December 9, 2014

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
POWERTECH (USA) INC.,	)	Docket No. 40-9075-MLA
	)	ASLBP No. 10-898-02-MLA-BD01
(Dewey-Burdock In Situ Uranium Recovery Facility)	)	
	)	

NRC STAFF'S ANSWERING TESTIMONY

Q1: Please state your name and position.

A1a: (J. Prikryl) My name is James Prikryl. I am a Senior Research Scientist in the Geosciences and Engineering Division of the Southwest Research Institute. My statement of professional qualifications can be found at Exhibit NRC-006.

A1b: (T. Lancaster) My name is Thomas Lancaster. I am a Hydrogeologist with the Uranium Recovery Licensing Branch in the NRC's Office of Nuclear Materials Safety and Safeguards (NMSS). My current statement of professional qualifications can be found at Exhibit NRC-005-R.

Q2: Have you testified previously in this hearing?

A2: (J. Prikryl, T. Lancaster) Yes. We submitted written testimony on June 20, 2015 (Ex. NRC-001) and written rebuttal testimony on July 15, 2014 (Ex. NRC-151). We also testified in person at the August 19–21, 2014 oral hearing in this proceeding. In addition, on October 14, 2014 we submitted supplemental testimony addressing well log data that Powertech disclosed to the parties on September 13, 2014 (Ex. NRC-158). Finally, on October 24, 2014 we submitted supplemental testimony addressing two documents from the U.S. Environmental Protection Agency (Ex. NRC-174).

Q3: Why are you providing additional testimony now?

A3: (J. Prikryl, T. Lancaster) To address the November 21, 2014 testimony from the Oglala Sioux Tribe's expert, Dr. Hannan LaGarry. Dr. LaGarry's testimony concerns the well log data that Powertech disclosed to the parties on September 13, 2014. The well log data was generated by the Tennessee Valley Authority (TVA) when it conducted investigations in the Dewey-Burdock area during the 1970s and 1980s. As we explained in our prior testimony, the NRC Staff and the Center for Nuclear Waste Resource Analyses (CNWRA) reviewed the well log data to determine whether they affect the conclusions in the Final Supplemental Environmental Impact Statement (FSEIS) for the Dewey-Burdock Project. We found that, rather than calling into question the conclusions in the FSEIS, the recently disclosed well log data support those conclusions. In his recent testimony Dr. LaGarry questions our analyses and conclusions. We are now responding to his claims.

Q4: What are your initial impressions of Dr. LaGarry's testimony?

A4: (J. Prikryl, T. Lancaster) Dr. LaGarry concedes that he and his assistants "did not attempt to reconstruct the geology of the proposed license area." Ex. OST-029 at 2. The Tribe's position throughout the hearing, however, has been that the TVA well log data, once analyzed, would support their arguments with regard to Contention 3. With the extension of time granted by the Board, the Tribe effectively had almost 70 days to review the well log data. This should have been ample time to construct stratigraphic cross-sections to either confirm or refute the Tribe's claims regarding a lack of hydrologic confinement within specific sections of the Dewey-Burdock site. This was in fact the approach the Staff took in our review of Powertech's recently disclosed well log data (*see, e.g.,* Exs. NRC-158 at 9–12, NRC-168, NRC-169).

Q5: What approach did Dr. LaGarry and his assistants take instead?

A5? (J. Prikryl, T. Lancaster) Dr. LaGarry states that he and his assistants reviewed drillers' notes from 4,177 boreholes. Ex. OST-029 at 2. They also reviewed 488 full-sized and

1,774 “mini” resistivity and gamma log pairs, although they only reviewed the “mini” logs briefly and did not rely on them in reaching their conclusions. *Id.*

Q6: What are drillers’ notes?

A6: (J. Prikryl, T. Lancaster) Drillers’ notes are remarks recorded during the drilling of a well. They can provide information about the geology of the site or the well, such as the occurrence of groundwater. These notes are recorded on the drillers’ log, which is a hand-written description of the lithology of the rocks and sediments encountered during drilling of a well. The log describes the nature of cuttings (small pieces of rock produced by the drill bit) brought up to the surface during the drilling of the well. By visually examining the cuttings, the driller can piece together a general picture of the rocks or sediments that make up the subsurface in the location being drilled.

Q7: Are drillers’ notes a reliable guide to geologic features?

