

**SOAH DOCKET NO. 582-09-3064  
TCEQ DOCKET NO. 2008-1888-UIC**

**APPLICATION OF URANIUM § BEFORE THE STATE OFFICE**  
**ENERGY CORP FOR CLASS III §**  
**INJECTION WELL PERMIT NO. §**  
**UR03075, FOR AQUIFER § OF**  
**EXEMPTION, AND FOR §**  
**PRODUCTION AREA §**  
**AUTHORIZATION NO. 1 IN §**  
**GOLIAD COUNTY, TEXAS § ADMINISTRATIVE HEARINGS**

**PROPOSAL FOR DECISION**

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<b>AUTHORIZATION NO. 1 IN</b>	§	
<b>GOLIAD COUNTY, TEXAS</b>	§	<b>ADMINISTRATIVE HEARINGS</b>

**PROPOSAL FOR DECISION**

Uranium Energy Corporation (UEC) seeks approval from the Texas Commission on Environmental Quality (Commission or TCEQ) for three applications to conduct *in situ* uranium mining at a location in Goliad County.<sup>1</sup> Protestants opposing UEC’s applications are two units of government, Goliad County and the Goliad County Groundwater Conservation District (District). The Office of Public Interest Counsel (OPIC) opposes the applications, and the Commission’s Executive Director (ED) supports them. For purposes of efficiency, all of the parties requesting denial are sometimes collectively referred to as “Protestants.” After considering the evidence and arguments presented, the Administrative Law Judge (ALJ) concludes that there remain unresolved issues which preclude a recommendation that the applications be granted at this time. Therefore, the ALJ recommends that the applications either be denied or remanded for additional actions to be taken and additional evidence received.

Specifically, as discussed in detail concerning Issue G below, the ALJ recommends that additional evidence be developed and made part of the record as to whether: (1) the Northwest Fault is sealed<sup>2</sup> or transmissive,<sup>3</sup> and (2) if proven to be transmissive, whether with proper safeguards, both ground and surface water can be protected from pollution if *in situ* uranium

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<sup>1</sup> One of the three applications is for a Production Area Authorization (PAA), TCEQ Docket No. 2009-1319-UIC, *Application by Uranium Energy Corp. for Production Area Authorization No. 1*. SOAH assigned that application SOAH Docket No. 582-09-6184. That docket was then consolidated with this SOAH Docket No. 582-09-3064.

<sup>2</sup> An impervious barrier to the movement (migration) of groundwater.

<sup>3</sup> Permeable.

mining is allowed. In addition, the ALJ recommends that baseline groundwater quality and the restoration table be amended to reflect the average of all three rounds of sampling for all constituents. This would necessitate other changes before permits could be issued, but would not necessarily require a remand.

## I. INTRODUCTION

UEC has requested the Commission's approval for: (1) a Class III Underground Injection Control area permit, Permit No. UR03075; (2) an aquifer exemption (collectively, the Mine Application); and (3) a PAA, Authorization No. UR03075PAA1 (the PAA-1 Application). The three applications, if approved, would authorize UEC to conduct an *in situ* uranium mining operation 13 miles north of the City of Goliad. The ED reviewed the applications and concluded that the applications meet all legal standards. The ED prepared for the Commission's approval a draft Mine Permit, an Aquifer Exemption Order, and a PAA. If the applications were approved, they would set the conditions under which UEC would be permitted to conduct the *in situ* uranium mining.

After the Protestants filed their protests, the Commission referred these issues to SOAH for a contested case hearing:

- A. Whether the use and installation of the injection wells are in the public interest under TEX. WATER CODE § 27.051(a). Public interest in regard to this issue includes whether UEC's mining operation or restoration activities will adversely impact the public interest by unreasonably reducing the amount of groundwater available for permitting by the Goliad County Groundwater Conservation District.
- B. Does the applicant's compliance history require denial of the application under TEX. WATER CODE § 27.051(e) and 30 TEX. ADMIN. CODE (TAC) Ch. 60?
- C. Does the application adequately and accurately describe baseline conditions of the groundwater in the proposed permitted area under applicable requirements of 30 TAC Ch. 331?
- D. Does the application meet all applicable criteria of 30 TAC § 331.122, related to required consideration by the Commission prior to issuing a Class III Injection Well Area Permit?

- E. Has the applicant demonstrated that the proposed exempted aquifer meets the applicable criteria of 30 TAC § 331.13?
- F. Is the application sufficiently protective of groundwater quality?
- G. Does the application adequately characterize and describe the geology and hydrology in the proposed permit area, including fault lines, under the applicable rules?
- H. Do the geologic and hydraulic properties of the proposed permit area indicate that the applicant will be able to comply with rule requirements?
- I. Does the applicant meet the applicable requirements for financial assurance under TEX. WATER CODE §§ 27.051 and 27.073, and 30 TAC Ch.37 and 331?
- J. Is the application sufficiently protective of surface water quality?
- K. Are local roadways sufficient to handle traffic to and from the proposed facility?
- L. Whether UEC's proposal for restoration of groundwater to baseline levels as contained in the permit application is reasonable and adequate?
- M. Will the applicant's proposed activities negatively impact livestock and wildlife, including endangered species?
- N. Will the applicant's proposed activities negatively impact the use of property?
- O. Will the applicant's proposed activities adversely affect public health and welfare?
- P. Whether the proposed mining is in the recharge zone of the Gulf Coast Aquifer (Evangeline component)?
- Q. Whether the Gulf Coast Aquifer is a confined aquifer in the areas of Goliad County where UEC will conduct UIC [underground injection control] activities?
- R. Whether mining fluids will migrate vertically or horizontally and contaminate an USDW [underground source of drinking water]?
- S. Whether there are any USDWs within the injection zones proposed by UEC?



- T. Whether any USDWs within Goliad County will be adversely impacted by UEC's proposed *in situ* uranium operations?
- U. Whether there is a "practical, economic and feasible alternative to an injection well reasonably available" within the meaning of that term as set forth in TEX. WATER CODE § 27.05(d)(2)?

In addition, the Commission referred directly to SOAH UEC's PAA-1 Application. The issue in that referral was whether the application complies with all applicable statutory and regulatory requirements.

## II. PARTIES AND PROCEDURAL HISTORY

These were the parties and their representatives who participated in the hearing of this case:<sup>4</sup>

<b>Party</b>	<b>Representative</b>
UEC	Monica Jacobs and Diana Nichols, Attorneys, Austin, Texas
Goliad County	James B. Blackburn and Adam M. Friedman, Attorneys, Houston, Texas
District	Rob Baiamonte, Attorney, Goliad, Texas
ED	Shana Horton, Staff Attorney, TCEQ
OPIC	Garrett Arthur, Attorney

In its Interim Order of March 3, 2009, the Commission established a deadline to complete this case within one year of the first preliminary hearing. SOAH held a preliminary hearing on May 14, 2009. Immediately after the preliminary hearing, the ALJ set a procedural schedule to

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<sup>4</sup> These persons were designated as parties but did not participate in the hearing: Raymond V. Carter, Tom E. Stockton, Mona Samford and Sidney Braquet, aligned with UEC; and Goliad County Farm Bureau, individually and as representative of the following aligned protestant entities and land owners: Ander-Weser Volunteer Fire Department, Mary and Tom Anklam, Raymond and Karon Arnold, Aldon and Brenda Bade, Mickey and Elizabeth Beard, Richard and Catherine Bettge, Otto and Ruth Bluntzer, Matt and Erika Bochat, Gene and Reta Brown, John and Pearl Caldwell, Lynn and Ginger Cook, Luann and Craig Duderstadt, Darwyn and Waynell Duderstadt, Wilburn and Doris Duderstadt, Douglas and Wanda Franke, Mary Kathryn Bluntzer Gray, Joel and Jana Grieser, Brenda Jo Hardt, Ernest and Frances Hausman, Gaylon and Barbara Kornfuehrer, Ted and Pam Long, Ricki McKinney, Mr. and Mrs. Jason Mikeska, Susan and Weldon Orr, Margaret Rutherford, Wayne and Margie Smith, St. Peter's Lutheran Church, and Dorian and Carol Thurk.

meet the Commission's one-year deadline. Over the next few months, the parties filed joint or unopposed motions to extend the schedule and the Commission's deadline. The ALJ granted these requests as part of his authority under to 30 TAC § 80.4(c)(17).

These were the key procedural events in this case:

Date	Event
August 9, 2007	UEC filed its Mine Application with TCEQ.
August 29, 2007	UEC's Mine Application was declared administratively complete.
June 4, 2008	The ED made a preliminary decision that the Mine Application meets all statutory and regulatory requirements and issued a draft Mine Permit and a draft Aquifer Exemption Order.
September 4, 2008	UEC filed its PAA-1 Application with TCEQ.
September 19, 2008	TCEQ made an official determination that the PAA-1 Application was administratively complete.
March 3, 2009	TCEQ issued an Interim Order granting requests for a contested hearing on UEC's Mine Application filed by Goliad County, GCGCD, and others, and referred the case to SOAH.
May 14, 2009	SOAH held a preliminary hearing in Goliad, Texas, established jurisdiction over the Mine Application, designated parties, established a procedural schedule, and set a hearing on the merits to be commenced on January 4, 2010. The procedural schedule was later extended based on agreed or unopposed motions filed by the parties.
June 2, 2009	The ED made a preliminary determination that the PAA-1 Application meets all statutory and regulatory requirements.
June 9, 2009	The ED issued a draft PAA.
August 14, 2009	UEC filed a request for direct referral of the PAA-1 Application to SOAH for a contested case hearing.
September 29, 2009	UEC filed an Agreed Motion to Consolidate the PAA-1 Application with the Mine Application.
October 6, 2009	SOAH held a preliminary hearing in Goliad, Texas, established jurisdiction over the PAA-1 Application and designated parties.
October 8, 2009	SOAH granted the Motion to Consolidate.
October 26, 2009	SOAH granted UEC's unopposed motion to abate the proceeding to make minor amendments to the Mine Application and PAA-1 Application.
December 18, 2009	SOAH established a new procedural schedule and set the hearing on the merits for May 3, 2010.
April 30, 2010	Prehearing Conference.

Date	Event
May 3-11, 2010	Hearing on the Merits.
July 9, 2010	Parties filed Closing Arguments.
July 30, 2010	Parties filed Replies to Closing Arguments and the record closed.

### III. NOTICE AND JURISDICTION

No party contested proper notice or jurisdiction. These matters will be addressed in the findings of fact and conclusions of law in the proposed order.

### IV. BACKGROUND: *IN SITU* MINING

#### A. Mining Overview

UEC proposes to mine uranium deposits found in the Goliad Formation, a stratum of sand and sandstone within the local aquifer. To extract the ore, UEC proposes to conduct *in situ* mining. Using extraction wells, native groundwater is pumped to the surface where the water is fortified with oxygen and sodium bicarbonate. This solution, known as mining solution or lixiviant, is re-injected into the uranium bearing sand, known as the production zone. The lixiviant then oxidizes the uranium, allowing it to move into solution. After the uranium is solubilized, it combines or “complexes” with the bicarbonate, which traps the uranium in solution until it is pumped to the surface and removed from the mining solution at the plant.

The uranium-bearing mining solution (or “pregnant” lixiviant) is passed through pressurized vessels that contain ion-exchange resin beads. These beads are designed to attract and hold the uranium compound on the beads, thus removing it from the solution. After the uranium is removed from the mining solution (“barren” lixiviant) is then re-fortified with oxygen and sodium bicarbonate and re-injected into the production zone (i.e., the mining solution is re-circulated). A small amount of the barren lixiviant – approximately 1% -- is diverted from the production area for disposal in a Class I disposal well. This is known as “bleed.” Bleed maintains a negative pressure on the groundwater and creates a “cone of depression.” By

maintaining this status, the mining operation retains the groundwater and the dissolved solids within the production area and prevents them from flowing into other areas in the aquifer. The mining operation is required to restore the groundwater within the production area to its original baseline status after the mining is completed, and to monitor the site through the use of monitor wells.<sup>5</sup>

## **B. Permits**

To begin these operations, a mining operation must receive from the Commission: (1) an underground injection permit to establish a mine and begin mining operations, (2) an aquifer exemption to conduct mining activities within an aquifer, and (3) a PAA, an administrative designation of a production area within the boundary of the approved mining area.

### **1. Class III Underground Injection Permit**

UEC applied to the Commission for a new Class III underground injection control area permit. The proposed mining activity would be conducted about 13 miles north of the City of Goliad and 0.9 miles east of the intersection of State Highway 183 and Farm-to-Market Road 1961 in Goliad County. The Class III area permit would authorize UEC to construct and operate Class III injection and production wells for recovery of uranium from a certain portion of the Goliad Formation beneath the permit area. The area within the proposed permit boundary is 1,139.4 contiguous acres, including a 100-foot buffer zone.<sup>6</sup>

### **2. Aquifer Exemption**

UEC's Class III application includes a request for an aquifer exemption. An aquifer exemption is an administrative order by the Commission establishing that the part of the aquifer

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<sup>5</sup> UEC Ex. 5, Underdown Direct at 5-7.

<sup>6</sup> Designated monitor wells shall be installed at least 100 feet inside any permit area boundary, unless excepted by written authorization from the executive director. 30 TAC § 331.82(g).

in which mining is to be conducted will not serve as a source of drinking water for human consumption. Until the exempt status is removed, the aquifer may not serve as a source of drinking water for human consumption.<sup>7</sup> For this application, the requested aquifer exemption would apply from a depth of 45 to 404 feet within the Goliad Formation and would encompass a 423.8 acre area within the proposed permit area.

### **3. PAA Application**

UEC also filed a PAA-1 Application to authorize mining and restoration in proposed Production Area No. 1 within the Class III permit area. Proposed PAA-1 covers 36.1 acres within a 94.2 acre mine area on the southern portion of the proposed permit area. The draft PAA would be issued under the terms of the proposed Class III injection well area permit. The draft PAA includes: a mine plan with estimated schedules for mining and aquifer restoration, a baseline water quality table, a restoration table, control parameter upper limits, monitor well locations, and cost estimates for aquifer restoration and well plugging and abandonment.

## **V. APPLICABLE LAW**

In 1982 the federal Environmental Protection Agency (EPA) authorized Texas' plan to implement provisions of the federal Safe Drinking Water Act. The Texas legislature adopted Chapter 27 of the Texas Water Code to delegate to the Commission the statutory authority to approve mining operations within an aquifer. Section 27.003 of the Injection Well Act sets the state's policy about injection wells:

**POLICY AND PURPOSE.** It is the policy of this state and the purpose of this chapter to maintain the quality of fresh water in the state to the extent consistent with the public health and welfare and the operation of existing industries, taking into consideration the economic development of the state, to prevent underground injection that may pollute fresh water, and to require the use of all reasonable methods to implement this policy.<sup>8</sup>

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<sup>7</sup> 30 TAC § 331.13(c)(1) and (2).

<sup>8</sup> *Id.* § 27.003 (Vernon 2008).

Subchapter D of the Injection Well Act governs the issuance of permits for injection wells.<sup>9</sup> Section 27.051(a) of Subchapter D of the Injection Well Act provides that TCEQ may grant an application in whole or in part and may issue the permit if the TCEQ finds that:

- (1) the use or installation of the injection well is in the public interest;
- (2) no existing rights, including, but not limited to, mineral rights, will be impaired;
- (3) with proper safeguards, both ground and surface fresh water can be adequately protected from pollution; and
- (4) the applicant has made a satisfactory showing of financial responsibility if required by Section 27.073 of the code. . . .<sup>10</sup>

As part of this same regulatory scheme, Section 27.051(c) requires the TCEQ to impose terms and conditions “reasonably necessary to protect fresh water from pollution.”<sup>11</sup>

The TCEQ has adopted rules that govern its administration of the injection well program. In 30 TAC ch. 331, the TCEQ provides for the review of requests for the issuance of Class III injection well permits, applications for PAAs, and requests for exemption designations of aquifers. Chapter 331 underwent significant revision during the pendency of this proceeding. Those revisions, including new and amended rules, effective March 12, 2009, applied to this proceeding.<sup>12</sup>

The purpose of Chapter 331 is:

. . . to implement the provisions of the Injection Well Act, Texas Water Code, Chapter 27, as it applies to the commission. The implementation shall be consistent with the policy of this state to: maintain the quality of fresh water in the state to the extent consistent with the public health and welfare and the

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<sup>9</sup> *Id.* §§ 27.051-.056 (Vernon 2008 & Supp. 2009).

