

## Uranium Energy Corp. PFD (Item # 1)

1. Uranium Energy Corp. (UEC) satisfied its burden of proof by sufficiently describing the local geology and assessing faults.

### *Characterization of Local Geology:*

- Before issuing a Class I injection well, the ED shall determine geologic suitability based on an analysis of the local geology and hydrogeology of the well site, including, at a minimum, detailed information regarding stratigraphy, structure, and rock properties, aquifer hydrodynamics, and mineral resources.
- Evidence in the record establishes that UEC provided information in its Application describing: the geologic suitability of the area; the stratigraphic units at the UEC wells locations in detail, including a stratigraphic column; hydrostratigraphy and the major aquifers and the underground source of drinking water (USDW); approximate depths to the permitted horizons as estimated for the UEC wells using log depths from nearby Nugget Oil Corp. Gleinser No. 2 (Gleinser No. 2) well; two cross sections; structural geology; injection interval; confining strata beneath injection zone; local structural cross sections; structural geology; faulting transmissivity; confining zone lateral continuity; confining zone lithologic and stress characteristics; seismic history; delineation of all faults within the AOR; and the surface geology.
- The Commission disagrees with the ALJs' determination that the TCEQ rules and the permit application instructions do not allow extrapolations from or geologic interpretations of regional data to characterize local geology. The rules do not provide a method on how to determine local geology, and, therefore, do not prohibit a Professional Geologist from making geologic interpretations based on available regional data. The submission of geologic data for Class I wells requires the educated inference and extrapolation of a licensed Professional Geologist to provide understanding of the subsurface geology in any area that has not been directly accessed and measured. The methods utilized by UEC to characterize the geology in the Application are appropriate and similar to methods of geologic characterization used in other applications for Class I injection well permits. The ALJs' determination that geologic interpretations and extrapolation cannot be used to describe subsurface geology in areas where there is no available data is a misunderstanding of the rules and the professional practice of geoscience. Additionally, the ALJs' determination fails to give the proper weight to the *prima facie* demonstration established by Texas Government Code § 2003.047(i-1). Mere questioning of the data included in the Application is not sufficient to rebut the *prima facie* demonstration.
- Unless there are core samples or other geologic data specific to the area of review (AOR), there is not going to be absolute certainty regarding the geologic characteristics of the subsurface until the actual injection well is drilled. The TCEQ rules account for this situation by establishing a two-part process to ensure protection of USDWs. The first part requires an applicant to provide sufficient geologic data to the ED so she can evaluate

whether the proposed injection wells are located in a suitable location and are protective of USDWs. As noted above, in areas where there is no local geologic data in the AOR, applicants commonly interpret regional data obtained from outside the AOR to determine the local geology. However, because there is always some level of uncertainty in the subsurface geology before an injection well is drilled, 30 TAC § 331.65(b)(1) requires an applicant to take a second step that requires the applicant to file a completion report after the well is drilled. The completion report provides the site-specific geologic data for the proposed well location, which includes the results of the injection zone and confining zone testing, adjusted formation pressure increase calculations, updated cross sections of the confining and injection zones based on the data obtained during drilling, and the calculated area of review and cone of influence based on data obtained during logging and testing of the well.

- An applicant cannot begin injecting waste into the well until after the ED reviews the site-specific geologic characteristics. Once the ED evaluates the completion report, if the ED determines that the site-specific data confirms the information provided in the Application, then the ED must give her written approval to authorize the applicant to begin injecting waste pursuant to 30 TAC § 331.65(b)(4). However, if the ED determines that the site-specific information differs significantly from the data provided in the Application, then the applicant is not authorized to inject waste into the well and must submit a permit amendment or modification in accordance with 30 TAC §§ 305.62 or 305.72. This process is the same even if an applicant provided data regarding local geology obtained from sources within the AOR.
- The evidentiary record establishes that UEC provided all the geologic data required by the rules.