A7: (J. Prikryl, T. Lancaster) Drillers’ notes typically consist of generalized, subjective descriptions of the geologic formations encountered during drilling. Accordingly, they are of limited use for evaluating subsurface hydrogeologic conditions and stratigraphic relationships. As illustrated by the drillers’ notes included within Exhibits OST-030 through OST-041, drillers’ notes are typically brief annotations that vary in quality depending on the individual logging the well. It is important to understand that the drillers’ notes are typically recorded by the driller, rather than by a trained geologist. Therefore, the quality of these notes varies depending on the drillers’ knowledge of the local subsurface geology, the quality of the cuttings, and the driller’s experience in interpretation. Furthermore, formation rock cuttings produced during drilling may be misidentified or improperly collected. Therefore, drill cuttings cannot be relied upon to evaluate stratigraphic and structural features, such as bed displacements caused by faulting, that might be present at the location being drilled.

Q8: How do drillers’ notes compare to borehole geophysical logs?

A8: (J. Prikryl, T. Lancaster) As stated above, drillers' notes cannot be relied upon to evaluate structural features such as faults and fractures that might be encountered at the location being drilled. In contrast, borehole geophysical logs (*i.e.*, gamma and resistivity logs) can be used for this purpose. The geophysical logs provide quantitative information about subsurface geology that can be used by geologists and hydrologists to identify and map geologic units (*e.g.,* sandstone bodies). The geophysical logs are generated using calibrated instruments that provide reliable information on subsurface stratigraphy, such as the location of formation contacts and formation thicknesses.

Q9: On page 2 of his testimony, Dr. LaGarry argues that the number of drillers' notes he and his assistants examined is sufficiently large to characterize the data and reasonably reflect the geological conditions in the Dewey-Burdock area. Is that true?

A9: (J. Prikryl, T. Lancaster) While the number of drillers' notes they examined (4,177) may be sufficiently large to characterize the *drillers' notes*, there is no evidence those notes reflect the geological conditions in the Dewey-Burdock area. As stated above, drill cuttings cannot be relied upon to evaluate structural features, such as faults and fractures, that might be encountered at the location being drilled. Furthermore, the quality of drillers' notes varies depending on the drillers' knowledge of the local subsurface geology, the quality of the cuttings, and the driller's experience in interpretation. Borehole geophysical logs therefore provide more reliable information on subsurface stratigraphy.

Q10: Dr. LaGarry argues that during his review he found evidence of numerous features that suggest a lack of hydrologic confinement in aquifers underlying the Dewey-Burdock site. He first claims, on page 3 of his testimony, that the drillers' notes show evidence of open boreholes. Can you address this claim?

A10: (J. Prikryl, T. Lancaster) We previously addressed this issue in our rebuttal testimony (Ex. NRC-151) at A3.12. As we explained, when preparing the FSEIS the Staff was fully aware that there are open boreholes in the Dewey-Burdock area. As the Staff documents in

FSEIS Section 4.5.2.1.1.2.2 at page 4-64 (Ex. NRC-008-A-2 at 369–370), Powertech has committed to identifying and plugging abandoned boreholes before beginning operations in specific wellfields. As we state on pages 27–28 of the Safety Evaluation Report (SER):

> The applicant cannot attest to whether or not all historic borings were properly plugged and abandoned (Powertech, 2011a). However, it has made the following commitments to ensure that unplugged borings will not impact human health or the environment during operations. These commitments are as follows:
>
> - The applicant will attempt to locate any unknown borings and wells in the vicinity of every potential wellfield using historical records.
> - Pumping tests will be designed to detect and locate unplugged borings.
> - Unplugged or improperly plugged borings will be plugged and abandoned using South Dakota standards (Powertech, 2011a).

Ex. NRC-134 at 27–28. We would also note that the boreholes to which Dr. LaGarry refers are ones that were unplugged at the time the drillers' notes were recorded—that is, in the 1970s and 1980s. That does not mean they are unplugged today. As we further note in the SER:

> The applicant states that little evidence of unplugged boreholes has been observed because borings tend to collapse or self-seal over time (Powertech, 2011a). This assertion is supported by infrared photography that identifies certain water features within and near the Dewey-Burdock Project.

Id. at 28. *See also Id.* at 52.