<sup>10</sup> *Id.*

<sup>11</sup> TEX. WATER CODE ANN. § 27.051(c) (Vernon 2008).

<sup>12</sup> 30 TAC § 305.127(4)(B).

operation of existing industries, taking into consideration the economic development of the state; prevent underground injection that may pollute fresh water; and require the use of all reasonable methods to implement this policy.<sup>13</sup>

Consistent with the policy of the statute, the rules require that: (1) no existing rights may be impaired,<sup>14</sup> (2) fresh water be adequately protected from pollution,<sup>15</sup> (3) applicants make a satisfactory showing of financial responsibility,<sup>16</sup> and (4) the injection wells be otherwise in the public interest.<sup>17</sup>

## VI. ISSUE A

**Whether the use and installation of the injection wells are in the public interest under TEX. WATER CODE § 27.051(a). Public interest in regard to this issue includes whether UEC's mining operation or restoration activities will adversely impact the public interest by unreasonably reducing the amount of groundwater available for permitting by the Goliad County Groundwater Conservation District?**

### **Recommendation:**

**UEC's proposed use and installation of the injection wells are in the public interest, subject to the revision of the baseline water quality table and restoration table for PAA-1 to reflect baseline water quality based on the average of all three rounds of sampling for all constituents. This recommendation is also based on the provisions of TEX. WATER CODE § 27.051(a) and is further addressed in Sections VIII and XVI analyzing Issues C and L and in Section XXVII B. analyzing PAA-1.**

### **A. Parties' arguments**

#### **1. UEC**

UEC argued that the public interest should be determined based on an analysis of the Injection Well Act and the decision of the Austin Court of Appeals in *Texas Citizens for a Safe*

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<sup>13</sup> 30 TAC § 331.1(a).

<sup>14</sup> See *infra*, Section I.E.

<sup>15</sup> See *infra*, Section I.F.

<sup>16</sup> See *infra*, Section I.G.

<sup>17</sup> See *infra*, Section I.D.

*Future and Clean Water v. Railroad Comm'n of Texas*,<sup>18</sup> (commonly referred to as the *Popp* case). Based on these sources, UEC delineated what it believes are the five considerations relevant to the public interest: (1) continued operation of existing industries and recovery of natural resources; (2) availability of alternatives to the use of an injection well; (3) economic development; (4) public health and welfare, including: protecting fresh water from pollution, protecting air from pollution, protecting soil and vegetation from contamination, traffic safety, and groundwater availability; and (5) the applicant's compliance history.

**a. Continued Operation of Existing Industries and Recovery of Natural Resources**

UEC argued that its applications will help supply energy for the United States. Because energy independence is part of the public policy of this country, UEC is helping to satisfy the public interest. Energy demand in the United States is expected to grow by almost 50% by 2030. To keep pace with this growth, the National Energy Policy recommends expanding the role of nuclear energy. UEC's argument was that the uranium mining industry, which has been a part of the Texas economy for decades, is a vital component for sustaining the growing nuclear power plant industry in Texas and throughout the United States.<sup>19</sup>

In addition, UEC's expert witness and geologist, Dr. William Galloway, testified that uranium is found in a limited number of places.<sup>20</sup> Although uranium ore is distributed worldwide, only twenty-one countries export it.<sup>21</sup> The South Texas Uranium Province is one of only three significant uranium ore reserves within the United States.<sup>22</sup>

UEC argued that the public interest is served by its development of the uranium ore reserves in Texas. In addition, UEC argued that the Protestants' evidence did not contradict its

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<sup>18</sup> 254 S.W.3d 492 (Tex. App.—Austin 2007, pet. granted).

<sup>19</sup> UEC Ex. 6, Holmes Direct, Ex. 13.

<sup>20</sup> UEC Ex. 1, Galloway Direct at 16.

<sup>21</sup> *Id.* at 16.

<sup>22</sup> *Id.* at 16.



position. In support of that argument, UEC pointed to the testimony of Goliad County's witness Dr. Bruce K. Darling. Dr. Darling's testimony relied on a United States Geological Survey (USGS) report by Susan Hall (the Hall Study) that describes the importance of Texas' uranium mining industry in meeting national energy demand.<sup>23</sup> The Hall Study states that the United States has been steadily producing uranium using *in situ* recovery mining since the mid-1970s<sup>24</sup> and that "Texas has been the location of the greatest number of uranium in-situ recovery (ISR) mines in the United States."<sup>25</sup> The study reports that although 38% of U.S. uranium reserves are amenable to *in situ* mining, the United States still imports 82% of its uranium.<sup>26</sup> The study concludes that "the safe and effective use of ISR technology in mining uranium deposits is a potentially critical element in the movement towards energy independence in the United States."<sup>27</sup> UEC argued that the public interest is served by the development of the state's energy-producing natural resources<sup>28</sup> and that UEC's Mine Application is in the public interest and should be granted.

**b. Availability of Alternatives to the Use of Injection Wells**

UEC argued that there are no practical, economic, and feasible alternatives to the use of injection wells in this case. This argument is more fully addressed in the analysis of Issue U.

**c. Economic Development**

UEC relied on the public interest demonstration in the Mine Application in arguing that the uranium mining industry "creates a significant number of high-paying, long-term jobs and

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<sup>23</sup> Goliad County Ex. 1; Goliad County Ex. 4, Darling Direct at 1 and 4.

<sup>24</sup> *Id.* at 4.

<sup>25</sup> *Id.* at 1.

<sup>26</sup> *Id.* at 4.

<sup>27</sup> *Id.*

<sup>28</sup> TEX. CONST. art. XVI, § 59 (declaring that "[t]he conservation and development of all of the natural resources of this State" ... [are] public rights and duties"); *Berkeley v. Railroad Comm'n*, 282 S.W.3d 240, 244 (Tex. App. – Amarillo 2009, no pet.) (recognizing increased capacity for oil and gas production as a public interest factor that favors the granting of a permit for a salt water disposal injection well).

contributes to the tax base in the largely rural communities in which it operates.”<sup>29</sup> UEC also argued that the South Texas economy would benefit through added economic diversity and good paying jobs if the Goliad Project is approved. UEC estimated that it would employ about 80 workers at the project. UEC challenged the Protestants’ alleged failure to offer direct testimony on how the project would stimulate local economic development. UEC contended that in considering the public interest issue, TCEQ may consider factors such as job creation, generation of local property taxes, and increased local economic activity and diversity.<sup>30</sup>

**d. Protecting Fresh Water from Pollution**

UEC argued that fresh water is adequately protected from pollution. This issue is more fully addressed in the analysis of Issues F, G, and J.

**e. Protecting Against Air Pollution, Soil and Vegetation Contamination, and Harm to Livestock and Wildlife**

UEC argued that its application addresses the protection of air from pollution and soil and vegetation from contamination. UEC also asserted that its proposed *in situ* mining would not negatively impact livestock and wildlife, including endangered species. This issue is more fully addressed in the analysis of Issue M.

**f. Traffic Safety**

UEC argued that local roadways are adequate to safely handle traffic to and from the proposed mine site. This argument is more fully addressed in the analysis of Issue K.

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<sup>29</sup> UEC Ex. 6, Holmes Direct Ex. 13 at ix.

<sup>30</sup> *Graff Chevrolet Co. v. Tex. Motor Vehicle Bd.*, 60 S.W.3d 154, 161 (Tex. App. – Austin 2001, pet. denied) (upholding board’s determination that new franchise was in the public interest where evidence showed that it would enhance competition, create jobs, and provide a successful minority-run dealership in the community).

**g. Groundwater Available for Permitting**

UEC plans to use reverse osmosis<sup>31</sup> during the mining and restoration stages of the operation.<sup>32</sup> As explained in the public interest demonstration in the Mine Application, the use of reverse osmosis in both mining and restoration conserves groundwater.<sup>33</sup> UEC plans to use ion exchange columns to remove residual uranium, which will shorten the duration of the restoration period and thus reduce water consumption. UEC will also use groundwater sweep,<sup>34</sup> not only to satisfy restoration goals, but also to conserve water.<sup>35</sup> Additionally, UEC's projected water consumption—water that will be disposed of down the Class I disposal wells—is between 133 and 206 acre-feet per year.<sup>36</sup>

UEC argued that the District's Management Plan anticipated the need to plan for groundwater usage for uranium mining purposes.<sup>37</sup> The Plan projects 800 acre-feet per year of groundwater usage for such purposes, which is almost *four times* the amount that UEC projects it would use on an annual basis.<sup>38</sup> This, argued UEC, demonstrates that the amount of water to be used by UEC can be accommodated by the District.

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<sup>31</sup> Reverse osmosis is a filtration method that removes many types of large molecules and ions from solution by applying pressure to the solution when it is on one side of a selective membrane. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side.

<sup>32</sup> UEC Ex. 5, Underdown Direct at 22-23; UEC Ex. 6, Holmes Direct at 53-54.

<sup>33</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at ix.

<sup>34</sup> The injection of lixiviant is stopped but fluid continues to be pumped from recovery wells. This removes contaminated water and brings uncontaminated groundwater into the ore body aquifer. The removed contaminated water is disposed of by injection into a disposal well.

<sup>35</sup> UEC Ex. 6, Holmes Direct at 54-55.

<sup>36</sup> UEC Ex. 7, Holmes Issue A Rebuttal at 3.

<sup>37</sup> See, District Ex. 2, Dohmann "A" (Goliad County Groundwater Conservation District's Management Plan).

<sup>38</sup> *Id.* at 13.

## 2. Protestants

Goliad County pointed out there are no TCEQ regulations defining “public interest.” Then, relying heavily on the “shall not be limited to” language in TEX. WATER CODE § 27.051(d) and the holdings in the *Popp* case and other relevant case law,<sup>39</sup> Goliad County advocated that the Commission should interpret the public interest standard very broadly. Goliad County also noted that it is aware of only one other environmental law that has an affirmative regulatory requirement to consider the public interest and that is Section 10 of the River and Harbor Act administered by the U.S. Army Corps of Engineers. Under this regulation the concept of public interest requires a “balancing of interests.” In other words, the positives and negatives are considered.<sup>40</sup> Goliad County argued that many of the other Commission-referred issues should be considered in conducting the overall public interest review.

Goliad County then focused on three concerns: (1) the manner in which the TCEQ staff addressed public interest concerns; (2) UEC’s compliance record; and (3) the balance between the risk to Goliad County and its water supply and the development of mineral resources and economic development. The District supported Goliad County’s position with respect to criticism of the ED’s public interest assessment and the risk of permanent harm to Goliad County’s groundwater quality. Additionally, the District asserted that the proposed *in situ* mining will adversely impact the amount of groundwater available for permitting.

### a. ED’s Inadequate Consideration of Public Interest

Both Goliad County and the District argued that the ED failed to analyze the public interest as required by the Texas Water Code or the holding of the Austin Court of Appeals in the *Popp* decision. To demonstrate that failure, Protestants referred to the testimony of the ED’s witness, David Murry:

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<sup>39</sup> *Texas Citizens for a Safe Future & Clean Water v. R.R. Comm’n*, 254 S.W.3d 492, 502 (Tex. App. – Austin 2007); *Berkley v. R.R. Comm’n*, 282 S.W.3d 240, 244 (Tex. App. – Amarillo 2009).

<sup>40</sup> 33 Code of Federal Regulation (CFR) 320.4.

**Q: (by Mr. Blackburn). Now, did you consider the fact that there could be some negative aspects to the public interest?**

A: (by Mr. Murry). No.

**Q: (by Mr. Blackburn). So just in terms of your evaluation of public interest, you did not consider even the possibility there could be a negative aspect on the public interest? Did I understand your testimony that way?**

A: (by Mr. Murry). Yes. What --- excuse me. Yes. I mean, what I looked at, again, was the information provided in the application, which are, positive aspects of in-situ uranium mining, or of allowing the use of Class 3 injection wells for uranium mining, I should say.

**Q: (by Mr. Blackburn). So all you considered in your review were positive aspects provided by the applicant, correct?**

A: (by Mr. Murry). Correct.<sup>41</sup>

According to Protestants, this testimony demonstrated that no attempt was made by the TCEQ staff to undertake any balancing approach or even consider public safety or other potential negative impacts in making a determination whether the proposed *in situ* uranium mining is in the public interest. Based on this and other testimony in the record, Protestants asserted that testimony offered by the TCEQ should be rejected as failing to reflect the standard for public interest consideration required by the Texas Water Code.

#### **b. Risks to Goliad County Ground Water**

Protestants argued that the mining operations would present a risk of permanent harm to groundwater.<sup>42</sup> As part of that argument, Protestants asserted that it was highly unlikely that UEC would restore the groundwater at the mine site after mining ceases. As proof of this assertion, Goliad County noted the testimony of Craig W. Holmes, UEC's lead witness, who testified that he had worked on 80% of the mine sites in Texas and that none of them were fully

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<sup>41</sup> Tr., Vol. 6 at 1233 – 1234 (Murry).

<sup>42</sup> This is addressed in greater detail under Issue L below.

restored.<sup>43</sup> Similarly, William Underdown, a UEC employee, testified that his experience with unsuccessful restoration had been the same.<sup>44</sup> Mr. Underdown stated on cross-examination that UEC “will attempt to get every constituent back, but there is a certain point when you will reach . . . [and] at that time you petition the agency to give you an amendment.”<sup>45</sup>

Protestants contended the evidence showed that the contaminated groundwater produced by the mining operations will not be restored to baseline conditions and that high levels of harmful constituents will remain in the groundwater when the mining is completed. Protestants argued that the evidence of past restoration attempts showed that reclamation efforts by UEC, if a permit is issued, will likely fail to restore the water to baseline levels. This failure, argued Protestants, is an exceptionally important factor in the determination that UEC’s mining operations would not be in the public interest.

### c. UEC’s Compliance History

As will be addressed in greater detail with respect to Issue B, Goliad County argued that UEC repeatedly violated Texas Railroad Commission (TRC) rules during its exploration drilling activities at the proposed mine site. Goliad County claimed that UEC failed to restore the surface of 74 of 117 mud pits,<sup>46</sup> failed to mark and locate many boreholes, and failed to properly plug 5 of the 14 boreholes that were found.<sup>47</sup> Goliad County asserted that 22 of UEC’s exploration borehole sites had radiation levels that were above background levels and that 139 exploration boreholes were left open beyond the 48-hour time period within which they were required to conduct plugging operations.<sup>48</sup> Eighteen of UEC’s 20 exploration boreholes that were converted to baseline water quality wells were not cased within the required 48-hours.<sup>49</sup>

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<sup>43</sup> Tr., Vol. 1 at 248 – 249 (Holmes).

<sup>44</sup> Tr., Vol. 1 at 213 – 214 (Underdown).

<sup>45</sup> Tr., Vol. 1 at 192 – 23 (Underdown).

<sup>46</sup> Goliad County Ex. 4, Darling Direct, Ex. 3. (Notice of Violation).

<sup>47</sup> *Id.*

<sup>48</sup> Goliad County Ex. 4, Darling Direct at 11-27.

<sup>49</sup> Goliad County Ex. 4, Darling Direct at 12-14; *Id.* at 12 – 22; *see also, Id.* at Darling Direct, Ex. 8.

Goliad County pointed to this record as evidence of the potential for environmental harm that UEC would continue to create for Goliad County residents if UEC were allowed to conduct *in situ* mining activities.

