ¶ A.12, *citing* Powertech Ex. APP-049 at 3. Mr. Fritz testified that Powertech’s requested Inyan Kara usage is less than this amount and that “[s]ufficient water to irrigate 139 acres generally would not be considered to be a ‘massive’ amount of groundwater.” *See id.* Mr. Fritz also testified that usage of up to 551 gpm from the Madison aquifer is not considered “massive” relative to typical agricultural usage. *See id.* at 7-8, ¶ A.13.

10.227 Powertech witness Fritz testified that the FSEIS appropriately distinguishes between and explains the difference between the gross production pumping rate of up to 4,000 gpm authorized by Powertech’s NRC license and a gross production pumping rate of up to 8,000 gpm (total net pumping rate of up to 8,500 gpm including aquifer restoration) in Powertech’s requested Inyan Kara water right application. *See id.* at 5-6, ¶ A.8.

2. Potential Drawdown-Related Impacts to Local Wells Have Been Adequately Evaluated

10.228 Powertech witness Demuth testified that the FSEIS describes in detail the potential drawdown-related impacts to local wells based on numerical modeling, including drawdown of up to 12 feet in the Fall River aquifer and up to 10 feet in the Chilson aquifer adjacent to the project area, with recovery to near pre-operational levels within 1 year after groundwater withdrawals cease. *See* Powertech Ex. APP-013 at 21, ¶ A.47, *citing* NRC Staff Ex. NRC-008-A-2 at 59-62. Mr. Demuth also testified that the Inyan Kara aquifer has been demonstrated through numerical modeling to be capable of sustaining the anticipated extraction rate. *See id.*

10.229 Powertech witness Lawrence testified that the simulation of the Dewey Fault approximately 1 mile north of the project boundary as a no-flow boundary in the numerical model resulted in a conservative estimate of the potential drawdown, since more water will be available to the project if the fault allows some flow through the Fall River or Chilson aquifers. *See* Powertech Ex. APP-037 at 41-42, ¶ A.99. Mr. Lawrence testified that numerical groundwater model used to estimate drawdown in the Fall River and Chilson aquifers is the best predictive tool available at the time it was developed. *See id.* at 42, ¶ A.100. Mr. Lawrence further testified that NRC Staff’s review of Powertech’s numerical groundwater model is documented in the FSEIS and SER. *See id.* at 19, ¶ A.42, *citing* NRC Staff Exs. NRC-008-A-2 at 64-65 and NRC-134 at 250-258. *See also* ¶¶ 10.186 and 196, *supra*.

10.230 NRC Staff witnesses Prikryl and Lancaster also testified that the FSEIS describes the potential Fall River and Chilson drawdown outside the project area based on Powertech’s numerical modeling. *See* NRC Staff Ex. NRC-001 at 75-76, ¶ A4.13. Messrs. Prikryl and Lancaster testified that the revised drawdown estimates in the FSEIS are more precise than previous estimates in the DSEIS, which were not based on numerical modeling. *See id.* Messrs. Prikryl and Lancaster testified that the numerical modeling results provide justification for Powertech’s proposal to monitor domestic and stock wells within a 2 km distance. *See id.* Powertech witness Demuth testified that LC 12.10 specifically requires Powertech to monitor all domestic, livestock and irrigation wells within 2 km of the boundary of any wellfield during operations. *See* Powertech Ex. APP-013 at 12, ¶ A.25, *citing* NRC Staff Ex. NRC-012 at 13.

10.231 Powertech witness Fritz testified that he helped develop the flow-net analysis for the Madison aquifer in the vicinity of the project area based on a technique similar to that

used by the USGS. *See* Powertech Ex. APP-046 at 8-9, ¶ A.15, *citing* Powertech Ex. APP-027-A at 71-77. Mr. Fritz testified that the flow-net analysis provided justification that there is a reasonable probability that water from the Madison aquifer is available to support the proposed project use. *See id.*

10.232 Powertech witness Fritz testified that the FSEIS documents NRC Staff's development of a three-layer model, use of the model to evaluate potential drawdown in the Madison aquifer and conclusion that the model provides evidence that the project is not likely to affect the operation of the Edgemont water supply wells. *See* Powertech Ex. APP-046 at 6, ¶ A.10, *citing* NRC Staff Ex. NRC-008-B-2 at 364-365.

10.233 NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Sections 4.5.2.1 and E5.21.1 document SDDENR's review of Powertech's water permit application for the Inyan Kara and Madison aquifers, which included conducting regional and local water balances for the aquifers based on available information on annual recharge and withdrawals. *See* NRC Staff Ex. NRC-001 at 67, ¶ A4.5, *citing* FSEIS Sections 4.5.2.1 and E5.21.1 and Powertech Exs. APP-028 and APP-048. Powertech witness Fritz testified that the FSEIS documents SDDENR's recommendation of approval of the Madison and Inyan Kara water permit applications based on SDDENR's conclusion that:

(i) withdrawal at the permitted rates will not result in average annual withdrawals that exceed the average annual recharge to the aquifers, (ii) there is a reasonable probability of adequate unappropriated water available, and (iii) there is a reasonable probability that the withdrawals proposed by Powertech can be made without unlawful impairment of existing water rights or domestic wells.

See Powertech Ex. APP-046 at 6, ¶ A.10, *citing* NRC Staff Exs. NRC-008-A-2 at 55 and NRC-008-B-2 at 356, 364. *See also* Tr. at 1151-1152 (Dr. Moran). Intervenor witnesses did not provide any information to contradict SDDENR's findings. *See* Tr. at 1303, lines 15-25 (Clark).

10.234 Powertech witness Demuth testified that Powertech has committed to specific mitigation measures to protect existing wells during operations, including removing all domestic wells with the license area and all stock wells within ¼ mile of wellfields from private use prior to operations, providing replacement water supplies for wells removed from private use, as needed, and monitoring all domestic, stock and irrigation wells within 2 km of existing and potential wellfields during operations. *See* Powertech Ex. APP-013 at 23, ¶ A.50, *citing* Powertech Ex. APP-016-B at 59-60. Mr. Demuth testified that Powertech’s commitment to monitor private wells is enforced by LC 12.10. *See id.*, *citing* NRC Staff Ex. NRC-012 at 10. Mr. Demuth also testified that these mitigation measures are addressed in FSEIS Section 4.5.2.1.1.2.2. *See id.* at 21, ¶ A.47, *citing* NRC Staff Ex. NRC-008-A-2 at 59-62.

10.235 Powertech witness Fritz testified that the South Dakota water right permits will provide additional protection for nearby water users, since Powertech will not be permitted to adversely affect existing water rights or domestic wells. *See* Powertech Ex. APP-046 at 10, ¶ A.19, *citing* Powertech Ex. APP-028 at 16.

10.236 Powertech witness Fritz testified that potential drawdown-related impacts to local and regional wells are described and evaluated throughout the FSEIS. *See* Powertech Ex. APP-046 at 6, 10-11, ¶¶ A.10, A.20, *citing* NRC Staff Exs. NRC-008-A-2 at 55, 61-62, 294 and NRC-008-B-2 at 356, 364-365, 375, 377, 467. *See also* Powertech Ex. APP-013 at 21, ¶ A.47 (Demuth), *citing* NRC Staff Ex. NRC-008-A-2 at 59-62.

3. The Water Balance Is Adequate for Its Intended Purpose

10.237 Powertech witness Demuth testified that the purpose of Powertech’s water balance, which is provided in the license application and summarized in the FSEIS, stems from a TR RAI in which NRC Staff requested a water balance diagram consistent with guidance in

NUREG-1569, Section 3.1.2. *See* Powertech Ex. APP-013 at 19, ¶ A.41, *citing* Powertech Ex. APP-016-D at 156 and NRC Staff Ex. NRC-013 at 74. Mr. Demuth testified that NRC Staff's review of the adequacy of the water balance is documented in the SER. *See id.* at 20, ¶ A.43, *citing* NRC Staff Ex. NRC-134 at 101.

10.238 Powertech witness Demuth testified that the water balance provided in the license application and summarized in the FSEIS depicts the project-wide, typical flow rates during uranium recovery, groundwater restoration and concurrent uranium recovery/groundwater restoration. *See id.* at 19, ¶ A.42, *citing* Powertech Ex. APP-016-B at 92-97. NRC Staff witnesses Prikryl and Lancaster testified that FSEIS Section 2.1.1.1.3.3 provides a water balance that is graphically illustrated in FSEIS Figure 2.1-14. *See* NRC Staff Ex. NRC-001 at 66, ¶ A4.5, *citing* NRC Staff Ex. NRC-008-A-1 at 128-130.

10.239 Powertech witness Demuth testified that the water balance shows that in each wastewater disposal option and for each phase of operations, the inputs from the Inyan Kara and Madison aquifers equal the output for liquid waste disposal, and thus the water balance diagram "depicts an actual net zero balance." *See* Powertech Ex. APP-013 at 19, ¶ A.42. During the evidentiary hearing, Intervenor witness Dr. Moran did not dispute that the depicted flow rates actually balance:

JUDGE BARNETT: Okay. So do you make any contention that the flows that are shown there do not balance?

DR. MORAN: No, that's not what I said.

JUDGE BARNETT: Okay. I'm making sure I get it correct. So would you concur that the flows that are shown there do balance? Is that correct?

DR. MORAN: The truth is I haven't gone through to see if they balance.

See Tr. at 1144, lines 11-19.

10.240 NRC Staff witnesses Prikryl and Lancaster testified that a water balance alone is not capable of predicting the potential impacts from consumptive groundwater use resulting from ISR activities; they describe how FSEIS Sections 4.5.2.1 and E5.21.3 discuss the results of drawdown estimates in the Inyan Kara aquifer based on numerical modeling. *See* NRC Staff Ex. NRC-001 at 68, ¶ A4.6.