In summary, the Staff reviewed the borehole information Powertech provided and determined that it sufficiently describes the risks associated with unplugged boreholes. Furthermore, the Staff appropriately considered Powertech's commitment to identify and address unplugged boreholes as a mitigation measure that would limit environmental impacts related to fluid migration.

Q11: Dr. LaGarry next claims that artesian flow is present in the Dewey-Burdock area. Is he right?

A11: (J. Prikryl, T. Lancaster) In A3.13 of our rebuttal testimony (Ex. NRC-151), we addressed the same arguments Dr. LaGarry now makes concerning artesian flow. Dr. LaGarry's statement that there is artesian water at the Dewey-Burdock site is nothing new, and the Staff acknowledged this possibility in FSEIS Section 4.5.2.1.1.2.2 at page 4-60 (Ex. NRC-008-A-2 at 366). In particular, 26 wells in the Dewey-Burdock area were identified as flowing artesian wells screened in either the Fall River Aquifer (12 artesian wells) or the Chilson Aquifer (14 artesian wells).

Q12: Will Powertech be taking any steps to address these wells?

A12: (J. Prikryl, T. Lancaster) Yes. As we explain in the FSEIS, Powertech has committed to removing all domestic wells within the project area from private use prior to beginning operations. Ex. NRC-008-A-2 at 366. Powertech has also committed to removing all stock wells within 0.4 km [0.25 mi] of any wellfield from private use prior to operation of the wellfield. Ex. NRC-008-A-2 at 366. As we explain further in the FSEIS and in our rebuttal testimony, Powertech has committed to monitoring all domestic wells within 2 km [1.2 mi] of its wellfields and all stock wells within the Dewey-Burdock area. Ex. NRC-008-A-2 at 360, 366, 599; Ex. NRC-151 at A3.13. Powertech's commitment to monitoring is memorialized in License Condition 12.10. Ex. NRC-012 at 13. This license condition states that all domestic, livestock, and crop irrigation wells within 2 km [1.2 mi] of the boundary of any wellfield, as measured from the perimeter monitoring well ring, will be included in the routine environmental monitoring program provided that well owners consent to sampling and the condition of the well renders it suitable for sampling.

Q13: How are Powertech's license conditions relevant to the potential environmental impacts associated with artesian flow?

A13: (J. Prikryl, T. Lancaster) As we also explain in our rebuttal testimony, Powertech is bound by license conditions that will limit the environmental impacts of any excursion associated with artesian flow. Ex. NRC-151 at A3.13. In particular, License Condition 11.5 (Ex. NRC-

012 at 10) requires that Powertech monitor for excursions twice monthly, and no more than 14 days apart in any given month during operations, for all wells where upper control limits (UCL) have been established. We discuss Powertech's excursion monitoring in FSEIS Sections 2.1.1.1.3.1.3 (Ex. NRC-008-A-1 at 125–126) and 7.3.1.2 (Ex. NRC-008-B-1 at 88–90), providing details on monitor well placement, the establishment of UCLs, sampling intervals, reporting requirements, and corrective actions if an excursion is detected. Furthermore, Powertech is bound by License Condition 10.7 (Ex. NRC-012 at 8), which requires that it maintain a net inward hydraulic gradient at each wellfield from the time lixiviant is first injected into the production zone until initiation of the stabilization period. The inward hydraulic gradient will ensure that groundwater flows toward the production zone, and that horizontal excursions will not occur.

Q14: What are your conclusions regarding Dr. LaGarry's arguments on artesian flow?

A14: (J. Prikryl, T. Lancaster) When preparing the FSEIS the Staff was fully aware of the issues Dr. LaGarry raises. We understood that there is artesian flow in the Dewey-Burdock area, and we took this into account when developing mitigation measures (*e.g.*, license conditions) and assessing the environmental impacts of the Dewey-Burdock Project.

Q15: Dr. LaGarry states that approximately 20 boreholes appear to have been plugged with wood or ferrous metals such as steel, and that these plugs are prone to deterioration. Can you address this statement?