#### *Assessment of Faults:*

- The ALJs find that UEC failed to demonstrate that the faults are not sufficiently transmissive to allow migration of hazardous constituents out of the injection zone pursuant to 30 TAC § 331.121(a)(2)(P). However, the ED's technical memorandum and the Draft Permits for UEC's proposed injection wells establish that the waste injected into the wells will be non-hazardous. The Draft Permits also expressly prohibit the disposal of hazardous waste into the injection wells. There has also been no rebuttal evidence presented in this case that there are hazardous constituents native to the injection zone that could migrate out of the injection zone. Therefore, the Commission does not agree with the ALJs' finding that UEC failed to show that the faults are not transmissive to allow migration of hazardous constituents.
- The reference to 30 TAC §§ 335.205(a)(5)(A) and 331.121(a)(2)(P) in the in the Proposed Order do not include the complete language of the rules. Therefore, the Commission amends Conclusion of Law Nos. 10 and 16 to quote the language of the rule.
- Although 30 TAC §§ 331.121(a)(2)(P) and 335.205(a)(5)(A) address the migration of hazardous constituents, 30 TAC § 331.121(c)(3)(B) requires an applicant to site a Class I

injection well such that the confining zone is “laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW or freshwater aquifer.” To satisfy this requirement, UEC included in its Application several geologic maps, including structure maps, isopach maps, and cross sections. UEC utilized geophysical logs and seismic data to construct two cross sections through the AOR. To establish that the faults located in the AOR are self-sealing and will prevent injected fluids from migrating out of the injection zone, UEC relied on regional data obtained from the Jones Paper. The regional data shows that when two “bodies of unconsolidated shale, or shale and sand, slide past each other along a fault, it is likely that the fault plane will become filled and sealed with plastic shale. Jones and Haimson (1986) have noted that due to the very plastic nature of the Gulf Coast Region shales, faults tend to seal themselves, allowing no vertical fluid movement up the fault plane.”<sup>1</sup>

- UEC’s Professional Geologist, Mr. Grant testified that because all the faults within the AOR are less than the thickness of the confining zone and are self-sealing, the confining zone is laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW or freshwater aquifer.
- The evidence in the record establishes that UEC relied mostly on the regional data obtained from the Jones Paper, rather than the presence of hydrocarbons, to demonstrate that the faults in the AOR are not transmissive. Based on the Jones Paper, UEC explains that “the large thickness of shale strata above the Injection Interval, which provides extensive shale to shale contact along the fault plane, combined with possible shale smearing along the fault plane, would likely ensure adequate sealing to prevent any significant vertical migration of formation and/or injected fluids along the fault plane.” Although the presence of trapped deep hydrocarbons can be an indication of the self-sealing nature of faults, it is not required to demonstrate that the faults are self-sealing.
- The Commission does not agree with the ALJs’ determination that UEC did not satisfy the TCEQ rules because UEC relied solely on a regional study to assert that the faults in the area tend to self-seal and not be transmissive. As discussed above, TCEQ rules do not prohibit a Professional Geologist from interpreting regional data to determine whether the faults in the AOR are transmissive. TCEQ’s UIC rules are designed to account for a certain level of uncertainty when dealing with subsurface geology. That is why an applicant is not authorized to begin injecting waste upon permit issuance. An applicant must provide to the ED a completion report after the well has been drilled that includes the site-specific data obtained from drilling the injection well. The ED must then evaluate this report. It is not until after the ED has evaluated the site-specific data and given her written approval that an applicant can begin injecting waste into the well.
- UEC’s Application included the required geologic data, including maps and cross sections, that show the location of faults in the AOR and sufficiently evaluates the transmissivity of the faults.

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<sup>1</sup> App Ex. 1 at 133 (bates labels).