10.241 Powertech witness Demuth testified that evaporation will not impact the project water usage, since water that is recirculated will remain within a closed system of pipes and vessels and will not be subject to evaporation. *See* Powertech Ex. APP-013 at 20, ¶ A.45. Mr. Demuth testified that any water lost to evaporation from ponds “merely represents less water requiring disposal via deep disposal wells or through land application.” *See id.* *See also* Tr. at 1145-1146 (Demuth). *See also* Tr. at 1146-1147 (Prikryl). *See also* Powertech Ex. APP-068 at 5, ¶ A.5 (Fritz).

10.242 Regarding the allegation that “measured data” should have been included in the water balance, Powertech witness Demuth testified that this is not possible, since measured data will not be available until after operations commence. *See* Powertech Ex. APP-013 at 20, ¶ A.44. *See also* NRC Staff Ex. NRC-001 at 77-78, ¶ A4.16 (Prikryl and Lancaster).

10.243 Intervenor witness Dr. Moran failed to cite any NRC-led EISs that include the kind of water balance Dr. Moran alleges is lacking from the Dewey-Burdock Project FSEIS. *See* Tr. at 1143, lines 6-16.

4. The License Application Includes Adequate Information on Baseline Water Levels in Local Wells

10.244 Powertech witness Demuth testified that information on baseline water levels and flow rates for existing wells is documented in the license application. *See* Powertech Ex. APP-013 at 22, ¶ A.48, *citing* Powertech Exs. APP-016-M at 926-1072 and APP-025 at 115-116.

Mr. Demuth testified that additional water-level data will be required prior to operations by LCs 12.4 and 12.10. *See id.* at 22-23, ¶ A.49, *citing* NRC Staff Ex. NRC-012 at 12-13.

10.245 NRC Staff witnesses Prikryl and Lancaster testified that baseline water-level information is found in Powertech's ER and TR RAI responses. *See* NRC Staff Ex. NRC-001 at 73-74, ¶ A4.11, *citing* Powertech Exs. APP-040-A at Section 3.4.1.2, APP-040-Y at Appendix 3.4-A, APP-040-Z at Appendix 3.4-B, and APP-016-C at TR RAI 2.7-15. Messrs. Prikryl and Lancaster testified that this information on pumping rates from existing wells is discussed in FSEIS Section 4.5.2.1.1.2.2. *See id.*

F. CONTENTION 6: MITIGATION

1. Mitigation Measures Are Described and Evaluated throughout FSEIS

10.246 Powertech witness Fritz testified that the FSEIS contains two tables in Chapter 6, which summarize mitigation measures proposed by Powertech or recommended by NRC Staff, while the implementation and effectiveness of mitigation measures are described and evaluated throughout the FSEIS. *See* Powertech Ex. APP-046 at 11-12, ¶ A.22, *citing* various sections and pages in the FSEIS, NRC Staff Exs. NRC-008-A and NRC-008-B. NRC Staff witnesses Yilma, Jamerson and Prikryl testified that FSEIS Chapter 4 explains how proposed mitigation measures will be effective in avoiding or reducing potential environmental impacts, Chapter 2 discusses mitigation measures associated with the proposed action and alternatives, and Chapter 7 discusses environmental monitoring measures, which are relevant to assessing the effectiveness of certain mitigation measures. *See* NRC Staff Ex. NRC-001 at 80, ¶ A6.2. Ms. Yilma testified that the summary tables in Chapter 6 are provided for ease of reference, while Chapter 4 describes how mitigation measures are considered when assessing the magnitude of potential impacts. *See* Tr. at 1263, lines 8-24.

10.247 Regarding the allegation that mitigation measures merely consist of a list of items to be developed at a future date, Powertech witness Fritz testified that Powertech's license application describes a variety of proposed mitigation measures for all resource areas. *See* Powertech Ex. APP-046 at 13-16, ¶ A.23, *citing* Powertech Exs. APP-016-B, APP-016-C, APP-016-D, APP-040-C and APP-050. Mr. Fritz also testified that air quality and land application mitigation measures are detailed throughout the FSEIS. *See id.* at 16-17, ¶¶ A.24-A.25. NRC Staff witnesses Yilma, Jamerson and Prikryl testified that numerous mitigation measures described in the FSEIS do not rely on future actions. *See* NRC Staff Ex. NRC-001 at 86, ¶ A6.11.

10.248 Regarding the allegation that the FSEIS fails to evaluate the effectiveness of mitigation measures, NRC Staff witnesses Yilma, Jamerson and Prikryl testified that the FSEIS evaluates the effectiveness of mitigation measures by explaining how they will avoid or reduce potential impacts in various resource areas. *See* NRC Staff Ex. NRC-001 at 81, ¶ A6.4, *citing* FSEIS Chapters 2 and 4. Witnesses Yilma, Jamerson and Prikryl provided specific examples of how this was done for the land use resource area. *See id.* at 81-82, ¶ A6.5. Ms. Yilma testified that mitigation measures were described in the FSEIS even if the significance of the potential impacts was determined to be small, in conformance with NEPA requirements. *See* Tr. at 1225, lines 1-7.

10.249 NRC Staff witness Yilma testified that the FSEIS defines best management practices (BMPs) as "processes, techniques, procedures or considerations that could be used to effectively avoid or reduce potential environmental impacts." *See* Tr. at 1274, lines 15-21, *citing* NRC Staff Ex. NRC-008-B-1 at 59. Ms. Yilma testified that Powertech proposed certain BMPs in its license application, while NRC Staff evaluated additional BMPs in the FSEIS based on its

knowledge of what is commonly done at other facilities. *See* Tr. at 1274, lines 2-6. Ms. Yilma testified that the FSEIS considered BMPs developed by other agencies such as EPA for resource areas ranging from shallow groundwater to revegetation. *See* Tr. at 1276-1277. Powertech witness Fritz testified that other agencies have developed BMPs for sediment control such as check dams and bale dikes. *See* Tr. at 1276, lines 9-20.

10.250 Powertech witness Fritz testified that many of the mitigation measures described in the FSEIS are enforced by binding commitments in Powertech's license application and by license conditions. *See* Powertech Ex. APP-046 at 12-13, ¶ A.22. Mr. Fritz testified that "[w]hen evaluating the potential impacts of a project, it cannot be assumed that the operator will violate conditions of its permit or any applicable statutes or regulations." *See id.* NRC Staff witness Yilma testified that compliance with license conditions is determined during announced and unannounced inspections conducted by the NRC Staff safety team. *See* Tr. at 1215. NRC Staff witness Lancaster testified that the minimum inspection frequency is annually. *See* Tr. at 1216, lines 13-15. Mr. Lancaster also testified that self-reporting of non-compliance by the licensee, routine reporting requirements, and allegations are other ways that violations of license conditions are identified. *See* Tr. at 1218-1219. NRC Staff witnesses Lancaster and Yilma testified that adherence to license conditions and implementation of BMPs will be evaluated during the pre-operational inspection that is required prior to commencing operations. *See* Tr. at 1285-1286. Standard Operating Procedures (SOPs) also will be evaluated during the mandatory pre-operational inspection. *See* Tr. at 1295, lines 15-25 (Pugsley).

10.251 NRC Staff witnesses Yilma, Jamerson and Prikryl testified that the evaluation of the effectiveness of mitigation measures in the FSEIS considers Powertech's compliance with regulations and permit conditions imposed by other Federal, State and local agencies, including

permits Powertech already has obtained and those yet to be obtained. *See* NRC Staff Ex. NRC-001 at 82-83, ¶ A6.6. Witnesses Yilma, Jamerson and Prikryl testified that examples of mitigation measures imposed by other permits include those contained in the Avian Plan, which Powertech is developing in coordination with FWS, SDDENR and the South Dakota Department of Game, Fish and Parks (SDGFP), ecological mitigation measures in Powertech's SDDENR large scale mine permit and groundwater discharge permit and the Programmatic Agreement for protection of historic properties. *See id.* NRC Staff witnesses Yilma, Jamerson, Hsueh and Luhman testified that the Programmatic Agreement specifies mitigation measures for the protection of historic and cultural resources and that Powertech must comply with the provisions of the Programmatic Agreement as a condition of both its NRC license and the BLM Plan of Operations. *See* NRC Staff Ex. NRC-151 at 10-11, ¶ A1.11. *See also* ¶ 10.40, *supra*. Witnesses Yilma, Jamerson and Prikryl testified that relying on other permitting processes to require appropriate mitigation measures to lessen impacts is appropriate in a NEPA analysis, and Powertech will be required by LC 12.1 to obtain all necessary permits and approvals from the appropriate regulatory agencies prior to operating its facility. *See* NRC Staff Ex. NRC-001 at 82-83, ¶ A6.6. at 90-91, ¶ A6.17. NRC Staff witness Yilma testified that EPA was consulted extensively during development of the FSEIS regarding mitigation measures related to the Class III and V UIC permits. *See* Tr. at 1227-1228. Ms. Yilma also testified that EPA reviewed and commented on the DSEIS, FSEIS and preliminary drafts of SEIS sections. *See* Tr. at 1267-1268.

10.252 NRC Staff witnesses Yilma, Jamerson and Prikryl testified that CEQ regulations at 40 CFR §§ 1502.14(f), 1502.16(h) and 1505.29(c) do not require that mitigation measures have succeeded in the past in order for an agency to consider them as a means of

mitigating impacts. *See* NRC Staff Ex. NRC-001 at 86-87, ¶ A6.12. Powertech witness Fritz testified that “[i]f this were not true, there could be no innovation or adoption of new technology in any endeavor under the auspices of NEPA.” *See* Powertech Ex. APP-068 at 7, ¶ A.9.

10.253 NRC Staff witnesses Yilma, Jamerson and Prikryl testified that NEPA does not require that all of the mitigation measures that an agency specifies in an EIS be in final form. *See* NRC Staff Ex. NRC-001 at 83, ¶ A6.7.