Goliad County further asserted that UEC failed to give the TCEQ staff the results of an important 24-hour pump test. The test, conducted by UEC, had shown that the Northwest Fault, underlying the Goliad Formation, could be transmissive—that is, allow polluted water from the *in situ* mining operations to leak into the part of the groundwater used for human consumption.<sup>50</sup> Goliad County argued that not only was this information relevant to the merits of the Mine Application, the information contradicted evidence offered by UEC.

Further, Goliad County pointed out that TCEQ rules require that “where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application, or in any report to the Executive Director, it shall promptly submit such facts or information,”<sup>51</sup> and UEC failed to do so. Similarly, Goliad County alleged, UEC failed to provide the ED with the results of the second and third rounds of baseline water quality sampling. This sampling, according to Goliad County, showed a significant decrease in the baseline concentration of uranium, an outcome to which UEC should be held when restoring the groundwater to its pre-mining condition, if the application were approved.<sup>52</sup>

In conclusion, Goliad County asserted that it is essential that an applicant’s compliance history be reviewed by the Commission. Only by examining an applicant’s history of compliance may the Commission determine the character of an applicant who seeks authority to undertake risk at the expense of the public. Goliad County contended that the Commission should not grant rights or delegate responsibilities to UEC because it has demonstrated that it cannot be trusted to discharge its obligations when a permit is issued.

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<sup>50</sup> Tr., Vol. 7 at 89 (Murry).

<sup>51</sup> 30 TAC § 305.125(19).

<sup>52</sup> This is addressed in greater detail under Issue C below.

**d. Availability of Ground Water for Permitting**

The District's expert hydrologist Thomas N. Blandford<sup>53</sup>, P.G., testified that water lost through the mining and restoration processes will limit the availability of groundwater outside the permit area.<sup>54</sup>

**Q: Do you have an opinion whether the groundwater used by UEC would have an effect on GCGCD's ability to manage the groundwater in the area surrounding the permit?**

A: Yes I do.

**Q: What is your opinion?**

A: The GCGCD Management Plan and Rule 12.6 of the GCGCD Rules state that the GCGCD is to manage groundwater in the Gulf Coast Aquifer on a sustainable basis, where the groundwater available for use equals the estimated recharge to the aquifer. The GCGCD has implemented multiple rules to achieve this goal, one of the most important being Rule 12.6(3), which limits production volumes to 0.5 acre-foot per acre per year. Since UEC is not required to obtain an operating permit from the GCGCD in order to mine, the GCGCD will be denied the opportunity to appropriately permit and manage UEC's groundwater use. If mining proceeds, it is highly likely that the production limits of Rule 12.6(3) will be exceeded.

**Q: Why do you believe that GCGCD Rule 12.6(3) will be exceeded?**

A: Based on the proposed area of aquifer exemption of 423.8 acres, under GCGCD rules about 212 acre-ft per year of water would be appropriable (*i.e.* 423.8 acres times 0.5 acre-ft per acre), which is about 130 gallons per minute (gpm). However, UEC can reasonably be expected to use their full permitted deep well disposal capacity of 200 gpm, which is about 70 gpm greater than the maximum amount of water that the GCGCD would appropriate in accordance with their rules. This scenario will essentially cause the GCGCD to consider acreage adjacent to UEC as unavailable for new appropriation, in an amount sufficient to offset the "over-utilization" of groundwater by UEC. The potential restrictions that the GCGCD would be required to impose on property adjacent to the UEC operation, in order to offset the effects of UEC's use, would constitute an unreasonable reduction in the amount of groundwater available for permitting by GCGCD.

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<sup>53</sup> Dr. Blandford's name is spelled with and without a "d" in various places in the evidentiary record. For consistency, this PFD uses "Blandford."

<sup>54</sup> District Ex. 3, Blandford Direct at 6-7.



The District concluded that the proposed project will adversely impact the District's ability to permit groundwater. Specifically, the District claimed that it will be required to limit groundwater pumping outside the permit area to be able to maintain the integrity of the mine project and to sustain the level of the aquifer. Citing TEX. WATER CODE § 27.051(a)(2) for the proposition that the Commission can issue a permit only if no existing rights will be impaired, the District argued that the reduction in the amount of groundwater available for permitting by the District is an impairment of an existing right. Moreover, according to the District, the reduction in the amount of groundwater available to the citizens of Goliad County constitutes another impairment of an existing right. Thus, the District contended UEC failed to demonstrate that its *in situ* mining project is in the public interest.

### **3. OPIC**

OPIC noted that the District is obligated to protect the groundwater resources of Goliad County. Relying on the testimony of the District's witness, Arthur Dohmann, OPIC asserted that UEC's mining operation would result in the loss of 1,169 acre-feet of groundwater from the aquifer per year, a volume that greatly exceeds the amount that UEC would be allowed under the District's rules. Accordingly, if UEC were allowed to conduct the proposed mining operation, the District would be forced to restrict the use of water by landowners adjacent to UEC's mine site. Thus, adjoining groundwater users would pay the price for UEC's over-utilization of groundwater. OPIC concluded that UEC's proposed *in situ* mining and restoration activities will unreasonably reduce the amount of groundwater available for permitting by the District; therefore, UEC's proposed injection wells are not in the public interest as required by TEX. WATER CODE § 27.051.

#### 4. Executive Director

The ED supported a finding that UEC's Mine Application and the ED's draft permits are in the public interest. The ED explained that in a response to a Notice of Deficiency,<sup>55</sup> UEC provided information regarding how the wells contemplated by the Class III area permit are in the public interest. The response addressed compliance history, alternatives to the use of an injection well, maintenance of the quality of freshwater and prevention of its pollution, public health and welfare, and economic development.<sup>56</sup> Based on his review of this information, the ED determined that the application satisfied the requirements of the statute.

The ED also evaluated UEC's compliance history in accordance with the Texas Water Code and TCEQ rule.<sup>57</sup> Based on that review, the ED asserted that UEC's compliance history does not tend to show that granting the Mine Application would be against the public interest.

UEC presented surface and underground mining as alternatives to the use of injection wells in its response to the NOD. The ED concluded that neither would be in the public interest.<sup>58</sup>

The ED evaluated whether the proposed *in situ* mining activity would unreasonably reduce the amount of groundwater available for permitting by the District. The ED concluded that the Class III injection well requirements that apply to *in situ* mining do not regulate the volume of fresh water used by a permittee. The rules do not require applicants to provide any direct information about the amount of water they will use from the aquifer. Nonetheless, the application does include some information that is related to this issue. The ED pointed out that in Section 10 of its application, UEC provided an analysis of the fluid handling capacity and the fluid disposal requirements for its proposed *in situ* mining operation. The ED further pointed out

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<sup>55</sup> ED Ex. ED-4, Notice of Deficiency dated Jan. 7, 2008.

<sup>56</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Class III UIC application, Project Overview at x-xiii.

<sup>57</sup> 30 TAC Ch. 60.

<sup>58</sup> Tr., Vol. 6 at 133-141 (Murry).

that based on Table 10.1 of the application, UEC expects to dispose of 380,783,976 gallons (1,169 acre-feet) of water over a period of about 8 years, the projected life of the operation. The maximum projected fluid disposal rate would be 5,612,000 gallons a month. The ED reviewed this data and concluded that UEC's projections of water use are reasonable.<sup>59</sup>

The ED argued that although the District has the power to issue permits regulating the pumping of groundwater under Chapter 36 of the Texas Water Code Section 36.117(l) specifically states that the Texas Water Code does not apply to production or injection wells drilled for uranium. Therefore, the District does not have the authority to restrict UEC's groundwater use for its proposed uranium mining activities. Even so, the ED emphasized that under the District's rule restriction of 0.5 acre-feet per acre per year,<sup>60</sup> UEC would be allowed to pump 212 acre-feet per acre per year from the 423.8-acre aquifer exemption area. Thus, the ED found it very significant that UEC's estimated water use over the life of the project and projected maximum monthly water use<sup>61</sup> are *projected to fall within the limits of the District's current rule*.

## **B. ALJ's Analysis and Recommendation**

The ALJ finds that UEC's proposed installation and use of Class III injection wells for *in situ* mining of uranium are in the public interest, in accordance with the criteria in TEX. WATER CODE § 27.051(a). Uranium, in contrast with oil and gas, is a very scarce natural resource. It exists in commercially mineable concentrations in only a few areas of the United States, including Goliad County, Texas. It is in the public interest for this natural resource to be produced to meet the energy needs of the United States, and for the mineral owners to realize the economic benefits of uranium production on their property. The ALJ additionally finds that UEC's mining operation and restoration activities will not unreasonably reduce the amount of groundwater available for permitting by the District. The ALJ further disagrees with Protestants'

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<sup>59</sup> ED Ex. ED-10 at 39.

<sup>60</sup> District Ex. 2, Dohmann Direct at 8.

<sup>61</sup> UEC Ex. 6, Holmes Direct, Ex. 13, PAA1 application, table 7.2.

claim that the ED failed to undertake a balancing approach or consider potential negative impacts in making a determination of public interest. However, the ALJ raises the *caveat* that if the Northwest Fault is proven to be transmissive, upon further testing as recommended by the ALJ, and the preponderance of the evidence is also negative as to whether with proper safeguards, both ground and surface water can be protected from pollution due to the nature of the fault, that would, of course, tip the public interest scale toward a finding that the proposed *in situ* uranium mining is not in the public interest.

In major part, Protestants rely on the quoted testimony of Mr. Murry to support their criticism of the scope of the ED's consideration of the public interest.<sup>62</sup> But, the Protestants ignore Mr. Murry's further testimony that, in addition to information provided by UEC, he "also considered the comments from the public and still came to the conclusion that [granting the application] was in the public interest."<sup>63</sup> Additionally, a review of the ED's response to public comments shows that the ED considered a wide range of issues regarding public interest, including: economic impacts and quality of life, land use and mine site selection, health and welfare, groundwater quality, geology/hydrology of the aquifer, monitoring, control of migration of mining fluids, aquifer restoration, financial assurance, and compliance history.<sup>64</sup> Mr. Murry also testified that he reviewed the Mine Application to ensure that UEC would meet all regulatory requirements.<sup>65</sup>

Moreover, Protestants' assertion that the ED failed to take a "balancing approach" or consider potential negative impacts, ignores that TCEQ rules require TCEQ to implement Chapter 27 of the Texas Water Code in a manner "consistent with the policy of this state to: maintain the quality of fresh water in the state to the extent consistent with the public health and welfare and the operation of existing industries, taking into consideration the economic development of the state; prevent underground injection that may pollute fresh water; and require

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<sup>62</sup> Tr., Vol. 6 at 1233-1234 (Murry).

<sup>63</sup> Tr., Vol. 6 at 1235 (Murry).

<sup>64</sup> ED Ex. ED-10 at 7.

<sup>65</sup> Tr., Vol. 1 at 37-38 (Murry).

the use of all reasonable methods to implement this policy.”<sup>66</sup> The rules clearly require a “balancing approach.” Considering all the evidence, the ALJ concludes that the ED properly determined that UEC’s Mine Application is in the public interest consistent with the policy of the state as defined by the Legislature.

Further, the ALJ finds the ED’s arguments and authorities persuasive that the Protestants and OPIC go too far with their positions that the proposed *in situ* mining will unreasonably reduce the amount of groundwater available for permitting by the District. The ALJ concurs with the ED that while this issue was specifically referred by the Commission, the scope of the public interest consideration must be appropriately limited so that it does not conflict with other law.

The District posited that if it is forced to curtail groundwater pumping for properties adjacent to the site, the value of those properties would be diminished and thus, the groundwater use proposed by the Applicant would result in the taking of a property right.<sup>67</sup> It states in its Closing Argument: “The loss of one’s right to pump groundwater, in order to maintain the integrity of the mine project, without any compensation, clearly violates § 27.051(a)(2) of the Water Code.”<sup>68</sup> However, the ALJ observes in agreement with the ED that this argument this argument is inconsistent with Texas groundwater law. In Texas, groundwater law is based upon the “rule of capture,” which essentially states that absent malice or willful waste, landowners have the right to take all the water they can capture under their land and do with it what they please, and they will not be liable to neighboring landowners even if in so doing they deprive their neighbors of the water’s use.<sup>69</sup> There is no law that prohibits one party from pumping so much water that it decreases the amount of groundwater available to others; conversely, while a

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<sup>66</sup> 30 TAC §331.1(a).

<sup>67</sup> District Closing Argument at 6-7.

<sup>68</sup> *Id.* at 7.

<sup>69</sup> 100 Years of Rule of Capture: From East to Groundwater Management, Report 361, a publication of the Texas Water Development Board, at 1 (2004) (citing *Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d, 75 76 (1999)). (Though Protestants may believe mining use to be wasteful as compared to use for human consumption, use of groundwater for *in situ* mining purposes cannot be deemed wasteful due solely to the purpose of use, as the Water Code explicitly exempts groundwater used for minerals mining from regulation under Chapter 36. Mining use has been sanctioned by the legislature in statute.)

landowner has the right to pump as much groundwater as he can from under his property, he does not have the right to require others to ensure the availability of any amount he wants to pump.

OPIC argues more generally that the permit is not in the public interest because “nearby groundwater users [that are] subject to [the District’s] rules would pay the price for UEC’s overutilization of groundwater.”<sup>70</sup> However, the ALJ finds that it is contrary to legislative intent and principles of statutory interpretation to interpret a more general statutory requirement, like the public interest, to override more specific law--such as the rule of capture and the exemption from groundwater conservation district regulation of groundwater use for *in situ* mining. Protestants may argue that this should be changed because it can work to the detriment of property owners; however, before the ALJ will consider the rule of capture to have been overridden, the Protestants must cite a source more specific than the general rule that the Commission must consider the public interest.

The ALJ agrees that the public interest is an intentionally broad and undefined term in statute. But this does not mean that every concern voiced by a Protestant is appropriately placed on the public interest scale. The ALJ is persuaded that OPIC and the District have applied the public interest considerations in a manner that is over-broad and inconsistent with other applicable law.

With regard to Protestants, additional public interest arguments, including compliance history, financial assurance, and past failures to restore groundwater to baseline levels, the ALJ incorporates by reference his analyses and recommendations where those issues are specifically discussed concerning Issues B, I, and L.

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<sup>70</sup> OPIC Closing Argument at 4. It appears that OPIC defines “overutilization” as pumping more water than would be allowed under the Goliad County GCD’s rules if the mining use were subject to its regulations.

## VII. ISSUE B

**Does the Applicant's compliance history require denial of the application under TEX. WATER CODE § 27.051(e) and 30 TAC ch. 60?**

### **Recommendation:**

**UEC's compliance history does not require denial of UEC's Mine Application under TEX. WATER CODE § 27.051(a) and 30 TAC ch. 60.**

### **A. Parties' Arguments**

#### **1. UEC**

UEC's witness Mr. Holmes testified that because UEC has no history of operations in Texas, UEC has no TCEQ compliance record.<sup>71</sup> The TCEQ compliance history rules assign an applicant a default compliance history of "average performer." Otherwise, an applicant's compliance history classification is established through a series of steps outlined in 30 TAC § 60.2. UEC emphasized that TCEQ may deny a permit to an applicant who is designated a poor performer or repeat violator, only if the applicant "has an unacceptable compliance history based on violations constituting a recurring pattern of conduct that demonstrates a consistent disregard for the regulatory process, including a failure to make a timely and substantial attempt to correct the violation(s)."<sup>72</sup>

UEC acknowledged the notice of violation (NOV) issued by the TRC for UEC's alleged exploration drilling violations and responded with two arguments: (1) the NOV issued by the TRC is the only one UEC ever received;<sup>73</sup> and (2) NOVs issued by the TRC are not components of an applicant's compliance history at TCEQ.

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<sup>71</sup> UEC Ex. 6, Holmes Direct at 55.

<sup>72</sup> 30 TAC § 60.3 (a)(3)(E).

<sup>73</sup> UEC Ex. 7, Holmes Issue A Rebuttal at 2.