*Changes to the Proposed Order:*

- To incorporate the Commission’s decision that the Applicant satisfied that statutory and regulatory requirements for the characterization of local geology and assessment of faults, the Commission adds and amends the following Findings of Fact and Conclusions of Law:
  - i) Amend Finding of Fact No. 26 to state, “The Application includes adequate data on the local geology and hydrogeology of the project site.”
  - ii) Amend Finding of Fact No. 27 to state, “UEC confidently described the local geology within the 2.5-mile Area of Review (AOR) at the project site.”
  - iii) Amend Finding of Fact No. 28 to state, “The Cone of Influence (COI) included in the Application was adequately determined based on parameters shown to be representative of the Vicksburg Formation at the project site. Geologic information obtained during the drilling of the well will be used to recalculate the COI as required by 30 TAC § 331.65(b)(1). If the values estimated differ significantly from the post-permitted site-specific values, the permittee must revise the pressure modeling. Before operations begin, the permittee must obtain written approval from the Executive Director in accordance with 30 TAC § 331.65(b)(4).”
  - iv) Add new Finding of Fact No. 29A to state, “The Draft Permits for UEC’s proposed injection wells authorize the injection of non-hazardous waste. No evidence was presented in this this case to establish that there are hazardous constituents native to the injection zone that could migrate out of the injection zone.”
  - v) Amend Finding of Fact No. 38 to state, “UEC provided adequate geologic data in accordance with the TCEQ rules to determine the transmissivity of the faults within the AOR.”
  - vi) Amend Finding of Fact No. 41 to state, “The Application adequately identifies and assess the transmissivity of the faults within the AOR.”
  - vii) Amend Finding of Fact No. 42 to state, “The Application adequately describes the porosity and permeability of the disposal formation.”
  - viii) Amend Finding of Fact No. 43 to state, “The Application adequately shows that the faults in the vicinity of the UEC wells are self-sealing.”
  - ix) Amend Conclusion of Law No.7 to state, “The District and Landowners did not present sufficient evidence to rebut UEC’s *prima facie* case. 30 Tex. Admin. Code § 80.117(c)(2).”
  - x) Amend Conclusion of Law No.8 to state, “UEC met its burden to prove that

the Application and Draft Permits meet all applicable state and federal requirements on all issues referred by TCEQ. 30 Tex. Admin. Code § 80.17(a).”

- xi) Amend Conclusion of Law No. 10 to state, “TCEQ is prohibited from issuing a permit for a Class I injection well if a fault exists within 2.5 miles from the proposed Class I injection well unless the applicant demonstrates to the satisfaction of the Commission, unless previously demonstrated to the Commission or to the United States Environmental Protection Agency, that the fault is not sufficiently transmissive or vertically extensive to allow migration of hazardous constituents out of the injection zone. 30 Tex. Admin. Code § 335.205(a)(5)(A).”
- xii) Amend Conclusion of Law No. 12 to state, “UEC adequately established that the faults within 2.5 miles of its proposed disposal wells are not sufficiently transmissive or vertically extensive to allow migration of hazardous constituents out of the injection zone. Consequently, UEC proved that fresh groundwater can be adequately protected from pollution. Tex. Water Code § 27.051(a)(3); 30 Tex. Admin. Code §§ 335.205(a)(5)(A), 331.5(a), 331.63.”
- xiii) Amend Conclusion of Law No. 15 to state, “UEC’s Application included an analysis of local geology and hydrogeology and detailed information regarding stratigraphy, structure, and rock properties, aquifer hydrodynamic, and mineral resources. Consequently, UEC confidently described the local geology at the project site. 30 Tex. Admin. Code § 331.121(c)(2).”
- xiv) Amend Conclusion of Law No. 16 to state, “Before issuing a Class I injection well permit, TCEQ shall consider the delineation of all faults within the area of review, together with a demonstration, unless previously demonstrated to the Commission or to the United States Environmental Protection Agency, that the fault is not sufficiently transmissive or vertically extensive to allow migration of hazardous constituents out of the injection zone. 30 Tex. Admin. Code § 331.121(a)(2)(P).”
- xv) Amend Conclusion of Law No. 17 to state, “UEC satisfied its burden to show that the faults in the AOR are not sufficiently transmissive or vertically extensive to allow migration of hazardous constituents out of the injection zone. 30 Tex. Admin. Code § 331.121(a)(2)(P).”
- xvi) Add new Conclusion of Law No. 17A to state, “Class I injection wells shall be sited such that the confining zone is laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW or freshwater aquifer. 30 Tex. Admin. Code § 331.121(c)(3)(B)(i).”
- xvii) Add new Conclusion of Law No. 17B to state, “UEC adequately established

that the confining zone is laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW or freshwater aquifer. 30 Tex. Admin. Code § 331.121(c)(3)(B)(i).”

xviii) Amend Conclusion of Law No. 22 to state, “UEC demonstrated the proposed disposal wells will prevent movement of fluids that would result in pollution of a USDW. 30 Tex. Admin. Code § 331.63(b).”