10.254 NRC Staff witness Yilma testified that mitigation measures are considered in the FSEIS when evaluating potential short and long-term impacts, as required by NEPA. *See* Tr. at 1226, lines 16-25.

10.255 The NRC Staff considered mitigation measures and related licensing actions to the extent consistent with other EISs prepared by NRC and other agencies. *See* Tr. at 1304 (Clark).

2. The FSEIS Adequately Describes and Evaluates Mitigation Measures Protective of Groundwater Resources

10.256 Powertech witness Demuth testified that the FSEIS describes the mitigation measures that will be used to protect groundwater resources and evaluates their effectiveness based on proven effectiveness at operating ISR facilities and adherence to regulatory requirements and license conditions. *See* Powertech Ex. APP-013 at 23-24, ¶ A.51. Mr. Demuth testified that the mitigation measures used to minimize and control potential adverse impacts to the environment are the same procedures and controls that NRC Staff reviewed in the SER to ensure that the facility will be operated in a manner that protects public health and the environment in accordance with federal regulations. *See id.* Mr. Demuth testified that the FSEIS provides frequent references to the SER, license application and license conditions for additional explanation and commitments regarding mitigation measures designed to protect groundwater

resources; as an example, Mr. Demuth testified that the FSEIS describes and evaluates the monitoring and mitigation measures used to minimize potential impacts from pipeline leaks. *See id.* at 24-25, ¶ A.52. Mr. Demuth also testified that the FSEIS evaluates the effectiveness of operational controls to protect groundwater quality based on their use at historically and currently operated ISR facilities, including documentation that no off-site impacts to groundwater have occurred. *See* Powertech Ex. APP-013 at 25-28, ¶¶ A.53-A.54, *citing* NRC Staff Exs. NRC-087 at 479 and NRC-091 at 1-2 and Powertech Exs. APP-030 at 83 and APP-031 at 48.

10.257 Powertech witness Demuth testified that the FSEIS adequately describes and evaluates mitigation measures to minimize potential impacts from historical mine pits, including Powertech's commitment, enforceable by license condition, to evaluate the integrity of the Fuson Shale in each wellfield in the vicinity of the historical mine pits through pumping tests and the development of the wellfield hydrogeologic data packages; Powertech's commitment to plug and abandon unplugged or improperly plugged exploration boreholes and wells in the vicinity of ISR wellfields; and the license requirement to develop a monitoring well network designed specifically to address potential impacts resulting from the historical mine pits. *See* Powertech Ex. APP-013 at 28-29, ¶¶ A.55-A.58, *citing* NRC Staff Exs. NRC-008-B-2 at 365-366, NRC-012 at 12 (LC 12.7) and NRC-008-A-2 at 68.

10.258 Powertech witness Demuth testified that the FSEIS adequately describes and evaluates mitigation measures to minimize potential impacts from exploration boreholes, including Powertech's commitment to use available information and best professional practices to locate or detect improperly plugged boreholes or wells, including through use of pumping

tests conducted for each wellfield, and Powertech's commitment to follow State hole plugging requirements. *See id.* at 30, ¶ A.59.

10.259 Regarding the allegation that procedures to conduct pumping tests for each wellfield are not adequately described in the FSEIS, Powertech witness Demuth testified that the FSEIS Section 2.1.1.1.2.3.3 describes the pumping test methodology and performance criteria. *See id.* at 30-31, ¶ A.60, *citing* NRC Staff Ex. NRC-008-A-1 at 111-112. Mr. Demuth testified that Powertech's license application provides further details regarding the performance criteria and that NRC Staff's review of the adequacy of Powertech's pumping test procedures is documented in the SER. *See id.*, *citing* Powertech Ex. APP-016-D at 284 and NRC Staff Ex. NRC-134 at 196. *See also* ¶ 10.206, *supra*.

10.260 Regarding the allegation that procedures to restore groundwater and conduct restoration stability monitoring are not described or evaluated in the FSEIS, Powertech witness Demuth testified that the information intervenors allege is missing is provided in the FSEIS. *See* Powertech Ex. APP-013 at 31-35, ¶¶ A.61-A.68, *citing* NRC Staff Ex. NRC-008-A-1 at 131-134. Mr. Demuth testified that the FSEIS documents Powertech's requirement, by license condition, to restore groundwater to meet the standards of 10 CFR Part 40, Appendix A, Criterion 5B(5). *See id.* at 32, ¶ A.64, *citing* NRC Staff Ex. NRC-008-A-2 at 69-70. Mr. Demuth testified that the FSEIS evaluates the effectiveness of Powertech proposed groundwater restoration methods through consideration of available groundwater restoration data from three NRC-licensed ISR facilities. *See id.* at 33, ¶ A.64, *citing* NRC Staff Ex. NRC-008-A-2 at 67. Mr. Demuth testified that NRC Staff's review of Powertech's groundwater restoration and stability monitoring procedures is documented in the SER. *See id.* at 32, 34, ¶¶ A.64, A.67, *citing* NRC Staff Ex. NRC-134 at 210, 213.

10.261 NRC Staff witnesses Yilma, Jamerson and Prikryl testified that Powertech is required by LC 10.6 to restore groundwater to the numerical groundwater protection standards in 10 CFR 40, Appendix A, Criterion 5B(5); the FSEIS clearly sets forth the standards that will be used to establish aquifer restoration goals; and the FSEIS provides examples of existing ISR facilities at which aquifer restoration has been successful and approved by relevant regulatory agencies. *See* NRC Staff Ex. NRC-001 at 84-86, 87-88, 92-93, ¶¶ A6.9-A6.10, A6.13, A6.18.

3. The FSEIS Adequately Describes and Evaluates Mitigation Measures for Protection of Surface Water and Wetlands

10.262 Powertech witness Fritz testified that the FSEIS describes and evaluates mitigation measures protective of surface waters and wetlands. *See* Powertech Ex. APP-046 at 22, ¶ A.28, *citing* NRC Staff Ex. NRC-008-A-2 at 31-32, 43-44, 221. *See also* Tr. at 1275-1276 (Fritz). Mr. Fritz further testified that the FSEIS considers mitigation measures that will be required by SDDENR through Powertech's construction and industrial stormwater National Pollutant Discharge Elimination System (NPDES) permits. *See id.*

10.263 NRC Staff witness Prikryl testified that FSEIS Section 4.5.1.1.1.1 describes the mitigation measures that were evaluated when determining the potential impacts to surface water and wetlands during construction, including Powertech's commitment to implement erosion control, stormwater runoff and sedimentation mitigation measures; Powertech's requirement to comply with U.S. Army Corps of Engineers permitting requirements for protection of wetlands; Powertech's requirement to comply with NPDES permit requirements for stormwater discharges; and Powertech's requirement to follow NRC regulations for pond construction. *See* Tr. at 1230-1231. Mr. Prikryl testified that these and other mitigation measures such as emergency response plans to identify and clean up accidental spills and leaks were

evaluated to determine the potential impacts during the operations phase. *See* Tr. at 1232, lines 6-20.

10.264 Powertech witness Demuth testified that the FSEIS describes the mitigation measures that will be used to control and minimize potential adverse impacts from pipeline leaks and spills. *See* Powertech Ex. APP-013 at 24, ¶ A.52. NRC Staff witness Yilma testified that the FSEIS also considered that decommissioning surveys will be required to verify that the site meets specific conditions for release for unrestricted use when evaluating the potential long-term impacts from spills. *See* Tr. at 1285, lines 5-16.

4. The FSEIS Adequately Describes and Evaluates Mitigation Measures for Wildlife Protection

10.265 Powertech witness McKee testified that the FSEIS adequately describes and evaluates mitigation measures for protecting wildlife. *See* Powertech Ex. APP-053 at 5-6, ¶ A.8. *See also* Tr. at 1245-1246. Ms. McKee testified that many of these measures are consistent with current recommendations by regional experts for wildlife protection. *See* Powertech Ex. APP-053 at 6, ¶ A.9. Ms. McKee testified that the combination of wildlife protection mitigation measures specifically listed in the FSEIS, along with references to guidance from organizations with expertise in wildlife protection and Powertech's requirement to abide by State permitting requirements for wildlife protection, is thorough and comprehensive. *See* Tr. at 1246, lines 5-20.

10.266 Powertech witness McKee testified that mitigation measures for the protection of raptors and other avian species are described in the license application and FSEIS in conformance with NUREG-1569 Acceptance Criterion 2.8.3(4), which does not indicate the need to develop and finalize a specific mitigation plan. *See* Powertech Ex. APP-053 at 6, ¶ A.10, *citing* NRC Staff Ex. NRC-013 at 68-69. Ms. McKee testified that the Avian Plan is a State requirement that will require approval from the South Dakota Department of Game, Fish and

Parks and SDDENR prior to initiating construction activities under Powertech's pending large scale mine permit. *See id.* at 6-7, ¶¶ A.11-A.12. *See also* Tr. at 1253, lines 17-20. Ms. McKee testified that Powertech already has implemented an extensive, voluntary bald eagle monitoring system as part of the draft Avian Plan that is still being developed. *See* Tr. at 1250, lines 8-23. Ms. McKee testified that the FSEIS includes numerous references to the Avian Plan. *See* Tr. at 1253, lines 10-11. Ms. McKee also testified that several of the mitigation measures in the draft Avian Plan are similar to those described in the FSEIS. *See* Tr. at 1242, 1245-1246.

10.267 NRC Staff witnesses Yilma, Jamerson and Hester testified that the information in Powertech's non-purposeful bald eagle take permit application to the FWS and the draft Avian Plan is consistent with mitigation measures evaluated in the FSEIS and does not call into question the analyses or determinations presented in the FSEIS. *See* NRC Staff Ex. NRC-157 at 3, 9-14, ¶¶ A7, A20-A26, *citing* Tribe Exs. OST-023 and OST-024.