Moreover, UEC argued that when questioned by OPIC at the hearing, TCEQ's witness Mr. Murry said that he did not think the TRC NOV would affect UEC's compliance history classification at the TCEQ even if considered.<sup>74</sup> According to UEC, that conclusion is appropriate, given the nature of the violations, UEC's prompt remedial action, and the number of other TRC inspections of UEC's exploration drilling activities that resulted in no other NOV's.<sup>75</sup>

UEC concluded that the record provides no support for finding that UEC has "an unacceptable compliance history based on violations constituting a recurring pattern of conduct that demonstrates a consistent disregard for the regulatory process, including a failure to make a timely and substantial attempt to correct the violation(s)."

## 2. Protestants

Protestants claimed that the TRC Inspection Report and NOV demonstrate that UEC failed to take rules and procedures seriously and should not be trusted with the rights and responsibilities attendant to *in situ* mining for uranium. Protestants further argued that UEC has not disputed (because it cannot) the numerous violations committed during exploration drilling. The NOV issued by TRC states that UEC failed to properly install cement surface plugs and mark the exact location of each borehole.<sup>76</sup> As stated in the inspection report accompanying the NOV, UEC was required to mark each borehole location in such a way that TRC could verify the presence of a surface plug.<sup>77</sup> TRC attempted to locate the boreholes, but the inspectors were able to tag the surface plug in only six holes of the 117 inspected.<sup>78</sup> TRC required each borehole drilled at the site to have a 10-foot surface plug located three feet below the surface, but the majority of the borehole locations could not be located for verification.<sup>79</sup> The report also states that of the 14 boreholes located, five were found to be open to the surface with the cement plug

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<sup>74</sup> Tr., Vol. 7 at 1404-1405 (Murry).

<sup>75</sup> UEC Ex. 7, Holmes Issue A Rebuttal at 2-4; UEC Ex. 7, Holmes Issue A Rebuttal Ex. 33.

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*



estimated to be greater than 20 feet below the surface, and the remaining plugs found were between 0 and 18 inches below the surface.<sup>80</sup>

Regarding drill site reclamation, Protestants called attention to the TRC Inspection Report notation that allowing mud pits to dry before being backfilled aids in preventing excursions of semi-solid drilling fluids.<sup>81</sup> In spite of this, UEC was backfilling drilling pits very quickly after the hole was logged, with no drying period, and this process caused lighter drilling liquids to be crowded out of the pit and flow on to the surface.<sup>82</sup>

According to Protestants, UEC's exploration permits required each borehole to be plugged within seven days after drilling, unless an aquifer was encountered, in which case the borehole had to be plugged within 48 hours.<sup>83</sup> Since UEC's boreholes were drilled into the Evangeline aquifer they all should have been plugged within 48 hours. Protestants asserted that UEC violated this permit condition by leaving 139 exploration boreholes unplugged longer than 48 hours.<sup>84</sup>

Protestants further argued that UEC converted 20 boreholes into regional baseline wells (RBLs).<sup>85</sup> Of these, 18 were not cased within 48 hours, as required by UEC's permits.<sup>86</sup> They pointed out the RBLs are used to establish baseline water quality for purposes of post-mining reclamation. By being left open, Protestants argued, the RBLs allowed air, oxygen and rain water to contact the groundwater which distorted the uranium and radium-226 concentrations upward.

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<sup>80</sup> *Id.*

<sup>81</sup> *Id.*

<sup>82</sup> *Id.*

<sup>83</sup> Goliad County Ex. 4, Darling Direct, Ex. 5.

<sup>84</sup> Goliad County Ex. 4, Darling Direct, Ex. 1 at 11.

<sup>85</sup> *Id.* at 12.

<sup>86</sup> *Id.*

Protestants claimed that UEC's poor behavior was internally recognized and properly described in a scathing memorandum authored by an upper level UEC employee. They quoted the following excerpts from the document:

I was immediately struck by the poor communications and lack of necessary information at the project site. I witnessed a "comedy of errors" on the parts of all concerned (site management, consultants, and contractors);

\* \* \*

I am concerned that UEC has set itself for failure in this region of Texas and corrections must be applied;

\* \* \*

Site management appeared confused about what regulatory standards need to be met and how to meet them;

\* \* \*

Legal and environmental regulatory consultants are conducting negotiations and establishing policy without concurrence and representation by UEC management personnel. In my face-to-face meeting with these consultants, it was emphasized that certain issues need to be discussed outside of "earshot" [direct quote] of site personnel, these same persons being UEC site management. Thus, site personnel have not known to what standards they are being held;

\* \* \*

Some contractors were likely more conscientious than others as was shown in the handling of drill site material at various places. ... The contractors are by necessity self-policing. The damage that can be caused to the reclamation program can occur within moments and take days to rectify.<sup>87</sup>

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<sup>87</sup> *Id.*

### 3. OPIC

OPIC agreed with Protestants and recommended that UEC's Mine Application be denied based on its compliance history. OPIC explained that UEC's compliance history with the TCEQ is not useful because UEC and the Goliad County site have not previously been permitted by the TCEQ. This means that under the TCEQ compliance history rules found in 30 TAC ch. 60, UEC defaults to an "average" compliance history rating.

OPIC argued that consistent with the ALJ's ruling at the prehearing hearing conference, UEC's compliance history with the TRC was admitted as part of the evidentiary record in this docket. As stated in TEX. WATER CODE § 27.051(e), "Evidence of compliance or noncompliance ... with environmental statutes ... may be ... admitted into evidence." According to OPIC, "environmental statutes" are not limited to statutes implemented by the TCEQ. In fact, TCEQ and TRC have split jurisdiction over injection wells.<sup>88</sup> According to OPIC, UEC's compliance history with the TRC warrants denial of the Mine Application. The record indicates UEC failed to comply with its exploration permits and TRC regulations.<sup>89</sup> Furthermore, OPIC argued, UEC's violations during the exploration phase of this project likely degraded the groundwater quality at the site. OPIC concluded that UEC's compliance history is unacceptable, and under TEX. WATER CODE § 27.051(e), requires denial of the permit.

### 4. Executive Director

According to the ED, UEC's compliance history was evaluated according to the rules laid out in 30 TAC ch. 60, and was assigned a rating of 3.01, the average classification by default.<sup>90</sup> TCEQ rules require denial of an application for a permit only when the applicant has an unacceptable compliance history. The ED emphasized that a determination that an applicant has an unacceptable compliance history must be based on violations constituting a recurring pattern

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<sup>88</sup> See, 30 TAC § 331.11.

<sup>89</sup> See, Goliad County Ex. 4, Darling Direct, Ex. 3.

<sup>90</sup> ED Ex. ED-8, Uranium Energy Corp's Compliance History report.

of conduct that demonstrates a consistent disregard for the regulatory process, including a failure to make a timely and substantial attempt to correct the violation(s).<sup>91</sup> Thus, the ED applied these criteria to the facts and argued that under the TCEQ rules, UEC's compliance history does not require denial of its application.

The ED argued that under current TCEQ rules, compliance history does not include information related to compliance with legal requirements under the jurisdiction of another state agency, such as the TRC. Therefore, the ED did not include UEC's compliance history with the TRC as part of his review of the permit application. However, the ED acknowledged that in considering whether the use and installation of the wells is in the public interest, the Texas Water Code does not limit the Commission to considering only compliance history components in TCEQ's rules.

However, the ED noted that the alleged violations were addressed to the satisfaction of the TRC, and it did not issue any enforcement orders or impose any penalties against UEC.

Therefore, the ED concluded that based on a consideration of the full record of this proceeding, the evidence regarding UEC's compliance with TRC regulations does not indicate a pattern of disregard for the regulatory process that would warrant denial of the application on the basis of compliance history.

## **B. ALJ's Analysis**

At a prehearing conference convened on April 30, 2010, the ALJ ruled that UEC's TRC compliance history would be considered with respect to the Mine Application. The ALJ found that consideration of the TRC NOV was consistent with the components of compliance history set forth in 30 TAC § 60.1(c)(7). Additionally, the ALJ concluded that it would be incongruous to ignore TRC compliance history associated with exploratory drilling conducted for the very

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<sup>91</sup> 30 TAC § 60.3(a)(3)(E).

purpose of seeking a TCEQ permit for drilling and use of Class III injection wells for *in situ* uranium mining, especially where no meaningful TCEQ history exists.

UEC's TRC NOV was based mainly on: (1) failure to provide a physical marker for boreholes such as a stake rather than using GPS coordinates; (2) failure of UEC's drilling contractors to properly clean up cuttings and drilling mud at some boreholes; (3) failure to plug to within three feet of the surface (some too low and some too high); and (4) failure to plug or case some of the boreholes within the allotted time. Although the ALJ is mindful that such violations are serious and should not be disregarded, he is equally concerned that they not be exaggerated. In this regard the ALJ finds it persuasive, as pointed out by the ED and UEC, that the violations were promptly rectified to the satisfaction of the TRC; no enforcement orders were issued; and no penalties were assessed.

Protestants place much weight on what they characterize as a "scathing memorandum" written by UEC's upper level employee, Paul Pierce. Protestants portray the memorandum as an indictment of UEC's worthiness for issuance of the requested *in situ* mining permits. However, the ALJ views the significance of the memorandum much differently. Rather than showing a casual indifference to the violations alleged in the NOV, the memo shows a forthright recognition of the gravity of the shortcomings, and reveals an attitude of determination that no similar noncompliance will be tolerated in the future. Stated differently, the ALJ views the memorandum as an open acknowledgement of responsibility for the violations and an indication of firm resolve that such noncompliance will not occur again.

Based on consideration of the entire record, the ALJ finds that Protestants have failed to show by a preponderance of the evidence that UEC has exhibited a recurring pattern of conduct that demonstrates a consistent disregard for the regulatory process, including a failure to make timely and substantial attempt to correct the violations, as required by TCEQ rules.<sup>92</sup> The ALJ further agrees with Mr. Murry's opinion that even if TCEQ had considered UEC's

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<sup>92</sup> 30 TAC § 60.3(a)(3)(E).

compliance history based on the TRC NOV, it would have not changed the “average” classification that TCEQ assigned to UEC.

## VIII. ISSUE C

**Does the application adequately and accurately describe baseline conditions of the groundwater in the proposed permitted area under applicable requirements of 30 TAC Chapter 331?**

### **Recommendation:**

The ALJ notes for clarification that although this issue was referred for consideration in connection with the Class III injection well permit, there are no TCEQ rule requirements for establishing baseline conditions as part of the Class III application. Rather, baseline water quality determination is required as part of the PAA to establish a restoration table for each production area. The parties’ presentations regarding baseline water quality in these contexts often overlap. To the extent that the Class III application includes information regarding water quality for the purpose of providing a general idea of the quality of the water within the area that UEC proposes to mine, the Class III application adequately and accurately describes the pre-mining groundwater quality. However, the Commission’s attention is directed to the discussion of Issue L (whether UEC’s proposal for restoration of groundwater to baseline levels is reasonable) and Section XXVII B. about the adequacy and accuracy of the restoration table for PAA-1. In those sections, the ALJ makes contra-findings.

### **A. Parties’ Arguments**

#### **1. UEC**

According to UEC, representative water quality was established by sampling all wells within the proposed permit area and by sampling nearly all the wells within 1 kilometer of the permit area boundary. In addition, UEC completed 20 baseline wells. Chapter 5 of the Mine Application contains water quality results for the 20 baseline wells and the 47 area wells within the area of review (AOR). The location of the baseline wells largely correspond to the area where UEC anticipates mining (i.e., areas of high uranium mineralization). The significant difference in the levels of uranium and radium-226 between the AOR wells and the baseline wells is shown in the following table:

	Ra-226 (pCi/l) <sup>93</sup>	URANIUM (mg/l)	EPA Drinking Water Standard*
Permit Area Average	579	0.401	5 pCi/l (Ra-226)
Permit Area High	3,160	6.68	0.03 mg/l (Uranium)
AOR Area High	29	0.009	
AOR Average	2.31	0.003	

\* Maximum Contaminant Level (MCL)

UEC pointed out that the average radium-226 concentration in the permit area is approximately 116 times higher than the drinking water standard, and the average uranium level is 13.4 times higher than the drinking water standard. UEC expert witnesses Dr. Galloway and Dr. Philip Bennett confirmed that such elevated levels of uranium and radium are expected to be found in groundwater in and around areas of uranium mineralization.<sup>94</sup>

## 2. Protestants

Goliad County asserted that one of the key requirements of an *in situ* permit is that the baseline water conditions be adequately described. It explained that establishing baseline water quality serves two purposes. First, baseline water quality sets the concentration levels for constituents that the operator must strive to achieve during restoration of a production area.<sup>95</sup> Second, baseline water quality helps determine the current uses of the groundwater at the proposed project site. Protestants claimed that UEC has misrepresented baseline water quality at the permit area to reflect far greater levels of uranium and radium-226 than existed prior to UEC's exploration activities at the site. They also advanced three basic arguments about the baseline readings. First, they argued that the screens in the wells were too short; second, they argued that the wells were located in the wrong places; and third, they claimed that uranium and

<sup>93</sup> picoCuries per liter.

<sup>94</sup> UEC Ex. 1, Galloway Direct at 25-26; UEC Ex. 10, Bennett Direct at 32-33.

<sup>95</sup> 30 TAC § 331.107(a) [Note: this applies to the PAA rather than Class III injection well permit].

radium values were artificially elevated by the introduction of oxygen into the ore bodies. Goliad County unabashedly accused UEC of overt unlawful conduct, including ethical lapses, blatant permit violations, misrepresentation, manipulation, and contamination of the aquifer. In major part, Protestants' evidence reflected their position that UEC's baseline water quality determinations are skewed to represent poorer quality than actually exists, or existed prior to UEC's exploration drilling, for the self-serving purpose of allowing post-mining restoration to only the higher concentrations of contaminants. Protestants also relied on arguments and evidence presented in their analysis of the PAA.

### **3. OPIC**

OPIC supported the position of Protestants on this issue, contending that UEC's noncompliant exploration activities have caused artificially elevated levels of uranium and radium in the groundwater. Thus, OPIC concludes, UEC should not be allowed to benefit from its wrongdoing by not having to remediate to true baseline conditions and thereby save money. This position also addresses an issue relevant to the PAA and will be further considered in the analysis of that issue.

### **4. Executive Director**

The ED noted that groundwater quality data from the baseline wells is remarkably similar to the data from the AOR wells in the vicinity for all constituents with the exception of uranium and radium-226, which are significantly higher in the baseline wells. Based on this data and the high gamma-ray activity recorded in the baseline wells, the ED concluded that data from the analysis of the groundwater samples from the baseline wells is representative of the quality of water within the uranium-mineralized zones. The ED's position about the baseline groundwater analysis is further addressed in the analysis of the PAA.



**B. ALJ's Analysis**

For purposes of the Mine Application the ALJ finds that the application adequately describes the baseline groundwater conditions. The data shows concentrations of uranium and radium-226 substantially in excess of the drinking water standards and commercially suitable for *in situ* uranium mining. Conversely, as discussed in the analyses of Issue L and the PAA, the ALJ finds that UEC's proposal for restoration to baseline levels is too lenient.

**IX. ISSUE D**

**Does the application meet all applicable criteria of 30 TAC § 331.122, related to required consideration by the Commission prior to issuing a Class III Injection Well Area Permit?**

**Recommendation:**

**The Mine Application satisfies the requirements of 30 TAC § 331.122.**

**A. Parties' Arguments**

**1. UEC**

UEC provided a list of the items that the Commission is required to consider in its administrative and technical review before issuing an area permit, as well as the location of each item in the application.<sup>96</sup>

According to UEC, the Mine Application contains considerable information concerning both the baseline wells and the anticipated injection wells. Specifically, UEC pointed out that the Mine Application contains maps showing the proposed permit area,<sup>97</sup> the area of review,<sup>98</sup> the

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<sup>96</sup> 30 TAC § 331.122; UEC Ex. 6, Holmes Direct at 26-27, 57.