2. The Draft Permits provide for adequate monitoring of injected fluids in the vicinity of the UEC wells.

- The Draft Permits provide for adequate monitoring of injected fluids in the vicinity of the UEC wells. Specifically, Provision IX of the Draft Permits provide for adequate monitoring of the migration of injected fluids in accordance with 30 TAC §§ 305.125, 305.154, and 331.64. The requirements include annual mechanical integrity testing of the casing, injection tubing, annular seal, and bottom-hole cement for leaks using a pressure test, in addition to other requirements. Provision IX also requires continuous corrosion protection monitoring that must be performed on the wellhead, injection tubing, packer, and casing materials. The Draft Permits require ambient monitoring of the injection zone by annual monitoring of the pressure buildup in the injection zone conducted in a pressure fall-off test under 30 TAC § 331.64(h).
- Evidence in the record demonstrates that the Gleinser No. 2 and Hausman No. 2 wells are likely adequately plugged and will not provide a pathway for fluid movement between the injection zone and lowermost USDW. While the Protestants provided evidence of some discrepancies in well plugging records, they do not provide evidence showing that the wells were not plugged or provide a pathway for fluid movement.
- Therefore, incorporating ambient monitoring requirements into the draft permits, prior to obtaining additional site-specific information, is not appropriate at this stage of the permitting process. Additional site-specific information will be provided by the Applicant with the submission of the Completion Report to the TCEQ that documents the construction and testing activities associated with the injection wells, as required by 30 TAC § 331.65(b)(1).
- The ED retains authority to impose permitting requirements to require monitor wells to protect fresh water from pollution under 30 TAC § 331.64(h)(1), should the ED determine monitoring wells are warranted.
- To incorporate the Commission’s decision that the Draft Permits provide for adequate monitoring of injected fluids in the vicinity of the UEC wells, the Commission adds and amends the following Findings of Fact and Conclusions of Law:

i) Amend Finding of Fact No. 44 to state, “The Draft Permits include

Monitoring and Testing Requirements at Provision IX. Specifically, under Provision IX of the Draft Permits, the wells would be required to be tested and monitored in accordance with 30 TAC §§ 305.125, 305.154, and 331.64.”

- ii) Amend Finding of Fact No. 45 to state, “In accordance with Provision IX of the Draft Permits, site-specific evidence will be obtained to determine whether there is potential movement of fluid from the well or injection zone.”
- iii) Amend Finding of Fact No. 46 to state, “Based on the site-specific evidence gathered in accordance with Provision IX of the Draft Permits, the ED will determine whether there is potential value of monitoring wells to detect fluid movement.”
- iv) Amend Finding of Fact No. 47 to state, “The monitoring and testing requirements in the Draft Permits provide for adequate monitoring of migration of injected fluids in the vicinity of the proposed injection wells.”
- v) Add new Conclusion of Law No. 17C to state, “The testing and monitoring requirements in Provision IX of the Draft Permits provide for adequate monitoring of migration of injected fluids in the vicinity of the proposed injection wells.”

3. The evidence in the record supports that the location and design of the UEC wells and pre-injection facilities are adequate.

- No evidence was presented on the design of the UEC wells and pre-injection facilities to rebut UEC’s *prima facie* demonstration.
- The record supports that the Gleinser No. 2 well and the Mamie Hausman No. 2 well (Hausman No. 2) are adequately plugged, and corrective action and additional monitoring are not required at this time.
- There is sufficient evidence in the record to support that the Gleinser No. 2 well is adequately plugged, including documentation from the Railroad Commission of Texas and a scout ticket. The scout ticket establishes that the Gleinser No. 2 well could produce gas through the perforations from 557 to 560 feet, providing evidence that Plug #1 is present in the well. The evidentiary record also demonstrates that Plug #1 provides a cement barrier to flow between the Injection Interval and the base of the USDW. Therefore, the Gleinser No. 2 well is adequately plugged to prevent migration of fluids from the injection interval into a USDW, and corrective action is not required.
- The plugging report (Form W-3) for the Gleinser No. 2 well shows that the well is plugged with 10 pounds-per-gallon (lbs./gal) mud, not 9.8 lbs./gal, as the Proposed Order states.
- The record evidence supports that the Hausman No. 2 well is adequately plugged. Specifically, the evidentiary record demonstrates that the Hausman No. 2 well has four

cement plugs in the wellbore and is filled with 9.5 lbs./gal mud in between the cement plugs. The evidence also demonstrates that the annular space between the production casing and formation is filled with drilling mud, and that drilling mud contains properties that are expected to provide adequate protection against vertical fluid migration. Therefore, the record supports that the Hausman No. 2 well is adequately plugged to prevent migration of fluids from the injection interval, and additional monitoring is not required.