10.268 Powertech witness McKee testified that BMPs developed by the Avian Power Line Interaction Committee (APLIC) for protecting birds perched on power lines are referenced in the FSEIS. *See* Tr. at 1282, lines 1-6 and at 1283, line 5, *citing* NRC Staff Ex. NRC-008-B-1 at 76. NRC Staff witness Yilma testified that APLIC guidance is also referenced on FSEIS page 4-89. *See* Tr. at 1282-1283, *citing* NRC Staff Ex. NRC-008-A-2 at 89. NRC Staff witnesses Yilma, Jamerson and Hester also testified that the FSEIS discusses following APLIC standards as an NRC-recommended mitigation measure on FSEIS page 6-14. *See* NRC Staff Ex. NRC-157 at 5, ¶ A10, *citing* NRC Staff Ex. NRC-008-B-1 at 72.

10.269 NRC Staff witnesses Yilma, Jamerson and Prikryl testified that the FSEIS explains and evaluates South Dakota regulatory requirements for migratory birds and wildlife protection associated with ponds and that CEQ regulations at 40 CFR §§ 1502.16(h) and

1505.2(c) encourage agencies to consider an applicant's compliance with environmental quality requirements imposed by other agencies with responsibility for environmental protection. *See* NRC Staff Ex. NRC-001 at 91, ¶ A6.17.

10.270 Powertech witness McKee testified that there are a variety of mitigation measures available to deter avian species from ponds, including netting, visual deterrents and sound hazing devices, all of which are described in the FSEIS. *See* Tr. at 1246-1248. Ms. McKee further testified that Powertech has committed to monitor ponds daily, including inspecting fences designed to exclude wildlife and any avian deterrent systems implemented. *See id.* Ms. McKee testified that while the mitigation measures may not eliminate every single bird from the ponds, they will be sufficient to maintain the long-term wildlife resources of the site. *See id.*

10.271 Powertech witness Fritz testified that the FSEIS describes mitigation measures designed to prevent or reduce potential impacts from land application, including (1) treating the wastewater through ion exchange and with barium chloride to meet NRC release requirements for radionuclides in 10 CFR Part 20, Appendix B and South Dakota requirements, (2) sampling treated wastewater prior to land application to verify that it meets applicable limits, (3) routinely monitoring air, soil, crop, livestock, surface water and groundwater to identify the presence of regulated constituents, (4) adhering to South Dakota compliance limits for alluvial wells downgradient from land application systems and (5) performing decommissioning radiological surveys to verify that soils meet release limits. *See* Powertech Ex. APP-046 at 16-17, ¶¶ A.25, *citing* NRC Staff Exs. NRC-008-A-1 at 146-147 and NRC-008-B-1 at 98. Mr. Fritz also testified that the FSEIS provides frequent references to Powertech's State permit applications associated with land application, which contain additional detail on land application mitigation measures. *See id.*

10.272 NRC Staff witnesses Yilma and Jamerson provided additional testimony on land application mitigation measures addressed in the FSEIS, including that land application water will be treated to meet NRC release requirements for radionuclides and SDDENR requirements imposed by the groundwater discharge permit, and that runoff from precipitation or snowmelt on land application areas will be captured in catchment areas. *See* NRC Staff Ex. NRC-001 at 90, ¶ A6.17, *citing* FSEIS Sections 3.13, 4.14 and 4.5.1.1.2.1. *See also* Tr. at 1237, lines 3-7 (Prikryl). *See also* Tr. at 1238, lines 5-9 (Yilma). NRC Staff witness Yilma testified that wildlife monitoring associated with land application is described in FSEIS Chapter 7. *See* Tr. at 1239, lines 13-16.

10.273 Powertech witness McKee testified that Powertech has committed to specific monitoring and mitigation measures related to potential bioaccumulation of selenium due to land application, including inspecting ponds daily, monitoring selenium concentrations in land application water, soils and vegetation, comparing the concentrations to threshold values or trigger levels and taking immediate corrective action if threshold levels are exceeded. *See* Tr. at 1255-1256. Powertech witness Fritz testified that animal tissue also will be monitored routinely for potential selenium bioaccumulation. *See* Tr. at 1256, lines 16-19. NRC Staff witness Yilma testified that selenium is included in the list of constituents required for routine land application system monitoring in FSEIS Chapter 7. *See* Tr. at 1257, lines 15-25, *citing* NRC Staff Ex. NRC-008-B-1 at 87. Ms. Yilma testified that potential impacts from selenium bioaccumulation due to land application are addressed in FSEIS Section 4.6.1.2.2, which concludes that potential impacts to wildlife will be moderate. *See* Tr. at 1257, lines 9-14, *citing* NRC Staff Ex. NRC-008-A-2 at 111. *See also* Tr. at 1258-1259 (McKee).

5. The FSEIS Adequately Describes and Evaluates Mitigation Measures for Cultural Resources

10.274 NRC Staff witnesses Yilma and Jamerson testified that mitigation measures for cultural resources that are specified in the Programmatic Agreement were taken into account in the Staff's NEPA review. *See* NRC Staff Ex. NRC-001 at 88, ¶ A6.14. Mss. Yilma and Jamerson testified that the Staff did not issue the Record of Decision for the Dewey-Burdock Project, which is the NEPA decision document, until after the Programmatic Agreement was finalized. *See id.*

10.275 Powertech witness Dr. Sebastian testified that there is no requirement that a Section 106 agreement document, whether a Programmatic Agreement or a Memorandum of Agreement, must be analyzed in the NEPA document. *See* Powertech Ex. APP-001 at 5, ¶ A.11. Dr. Sebastian testified that use of a Programmatic Agreement to complete the Section 106 process was appropriate for the Dewey-Burdock Project, since there is a need to develop a future utility corridor in a currently unknown location and uncertainty regarding the wastewater disposal mechanism. *See id.* at 6, ¶ A.14.

G. CONTENTION 9: CONNECTED ACTIONS

1. The FSEIS Follows the Integrative Approach Recommended by CEQ in Considering Reviews Conducted by Other Agencies

10.276 NRC Staff witnesses Yilma and Jamerson testified that the Staff followed CEQ guidance encouraging federal agencies to integrate draft EISs with environmental impact analyses prepared by other agencies and with related surveys and studies required by other statutes. *See* NRC Staff Ex. NRC-001 at 97, ¶ A9.6, *citing* NRC Staff Ex. NRC-132. Mss. Yilma and Jamerson testified that the Staff took into account “the regulations of other agencies and the

reasonably foreseeable conditions that might be included in any permits issued by those other agencies.” *See id.* at 104, ¶ A9.11.

2. The FSEIS Demonstrates that NRC Fully Engaged BLM during the Development of the FSEIS

10.277 NRC Staff witness Yilma testified that the BLM is a cooperating agency in the development of the FSEIS. *See* Tr. at 1269, lines 5-7. Powertech witness Fritz testified that the FSEIS documents BLM’s involvement in development of the FSEIS as a cooperating agency, particularly with respect to land use, historic and cultural resources, wildlife and visual resources. *See* Powertech Ex. APP-046 at 17-18, ¶ A.26.

10.278 NRC Staff witnesses Yilma and Jamerson testified that BLM participated in the drafting of the Programmatic Agreement. *See* NRC Staff Ex. NRC-001 at 15, ¶ A1.17. *See also* Tr. at 828, line 25 (Dr. Luhman).

10.279 NRC Staff witness Yilma testified that BLM also participated in the development of the air modeling protocol. *See* Tr. at 1228, lines 19-25.

3. The FSEIS Demonstrates that EPA Was Appropriately Engaged in the Development of the FSEIS

10.280 Powertech witness Fritz testified that the FSEIS documents EPA’s involvement in its development, including that EPA is the primary permitting authority for the Class III and V UIC permits, EPA was involved during the development of the air modeling protocol, EPA participated during interactions with tribal governments, EPA will be involved in the establishment of water quality standards for each wellfield, and EPA reviewed and commented on the DSEIS and FSEIS along with preliminary drafts. *See* Powertech Ex. APP-046 at 18-19, ¶ A.26, *citing* various FSEIS sections. NRC Staff witnesses Yilma and Jamerson

testified that the FSEIS evaluates potential impacts related to EPA permits under the Safe Drinking Water Act and 40 CFR Part 61, Subpart W. *See* NRC Staff Ex. NRC-001 at 96, ¶ A9.5.

10.281 NRC Staff witness Yilma testified that EPA reviewed preliminary draft SEIS sections and provided feedback and comments that were incorporated into the DSEIS and FSEIS. *See* Tr. at 1267, lines 12-20. Ms. Yilma also testified that EPA provided comments on the DSEIS during the public comment period that were considered in the FSEIS and that NRC Staff continued to coordinate licensing/permitting efforts with EPA following issuance of the DSEIS, including obtaining information from EPA and providing information to EPA. *See* Tr. at 1267-1268.

4. The FSEIS Adequately Evaluates the Potential Environmental Impacts of Class III and V Injection Wells

10.282 Powertech witness Fritz testified that although 40 CFR § 124.9(b)(6) specifically precludes the preparation of an EIS in conjunction with a UIC permit, EPA was fully engaged in the license application process and NRC Staff's NEPA analysis. *See* Powertech Ex. APP-046 at 20, ¶ A.27.

10.283 Powertech witness Fritz testified that the injection wells permitted under EPA's Class III UIC permit are the same injection wells proposed for uranium recovery and aquifer restoration in Powertech's NRC license application. *See id.* Mr. Fritz testified that the FSEIS documents NRC Staff's NEPA analysis of the construction, operation and decommissioning of the Class III injection wells throughout the FSEIS. *See id.*, *citing* various FSEIS sections.

10.284 NRC Staff witnesses Yilma and Jamerson testified that the FSEIS describes the Class III UIC permitting process and evaluates the construction, development, and testing of

wells in accordance with EPA regulations under 40 CFR Part 146. *See* NRC Staff Ex. NRC-001 at 94-95, ¶ A9.2, *citing* NRC Staff Ex. NRC-008-A-2 at 32-33, 56, 71.