<sup>97</sup> See e.g., UEC Ex. 6, Holmes Direct, Ex. 13, Figure 1.4.

<sup>98</sup> *Id.*

location of the baseline (registered) wells,<sup>99</sup> an example diagram of a production area,<sup>100</sup> and information regarding the anticipated number of injection wells within each of the anticipated production areas<sup>101</sup> is also shown on various maps.<sup>102</sup> As Mr. Murry summarized, UEC provided a map showing the pattern of wells<sup>103</sup> and maps showing the areas of mineralization where “one would expect they are going to drill injection wells . . . .”<sup>104</sup> In other words, UEC argued that Mr. Murry was fully capable of considering the approximate locations of the proposed injection wells with the information provided in the Mine Application.

In response to Protestants’ contention that the reference to “all wells” in 30 TAC § 331.122(2)(B) includes plugged boreholes, UEC argued that exhibits provided by Protestants’ own witness, Dr. Bruce K. Darling, make it clear that once a borehole is plugged, it no longer meets the Chapter 331 definition of a well.

## 2. Protestants

No Protestant presented direct testimony concerning this issue. However at the hearing, Goliad County raised concern during the cross-examination of UEC’s witness Mr. Holmes that both UEC’s Mine Application and PAA-1 Application were signed and sealed by Harry Anthony, who did not testify at the hearing. Rather, Mr. Holmes presented the applications and he is neither a Registered Professional Engineer nor a Registered Geoscientist. However, Goliad County asserted that Mr. Holmes admitted that he actually prepared much of the applications. Goliad County contended that since no witness qualified to sign the applications testified in support of them, the applications are lacking truthfulness and accuracy.

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<sup>99</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Figure 5.1.

<sup>100</sup> *Id.* at Figure 9.4.

<sup>101</sup> *Id.* at 13.

<sup>102</sup> *Id.* at Figures 1.3 and 1.4.

<sup>103</sup> Tr., Vol. 6 at 1188-1189 (Murry).

<sup>104</sup> *Id.* at 1213-1214.

More specifically, Protestants challenged UEC's compliance with 30 TAC § 331.122(2)(A) and (B). Section 331.122(2)(A) requires the Commission to consider:

. . . a map showing the injection well(s) and area for which the permit is sought and the applicable area of review. Within the area of review, the map must show the number, or name, and location of all existing producing wells, injection wells, dry holes, surface bodies of water, mines (surface and subsurface), quarries, public water systems, water wells, and other pertinent surface features, including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be on this map. If production area authorizations are required prior to the commencement of mining, the proposed production areas must be shown on the map.

Protestants contended that UEC failed to provide a map showing: (1) injection wells and (2) proposed production areas. Protestants acknowledge that UEC's maps depict ore-bearing sands but claim there is a real difference between the identification of a production area and the identification of an ore-bearing sand.

Section 331(2)(B) requires the Commission to consider:

. . . a tabulation of reasonably available data on all wells within the area of review which penetrate the proposed injection zone. This data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and completion, and any additional information the executive director may require.

Protestants argued that the Mine Application violates this requirement by failing to identify the exploration bore holes at the site. As Protestants noted during the cross-examination of Mr. Holmes and Mr. Murry, a "well" is defined as "a bored, drilled or driven shaft whose depth is greater than its largest surface dimension."<sup>105</sup> According to Goliad County, the testimony is clear that exploration boreholes are drilled shafts whose depth is greater than its largest surface dimension, and that UEC did not include exploration boreholes as "penetrations" for purposes of 331.122(2)(B) even though these "wells" clearly penetrate the injection zone, given that they were designed to test the ore in these zones. None of these penetrations were

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<sup>105</sup> 30 TAC § 331.2(100)(Pre 2009 Rules); 30 TAC § 331.2(110) (Post 2009 Rules).

shown on a map. More than 1,000 exploration boreholes – *i.e.* wells - have been drilled within the permit area and penetrate the injection zone, yet they were ignored by UEC.

### **3. OPIC**

OPIC did not address this issue.

### **4. Executive Director**

The ED argued that he has never required an application to show the exact locations of every future injection well. Rather, TCEQ rules contemplate an area permit's authorization for yet-to-be-established injection wells.<sup>106</sup> Further, the ED has never required information regarding locations of plugged boreholes because the ED has not interpreted the term “well” to include plugged boreholes.

## **B. ALJ's Analysis**

The ALJ agrees with UEC and the ED that the Mine Application satisfies the criteria of 30 TAC § 331.122. The ALJ reaches this conclusion after considering: (1) the specific descriptions in 30 TAC § 331.122 of the factors that the Commission is required to consider; (2) UEC's description of the information that it provided; and (3) the ED's interpretation of the rule as not requiring the exact location of every future injection well, or the locations of plugged boreholes. Conversely, the ALJ finds Protestants' interpretation of the required criteria unpersuasive.

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<sup>106</sup> Under 30 TAC § 331.7(b), for Class III *in situ* uranium solution wells, an area permit authorizing more than one well may be issued for a defined permit area in which wells of similar design are proposed. Under 30 TAC § 305.154(b), the area permit may authorize the future construction and operation of additional wells within the permit area.

## X. ISSUE E

**Has the Applicant demonstrated that the proposed exempted aquifer meets the applicable criteria of 30 TAC § 331.13?**

### **Recommendation:**

**UEC has demonstrated that the proposed exempted aquifer meets the criteria of 30 TAC § 331.13**

### **A. Parties' Arguments**

#### **1. UEC**

UEC stated that for a portion of an aquifer to be exempted, 30 TAC § 331.13 requires that the portion of the aquifer: (1) not currently serve as a source of drinking water for human consumption; and (2) will not in the future serve as a source of drinking water for human consumption for one or more specified reasons.<sup>107</sup> The reasons include that the aquifer is mineral-bearing with production capability, or it is so contaminated that it is economically or technologically impractical to render the water fit for human consumption.<sup>108</sup> UEC contends that for purposes of this hearing, these are the only applicable criteria.

UEC argued that its direct testimony showed that its request for an aquifer exemption meets the above criteria and was properly delineated.<sup>109</sup> With respect to the first requirement, Figures 1.4 and 4.1 in the Mine Application show that there are no drinking water wells within the proposed aquifer exemption area.<sup>110</sup> The one well that is located within this area supplies a stock tank.<sup>111</sup> Regarding the second requirement, the Mine Application contains a description of

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<sup>107</sup> 30 TAC § 331.13(c)(1), (2).

<sup>108</sup> 30 TAC § 331.13(c)(2)(A), (C).

<sup>109</sup> UEC Ex. 6, Holmes Direct, Ex. 10 at 2 (stating, as part of the Technical Summary “. . . as required under § 305.49(a)(9), UEC has delineated and requested and aquifer exemption . . .”).

<sup>110</sup> UEC Ex. 6, Holmes Direct, Ex. 13.

<sup>111</sup> UEC Ex. 6, Holmes Direct, Ex. 12 at 49, Response 71; *see also*, Goliad County Ex. 1, Clark Direct at 30.

UEC's exploration program<sup>112</sup> that lead to the identification of uranium mineralization<sup>113</sup> and commercial grade ore deposits within the proposed aquifer exemption area.<sup>114</sup>

UEC asserted that Dr. Galloway testified the delineation of commercial quantities of uranium depends on a number of factors, including grade, quantity, depth, and market prices.<sup>115</sup> UEC completed wells in locations where, based on exploration results, ore is thought to exist.<sup>116</sup> The gamma logs for these wells, which are included in the Mine Application, indicate, among other things, the concentration and depth of mineralization in these areas.<sup>117</sup> In addition, the water quality data included in the Mine Application further supports the conclusion that the four sands identified within the proposed aquifer exemption boundary contain commercial quantities of uranium. Specifically, as Dr. Galloway and Dr. Bennett testified, under natural conditions, uranium deposits have a significant impact on water quality.<sup>118</sup> Consequently, water quality results are used as a uranium exploration tool.<sup>119</sup> UEC argued in this case, the high levels of uranium and radium-226 in the water quality results<sup>120</sup> support UEC's conclusion regarding production potential and provide an additional basis for why the groundwater within the proposed aquifer exemption area will not be used for human drinking water in the future.<sup>121</sup>

UEC further argued that exhibits submitted by two of Goliad County's witnesses also illustrate UEC's successful identification of ore within the proposed aquifer exemption area. For instance, Dr. Clark's Exhibit 4 provides a three-dimensional picture of UEC's exploration effort

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<sup>112</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at viiii.

<sup>113</sup> UEC Ex. 6, Holmes Direct, Ex. 12 at 40, Response 58.

<sup>114</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 5-10.

<sup>115</sup> UEC Ex. 1, Galloway Direct at 15-16.

<sup>116</sup> UEC Ex. 6, Holmes Direct at 37-38.

<sup>117</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Appendix B.

<sup>118</sup> UEC Ex. 1, Galloway Direct at 25-26; UEC Ex. 10, Bennett Direct at 33.

<sup>119</sup> UEC Ex. 1, Galloway Direct at 26.

<sup>120</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Table 5.4 and Appendix A, Laboratory Reports on Water Quality.

<sup>121</sup> UEC Ex. 6, Holmes Direct, Ex. 12 at 49, Response 71; *see also*, ED Ex. ED-7 at 2.

showing “boreholes, sands, clays [blue] and ore.”<sup>122</sup> Likewise, Dr. Sass included an exhibit that details the ore bodies in Sand B, focusing on the proposed production area.<sup>123</sup> UEC concluded that there is ample evidence in the record to show that UEC has met the relevant tests under 30 TAC § 331.13.

Goliad County contended that UEC failed to satisfy the requirement of 30 TAC § 305.49(a)(9) which requires “a complete delineation by a licensed professional geoscientist or a licensed professional engineer of any aquifer or portion of an aquifer for which exempt status is sought,”<sup>124</sup> because Mr. Holmes, who is not a geoscientist or engineer, prepared the map showing the plan view boundaries of the proposed aquifer exemption area.<sup>125</sup> UEC responded that Mr. Holmes did not prepare the map of the proposed aquifer exemption area on his own. As Mr. Holmes testified, “[f]irst, UEC geologists identified the uranium ore bodies. Once the area of the initial production zones was fairly well delineated, an aquifer exemption boundary was then defined.”<sup>126</sup> And as described in the Mine Application, “[t]he extent of the aquifer exemption is shown on all of the cross-sections that are part of the Mine Application,<sup>127</sup> and each of these cross-sections was individually sealed by a professional geoscientist. Mr. Holmes further testified that geologists also identified the lateral extent of the proposed aquifer exemption since the “boundary tightly conforms to the footprint of the four initial proposed production areas.”<sup>128</sup> Moreover, UEC asserted that Mr. Holmes made it clear that Mr. Anthony, who is a licensed professional engineer and who signed and sealed the Mine Application technical report, worked with Mr. Holmes and had the final say in the location of the proposed aquifer exemption boundary.<sup>129</sup> According to UEC, for Protestants to imply that this regulatory

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<sup>122</sup> Goliad County Ex. 1, Clark Direct, Ex. 4.

<sup>123</sup> Goliad County Ex. 3, Sass Direct, Ex. 6.

<sup>124</sup> 30 TAC § 305.49(a)(9).

<sup>125</sup> Tr., Vol. 2 at 294-300 (Holmes).

<sup>126</sup> UEC Ex. 6, Holmes Direct at 58.

<sup>127</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 14-1.

<sup>128</sup> UEC Ex. 6, Holmes Direct at 58-59; Tr., Vol 2 at 467 (Holmes).

<sup>129</sup> Tr., Vol. 2 at 468 and 505 (Holmes).

requirement has not been met because a geoscientist or engineer did not give the instruction to put the outline on the map is taking the regulatory requirement to a ridiculous extreme.

No party disputed that there are no wells used for human consumption located within the proposed aquifer exemption boundary. Although Goliad County's witness Dr. Clark agreed that this rule requirement was met,<sup>130</sup> he postulated that a proposed exemption area "currently" serves as a source of water for human consumption if it is "hydraulically connected" to any well outside the exemption area used for human consumption. But, the District's witness, Mr. Blandford, did not share Dr. Clark's meaning of "currently," relying instead on his interpretation of the "source" of drinking water to conclude that the source of the water at the two Braquet wells (*i.e.*, outside the proposed aquifer exemption area) is from a portion of the aquifer up-gradient of the two wells (*i.e.*, within the proposed aquifer exemption area) that will reach the Braquet wells within about two years.<sup>131</sup>

## **2. Protestants**

Protestants' evidence and arguments are sufficiently summarized above.

## **3. OPIC**

OPIC did not address this issue.

## **4. Executive Director**

Mr. Murry testified that he determined that there are no water wells providing water for human consumption within the area proposed for designation for the aquifer exemption. He further testified that UEC demonstrated that the proposed exempted aquifer is mineral-bearing with production capability. In addition, the groundwater in the proposed exempted aquifer is

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<sup>130</sup> Goliad County Ex. 1, Clark Direct at 30.

<sup>131</sup> District Ex. 3, Blandford Direct at 12.



contaminated due to the uranium mineralization such that it would be economically or technologically impractical to tender the water fit for human consumption.<sup>132</sup> Thus, according to the ED, the proposed exempted aquifer meets the requirements of 30 TAC § 331.13(1) and (2)(A) and (C) for designation as an exempt aquifer.

**B. ALJ's Analysis**

The evidence clearly shows that there are no water wells that are used for human consumption within the proposed aquifer exemption area. Protestants do not dispute this fact. But their expert witnesses, Dr. Clark and Mr. Blandford argued, for slightly different reasons that the exemption area currently serves as a source of drinking water for human consumption because wells outside the exemption area and down-gradient will at some future time receive water from within the exemption area. UEC and the ED responded to this argument that Protestants ignore the word "currently" because a well outside the exemption area can obtain water from the proposed exempted aquifer only at some time in the future. Goliad County criticized this interpretation as self-serving and nonsensical. The District characterized this interpretation as gerrymandering.

Considering the positions of Dr. Clark and Mr. Blandford in light of the plain language of 30 TAC § 331.13(c)(1), it appears to the ALJ that it is Protestants' experts that are being self-serving and gerrymandering with their theories of hydraulic connection and meaning of the word "source." Moreover, it is undisputed that UEC has demonstrated satisfaction of the second prong of the aquifer exemption demonstration that the area of the exempted aquifer is uranium-bearing with production capability. The ALJ finds that the preponderance of the evidence supports the conclusion the UEC has demonstrated that the proposed exempted aquifer meets the applicable criteria of 30 TAC § 331.13. This finding is further supported by the holding in *Western Nebraska Resources Council v. United States Environmental Protection Agency*,<sup>133</sup> cited by the ED.

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<sup>132</sup> ED Ex. ED-1, Murry Direct at 8.

<sup>133</sup> 943 F.2d 867, 870 (8<sup>th</sup> Cir. 1991).

## XI. ISSUE F

**Is the application sufficiently protective of groundwater quality?**

**Recommendation:**

**Until the issue of the transmissivity of the Northwest Fault is resolved, the ALJ concludes that the application may not be sufficiently protective of groundwater quality.**

**A. Parties' Arguments**

**UEC**

UEC relied on the evidence and arguments presented with respect to Issues L and R.

**2. Protestants**

Protestants likewise relied on the evidence and arguments presented with respect to Issues G, H, L, S, and T.

**3. OPIC**

OPIC relied on its arguments concerning Issue C and concluded that since UEC's Mine Application does not adequately and accurately describe baseline groundwater conditions, it logically follows that the application is not sufficiently protective of groundwater quality. OPIC argued that because UEC's noncompliant exploration activities degraded the groundwater at the site its post-mining restoration obligation is based on a baseline that does not represent the groundwater quality that existed prior to its noncompliant exploration activities. OPIC contended that the application should seek to restore groundwater quality to conditions that existed before the conduct of any UEC activity, but UEC's application does not do that.