A15: (J. Prikryl, T. Lancaster) Dr. LaGarry provides no exhibits (*e.g.,* copies of drillers' notes) to document that boreholes were plugged with wood or ferrous metals. With regard to the assertion that boreholes were plugged with wood, wooden fence posts may have been placed in the top of the hole after plugging to mark the borehole. With regard to the assertion that boreholes were plugged with ferrous metals such as steel, when drill pipe becomes stuck during drilling and cannot be retrieved, it is standard drilling practice to plug the hole with cement and leave the pipe in place. Based on the information Dr. LaGarry

has provided, we simply do not know the current condition of the boreholes to which he refers. In any event, we would reiterate that Powertech has committed to plugging abandoned boreholes. Ex. NRC-134 at 27–28, 33, 52–53. In addition, Powertech must conduct pumping tests before beginning operations in an aquifer, and these tests will reveal if there is any leakage caused by improperly plugged boreholes. *Id.* at 28, 33.

Q16: On page 3 of his testimony, Dr. LaGarry claims that the drillers' notes confirm that there are numerous faults in the Dewey-Burdock area. Can you address his claims?

A16: (J. Prikryl, T. Lancaster) Dr. LaGarry claims there are 12 records of faults within or beside drilled holes. He provides seven exhibits (OST-034 through OST-040) to support his claim. As we state above, drillers' logs and notes typically consist of generalized, subjective descriptions of the geologic formations encountered during drilling and are of limited use for evaluating subsurface structural features (*e.g.*, faults) and stratigraphic relationships. In addition, the quality of drillers' notes varies depending on the drillers' knowledge of the local subsurface geology, the quality of the cuttings, and the driller's experience in interpretation. Accordingly, the drillers' notes in the exhibits submitted by Dr. LaGarry do not definitively document the presence of faults within or beside drilled holes. For example, in Exhibit OST-035 (borehole IHK2) and OST-037 (borehole IHM61), there is a question mark after the word "fault" or "fault-fracture," indicating that the driller was not certain that the geologic feature being described was actually a fault or fault-fracture. In Exhibit OST-039 (borehole TRT16), the word "probable" precedes the word "fault," indicating again that the driller was not certain that the feature being described was a fault.

In Exhibit OST-040 (borehole FBM95), Dr. LaGarry interprets the statement "very broken up and caving" in the drillers' notes as being evidence of faulting. However, as described in FSEIS Section 3.4.1.2, the sandstone formations at the Dewey-Burdock site (*i.e.*, the Fall River and Chilson formations) are very porous and permeable; therefore, the "caving" referred to by the driller more likely resulted from disruption and slumping of the

porous and permeable sandstone units into the borehole during drilling, rather than from faulting. Ex. NRC-008-A-1 at 186–192. Moreover, "offsets" or "displacements" are noted in the drillers' notes submitted as Exhibits OST-034 (borehole DS392), OST-036 (borehole IHM32), and OST-038 (borehole TRR17). However, the drillers' notes provide no other information concerning the "offsets" or "displacements," such as the geologic formation(s) affected by these features.

Q17: Exactly how many suspected faults did Dr. LaGarry and his assistants identify?

A17: (J. Prikryl, T. Lancaster) Out of the review of drillers' notes from 4,177 boreholes, Dr. LaGarry and his assistants found only 12 records that they believe show faults within or beside drilled holes. Dr. LaGarry has previously asserted in his testimony, however, that faults are ubiquitous within the Dewey-Burdock boundary. The 12 suspected instances of faults found in the drillers' notes constitutes less than 0.3 percent of the 4,177 boreholes reviewed and can hardly be considered evidence that faults are ubiquitous within the Dewey-Burdock boundary. Furthermore, as we state above, the drillers' notes in several of the exhibits submitted by the Tribe do not definitively show the presence of faults within or beside drilled holes.

In summary, the drillers' notes do not support Dr. LaGarry's claims that faults are ubiquitous in the Dewey-Burdock area. Moreover, the geophysical logs, and the stratigraphic cross sections constructed from those logs, do not show evidence of faulting. Accordingly, the best available evidence supports the Staff's' conclusion in the FSEIS that faults are not present in the Dewey-Burdock area.

Q18: Dr. LaGarry also claims that the drillers' notes confirm there is a sinkhole in the Dewey-Burdock area. Is he correct?

A18: (J. Prikryl, T. Lancaster) The sinkhole Dr. LaGarry identifies is allegedly along a drilled transect associated with two closely spaced faults also intersecting the drilled transect. As evidence, LaGarry refers to Exhibit OST-033 (backside of DS178), which he represents as

a drawing of two faults and a sinkhole. However, no labels or explanation accompany this drawing. Therefore, it is impossible for us to determine the intent of the drawing, or whether the boreholes shown on this drawing are even located within the licensed area.