10.285 NRC Staff witnesses Yilma and Jamerson testified that in addition to considering the EPA permitting requirements for Class III injection wells, the FSEIS also independently evaluates how Class III injection wells may affect water and other environmental resources. *See id.* at 100, ¶ A9.7.

10.286 Powertech witness Fritz testified that the injection wells permitted under EPA's Class V UIC permit are the same deep disposal wells proposed for treated wastewater disposal in Powertech's NRC license application. *See* Powertech Ex. APP-046 at 21, ¶ A.27. Mr. Fritz testified that NRC Staff's NEPA analysis of the construction, operation and decommissioning of Class V deep disposal wells is carried out throughout the FSEIS. *See id.*, *citing* various FSEIS sections.

10.287 NRC Staff witnesses Yilma and Jamerson testified that FSEIS Chapter 4 evaluates the potential impacts of Class V deep disposal wells for each resource area and during each of the four project phases (construction, operation, aquifer restoration and decommissioning). *See* NRC Staff Ex. NRC-001 at 95, ¶ A9.3. As an example, Mss. Yilma and Jamerson testified that the FSEIS considers that EPA will evaluate the suitability of the deep disposal wells and will only authorize injection if the wastewater can be suitably isolated in a deep aquifer. *See id.*, *citing* NRC Staff Ex. NRC-008-A-2 at 69. *See also* Tr. at 1268, lines 18-21 (Yilma).

10.288 NRC Staff witnesses Yilma and Jamerson testified that the FSEIS identified and evaluated the potential impacts of Class V wells on its own while taking into account applicable EPA regulations, which is consistent with 40 CFR § 1502.21. *See* NRC Staff Ex.

NRC-001 at 93, ¶ A9.1. Mss. Yilma and Jamerson testified that the FSEIS describes the Class V UIC permitting requirements imposed by EPA as well as requirements imposed by other agencies and considers all applicable permitting requirements along with mitigation measures to which Powertech has committed when assessing potential impacts. *See id.* at 98-99, ¶ A9.7.

10.289 Powertech witness Fritz testified that while the FSEIS acknowledges that EPA will evaluate the suitability of the formations proposed for Class V well injection, it also documents extensive evidence that the Class V injection zones are hydrologically and hydraulically isolated. *See Powertech Ex. APP-046 at 21-22, ¶ A.28.*

10.290 Powertech witness Demuth testified that radioactive waste will not be disposed in the Class V deep disposal wells, since Powertech has committed, and will be required by its NRC license, to treating wastewater to meet the 10 CFR Part 20, Appendix B, Table 2, Column 2 limits for release of radionuclides to the environment. *See Powertech Ex. APP-013 at 35, ¶ A.69, citing NRC Staff Ex. NRC-008-A-2 at 34.* Mr. Demuth also testified that there is no regulatory requirement that Class V wells must be above or below any USDW. *See id.* at 35, ¶ A.71. *See also Tr. at 1272, lines 15-20 (Demuth). See also NRC Staff Ex. NRC-001 at 102, ¶¶ A9.8-A9.9 (Yilma and Jamerson).*

5. The FSEIS Appropriately Considers EPA Subpart W Permitting Requirements

10.291 NRC Staff witnesses Yilma and Jamerson testified that the FSEIS acknowledges the requirements of 40 CFR Part 61, Subpart W associated with the use of ponds as part of the wastewater disposal systems. *See NRC Staff Ex. NRC-001 at 96-97, ¶ A9.5.* Mss. Yilma and Jamerson testified that FSEIS Sections 2.1.1.1.2.4.1 and 2.1.1.1.2.4.2 evaluate the pond siting and designs, including consideration of Regulatory Guide 3.11, which states that ISR facility retention pond siting and design should consider EPA national emission regulations

under Subpart W. *See id., citing* NRC Staff Ex. NRC-094. Mss. Yilma and Jamerson testified that the FSEIS acknowledges that Powertech may need EPA approval of its impoundments before beginning operations. *See id.* Mss. Yilma and Jamerson further testified that LC 12.1 prohibits Powertech from commencing operations until all necessary permits, licenses and approvals are obtained from the appropriate regulatory authorities. *See id. See also* NRC Staff Ex. NRC-001 at 100-101, ¶ A9.7.

6. The FSEIS Appropriately Considers South Dakota Land Application Permitting Requirements

10.292 NRC Staff witnesses Yilma and Jamerson testified that the FSEIS documents that Powertech must obtain approval of its groundwater discharge plan (GDP) permit application from SDDENR prior to conducting land application. *See* NRC Staff Ex. NRC-001 at 103-104, ¶ A9.10. Mss. Yilma and Jamerson testified that the FSEIS analyzes the land application wastewater disposal option in detail throughout the FSEIS, including Sections 2.1.1.1.2.4.2, 4.2.1.2, 4.3.1.2 and 4.4.1.2. *See id.* Mss. Yilma and Jamerson testified that the FSEIS describes the monitoring and mitigation measures associated with land application, including treating wastewater to meet the NRC standards for discharge of radionuclides to the environment and conducting an operational monitoring program in accordance with State requirements. *See id.* Mss. Yilma and Jamerson further testified that potential impacts related to land application are evaluated in FSEIS Chapter 4, mitigation measures are described and evaluated in Chapters 6 and 7, and cumulative impacts are evaluated in Chapter 5. *See id.* Mss. Yilma and Jamerson provided additional testimony on land application mitigation measures under Contention 6, including treating the wastewater to meet both NRC and State limits established under the GDP and capturing runoff and precipitation from land application areas in catchment areas. *See* NRC Staff Ex. NRC-001 at 90, ¶ A6.17. *See also* ¶¶ 10.271-10.273, *supra*.

7. The FSEIS Appropriately Considers South Dakota NPDES Permitting Requirements

10.293 NRC Staff witnesses Yilma and Jamerson testified that FSEIS Chapter 4 documents Powertech's requirement to obtain construction and industrial stormwater NPDES permits from SDDENR prior to commencing construction or operation. *See* NRC Staff Ex. NRC-001 at 95-96, ¶ A9.4. Mss. Yilma and Jamerson testified that the FSEIS evaluates regulations governing stormwater discharge in FSEIS Section 4.5.1.1.1. *See id.* at 97, ¶ A9.6. Mss. Yilma and Jamerson testified that the NPDES permit requirements restrict the amount of pollutants discharged to surface waters and wetlands and that Powertech must implement a stormwater pollution management plan that will include erosion and sedimentation controls. *See id.* at 101, ¶ A9.7. Mss. Yilma and Jamerson testified that the FSEIS reasonably concluded that the potential environmental impacts from stormwater runoff will be small based on the reasonably foreseeable conditions in Powertech's required NPDES permits. *See id.* *See also* Tr. at 1269-1271 (Yilma).

10.294 Powertech witness Fritz testified that although the NPDES permits issued by SDDENR will set the limits on the amounts of pollutants entering site drainages and will define the required mitigation measures and BMPs to be implemented under the NPDES permits, the FSEIS adequately describes mitigation measures for protection of surface waters. *See* Powertech Ex. APP-046 at 22, ¶ A.28, *citing* NRC Staff Ex. NRC-008-A-2 at 31-32, 43-44, 221. Mr. Fritz testified that these include design considerations such as siting facility buildings away from drainage channels, crossing drainage channels at right angles to minimize disturbance and providing secondary containment for chemical storage areas; topsoil management and revegetation measures to minimize soil loss; sediment control measures such as silt fencing, sediment ponds, straw bale check dams and channel stabilization; and spill response and clean up

measures. *See id.* Mr. Fritz testified that although the NPDES permit applications will be submitted at a future date, the general content is widely accepted and they will conform with the analysis and discussion included in the FSEIS. *See* Powertech Ex. APP-068 at 8, ¶ A.14.

8. The FSEIS Appropriately Concludes that There Will Be No Cumulative Impacts Resulting from the Black Hills Army Depot

10.295 Powertech witness Lawrence testified that the NRC Staff evaluated the potential impacts from the Black Hills Ordnance Depot (also referred to as the Black Hills Army Depot) and concluded in the SER and FSEIS that any contamination from the Depot has not and will not impact groundwater quality at the Dewey-Burdock Project. *See* Powertech Ex. APP-066 at 4, ¶A.1. *See also* ¶ 10.95, *supra*.

10.296 NRC Staff witnesses Prikryl and Lancaster testified that the Staff evaluated activities at the Black Hills Army Depot and their potential environmental impacts in Chapter 5 of the FSEIS. *See* NRC Staff Ex. NRC-151 at 13-14, ¶ A2.1. *See also* Tr. at 1280-1281 (Prikryl). *See also* ¶ 10.96, *supra*.

10.297 NRC Staff witnesses Lancaster and Yilma testified that the SER evaluated the potential for the Dewey-Burdock Project to mobilize contaminants from the Black Hills Army Depot and that the findings in the SER were considered when preparing the FSEIS. *See* Tr. at 1286-1287. *See also* ¶ 10.97, *supra*.

V. SUMMARY OF THE LEGAL ARGUMENT: RESPONSE TO LICENSING BOARD QUESTIONS

As discussed above, Powertech believes that the aforementioned findings of fact and conclusions of law sufficiently demonstrate that none of CI's and/or the Tribe's admitted contentions warrant revocation or modification of Powertech's NRC License No. SUA-1600. In addition, pursuant to the Licensing Board's December 10, 2014, scheduling order, Powertech asserts that the aforementioned findings of fact and conclusions of law adequately address each of the Licensing Board's eighteen (18) questions. However, Powertech believes that it would assist the Licensing Board in making its initial decision on the admitted contentions to present a summary of the legal arguments presented in the proposed findings of fact and conclusions of law on each of the questions presented in the December 10, 2014, order. For ease of reference, citations in this summary of legal argument will refer to paragraph (¶) numbers where case law, expert testimony or other legal or factual statements/conclusions are offered.