- The Completion Report requires the permittee to submit additional detailed information on the well, including the calculated area of review and cone of influence based on data obtained during logging and testing of the well and the formation, and where necessary, revisions shall be submitted to the Executive Director. The Executive Director retains the authority to determine if additional monitoring or corrective action is required. If additional information is submitted or discovered that might pose a threat to an underground source of drinking water, a corrective action plan and compliance schedule may be prescribed under 30 TAC § 331.44(b).
- To incorporate the Commission’s decision that the location and design of the wells and pre-injection facilities are adequate, the Commission deletes Finding of Fact No. 53, and adds and amends the following Findings of Fact and Conclusions of Law:
  - i) Amend Finding of Fact No. 50 to state, “The Gleisner No. 2 well penetrates the injection zone.”
  - ii) Amend Finding of Fact No. 51 to state, “Documentation from the Railroad Commission of Texas and a scout ticket establish that the Gleisner No. 2 well is properly plugged to prevent migration of fluids from the injection interval into a USDW.”
  - iii) Amend Finding of Fact No. 52 to state, “The Gleisner No. 2 well is presumed to have been plugged with 10 pounds-per-gallon mud.”
  - iv) Amend Finding of Fact No. 54 to state, “Documentation from the Railroad Commission of Texas establishes that the Mamie Hausman No. 2 (Hausman No. 2) well is plugged to prevent migration of fluids from the injection interval into a USDW.”
  - v) Amend Finding of Fact No. 55 to state, “The Hausman No. 2 well has adequate cement plugs and mud barriers to prevent fluid from migrating to the lowermost USDW.”
  - vi) Amend Finding of Fact No. 56 to state, “No evidence was presented on the design of the UEC wells and pre-injection facilities to rebut UEC’s *prima facie* case under Tex. Gov’t Code § 2003.047(i-1); 30 Tex. Admin. Code § 80.17(c)(1). Therefore, the design of the UEC wells and pre-injection facilities is adequate.”



- vii) Amend Finding of Fact No. 57 to state, “The location of the UEC wells is adequate”
- viii) Add Conclusion of Law No. 18A to state, “The completion and plugging reports demonstrate that the wells within the AOR that penetrate the injection zone are adequately constructed, completed, and plugged.”
- ix) Amends Conclusion of Law No. 19 to state, “No corrective action is necessary on the Gleinser No. 2 and Hausman No. 2 wells, pursuant to 30 Tex. Admin. Code § 331.121(a)(2)(N).”

4. Other changes to the ALJs’ Proposed order.

- To memorialize the Commission’s decision to grant the Petition:
  - i) Amend the Order’s Title to state: “AN ORDER GRANTING THE APPLICATION BY URANIUM ENERGY CORPORATION FOR RENEWAL AND AMENDMENT OF PERMIT NOS. WDW423 & WDW424 IN GOLIAD COUNTY, TEXAS
  - ii) Amend the last sentence in the first paragraph of the order to state, “After considering the administrative record, the PFD, and the exceptions and arguments of the parties, the Commission makes the following findings of fact and conclusions of law,” to clarify what the Commission considered in this matter.
  - iii) Amend Conclusion of Law No. 26 to state, “The Application for renewal and amendment of Permits WDW423 and WDW424 provides sufficient information and, satisfies TCEQ rules and requirements, and the Application should be granted.”
  - iv) Amend Ordering Provision No. 1 to state: “UEC’s Application for renewal and amendment of Permits WDW423 and WDW424 is granted”
- To correct non-substantive typographical errors and improve readability of the Final Order, make the following revisions:
  - i) Amend Finding of Fact No. 11 to show that the Notice of Application and Preliminary Decision was also published in English on May 4, 2022, in the *Cuero Record*.
  - ii) Amend Finding of Fact No. 14 to remove the phrase “convened on December 20, 2022,” to clarify that the TCEQ’s public meeting at which it referred the District’s hearing requests to SOAH was not convened on December 20, 2022.