Q19: On page 4 of his testimony, Dr. LaGarry claims that notations in the drillers' notes to withhold data imply there was a purposeful attempt to deceive somebody about the character of particular boreholes. Is he correct?

A19: (J. Prikryl, T. Lancaster) Dr. LaGarry submitted no exhibits to document that drillers' notes contained "notations" by the driller to withhold data. Dr. LaGarry did submit Exhibit OST-041 (borehole TRJ111), which appears to show a redacted portion of a borehole log. Without further evidence, the Staff does not have enough information to respond to this assertion.

Q20: Also on page 4 of his testimony, Dr. LaGarry argues that the presence of water at various levels in the drill holes suggests that there are multiple aquifers present at the Dewey-Burdock site. He contends that uncased boreholes permit open communication and unrestricted flow of water between water-bearing strata at the site. Is this true?

A20: (J. Prikryl, T. Lancaster) It is true that there are multiple aquifers at the site. The aquifers underlying the site are visually depicted in the FSEIS in Figures 3.5-4, 3.5-5, and 3.5-7. Ex. NRC-008-A-1 at 203, 204, 209. FSEIS Section 3.5.3 describes these aquifer systems. *Id*. at 202–208.

As for Dr. LaGarry's arguments concerning open boreholes and communication between aquifers, we fully addressed these issues in our initial and rebuttal testimony. Ex. NRC-001 at A3.5, A3.8, A3.24; Ex. NRC-151 at A3.4, A3.5, A3.12. As we explained in our initial testimony, "Powertech concluded that hydraulic connection between the Fall River and Chilson Aquifers through the intervening Fuson Shale is caused by improperly installed wells or improperly abandoned boreholes." Ex. NRC-001 at A3.24, *see also* Ex. NRC-001

at A.3.8. As we further explained, because Powertech cannot confirm that all boreholes are properly plugged, it has committed to properly plugging boreholes before operating within wellfields. *Id*. at 44, 46. The Staff considered the borehole issue in FSEIS Section 4.5.2.1.1.2.2 (Ex. NRC-008-A-2 at 370), FSEIS Section 4.5.2.1.1.3 (Ex. NRC-008-A-2 at 272, 274–275), and Appendix E.5.21 (Ex. NRC-008-B-2 at 504, 510, 523–524).

In conclusion, we fully considered the issue Dr. LaGarry raises when we were preparing the FSEIS, and Dr. LaGarry's current testimony in no way calls into questions the FSEIS's conclusions.

Q21: Again on page 4 of his testimony, Dr. LaGarry argues that many of the drillers' notes contain references to poor, muddy, or destroyed samples. He states that the quality of these samples can bias descriptions and create circumstances in which confining layers could be considered present, when in fact they are not. Can you address this argument?

A21: (J. Prikryl, T. Lancaster) As we state above, formation rock cuttings produced during drilling may be misidentified or improperly collected. Dr. LaGarry is correct that improper collection of rock cuttings during drilling can lead to poor, muddy, or destroyed samples, which can lead to misidentification of strata and errors in correlation of strata. However, Dr. LaGarry overlooks that geophysical borehole log data (*i.e.,* resistivity and gamma readings) provide useful information about the subsurface to supplement lithologic descriptions in the drillers' logs. The geophysical log readings provide quantitative information about subsurface geology that can be used by geologists and hydrologists to identify and map geologic units, such as sandstone bodies and confining units, in the subsurface. In fact, for correlating strata in the subsurface, the geophysical log data provide more accurate and reliable information on formation contacts and thicknesses than drillers' notes.

Q22: Did Dr. LaGarry provide an analysis of the geophysical TVA borehole logs to draw conclusions concerning a possible lack of confinement?