A. CONTENTIONS 1A AND 1B

1. What Constitutes a Reasonable and Good Faith Effort to Seek Information from Consulting Parties, Other Members of the Public, and Native American Tribes to Identify Historic Properties in the Area of Potential Effect?

Under the NHPA and the ACHP's implementing regulations, a federal agency is required to make a "reasonable and good faith effort" to identify historic properties within the area of potential effect, including properties of religious and cultural significance to tribes, with an eye towards assessing potential adverse effects to historic properties—that is properties that are listed on or eligible for listing on the NRHP. *See* Powertech Proposed Findings at ¶¶ 10.14 & 10.15. Under ACHP regulations and guidance, the federal agency addressing an "undertaking"²⁶

²⁶ ACHP regulations at 36 CFR § 800.16(y) define "undertaking" as a:

determines how it will conduct the Section 106 process, including identifying historic properties after seeking and considering the views of other agencies and consulting parties. *See* NRC Staff Exhibit NRC-151 at 7, ¶ A1.5, *citing* NRC Staff Exhibit NRC-047 at 1-2. Powertech’s expert witness Dr. Lynne Sebastian testified that NRC has the authority to determine what constitutes a “reasonable and good faith effort” to consult with federally recognized Native American tribes concerning the Dewey-Burdock Project. *See* Powertech Proposed Findings at ¶ 10.15.

As stated in this pleading, NRC solicited the input of the ACHP to advise on the procedure and substance of its Section 106 process. The ACHP’s staff reviewed the complete package of Section 106 activities, findings, and decision documents, including the final PA. As detailed in the administrative record, the ACHP executed the PA because it concluded that “the content and spirit of the Section 106 process has been met by the NRC.” *See* Powertech Proposed Findings at ¶ 10.53. Even the Tribe’s designated representative has acknowledged that the ACHP is the authority as to whether the Section 106 process has been completed adequately or not. *See* Powertech Proposed Findings of Fact at ¶ 10.54. At the end of NRC’s Section 106 process, the ACHP executed the PA and demonstrated its endorsement of NRC’s Section 106 consultation effort. The ACHP’s execution of the PA demonstrates, beyond any question, compliance with the “reasonable and good faith effort” standard under 36 CFR Part 800.

“project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency.”

2. What Constitutes “A Reasonable Opportunity to Identify [a Tribe’s] Concerns about Historic Properties, Advise on the Identification and Evaluation of Historic Properties, including Those of Traditional Religious and Cultural Importance, Articulate Its Views on the Undertaking’s Effects on Such Properties, and Participate in the Resolution of Adverse Effects?”

Similar to the argument offered above in Section V(A)(1), the “reasonable and good faith effort” standard directly addresses the Licensing Board’s question here. The NHPA requires a “reasonable and good faith effort” to consult with federally recognized tribes during the Section 106 process. As stated above, federal agencies are permitted to determine the appropriate methodology to comply with the NHPA Section 106 requirements.

Powertech completed a detailed, one hundred (100) percent walkover Level III survey of the license area to identify archeological sites and historic structures, which was supplemented on two (2) occasions. This Level III survey, which was completed in accordance with state-of-the-art requirements and guidance, allowed tribes to develop field survey priorities prior to conducting field identification of potential historic properties of religious and cultural significance to the tribes.

NRC Staff made a reasonable and good faith effort to consult with federally recognized tribes throughout all phases of the Section 106 process. This began with identifying the federally recognized tribes with whom NRC Staff would consult during the Section 106 process as required by 36 CFR § 800.3. The list of tribes with which NRC Staff consulted was originally provided by the SD SHPO; also, additional Tribes were added to the list as a result of additional information provided by Powertech’s consultants and by tribes already engaged in the Project consultations with NRC Staff. *See* Powertech Proposed Findings at ¶ 10.49. NRC Staff consulted the tribes on the best approach to identify properties of religious and cultural significance to them and chose the field survey approach based on requests from the tribes for

the opportunity to identify such sites. *See id.* ¶¶ 10.17 & 10.18. The individual tribal field survey approach to identifying these sites has been used by other federal agencies and provided every tribe that wished to participate with the opportunity to evaluate the entire license area in a manner culturally appropriate to them, with expenses paid by Powertech. *See id.* at ¶ 10.22.

NRC Staff consulted with the tribes in regard to the NRHP eligibility recommendations for identified historic properties and revised eligibility recommendations based on written comments received from the tribes. *See Powertech Proposed Findings* at ¶ 10.42. NRC Staff also consulted extensively with the tribes during evaluation of potential adverse effects and regarding measures to resolve adverse effects to be included in the PA. *See id.* at ¶ 10.51. Consultation does not require agreement or signature by all consulting parties. *See id.* at ¶ 10.52. In addition to the consultations leading up to development of the Dewey-Burdock PA, this document also provides tribes the opportunity to participate in future consultations about identification of additional historic properties, the protection and evaluation of currently unevaluated properties, and plans for measures to avoid, minimize, and mitigate adverse effects regardless of whether they chose to participate in the development of the PA or signed the PA. *See id.* at ¶ 10.45.

As the administrative record demonstrates, NRC also consulted with the ACHP, the South Dakota SHPO, and BLM in developing and finalizing the PA. All required signatories (NRC, BLM, SD SHPO and the ACHP) and Powertech, as an invited signatory, executed the PA pursuant to 36 CFR § 800.6 to resolve adverse effects to historic properties as a result of the “undertaking.” Execution of the PA by all required signatories demonstrates that NRC’s conduct of its Section 106 process complies with the requirements of the NHPA. The availability of the Level III archaeological study, the multiple meetings and ongoing communications with the

Tribes, the field surveys conducted by all Tribes who requested to carry out the ground identification, and finally, the execution of the PA by ACHP and other required signatories demonstrate that the Section 106 process offered tribes an appropriate and reasonable opportunity to participate in every phase of the Section 106 process at the Dewey-Burdock ISR Project site.

3. Did the NRC Staff “Recognize the Government-to-Government Relationship between the Federal Government and Indian Tribes” in the Preparation of the FSEIS and the Programmatic Agreement?”

The NHPA mandates that federal agencies (such as NRC) consult with federally recognized tribes during the Section 106 process after an “undertaking” is identified and pursued by a license applicant. NRC Staff consulted extensively, and in good faith, with federally recognized tribes throughout the Section 106 process, including all Section 106 meetings (including webinars) and planning. *See* Powertech Proposed Findings at ¶ 10.48. The chronology of consultation provided in NRC Staff Exhibit NRC-015 and NRC Staff’s testimony regarding meetings or other Section 106-related activities demonstrate that the Staff identified appropriately delegated Tribal representatives and consulted with them on a “government-to-government” basis. Originally, NRC requested that Powertech’s consultants, experts from SRI Foundation with years of Section 106 experience, engage with the Tribes and begin the initial process of creating a cooperative effort going forward on assessment of historic properties of religious and cultural significance. The Tribes specifically told NRC Staff that they preferred to work directly with NRC (government-to-government) and not with the license applicant (Powertech) or the then-license applicant’s consultants. From that point on, NRC directly engaged the Tribes on all matters associated with the Section 106 process.

Further, all identified consulting tribes had equal opportunity to participate in the comment period for the DSEIS and in the development of the PA. The administrative record reflects that seven tribes did participate in the site field surveys as well but that the Tribe (Oglala Sioux) voluntarily elected not to participate. *See* Powertech Proposed Findings at ¶ 10.25. Moreover, given that the “government-to-government” process is an NHPA requirement and that the ACHP is the agency with the authority to interpret and implement NHPA requirements, its “sign-off” on the broader NRC process ultimately reflected in the PA represents an endorsement of NRC’s compliance with NHPA requirements, including “government-to-government” consultation. *See* Powertech Proposed Conclusions of Law at ¶ 7.11.

4. Have the Federal Courts Held That a Level III Cultural Survey Satisfies NEPA Requirements as to Places of Religious or Cultural Significance (as Opposed to NHPA § 106 Requirements)?

First, it is important to note that a Level III archaeological survey is not designed nor intended to address “places of religious or cultural significance.” Such surveys are, per Dr. Adrien Hannus’ testimony, conducted pursuant to well-understood State and federal guidelines to identify locations of archaeological significance. Identification of religious and cultural significance to the Tribes is carried out in a variety of ways, depending on the traditional knowledge and cultural practices of each Tribe..

To the best of Powertech’s knowledge, federal courts have not directly weighed in on whether or not a Level III archeological survey adequately addresses NEPA requirements²⁷ for identifying places of religious or cultural significance. However, federal courts have weighed in on the intense nature of Level III surveys for projects for the purposes for which they are conducted. *See* Powertech Proposed Conclusions of Law at ¶ 7.10.

²⁷ It is important to note that NEPA has no requirements for addressing historic and cultural resources. This is an issue evaluated under the NHPA and the Licensing Board should be mindful of the distinction.

With that said, the critical factor here is to take into account the highly site-specific nature of both types of NHPA reviews, which are represented here by the Level III archeological survey, and consulting with specific tribes on resources of religious or cultural significance. It is important to note that the Level III archeological survey is not intended to supplant a proper post-license application Section 106 process as reflected in the terms of the PA. However, a Level III survey is more than adequate to satisfy NRC NUREG-1569 requirements for contents of an ISR operating license application.

As a general matter, under NRC licensing procedures, tribal participation in a survey to identify places of religious or cultural significance to the tribes (without a tribal waiver of government-to-government relationship) will only take place after the license application process has commenced (i.e., the “undertaking” has been identified). As discussed in Section IV (A) and (B) of this pleading, Powertech’s expert witness Dr. Lynne Sebastian specifically discusses how NRC conducted its consultation and evaluation efforts with tribes willing to participate in the process. 36 CFR § 800.8 encourages the lead agency to coordinate its Section 106 compliance and its NEPA compliance by initiating the Section 106 process during the early stages of the NEPA process and ensuring that effects on historic properties are considered as part of the NEPA analysis. In the instant case, completion of the Section 106 compliance process prior to issuance of the ROD demonstrates appropriate coordination between NEPA and Section 106. . See Powertech Proposed Conclusions of Law at ¶ 7.8. Dr. Sebastian also testified that the NRC’s NHPA and NEPA reviews, which included the Level III survey, satisfied the specific regulatory requirements for both statutes and were consistent with guidance provided by CEQ and ACHP. See Powertech Proposed Findings at ¶ 10.36.