Therefore, OPIC contended, the application is not sufficiently protective of groundwater quality.<sup>134</sup>

#### 4. Executive Director

The ED pointed out that UEC will be required to protect groundwater outside the area that it proposes to mine using *in situ* techniques. In accordance with 30 TAC § 331.102, UEC will be required to:

- Identify existing wells that could serve as a conduit for mining solutions to move outside the production zone or the production area (30 TAC § 331.42);
- Construct wells in accordance with construction requirements (30 TAC § 331.82);
- Maintain mechanical integrity of all Class III wells (30 TAC § 331.4);
- Implement corrective action standards to prevent or correct pollution of a USDW (30 TAC § 331.44);
- Obtain Executive Director approval of construction and completion of wells (30 TAC § 331.45);
- Operate wells in accordance with operation requirements (30 TAC § 331.83);
- Monitor wells in accordance with monitoring requirements (30 TAC § 331.84);
- Submit reports in accordance with reporting requirements (30 TAC § 331.85); and
- Close wells in accordance with a plugging and abandonment plan in a manner which will not allow the movement of fluids through the well, out of the injection zone, or to the land surface (30 TAC §§ 331.46 and 331.86).

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<sup>134</sup> OPIC Closing Argument at 10.

Additionally, when making a decision to approve or deny a request for a Class III injection well permit, the ED takes into consideration all the factors detailed in 30 TAC § 331.122:

- All injection wells, dry holes, surface water bodies, quarries, public water systems, private water wells, and faults in the area of review;
- All data reasonably available on all wells in the area of review;
- Vertical and lateral limits of USDWs in the area of review;
- Maps and cross sections illustrating regional geology;
- Proposed operating data;
- Proposed formation testing program;
- Proposed stimulation program;
- Proposed operation and injection procedure;
- Engineering drawings of surface and subsurface construction details of the system;
- Plans for meeting minimum monitoring requirements;
- Expected changes in pressure, fluid displacement, direction of movement of injected fluid;
- Contingency plans to cope with all shut-ins or well failures;
- Corrective action procedures;
- Adequacy of financial assurance;
- Closure plan; and
- Other information reasonably required by the executive director.

The ED further pointed out that in addition to the requirements of the rules, the permit will require UEC to regularly test groundwater samples from monitor wells. The draft permit requires water samples to be taken at least twice each month at two-week intervals from all

monitor wells. The samples must be analyzed for specific control parameters.<sup>135</sup> Additional provisions require that samples are taken, preserved, and analyzed in a manner that will yield valid results.<sup>136</sup> If an excursion is detected, monitoring frequency must increase.<sup>137</sup> These monitoring requirements are designed to ensure that there are no excursions of mining fluid that could contaminate water outside the production zone. If an excursion is detected, then the monitors will allow UEC to detect it quickly and to take immediate action to stop the excursion, as required by the rules.<sup>138</sup>

The ED explained that UEC will use a one percent bleed as its primary method of protecting groundwater from pollution.<sup>139</sup> That means, UEC will remove one percent more fluid from the ground than it injects, creating a “cone of depression” toward the extraction wells. According to the ED, this is a proven method of preventing migration of fluids outside the production zone, thus protecting groundwater quality outside the production zone.

For these reasons, the ED concluded that UEC’s Mine Application is sufficiently protective of groundwater quality.<sup>140</sup>

## **B. ALJ’s Analysis**

The ALJ adopts the analyses of Issues G and R below without reiteration here.

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<sup>135</sup> ED Ex. ED-6, Draft Permit, Section V.G.1.

<sup>136</sup> ED Ex. ED-6, Draft Permit, Section V.F.

<sup>137</sup> *Id.* at Section V.G.2.

<sup>138</sup> 30 TAC § 331.106.

<sup>139</sup> UEC Ex. 6, Holmes, Ex. 13, Class III UIC application at 9.

<sup>140</sup> ED Post-hearing Brief at 12-14.

## XII. ISSUE G

**Does the application adequately characterize and describe the geology and hydrology in the proposed permit area, including fault lines, under the applicable rules?**

### **Recommendation:**

**Although the application characterizes and describes the geology and hydrology in the proposed permit area, including fault lines, the testimony of the witness for the ED raised questions about the adequacy of that information. The Commission's action on the application should not be completed until these questions are resolved within the record.**

### **A. Parties' Arguments**

#### **1. UEC**

UEC argued that this issue was examined to the satisfaction of the ED's staff,<sup>141</sup> as shown by a written declaration by the ED that UEC has "provided all application requirements relating to groundwater movement."<sup>142</sup> UEC provided a detailed description of the geology and hydrology in the proposed Mine Permit Area<sup>143</sup> and in the region.<sup>144</sup> These details included cross-sections<sup>145</sup> and potentiometric surface maps—within each sand and for the region—that show the direction of groundwater flow.

#### **2. Protestants**

Goliad County challenged the adequacy of UEC's efforts in describing this same set of data and asserted that UEC had "barely begun" the process. Goliad County complained that

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<sup>141</sup> See e.g., ED Ex. ED-2 (detailing Mr. Murry's experience).

<sup>142</sup> ED Ex. 10 at 20, Response 25.

<sup>143</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Chapters 6 and 7.

<sup>144</sup> UEC Ex. 1, Galloway Direct at 26-35.

<sup>145</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Appendix C.

UEC's application failed in two important ways. First, it argued that UEC failed to determine the number, location, or permeability of the faults within the geologic and hydrologic structures in which UEC proposes to begin mining operations. According to Goliad County, the absence of this information created a major uncertainty about the impacts that the faults will have on mining if the ore-bearing sands are to be mined in compliance with the rules. These failures relate to whether the Northwest Fault is a barrier to groundwater flow. On this score, Goliad County had two complaints: (1) UEC failed to provide important hydrology testing information to one of its primary expert witnesses, Dr. Bennett, and (2) UEC misrepresented the Northwest Fault as "sealing."

Second, Goliad County complained that UEC's information was insufficient to allow an expert to reach proper or accurate conclusions about the direction and speed of local groundwater flow at the proposed project site. Goliad County cited to apparently conflicting data, including data that it characterized as showing that the same groundwater flows in opposite directions and at different rates of flow. The sources of these inconsistent data, according to Goliad County, were UEC's application<sup>146</sup> and the testimony of one of UEC's expert witnesses.<sup>147</sup>

The District's critique of this issue focused on some of these same points. To these, the District added allegations about UEC's failure to properly document a group of abandoned boreholes within the Class III permit site or to provide data about the potential for vertical hydrologic permeability of the confining layers of the aquifer sands. The abandoned boreholes were a potential problem, according to the District, because UEC failed to provide information in the application about the boreholes' status as plugged or unplugged, the depth to which they may have been plugged, the manner in which they may have been plugged, and similarly detailed considerations. The District's concern was that the abandoned boreholes constituted "likely pathways" through which the uranium-bearing lixiviant could spread within the confining layers of the aquifer sands.

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<sup>146</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 6-14.

<sup>147</sup> UEC Ex. 8, Kelley Direct at 1.

In addition, the District's concerns included the natural permeability of the confining layers that separate Sands A, B, and C. That concern was prompted by, among other gaps that the District alleged as existing in the data, the duration of the pump test upon which UEC's experts based their conclusions that the confining layers were impermeable.

### **3. OPIC**

OPIC did not address the issue.

### **4. Executive Director**

The four sentences of the ED's closing argument on this issue stated that the ED had reviewed the evidence and concluded that UEC had included all of the information required by the applicable rules.

## **B. ALJ'S ANALYSIS**

The applicable rules require that the Commission consider a list of several dozen types of information before the Commission may issue a Class III injection well or area permit.<sup>148</sup> Among them is the requirement that the applicant include a map showing the injection wells and the area for which the permit is sought and the applicable area of review. The information on the map must include:

. . . the number, or name, and location of all existing producing wells, injection wells, dry holes, surface bodies of water, mines (surface and subsurface), quarries, public water systems, water wells, and other pertinent surface features, including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be on this map. If production area authorizations are required prior to the commencement of mining, the proposed production areas must be shown on the map;<sup>149</sup>

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<sup>148</sup> 30 TAC § 331.122.

<sup>149</sup> 30 TAC § 331.122(2)(A).



and

. . . a tabulation of reasonably available data on all wells within the area of review which penetrate the proposed injection zone. This data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and completion, and any additional information the executive director may require . . . .<sup>150</sup>

In addition to the specific information listed, the rule also requires that the Commission consider any additional information that the ED may reasonably require for the evaluation of the application.<sup>151</sup>

The statutory basis for the rule is TEX. WATER CODE § 27.051(a). Before the Commission may authorize a mining operation by injection of pollutants into an aquifer, the law requires that the Commission review all of the information available to ensure that the use or installation of an injection well is in the public interest and that, with proper safeguards, both ground and surface fresh water can be adequately protected from pollution.<sup>152</sup> In adopting and implementing the rule, the Commission stated that its practices

shall be consistent with the policy of this state to: *maintain the quality of fresh water in the state* to the extent consistent with the public health and welfare and the operation of existing industries, taking into consideration the economic development of the state; *prevent underground injection that may pollute fresh water*; and require the use of all reasonable methods to implement this policy.<sup>153</sup>

In response to these requirements, UEC's expert witnesses presented a wealth of information about the geology and hydrology of the area, including the areas within and surrounding the proposed mine site. That information was challenged by the Protestants' expert witnesses and evaluated by the ED. The Protestants' challenges defined the parts of the issues that received the greatest amount of attention during the hearing. Among these, the issue of the

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<sup>150</sup> 30 TAC § 331.122(2)(B).

<sup>151</sup> 30 TAC § 331.122(5).

<sup>152</sup> TEX. WATER CODE § 27.051(a)(1) & (3).

<sup>153</sup> 30 TAC § 331.1(a).

faults takes precedence in this analysis, particularly their number, location, and permeability/transmissivity.

## 1. Number

The preponderance of the evidence was that two faults exist within the proposed mine permit area: the Northwest Fault and the Southwest Fault.<sup>154</sup> The Northwest Fault is the larger of the two and runs along the northwest portion of the proposed mine site, near the perimeter of proposed production areas A and C and very near the perimeter of D.<sup>155</sup> The Southeast Fault transects only a small part of the southeast corner of the proposed mine permit site and touches none of the proposed production areas. Because of the Southeast Fault's relative lack of involvement in the mining operations, the ALJ does not consider it further in this analysis.

## 2. Location

Goliad County challenged UEC's assertion of the precise location of the Northwest Fault. Goliad County's challenge was based in part on the testimony of UEC's witness, Mr. Holmes, who referred to the fault as a "system" of faults.<sup>156</sup> Goliad County's complaint was that a system of faults suggests that the Northwest Fault has multiple elements rather than a single, mappable feature. This assertion, that more information is needed to precisely locate the fault, is undoubtedly true. But, the question for this proceeding is whether the information is sufficient for the purposes of granting or denying an injection well permit.

The part of the rule that requires the location of the Northwest Fault also requires that faults, "known or suspected," must be mapped and that only information ". . . of public record . . ." is required to be included on the map.<sup>157</sup> Dr. Bennett and his colleagues in the

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<sup>154</sup> UEC Ex. 1, Galloway Direct at 28.

<sup>155</sup> UEC Ex. 6, Holmes Direct, Ex. 3.

<sup>156</sup> Tr., Vol. 2 at 422 (Holmes).

<sup>157</sup> 30 TAC § 331.122(2)(A).

lineup of UEC experts were able to rely on public information about the stratigraphic offset of correlative beds as shown by the cross-sections of the local geology. Goliad County's questions raised questions about the accuracy and reliability of that information. But, neither the questions nor the evidence provided by Protestants were sufficient to overcome UEC's evidence on that point.

### 3. Permeability/transmissivity

The permeability or transmissive character of the Northwest Fault was addressed by UEC's expert witness, Dr. Bennett, among others. Dr. Bennett testified that the fault is "sealed." The meaning of and basis for that conclusion was a four-hour pump test, and Dr. Bennett's direct testimony about the test was summarized nicely in these few sentences:

During the NW Fault Pump Tests, when a well on one side of the fault was pumped, there was no response at all in the observation well located in the same sand but on the opposite side of the fault, and there was also no response in observation wells on the same side of the fault but in different sands. These tests thus show that the Northwest Fault is sealed with respect to both vertical and horizontal fluid movement.<sup>158</sup>

On cross-examination, Dr. Bennett acknowledged the existence of another pump test, a 24-hour test that he had not reviewed because he had been unaware of its existence.<sup>159</sup> About this test, Dr. Bennett testified that he would want to evaluate its results further.<sup>160</sup> Moreover, Dr. Bennett attributed the confusing nature of the data to a potentially malfunctioning electronic

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<sup>158</sup> UEC Ex. 10, Bennett Direct at 37.

<sup>159</sup> Goliad County Cross Ex. 18. After the hearing, UEC sought to offer post-hearing evidence that Dr. Bennett had received the results of the 24-hour pump test. This was not evidence adduced at the hearing and will not be considered. Further, the issue was not whether UEC had sent the information but whether Mr. Bennett had reviewed it.

<sup>160</sup> Tr., Vol. 4 at 913 (Bennett).

component in the testing equipment<sup>161</sup> or to the test conductor's unfamiliarity with the proper use of the equipment.<sup>162</sup>

During this same line of cross-examination of Dr. Bennett, he was asked to evaluate the effect of the test on wells that were on the same side of the fault. Dr. Bennett testified that the response was what he would have expected: a dramatic response. When Dr. Bennett was asked to evaluate well responses on the opposite side of the fault, but with responses registered at one-tenth of the magnitude of the response in the original question, he testified that he believed the evidence signified the presence of "noise."<sup>163</sup>

But, Mr. Murry, the ED's witness and a licensed professional geoscientist,<sup>164</sup> hazarded a different interpretation of the 24-hour pump test. He concluded that the test showed communication between the sands on the opposite sides of the Northwest Fault—a hydraulic response on one side of the fault following the pumping of water on the other side.<sup>165</sup> Although Mr. Murry testified that the graphed test results were "messy," he gave an unqualified "yes" to Goliad County's cross-examination question:

Q. So your testimony, from looking at that graphic is it shows communication, hydraulic communication, hydraulic connectivity, across the fault because the pumper was down-dip and the response was on the other side of the fault up-dip, correct?

A. Yes.<sup>166</sup>

UEC sought to dismiss the importance of this evidence on the basis that Mr. Murry had qualified his statement based on the "messiness" of the graph and on his having had only a few

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<sup>161</sup> Tr., Vol. 4 at 910 (Bennett). "So I would -- I understand what you're trying to show me here, Counselor, but the reality of it is that I would not look at this data until I troubleshot the transducer."

<sup>162</sup> *Id.*

<sup>163</sup> Tr., Vol. 4 at 913 (Bennett).

<sup>164</sup> ED Ex. ED-2 at 1.

<sup>165</sup> Tr., Vol. 7 at 89 (Murry).

<sup>166</sup> Tr., Vol. 7 at 89-90 (Murry).

seconds to evaluate the data. These criticisms, while accurate, did not contradict Mr. Murry's testimony. Counsel gave Mr. Murry the opportunity to re-examine his testimony; he did; and he reconfirmed it. He could not explain why the test had not been provided to him by UEC, particularly in light of a rule that obligated UEC to provide contradictory information to him.

The question is how to resolve the incongruity between: (1) Dr. Bennett's suspicion that the data was meaningless, and (2) Mr. Murry's previously unformed but presently unqualified testimony that the data—although messy—showed transmissivity.

The issue here is not the credibility of the witnesses. Each is an expert in his field, and each has reviewed many pump tests in the course of his career. The ALJ believes that the better answer may be to conduct a pump test with equipment that is known to be operating properly, conducted by a testing official who is known to be familiar with the use of the equipment, and performed on wells in the same sand on the opposite sides of the same fault. If nothing else, the test would eliminate some of the unknowns. The record could be reopened for the limited purpose of admitting the pump test evidence, and the parties given the option to conduct or waive cross-examination. Further, the additional pump test would come within the authority of the Commission to review all of the information available.<sup>167</sup>

If the reopening of the record is not an acceptable option, then the ALJ must treat the 24-hour pump tests as some evidence of transmissivity across the fault. Although the Commission's rules encourage the development of industry, the rule also is designed to “. . . *prevent* underground injection that *may pollute* fresh water . . . .”<sup>168</sup> This is some evidence that the underground injection may pollute the fresh water resources of the state, for which underground injection must be prevented.