A22: (J. Prikryl, T. Lancaster) No. Although Dr. LaGarry states that he examined 488 full-sized and 1,774 "mini" resistivity and gamma log pairs, he provided no analysis of the examined geophysical data. We would note that on October 9, 2014 Dr. LaGarry submitted a declaration in this hearing stating that the newly disclosed TVA borehole log data "may provide a sufficient number of data points for me to create stratigraphic cross-sections and geologic maps that support the Oglala Sioux Tribe and Consolidated Intervenors' position that there is a lack of adequate confinement." Declaration at 2 ¶ 9. The Board later cited this statement in its October 22, 2014 order granting the Tribe a 30-day extension to file additional testimony and exhibits on Contention 3. On page 2 of his supplemental testimony, however, Dr. LaGarry acknowledges that he did not attempt to reconstruct the geology of the proposed license area because of the limited time available and lack of modeling. It should also be noted that Dr. LaGarry and the NRC Staff have been in possession of over 3,000 *digital* TVA geophysical logs since September 15, 2014; these were the logs Powertech provided to the parties on DVD. In fact, the Staff used the digital logs provided by Powertech to construct stratigraphic cross-sections (fence diagrams) to verify certain findings in the FSEIS that had been called into question by Contention 3 (*see* Exs. NRC-158 at 10–12, NRC-168, NRC-169). In our opinion, with the extension of time granted by the Board, Dr. LaGarry had ample time to examine the geophysical well log data and reconstruct the geology of the site to support his claims concerning lack of confinement.

Q23: On page 5 of his testimony, Dr. LaGarry questions the NRC Staff's methodology in reviewing the well log data Powertech disclosed on September 13, 2014. He states that the Staff's "spot check of 34 data points does not provide a statistically reliable testimony or basis for any conclusions regarding confinement or hydrology." Ex. OST-029 at 5. Can you address his claim?

A23: (J. Prikryl, T. Lancaster) Yes. We would first emphasize that our review of Powertech's well log data was far more extensive than described by Dr. LaGarry. Initially, we reviewed the well log data Powertech submitted with its application, some of which Powertech submitted in response to the Staff's requests for additional information. In particular, we closely reviewed the structure and isopach maps presented in Powertech's revised Technical Report (Exs. APP-015-D, Plates 2.6-1 to 2.6-8 and APP-015-E, Plates 2.6-9 to 2.6-12). This was part of the Staff's "hard look" to assess the environmental impacts that site-specific geologic and hydrologic features could have on groundwater resources. We note that Powertech constructed the structure and isopach maps in its revised Technical Report using information from over 1,800 well logs. To suggest that the Staff considered information from only 34 well logs is, therefore, highly inaccurate.

Q24: How did you approach the well log data Powertech disclosed on September 13, 2014?

A24: (J. Prikryl, T. Lancaster) We explained our approach in our testimony of October 14, 2014. Ex. NRC-158 at A5, A6. In brief, we compared the digitized borehole logs on the DVD that Powertech provided with the locations listed in Appendix 2.6-A of the Technical Report. Ex. APP-015-J. We then traveled to Powertech's headquarters in Edgemont to conduct a spot check analysis of well logs to evaluate the validity of the structure and isopach maps presented in Powertech's revised Technical Report. *See* Ex. NRC-158 at A6, A7. In other words, we did not intend to assess the entirety of Powertech's well log data, as Dr. LaGarry suggests. Rather, we conducted a focused review to assess specific statements Powertech made in support of its application, as well as specific claims the Intervenors' experts made in support of Contention 3. For example, we focused on whether there was evidence of significant displacement or thickness variations that could confirm the presence of faulting or fracturing of the Fuson Shale. Ex. NRC-158 at A7, pp. 10–12. We also focused on logs that could help us evaluate claims that Dr. LaGarry and Dr. Moran had

made concerning secondary porosity, breccia pipes, and sinkholes (Ex. NRC-158 at A9, A10).

Q25: On page 5 of his supplemental testimony, Dr. LaGarry claims that your October 14, 2014 testimony makes no mention of the information contained in the drillers' notes. Can you address this claim?

A25: (J. Prikryl, T. Lancaster) First, as previously discussed, drillers' logs and notes typically consist of generalized, subjective descriptions of the geologic formations encountered during drilling and are of limited use for evaluating subsurface hydrogeology and stratigraphic relationships. In addition, the quality of drillers' notes varies depending on the driller's knowledge of the local subsurface geology, the quality of the cuttings, and the driller's experience in interpretation. Therefore, NRC Staff does not consider drillers' notes to be a reliable interpretive tool for evaluating subsurface geologic and hydrologic conditions.