B. CONTENTION 2

1. Have the Federal Courts Addressed the 10 CFR Part 40, Appendix A, Criterion 7 “Baseline Groundwater Quality” and Criterion 5 “Commission-Approved Background” Water Quality Distinction and Ruled Whether This Staggered Water Quality Review Satisfies NEPA?

The performance-based nature of the Commission’s review of groundwater quality data pre and post-license issuance for ISR operating licenses based on 10 CFR Part 40, Appendix A, Criteria 7 and 5B(5) has been approved by the Commission in the *Hydro Resources, Inc.* proceeding. The *Hydro Resources, Inc.* proceeding was litigated in two (2) phases: (1) Phase 1 dealing with the Church Rock Section 8 project site and (2) Phase 2 dealing with the remaining project sites locate at Church Rock Section 17, Unit One, and Crownpoint. See Powertech Proposed Conclusions of Law at ¶ 8.14. In CLI-06-01, the Commission affirmed the Licensing Board’s ruling in LBP-05-17 concluding that the assessment of groundwater quality data per Criteria 7 and 5B(5) may be conducted in a phased manner. See Powertech Conclusions of Law at ¶ 6.5. Indeed, CLI-06-01 specifically denotes four (4) items of groundwater quality data development that can occur post-license issuance including the development of Criterion 5B(5) Commission-approved background and upper control limits (UCLs). This issue has been thoroughly briefed by both Powertech and NRC Staff in its initial and rebuttal position statements, and Powertech continues to support this argument.

2. Further, in Response to a Question from Judge Barnett, Counsel for the Licensee and Staff Stated that Satisfying All the Requirements of NUREG-1569 (e.g., Staggered Water Quality Review) Will Automatically Satisfy All the Relevant Requirements of NEPA and 10 CFR Part 40. Please Provide Legal Support for This Assertion, Especially if the Commission or a Federal Court Has So Held.

As discussed in the proposed Findings of Fact and Conclusions of Law above, NUREG-1569 guidance for new ISR operating licenses, as well as subsequent license amendments and

renewals, constitutes Commission-approved guidance and, as such, satisfaction of such guidance is one pathway to obtaining an approved NRC ISR operating license. As a general matter, NUREG-1569 is guidance utilized by the Commission in prescribing a methodology by which a license applicant can satisfy relevant ISR licensing regulations such as 10 CFR Part 40 regulations and Appendix A Criteria. As stated by the Commission in the *Seabrook* and *Private Fuel Storage* cases, Commission guidance documents are entitled to special weight. See Powertech Proposed Conclusions of Law at ¶ 8.6. The Commission also has said that guidance documents, such as regulatory guides, conformed to by license applicants is likely to result in compliance with specific regulatory requirements, though non-conformance with such guidance does not mean non-compliance with the regulations. See Powertech Proposed Conclusions of Law at ¶ 8.7. These factors are supported by the explicit language of NUREG-1569's Response to Comments stating that the Commission's position on risk-informed, performance-based licensing in SECY-98-144 shows that it "provides general guidance on acceptable methods for compliance with the existing regulatory framework."²⁸ See Powertech Proposed Conclusions of Law at ¶ 8.8. NUREG-1569, Table 1 also shows the acceptance criteria for all resource areas associated with review of an ISR operating license application. This table shows that the vast majority of such acceptance criteria apply to both NRC Staff's safety *and* environmental (NEPA) reviews. See Powertech Proposed Conclusions of Law at ¶ 8.3. Furthermore, as stated in ¶ 8.8, NUREG-1569 also was finalized after a series of *Hydro Resources, Inc.* decisions from both the Licensing Board and the Commission. Taken together, at a minimum, NUREG-1569 should be accorded special weight when considering compliance with its criteria and regulatory requirements and, based on SRM-SECY-02-0204 (May 7, 2003), NUREG-1569 should be

²⁸ See also Powertech Conclusions of Law ¶ 5.1 regarding the Commission's delegation to NRC Staff to interpret its regulations, including but not limited to 10 CFR Part 40, Appendix A for ISR operating license applications.

observed as Commission-approved guidance. *See* Powertech Proposed Conclusions of Law at ¶ 8.4 and Powertech Proposed Findings at ¶ 10.73.

C. CONTENTION 3

1. To What Extent Do the Various Studies in the Record Either Support or Undermine the Proposition that the Fuson Shale Will Adequately Contain Fluid Migration?

It is Powertech's position that all studies and reviews contained in the ROD/administrative record support the proposition that the Fuson Shale exhibits adequate confinement for NRC-licensed ISR operations at the Dewey-Burdock Project site. As discussed in this pleading at ¶¶ 10.118, 10.122 through 10.128 and 10.179 through 10.194, Powertech has offered considerable evidence and expert testimony demonstrating that the Fuson Shale provides adequate confinement to contain fluid migration such that ISR may be conducted safely. In ¶ 10.127, Powertech notes that its expert witness has shown that the Fuson Shale does not affect the confinement of the Inyan Kara aquifer as a whole, since the Fuson Shale is an internal member of the Inyan Kara aquifer. As a whole, the combined information of hydrological information, including pump tests, water quality and potentiometric differences, and the recent NRC Staff review of additional disclosed borehole log data demonstrate that the Fuson Shale is adequate to contain fluid migration. In addition, Powertech will be required by license condition to conduct pumping tests and prepare wellfield hydrogeologic data packages that must demonstrate to NRC Staff that the Fuson Shale provides adequate confinement to safely conduct ISR in each ISR wellfield prior to operating each wellfield. *See* Powertech Proposed Findings at ¶ 10.188.

Further, the ROD/administrative record demonstrates that there has been no evidence of faults, fractures, breccia pipes or any other geologic feature that would indicate the potential for

any fluid migration out of the Project area during licensed operations. Powertech's proposed findings of fact in this pleading point to expert testimony from both its own expert witnesses and those offered by NRC Staff after review of the license application and the recently disclosed borehole log data showing that there are no such features in the Project area. The FSEIS is rife with references and analyses to similar data and information showing that there are no such features in the Project area. These data and information, taken together, demonstrate that there are no features directly or indirectly associated with the Fuson Shale that would indicate the potential for fluid migration during NRC-licensed ISR operations.

2. What is the Appropriate Legal Standard to Be Applied in Assessing the Evidence Regarding the Suitability of the Fuson Shale to Contain Fluid Migration?

The legal standard for assessing the data and information regarding fluid migration can be found in the line of decisions cited by both Powertech and NRC Staff under NEPA. NEPA requires that federal agencies take a "hard look" at the appropriate resource areas associated with reviews of major federal actions, including the Dewey-Burdock ISR Project. *See* Powertech Proposed Conclusions of Law at ¶ 5.7. NEPA does not require an agency to analyze every conceivable aspect of a proposed project. *See Private Fuel Storage*, CLI-02-25, 56 NRC at 349. NEPA also does not require that an agency commit virtually infinite study and resources to a proposed project. *See Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station)*, CLI-10-11, 71 NRC 287, 315 (2010) (footnote omitted). To the extent that Contention 3 involves environmental allegations, this would be the applicable legal standard.

To the extent that Contention 3 involves safety allegations, the appropriate legal standard is NRC's AEA statutory mandate of adequate protection of public health and safety and the Commission's regulatory mandate at 10 CFR Part 40.32 requiring that a licensing action be

adequate to protect public health and safety and is not inimical to the common defense. *See* 10 CFR § 40.32(c) & (d). As part of the Commission’s regulatory program, ISR operations must demonstrate that they satisfy the appropriate 10 CFR Parts 20 and 40 regulations and Part 40, Appendix A Criteria.

Moreover, as stated in the *Hydro Resources, Inc.* case, the Commission evaluated LBP-05-17, which was a Licensing Board decision regarding groundwater protection at HRI’s proposed Crownpoint Uranium Project ISR site. *See In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-01, 63 NRC 1 (January 11, 2006). In this decision, the Commission cites in several places that the standard for evaluating groundwater protection, including that from potential fluid migration or contamination, is “reasonable assurance.” In affirming the Licensing Board’s decision finding that HRI indeed satisfied the “reasonable assurance” standard, the Commission stated:

“The intervenors are correct that ‘[p]ost-hearing resolution [of licensing issues] must not be [employed] to obviate the basic findings prerequisite to a license, including a reasonable assurance that the facility can be operated without endangering the health and safety of the public.’ But here the basic findings on groundwater protection necessary for a licensing decision have been made. The Presiding Officer in LBP-05-17 found *reasonable assurance* that groundwater at the Section 17, Unit 1, and Crownpoint sites will be adequately protected.”

Hydro Resources, Inc. 63 NRC at 11-12 (emphasis added).

Thus, it is appropriate for the Licensing Board to employ a “reasonable assurance” standard when evaluating groundwater protection at the Dewey-Burdock ISR Project site.

D. CONTENTION 4

1. To What Extent, if Any, Can the NRC Rely Upon Analyses Conducted by EPA or the State of South Dakota to Fulfill its NEPA Responsibilities?

NRC has express statutory and regulatory authority to regulate all aspects of the production and generation of source material uranium through licensed ISR operations and the

generation and management of 11e.(2) byproduct material from such licensed operations. However, under other statutes such as the Safe Drinking Water Act (SDWA), other federal agencies have express statutory and regulatory authority over other materials and activities associated with ISR operations. Specifically, EPA has direct authority over the use of Class III and V UIC wells. These federal agency reviews are within the specialized expertise of these agencies and, therefore, they should be accorded special weight when NRC Staff is completing its review of a given license application.