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<sup>167</sup> TEX. WATER CODE § 27.051(a)(1) & (3).

<sup>168</sup> 30 TAC § 331.1(a).

### **XIII. ISSUE H**

**Do the geologic and hydraulic properties of the proposed permit area indicate that the Applicant will be able to comply with rule requirements?**

**Recommendation:**

**The geologic and hydraulic properties of the proposed permit area were addressed in the discussion of Issue G. The recommendation about Issue G applies to Issue H.**

**A. Parties' Arguments**

The parties' arguments on this issue were substantially the same as the arguments presented for Issue G.

**B. ALJ's Analysis**

The ALJ's analysis of this issue is substantially the same as that for Issue G which is adopted without further reiteration here.

### **XIV. ISSUE I**

**Does the Applicant meet the applicable requirements for financial assurance under Texas Water Code §§ 27.051, 27.073, and 30 TAC Chapters 37 and 331?**

**Recommendation:**

**UEC satisfies the requirements for financial assurance under TEX. WATER CODE §§ 27.051 and 27.073, and 30 TAC chs. 37 and 331.**

**A. Parties' Arguments**

**1. UEC**

UEC provided the following summary of these statutory and regulatory financial assurance requirements specific to underground injection control wells.

UEC contended that the applicable portion of TEX. WATER CODE § 27.051 provides that a permit may be issued if the commission finds that the applicant has made a satisfactory showing of financial responsibility if such showing is required by TEX. WATER CODE § 27.073.<sup>169</sup> Section 27.073 requires a person to whom an *in situ* uranium mining injection, monitoring, or production well permit is issued to maintain financial security to ensure that each abandoned well is properly plugged.<sup>170</sup> Chapter 37 of the TCEQ rules addresses both general requirements for financial assurance<sup>171</sup> and specific requirements for underground injection control wells.<sup>172</sup> In addition to including acceptable forms of financial assurance and the timing of the provision of financial assurance, 30 TAC § 37.7021 requires compliance with 30 TAC § 331.143.<sup>173</sup>

UEC argued that 30 TAC § 331.143 is central to the financial assurance requirements for mine permits.<sup>174</sup> The applicable portions of § 331.143 require (a) the preparation of a written cost estimate of plugging the wells;<sup>175</sup> (b) that this cost estimate take into account all applicable costs and be kept at the facility for the life of the project;<sup>176</sup> and (c) that this cost estimate be reviewed and updated as necessary on an annual basis, including adjustments for inflation.<sup>177</sup> Section 331.143 incorporates by reference the requirements listed in 30 TAC §§ 331.46 and 331.86.<sup>178</sup>

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<sup>169</sup> TEX. WATER CODE ANN. § 27.051(a)(4) (Vernon Supp. 2009).

<sup>170</sup> *Id.* at § 27.073(a-1).

<sup>171</sup> 30 TAC Chapter 37, Subchapters A-D.

<sup>172</sup> 30 TAC §§ 37.7001-37.7051.

<sup>173</sup> 30 TAC § 37.7021.

<sup>174</sup> *See e.g.*, 30 TAC § 331.142(a) (pointing to § 331.143 for the determination of the amount of financial assurance required for Class III well permits).

<sup>175</sup> 30 TAC § 331.143(a)(1).

<sup>176</sup> 30 TAC § 331.143(b), (c).

<sup>177</sup> 30 TAC §§ 331.143(d), 37.131.

<sup>178</sup> 30 TAC § 331.143(b)(1).

UEC explained that the applicable portions of 30 TAC § 331.46 contain requirements that well plugs shall not allow the movement of fluids through the wells, out of the injection zone, or to the land surface and shall consist of cement or an equally protective material;<sup>179</sup> closure plans must demonstrate that no movement of contaminants that will cause pollution from the production zone into a USDW will occur;<sup>180</sup> and lists factors for consideration in determining the adequacy of plugging and abandonment plans.<sup>181</sup>

Although 30 TAC § 331.46 concerns the closure standards and plan, 30 TAC § 331.86 lays out the timeframe for effectuating plugging and abandonment and requires written acknowledgment from the ED after the fact.<sup>182</sup> UEC asserted that financial assurance cannot be released without the written approval of the ED.<sup>183</sup>

UEC noted that 30 TAC § 331.143(a)(1) specifies that a written cost estimate must be prepared for “plugging the well(s) in accordance with the plugging and abandonment plan as specified in this chapter.” Accordingly, Chapter 13 of UEC’s Mine Application sets out a total preliminary estimated cost of \$633,470 for the plugging of the wells in the four planned production areas.<sup>184</sup> The estimate was derived by multiplying the total estimated footage for all wells by a cost per foot that reflects all costs, *i.e.*, labor, equipment, per diem, and materials, and specifies that the plugging material will be cement.<sup>185</sup> In addition, the Mine Application contains a description of the plugging method—cementing from bottom to top—that will be used to ensure that there will be no movement of fluid through the wells after abandonment,<sup>186</sup> and a description of the restoration process that will ensure that no movement of contaminants will

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<sup>179</sup> 30 TAC § 331.46(e).

<sup>180</sup> 30 TAC § 331.46(j).

<sup>181</sup> 30 TAC § 331.46(k).

<sup>182</sup> 30 TAC § 331.86.

<sup>183</sup> 30 TAC § 331.144.

<sup>184</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 13.

<sup>185</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 8-13.

<sup>186</sup> *Id.* at 8-13.



move from the production zone into a USDW.<sup>187</sup> Finally, the Mine Application contains a commitment that UEC will follow the requirements of § 331.86 in plugging the wells.<sup>188</sup>

UEC further noted that after reviewing the information contained in the Mine Application—including the information relating to financial assurance—the ED declared the Mine Application both administratively and technically complete.<sup>189</sup> UEC further pointed out that neither of the Protestants presented any evidence about UEC’s compliance with the financial assurance requirements. The Protestants contended in their briefs that UEC failed to meet the regulatory requirement for financial assurance. In response, UEC asserted that the District’s argument reveals a complete lack of understanding of the regulations and that Goliad County’s argument is based on a mischaracterization of the regulations. For example, the District complained that there is “no evidence” regarding various details related to UEC’s financial assurance and that numerous questions, therefore, remain unanswered. The District contended that UEC should have provided evidence establishing: 1) the rating of the bond company that would issue any surety bond used to establish financial assurance, and whether or not such company is in receivership; 2) the identity of the institution that would serve as the trustee of any trust that may be used to establish financial assurance, and the terms of any such trust; and 3) whether or not the financial institution that would issue any letter of credit used to establish financial assurance is federally insured and subject to government regulation, and whether or not such institution is in receivership.<sup>190</sup>

UEC argued in response that even a cursory review of Chapter 37 of the TCEQ rules reveals that none of these issues is unsettled. UEC explained that if it provides financial assurance by way of a surety bond, it must comply with 30 TAC § 37.211. That rule provides that the wording of the surety bond “must be *identical* to the wording specified” in 30 TAC

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<sup>187</sup> *Id.* at 12.

<sup>188</sup> *Id.* at 8-13.

<sup>189</sup> ED Ex. ED-1, Murry Direct at 5-7.

<sup>190</sup> District Closing Argument, Part II.I at 46.

§ 37.321<sup>191</sup> and that the bond must “be among those listed as acceptable sureties on federal bonds in Circular 570 of the United States Department of Treasury.”<sup>192</sup> Circular 570 contains a list of the surety companies that the U.S. Department of Treasury has determined are qualified to write bonds required by the federal government.<sup>193</sup> To include a surety company on this list, the Secretary of the Treasury must determine that the company “is solvent and financially and otherwise qualified” to issue bonds and that it “is able to keep and perform its contracts.”<sup>194</sup>

UEC contended that likewise, if it UEC provides financial assurance by way of a trust, it must comply with 30 TAC § 37.201. That rule specifies that the trustee must be an entity whose trust operations are regulated and examined by a federal or state agency, and that the “wording of the trust agreement must be identical to the wording specified” in Section 37.301(a).<sup>195</sup> Lastly, if UEC provides financial assurance by way of a letter of credit, it must comply with Section 37.231. That rule specifies that the letter of credit must be an issued by a financial institution whose operations are regulated and examined by a federal or state agency and that the “wording of the irrevocable standby letter of credit must be identical to the wording specified” in 30 TAC § 37.331.<sup>196</sup>

UEC pointed out that in addition, 30 TAC § 37.71 provides that if the trustee or issuing institution is placed into bankruptcy or otherwise has its authority to serve in its role revoked or suspended, the mining company “shall be deemed to be without the required financial assurance

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<sup>191</sup> 30 TAC § 37.211(c); *see also*, 30 TAC § 37.321 (setting forth the verbatim wording of the surety bond); 30 TAC § 37.21 (providing that “[t]he mechanisms submitted for compliance with this chapter must be worded as they appear in Subchapter D or G of this chapter (relating to Wording of the Mechanisms for Closure, Post Closure, and Corrective Action or Wording of the Mechanisms for Liability)).

<sup>192</sup> 30 TAC 37.211(b).

<sup>193</sup> 31 CFR § 223.16; *see*, 31 U.S.C. §§ 9304-9305.

<sup>194</sup> 31 CFR § 223.3; *see*, 31 U.S.C. § 9305 (providing that, for a company to be authorized to issue a bond required by federal law, the Secretary of the Treasury must have determined that the company has a certain amount of paid-up capital and is able to carry out its contracts.); *see also*, 31 CFR §§ 223.9 & 223.15 (setting forth criteria for the Secretary of Treasury’s valuation of the company’s assets and determination of the company’s rating).

<sup>195</sup> 30 TAC § 37.201(b)-(c); *see also*, 30 TAC § 37.301(a) (setting forth the verbatim wording of the trust agreement); 30 TAC § 37.321.

<sup>196</sup> 30 TAC § 37.231(b)-(c); *see also*, 30 TAC § 37.331 (setting forth the verbatim wording of the letter of credit); 30 TAC § 37.321.

coverage” and “must establish other acceptable financial assurance within 60 days after such an event.”<sup>197</sup>

According to UEC, Goliad County mischaracterized the applicable regulatory requirements when it asserted that UEC has failed to meet the requirements because neither the Mine Application nor the PAA-1 Application contain an estimate of the costs for aquifer restoration in the three production areas for which UEC is *not yet* seeking a production area authorization.<sup>198</sup> UEC contended that Goliad County’s argument does not accurately reflect the requirements of the TCEQ rules.

UEC explained that under the TCEQ rules, financial assurance for well plugging and abandonment must “be in effect before commencement of drilling operations.”<sup>199</sup> As a result, an applicant for a mine permit is required to provide a cost estimate for abandonment and plugging of all wells. Financial assurance for aquifer restoration, on the other hand, must be submitted prior to the commencement of “injection operations in a production area.”<sup>200</sup> Section 37.9045 provides that the amount of the required financial assurance for aquifer restoration is based upon “the cost estimate for aquifer restoration approved for each production area authorization.”<sup>201</sup> A PAA application, therefore, must contain a cost estimate for restoration in the production area.<sup>202</sup> Thus, according to UEC, neither the rules nor logic dictate that an applicant must provide cost estimates for aquifer restoration in proposed production areas for which it is not yet seeking a PAA.

UEC further pointed out that Goliad County stated: “Pursuant to 30 TAC § 331.143, an *applicant* must ‘prepare a written estimate, in current dollars, of the cost of . . . aquifer restoration

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<sup>197</sup> 30 TAC § 37.71(b).

<sup>198</sup> Goliad County Closing Argument, Part II.I at 61-62.

<sup>199</sup> 30 TAC § 37.7021(c).

<sup>200</sup> 30 TAC § 37.9040.

<sup>201</sup> 30 TAC § 37.9045(b) (emphasis added).

<sup>202</sup> 30 TAC § 305.49(6).

for each production area authorization.”<sup>203</sup> In fact, 30 TAC § 331.143 does not contain the word “applicant,” nor does it state that cost estimates for all proposed production areas must be included in a mine application or a PAA application.

## 2. Protestants

Goliad County and the District both argued that UEC failed to meet the regulatory requirements for financial assurance, but for different reasons.

The District referenced the statement in the Mine Application that “the surety mechanism would be: (1) a fully funded or pay-in trust; (2) a surety bond guaranteeing payment; (3) a surety bond guaranteeing performance; or (4) an irrevocable standby letter of credit.” The District claimed that UEC failed to provide any evidence about who would be the trustee and the terms of the trust. The District asserted that UEC provided no guidance for the trustee to know what conditions would require the trust to act or what actions the trustee must take under the provisions of the trust. Further, the District asserted, UEC provided no evidence about which bond company would be used, how the bond company is rated, or whether or not the bond company is/was in receivership.

The District further argued that TEX. WATER CODE § 27.073 (d) requires: “either the issuing institution or another institution which guarantees payment under the letter: (1) is a bank chartered by the state or by the federal government; (2) is a federally insured and its financial practices are regulated by the state or federal government; and (3) is solvent and is not in receivership or owned or controlled by an entity that is insolvent or in receivership.” The District claimed that once again UEC failed to provide any evidence that meets these requirements. The District asserted that UEC simply states they will choose one of the four mechanisms above, but provides none of the specific evidence required by the regulations. The District concluded that these conditions were not satisfied by UEC’s making a statement that it is

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<sup>203</sup> Goliad County Closing Argument at 61.

pondering its choices while providing no evidence about the financial integrity of any of the choices. Thus, the District contended, UEC has failed to meet its burden on this issue.

In contrast, Goliad County argued that pursuant to 30 TAC § 331.143, an applicant must “prepare a written estimate, in current dollars, of the cost of . . . aquifer restoration for each production area authorization.” It claimed that nowhere in the Mine Application or the PAA-1 Application does UEC estimate the cost for all four proposed production areas. Rather, UEC only included the projected costs of restoration efforts for PAA-1. Therefore, according to Goliad County, UEC has overlooked a substantial amount of financial assurance that must be posted prior to obtaining a Class III Injection well permit or PAA.

Goliad County additionally claimed that the financial assurance sections in both the Mine Application and the PAA-1 Application are difficult to follow in terms of how UEC calculated the necessary labor hours, treatment costs, and pumping, but asserted that it is reasonable to assume that UEC depended on its restoration table as its target to determine its clean-up costs. In other words, Goliad County asserted, UEC needed to calculate an estimated cost to restore the aquifer to .115 mg/L of uranium and 333.8 pCi of radium. However, Goliad County argued that these restoration goals are far more lenient than actual groundwater quality. Therefore, if Goliad County prevails on the issue of baseline groundwater quality, yet a permit is issued, the financial assurance calculation should be required to be reevaluated consistent with the new restoration goals. Goliad County also urged that no permit be issued before UEC calculates restoration costs for all four production areas as it claims is required by 30 TAC § 331.143.

### **3. OPIC**

OPIC did not address this Issue.

### **4. Executive Director**

The ED explained that the financial assurance rule requirements for the injection well program are found in 30 TAC §§ 331.142-144 and 30 TAC ch. 37. These rules require financial

assurance for plugging and abandonment of the wells used for *in situ* recovery of uranium. Evidence of the financial assurance must be submitted at least 60 days prior to commencement of drilling operations for new wells or 30 days prior to permit issuance for previously constructed wells. Acceptable financial assurance mechanisms include a trust fund, payment bond, performance bond, irrevocable standby letter of credit, insurance, financial test, or corporate guarantee.