Second, contractors for the NRC working on the Dewey-Burdock SEIS did, in fact, inspect drillers' notes during their visit to Powertech's office in Edgemont on September 23, 2014. As documented on page 4 of Exhibit NRC-158, the visit to the Powertech office focused on inspecting drill hole paper logs, deviation logs, lithological description logs, and borehole plugging records. The "lithological description logs" are the drillers' logs and notes that are recorded during drilling. The drillers' logs and notes inspected during the visit did not reveal any information pertinent to the NRC Staff's supplemental testimony concerning the drill hole log data, such as the presence of breccia pipes, collapse features, or bed displacements. Therefore, we did not mention the results of our inspection of the drillers' logs and notes in our October 14, 2014 testimony.

Q26: What about Dr. LaGarry's claim that you did not analyze a statistically significant number of well logs?

A26: (J. Prikryl, T. Lancaster) The claim is irrelevant, because we were not seeking to use Powertech's newly disclosed well log data to define hydrogeological conditions in the entire Dewey-Burdock area. We already had over 1,800 logs that went into defining the license area; those were the logs Powertech used to construct the structure and isopach maps in its license application, and we reviewed those logs closely when preparing the SER and FSEIS. When Powertech disclosed its newly acquired well log data on September 13, 2014, we conducted a focused review of the logs to assess statements in Powertech's application and statements the Intervenors' had made in support of Contention 3. We did not need to review a statistically significant sample of logs from the entire license area to assess these statements, because the statements pertained to specific areas within the Dewey-Burdock site.

Q27: On page 5 of his supplemental testimony, Dr. LaGarry claims that the NRC Staff's method for analyzing the TVA borehole data was fundamentally flawed and the testimony based on the Staff's review cannot be relied upon for any legitimate scientific purpose. Can you address this claim?

A27: (J. Prikryl, T. Lancaster) In the Staff's supplemental testimony filed on October 14, 2014, we clearly describe the methodology we used to analyze the TVA borehole log data. *See* Ex. NRC-158 at 6. Our analysis was scientifically valid for the intended purpose of providing additional testimony addressing specific arguments made in Contention 3. For example, we were able to evaluate the validity of structure maps presented in Powertech's revised Technical Report (*see* Ex. NRC-158 at 6–9), which were constructed using information from over 1,800 borehole logs. Furthermore, our analysis of closely spaced borehole logs, along with our construction of fence diagrams, allowed us to evaluate potential displacement and thickness variations in the Fuson Shale that could be indicative of structural features, such as faulting. *See* Ex. NRC-158 at 9–12.

In summary, the methods we used to analyze the TVA borehole log data were fundamentally sound and can be legitimately used to support the Staff's position on Contention 3. The drillers' notes used by Dr. LaGarry to support the Tribe's arguments, on the other hand, consist of generalized, subjective descriptions of the geologic formations encountered during drilling and are of limited use for evaluating subsurface hydrogeology and stratigraphic relationships. In other words, these notes are not a reliable interpretive tool for evaluating subsurface geologic and hydrologic conditions, and they provide minimal support for the Tribe's position on Contention 3.

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AFFIDAVIT OF JAMES PRIKRYL

I declare under penalty of perjury that my statements in prefiled Exhibits NRC-175 (NRC Staff's Answering Testimony) and NRC-006 (Statement of Professional Qualifications for James Prikryl) are true and correct to the best of my knowledge and belief.

/Executed in accordance with
10 C.F.R. § 2.304(d)/

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James Prikryl
Senior Research Scientist
Geosciences and Engineering Division
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute®
San Antonio, Texas
Email: jprikryl@swri.org

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AFFIDAVIT OF THOMAS LANCASTER

I declare under penalty of perjury that my statements in prefiled Exhibits NRC-175 (NRC Staff's Answering Testimony) and NRC-005-R (Revised Statement of Professional Qualifications for Thomas Lancaster) are true and correct to the best of my knowledge and belief.

/Executed in accordance with
10 C.F.R. § 2.304(d)/

_____

Thomas Lancaster
Hydrogeologist and Regulatory Project Manager
Office of Nuclear Material Safeguards and Safety
Uranium Recovery Licensing Branch
U.S. Nuclear Regulatory Commission
MAILSTOP: TWFN/ 8 D22
Phone: 301-415- 6563
Email: Thomas.Lancaster@nrc.gov

Executed in Rockville, Maryland
December 9, 2014