Similarly, the State of South Dakota has direct authority over specific activities associated with the Dewey-Burdock ISR Project, including regulating water consumption through its water right permitting program and regulating specific activities such as land reclamation and land application through its large scale mine and groundwater discharge plan permitting programs, respectively.

However, this does not relieve NRC Staff's statutory and regulatory responsibility to evaluate a license application within the statutory mandate of the AEA, which is to adequately protect public health and safety. When conducting its review, NRC is free to solicit the input of other agencies, including EPA, BLM, and SDDENR, and to determine whether their specialized expertise and the opinions rendered based on such expertise are adequate to satisfy its AEA statutory mandate.

In its NEPA analysis, NRC Staff did not rely on analyses conducted by other federal and State agencies, but considered the analyses of other agencies and the requirements of other permits while conducting its own, independent analysis of the affected environment, potential environmental impacts and mitigation measures. For example, NRC Staff considered EPA's permitting authority and permitting requirements for Class III and Class V injection wells when

conducting its independent evaluation of potential impacts from these wells in the FSEIS. *See* Powertech Proposed Findings at ¶¶ 10.285 & 10.288. Similarly, NRC Staff conducted an independent analysis of the potential drawdown-related impacts in the Inyan Kara and Madison aquifers (e.g., by constructing its own three-layer Madison aquifer model and by evaluating the development and calibration of Powertech’s numerical groundwater model), while at the same time considering SDDENR permitting requirements and SDDENR’s evaluation of water availability and potential impacts to nearby water rights and domestic wells. *See* Powertech Proposed Findings at ¶¶ 10.232 through 10.233.

2. Are the Permitting Processes of Other Agencies Adequate to Assess Ground Water Quantity Impacts?

The adequacy of other agency permitting or other approval processes is contingent on their statutory authority and the manner in which they are evaluated by NRC Staff.²⁹ As stated above, NRC Staff is required by statute and regulations to evaluate all aspects of a proposed ISR operation in accord with the AEA mandate of adequate protection of public health and safety and under its Commission regulatory mandate to implement NEPA requirements in 10 CFR Part 51. Numerous examples of approved ISR projects dating back to *Hydro Resources, Inc.* are available where state and other federal agencies/authorities have issued permits or approvals for items such as water rights so that an ISR operation can function. For example, in *Hydro Resources, Inc.*, the State of New Mexico Engineer’s Office issued water rights approvals for the Crownpoint Uranium Project, and NRC Staff reviewed such water rights to ensure that the proposed ISR operation could adequately function. This is no different in this instant case where water rights requested by Powertech from SDDENR were reviewed by NRC Staff in the

²⁹ The CEQ’s regulations encourage agencies to consider an applicant’s compliance with environmental quality standards imposed by other federal, state, and local agencies with responsibility for environmental protection. 40 C.F.R. § 1502.16(h) and § 1505.2(c).

FSEIS. States control the waters within their boundaries and allocate access according to State statutes and regulations. Without the appropriate State “water rights” approval(s), an ISR project cannot move forward as it cannot function without appropriately available water.

In the instant case, NRC Staff not only considered SDDENR’s water right permitting requirements and SDDENR’s determination that adequate groundwater is available to support the requested appropriations without impairing existing groundwater rights, but the Staff conducted its own independent analysis of the potential drawdown-related impacts of the proposed ISR operation. As stated above, this included evaluating Powertech’s numerical groundwater model and constructing a three-layer model of the Madison aquifer to evaluate potential impacts to the nearest municipal water supply wells in Edgemont. Further, while the SDDENR water rights will include provisions to protect nearby well owners, Powertech’s NRC license will provide other protections that were evaluated in the FSEIS such as Powertech’s commitment to remove domestic and livestock wells from private use prior to operations, something that is not required by the State permits. *See* Powertech Proposed Findings at ¶ 10.234.

E. CONTENTION 6

1. Does NEPA Require an Analysis of Mitigation Measures?

As stated in Powertech’s Proposed Conclusions of Law at ¶ 5.7, NEPA requires that an agency take a “hard look” at the potential environmental impacts of a major federal action. This “hard look” requirement necessitates an evaluation of mitigation measures, which has been implemented in NUREG-1569 and NUREG-1748 environmental review guidance.

2. Does NEPA Require a Showing of the Effectiveness of Proposed Mitigation Measures?

As stated in ¶ 5.12 above, NEPA does require an analysis of the effectiveness of proposed mitigation measures; however, such discussion does not need to be highly detailed. Additionally, in ¶ 5.13 above, courts have confirmed that an agency need not assign an effectiveness rating to mitigation measures.

3. How Detailed an Analysis of Proposed Mitigation Measures is Required?

As stated in ¶ 5.11 above, NEPA does not require a fully developed mitigation plan prior to engaging in final agency action. NEPA merely requires that mitigation be discussed in “sufficient detail to ensure that environmental consequences have been evaluated.” *See Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515, 1522 (10th Cir. 1992), *quoting Methow Valley*, 490 U.S. at 352-53; *see also Hydro Resources, Inc.*(Crownpoint Uranium Project), CLI-06-29, 64 NRC 417, 427 (2006) (discussing that an EIS need not contain “a complete mitigation plan” or even “a detailed explanation of specific [mitigation] measures which will be employed” and stating that mitigation measures “need not be legally enforceable, funded or even in final form to comply with NEPA’s procedural requirements.”)

4. Are Draft Mitigation Plans Needed or To-Be-Drafted Mitigation Plans Acceptable in the FSEIS?

Under NEPA, draft mitigation plans are acceptable so long as mitigation measures are adequately assessed in the 10 CFR Part 51 environmental review document. As cited by NRC Staff, an EIS need not contain “a complete mitigation plan” or even “a detailed explanation of specific [mitigation] measures which will be employed” and mitigation measures “need not be legally enforceable, funded or *even in final form* to comply with NEPA’s procedural requirements.” *See Hydro Resources, Inc.* (P.O. Box 777, Crownpoint , NM 87313), CLI-06-29, 64 NRC 417, 427 (2006).

F. CONTENTION 9

- 1. To What Extent, If Any, Can the NRC Rely Upon Analyses Conducted By EPA or the State of South Dakota to Fulfill its NEPA Responsibilities?**

See Powertech's response to Contention 4, Questions 1 and 2 above.

- 2. Are the Permitting Processes of Other Agencies Adequate to Assess Baseline, Potential Impacts, or Proposed Mitigation Issues Required to Be Addressed in a FSEIS?**

See Powertech's response to Contention 4, Questions 1 and 2 above.

- 3. Does NEPA Require That the Agency Independently (a) Identify and Understand What the Monitoring and Mitigation Measures Will Be, (b) Assess and Confirm That the Mitigations Will Actually Be Implemented, and/or (c) Assess and Confirm That They Will Be Effective?**

NRC is required under NEPA to independently identify and understand mitigation and monitoring. Based on controlling precedent, the Supreme Court has found that "a reasonably complete discussion of possible mitigation measures is an important ingredient of an EIS, and its omission therefrom would undermine NEPA's 'action-forcing' function." *Methow Valley*, 490 U.S. at 352. While NEPA requires that an EIS discuss environmental impacts and consider the degree to which those impacts can be avoided, it does not require that mitigation measures be imposed or guaranteed. *Id.* NRC Staff's preparation of the FSEIS demonstrates that it adequately identified and evaluated mitigation measures associated with the Dewey-Burdock ISR Project. NRC Staff also conducts inspections of a licensee's project, including for new projects a pre-operational inspection, to determine whether license conditions are being followed, which may include use of mitigation measures.

4. In *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352–53 (1989) the Court Recognized That Some of the Environmental Effects Discussed in the FEIS “Cannot Be Mitigated Unless Nonfederal Government Agencies Take Appropriate Action,” But Stated That “It Would Be Incongruous to Conclude That the [U.S.] Forest Service Has No Power to Act Until the Local Agencies Have Reached a Final Conclusion on What Mitigating Measures They Consider Necessary.” How Does This Decision and Principle Apply to This Case?

The above-cited case law applies to this case in that NRC can issue a 10 CFR Part 51 environmental review document, such as an FSEIS, without waiting for other agencies to issue other analyses, permits or approvals. NRC can issue an FSEIS containing analyses of potential impacts regarding other agency actions such as issuance of water rights, UIC permits or other mining permits, but it is not required to hold off on its issuance pending other agency actions. The case referenced by the Licensing Board notes that there is a “fundamental” difference between discussing mitigation measures in adequate detail and providing final mitigation plans. *See* 490 US at 352. Powertech’s license also contains a condition stating that all other required permits and authorizations are required to be in place before licensed operations commence. Thus, the above-cited case law supports NRC’s development and issuance of the FSEIS for the Dewey-Burdock ISR Project.

VI. CONCLUSION

For the reasons set forth above, Powertech respectfully requests that the Licensing Board find that CI and the Tribe's admitted contentions and the argument, testimony, and exhibits offered in support of such contentions should not result in the modification or revocation of Powertech's NRC License No. SUA-1600 for the Dewey-Burdock ISR Project.

Respectfully submitted,

/Signed (electronically) by/ Christopher S. Pugsley

Dated: January 9, 2015

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)
)
) Docket No.: 40-9075-MLA
)
POWERTECH (USA), INC.)
) Date: January 9, 2015
)
)
(Dewey-Burdock In Situ Uranium Recovery)
Facility))
_____)

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing “**POWERTECH (USA), INC.’S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW**” in the above-captioned proceeding have been served via the Electronic Information Exchange (EIE) this 9th day of January 2015, which to the best of my knowledge resulted in transmittal of the foregoing to those on the EIE Service List for the above captioned proceeding.

Respectfully Submitted,

**/Executed (electronically) by and in
accord with 10 C.F.R. § 2.304(d)/
Christopher S. Pugsley, Esq.**

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