In accordance with the requirements of 30 TAC § 37.7021, prior to drilling Class III injection wells, UEC will be required to provide financial assurance for plugging and abandonment of all Class III wells. Also, in accordance with 30 TAC § 37.9045(b), prior to commencement of mining operations, UEC will be required to provided financial assurance for aquifer restoration. However, for the Class III application, an applicant is required to provide a cost estimate only for abandonment and plugging of all the wells.<sup>204</sup> UEC presented its cost estimate in Section 13 of its application: \$1.10/foot for a total estimate of \$878,460. This cost estimate has proven to be acceptable for establishing financial assurance for plugging and abandonment of Class III wells.<sup>205</sup> The specific financial assurance for plugging and abandoning wells within Production Area 1 (PA1) are addressed within the PAA application. However, the requirement to maintain financial assurance for aquifer restoration based on those cost estimates would be required in a radioactive materials license. The application for a radioactive materials license for the Goliad site is still under review by the ED and is not the subject of this contested case hearing.

In response to the criticisms raised by the Protestants, the ED agreed with UEC that the arguments presented by Goliad County and the District show a misunderstanding of the financial assurance requirements of the Class III injection well area permit and PAA applications. The applications must show how the applicant intends to comply with the requirements and provide the cost estimates used to determine the amount of financial assurance coverage. The actual

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<sup>204</sup> 30 TAC § 331.143.

<sup>205</sup> ED Ex. ED-10, ED's response to Public Comment on Proposed Permit UR03075 at 89.

financial assurance instruments are not required to be submitted as part of the application and do not have to be effective until after the permit is issued.

Under the provisions of TEX. WATER CODE § 27.051(a), the TCEQ may issue an injection well permit if it finds that the applicant has made a satisfactory showing of financial responsibility if required by TEX. WATER CODE § 27.073.<sup>206</sup> Under the provisions of TEX. WATER CODE § 27.073(a-1), a person to whom an injection well mining permit is issued shall be required to maintain financial assurance to ensure that an abandoned well is plugged. The TCEQ rules in 30 TAC § 331.122(3) require the Commission to consider whether the applicant will assure the resources necessary to close, plug and abandon the wells authorized in the permit. The amount of financial assurance is based on the cost estimates provide by the applicant and subsequently updated by the permittee under 30 TAC §§ 331.142 and 331.143. The PAA-1 application also includes a cost estimate for aquifer restoration and well plugging and abandonment for the production area (30 TAC § 331.109), but the requirement to maintain financial assurance for aquifer restoration is addressed in the radioactive material license (30 TAC § 336.1125). Chapter 37, Subchapter Q of the TCEQ rules specify the types, the timing requirements, and specific wording of the acceptable financial assurance instruments authorized for injection well permits. Once the permit is issued, the financial assurance requirements are self-implementing—the rules are very specific as to the use and wording of the financial instruments.

The ED noted that Goliad County complained that UEC did not provide cost estimates for restoration of production areas 2 through 4 and that it had difficulty following the cost estimates. Goliad County also argued that the cost estimates are incorrect because UEC did not establish baseline quality correctly. The District argued that UEC did not provide evidence on the terms of the proposed trust mechanism, no evidence on the bonding company, and no evidence on the proposed letter of credit under Water Code § 27.101(d). Goliad County and the

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<sup>206</sup> Contrary to the Goliad County argument on public interest issues, the liability insurance requirements of TEX. WATER CODE § 27.051(d)(3) do not apply to the UEC applications because the proposed injection wells will not be used for the disposal of hazardous waste.

District repeated the same arguments raised in Issue I for their discussion of the cost estimates presented in the PAA application.

In response to the Protestants' complaints and arguments, the ED explained that the draft permit recommended by the ED (Exhibit ED-6) includes Section VII which requires financial assurance to provide for plugging and abandonment of the wells. The draft PAA recommended by the ED (Exhibit ED-18) includes a cost estimate of \$1,934,742 for aquifer restoration of the production area and a cost estimate of \$173,519 for well plugging and abandonment. If and when UEC receives a radioactive material license, financial assurance in the amount of the cost estimate for aquifer restoration must be provided sixty days prior to injection operations within the production area.<sup>207</sup> The permittee does not need to provide cost estimates for aquifer restoration for production areas 2 through 4 until an application for a PAA is submitted. The permittee would not be authorized to mine within any production area without a PAA.

When financial assurance is provided to the TCEQ, compliance with the financial assurance rules is required. These rules establish the requirements for the acceptable financial assurance instruments. If a fully-funded trust or standby trust fund is provided, it must comply with 30 TAC §§ 37.201 and 37.301 (these rules establish who may serve as a trustee and specify the required wording of the trust). If a payment bond is to be used, it must comply with 30 TAC §§ 37.211 and 37.311 (these requirements specify that the surety company must, at a minimum, be listed as an acceptable surety for federal bonds in Circular 570 of the United States Department of Treasury). If an irrevocable standby letter of credit is to be used, it must comply with 30 TAC §§ 37.231 and 37.331.

The ED reviewed the submitted cost estimates and determined that the coverage will be sufficient for the financial assurance that must be submitted after the permits and licenses are issued.

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<sup>207</sup> 30 TAC §§ 37.9045(b) and 336.1125(a).



**B. ALJ's Analysis**

Based on a preponderance of the evidence, the ALJ rejects the District's allegation that UEC's application lacks specificity regarding the form and quality of financial assurance. The argument is inconsistent with UEC's evidence showing its compliance with the detailed specifications and requirements about financial assurance that are prescribed by the TCEQ rules.

Similarly, the ALJ rejects Goliad County's interpretation of the statute and rules. The laws do not require UEC to include estimated cost for all production areas, and the assertion to the contrary is not supported by the plain meaning of the applicable TCEQ rules.

But, the ALJ agrees with Goliad County's assertion that that, if it is determined that its challenge to the accuracy of baseline water quality has merit and a permit is issued, then UEC's financial assurances should be recalculated to account for any increased restoration cost consistent with new restoration goals. The ALJ recommends that UEC and the ED be required, if a Mine Permit is issued, to revisit the appropriate amount of financial assurance consistent with the revised restoration table for PAA-1. This recommendation is further addressed in Section XXVII E.

**XV. ISSUE J**

**Is the application sufficiently protective of surface water quality?**

**Recommendation:**

**UEC's Mine Application is sufficiently protective of surface water quality.**

**A. Parties' Arguments**

**1. UEC**

According to UEC, the subject of surface water protection is an issue that is—as with all issues regarding the surface—primarily dealt with through applications other than the Mine

Application. Although surface water quality is addressed in Chapter 9 of the Mine Application in the context of operations,<sup>208</sup> regulatory requirements for containment of fluids are contained in the Radioactive Material License (“RML”).<sup>209</sup> UEC’s Mine Application contains operational measures to comply with the Draft Mine Permit’s prohibition<sup>210</sup> against discharge of fluids into surface waters. These measures are part of the Goliad Project’s comprehensive surface water quality protection plan that includes the identification of sensitive surface water features, effective management of flooding and runoff, and a multi-media monitoring program.

**a. Mine Application**

UEC explained that in addition to providing the required map showing surface water features,<sup>211</sup> Chapter 9 of the Mine Application includes a discussion of spill control<sup>212</sup> and rain and emergency operations<sup>213</sup> as a part of a larger discussion regarding satellite plant details. Details regarding the containment capacity and related calculations (net area of the satellite plant slab multiplied by the slab wall height, storage tank capacity, *etc.*) are shown on Figure 9.1, Plant Facility Layout<sup>214</sup> and are further described by Mr. Underdown in his testimony.<sup>215</sup> Mr. Underdown also detailed the various design controls and engineering safety devices that will serve to detect and minimize the effects of any pipeline or vessel leak that might occur at the plant, in the field, or at the Class I waste disposal well areas.<sup>216</sup> Thus, according to UEC, the Mine Application contains information as to how UEC will prevent and minimize contact of mining fluids with the ground surface.

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<sup>208</sup> ED Ex. ED-1, Murry Direct at 10.

<sup>209</sup> *See supra*, Part I.D.5.b.

<sup>210</sup> ED Ex. ED-6, section V.C.5.

<sup>211</sup> UEC Ex. 6, Holmes Direct at 68; UEC Ex. 6, Holmes Direct, Ex. 13, Figures 1.3 and 4.1.

<sup>212</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Section 9.4.

<sup>213</sup> *Id.* at § 9.5.

<sup>214</sup> UEC Ex. 5, Underdown Direct, Ex. 3.

<sup>215</sup> UEC Ex. 5, Underdown Direct at 15-17.

<sup>216</sup> *Id.* at 16-19.

**b. Wetlands**

UEC stated that as part of its RML Application, it submitted a wetlands delineation and jurisdictional determination,<sup>217</sup> in which the Corps of Engineers concurred.<sup>218</sup> UEC's expert, John J. Kuhl, testified that he does not anticipate impacts to wetlands from the Project.<sup>219</sup> In short, UEC contends that the delineation process ensures that sensitive surface water features are known and avoided.

**c. Runoff from Flooding**

After performing a study of the largest drainage way in the Mine Permit Area, UEC's drainage expert, Derek E. Naiser, P.E., concluded that with proper construction practices, mining activities will not impact the quality of runoff caused by flooding.<sup>220</sup> In evaluating this drainage area, Mr. Naiser took a conservative approach and looked at the impacts of a 100-year rainfall event.<sup>221</sup> In essence, Mr. Naiser evaluated and designed a solution for a "worst-case" scenario that can be adapted throughout the Mine Permit Area to minimize flood impacts and prevent sediment transport off-site.<sup>222</sup> Like the wetlands delineation, this study was submitted as part of UEC's RML Application.<sup>223</sup>

**d. Monitoring During Operations**

UEC asserted that during operations, it will monitor air quality, vegetation, soil, sediment, and surface water at pre-determined locations on a quarterly and annual basis.<sup>224</sup> UEC

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<sup>217</sup> UEC Ex. 13, Kuhl Direct at 6-17, Exs. 3 and 8.

<sup>218</sup> UEC Ex. 13, Kuhl Direct, Ex. 7.

<sup>219</sup> UEC Ex. 13, Kuhl Direct at 19.

<sup>220</sup> UEC Ex. 14, Naiser Direct at 7-12.

<sup>221</sup> *Id.* at 9.

<sup>222</sup> *Id.* at 7-8.

<sup>223</sup> *Id.* at 6.

<sup>224</sup> UEC Ex. 6, Holmes Direct at 20 and Ex. 28.

contended this monitoring will enable it to detect any potential breach of the above-described controls.

UEC noted that while the District was completely silent on this Issue, Goliad County's witness, Dr. Clark, opined that the Mine Application is not sufficiently protective of surface water quality. First, he stated that "[i]t appears that sand A is connected with Fifteen Mile Creek." Second, he stated that "sand A is not completely confined in all areas, indicating possible connection with the surface water."<sup>225</sup> Although the meaning of the latter statement is unclear (*i.e.*, what areas? what surface water?), the inference is that groundwater from Sand A within the Mine Permit Area will ultimately reach Fifteen Mile Creek and that the "interaction"<sup>226</sup> will be detrimental. UEC argued that there is no evidence to support this inference.

UEC explained in response to the Goliad County argument that interaction between groundwater from the Mine Permit Area and surface water in Fifteen Mile Creek is a concern only if constituents from Sand A within the Mine Permit Area (a) migrate to Fifteen Mile Creek and (b) migrate in quantities that are potentially harmful. UEC claimed that while there is no evidence in the record to support Dr. Clark's inferred concern, there is considerable evidence that constituents such as uranium and radium-226 will not be migrating from the Mine Permit Area into Fifteen Mile Creek. First, UEC argued that under the Mine Permit, any production areas within Sand A will be restored after mining.<sup>227</sup> Second, the geochemical nature of both the surrounding aquifer and the constituents themselves will severely limit any migration. Uranium is immobilized when it encounters sufficiently reducing conditions,<sup>228</sup> and as Dr. Sass explained,

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<sup>225</sup> Goliad County Ex. 1, Clark Direct at 33.

<sup>226</sup> *Id.*

<sup>227</sup> ED Ex. ED-6, Sections G.3 and G.4.

<sup>228</sup> UEC Ex. 1, Galloway Direct at 15.

“the whole area is a reducing area.”<sup>229</sup> The movement of radium-226 will likewise be retarded by precipitation and adsorption onto clays and iron oxides.<sup>230</sup>

UEC argued that ultimately, if Goliad County develops specific concerns regarding the migration of constituents from a production area in Sand A to Fifteen Mile Creek, the appropriate time to address those concerns is during the PAA application process for Sand A.

UEC further responded to several of Goliad County’s assertions by demonstrating that they either mischaracterize the record or lack any support in the record.

## **2. Protestants**

Goliad County’s arguments are effectively summarized above and will not be reiterated here.

## **3. OPIC**

OPIC did not address this issue.

## **4. Executive Director**

It was the ED’s position that the permit, if issued, would not authorize any discharge of waste to surface waters. The Class III application does not require the applicant to address protection of surface water quality. The Class III area permit does address some aspects of spill control in section 9.4 of the application, and rain and emergency operations in section 9.5. Other requirements to protect surface water quality would be addressed in the RML. The ED

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<sup>229</sup> UEC Ex. 10, Bennett Direct, Ex. 12 at 96-98; *see also*, UEC Ex. 1, Galloway Direct at 24 (noting that “most of the subsurface environment is reducing.”).

<sup>230</sup> UEC Ex. 4, Erskine Issue C Rebuttal at 17.

determined that UEC's Mine Application meets the requirements for Class III area permit applications regarding surface water quality protection.

**B. ALJ's Analysis**

The ALJ initially finds that the Class III area permit application addresses protection of surface water only in a general sense. The application does not authorize any discharge of waste to surface waters and has provisions regarding spill control and emergency operations. The specific regulatory requirements for containment of fluids are part of the RML.

Testifying for Goliad County, Dr. Clark states that "it appears that Sand A is connected with Fifteen Mile Creek." He also states that "Sand A is not completely confined in all areas, indicating possible connection with surface water."<sup>231</sup> Upon close analysis, the ALJ finds Dr. Clark's testimony to be more in the nature of surmise and possibility rather than reasonable scientific probability. Moreover, the ALJ finds that Dr. Clark failed to reconcile his suggestion that constituents from Sand A might migrate to Fifteen Mile Creek, with: (1) the fact that any production area within Sand A will be restored after mining; and (2) the testimony of several other experts, including Dr. Galloway and Dr. Sass, that the geochemical nature of both the surrounding aquifer and the constituents themselves will severely limit any migration. Uranium is immobilized when it encounters sufficiently reducing conditions,<sup>232</sup> and as Dr. Sass explained, "the whole area is a reducing area."<sup>233</sup> The ALJ further finds that any concerns regarding possible migration of constituents from a production area in Sand A to Fifteen Mile Creek can be appropriately addressed in connection with the PAA application process for Sand A.

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<sup>231</sup> Goliad County Ex. 1, Clark Direct at 33.

<sup>232</sup> UEC Ex. 1, Galloway Direct at 15.

<sup>233</sup> UEC Ex. 10, Bennett Direct, Ex. 12 at 96-98; *see also*, UEC Ex. 1, Galloway Direct at 24 (noting that "most of the subsurface environment is reducing.").

## XVI. ISSUE K

**Are local roadways sufficient to handle traffic to and from the proposed facility?**

**Recommendation:**

**Local roadways are sufficient to handle traffic to and from the proposed mine site.**

### A. Parties' Arguments

#### 1. UEC

UEC explained that no TCEQ rule requires the adequacy of roads to be considered as part of the Mine Application. Rather, the regulations require roadways to be addressed in the RML application process. In deciding whether or not to grant an injection well permit, traffic safety concerns, if any, are appropriately considered as part of the public interest determination.

Mr. Underdown, UEC's Vice President for Production, testified regarding UEC's site access plan<sup>234</sup> and vehicular traffic data for construction of the site and operations.<sup>235</sup> More specifically, Mr. Underdown testified that UEC plans to construct a new road so that the main entrance to the site will be directly onto Highway 183, which is designed for higher volume traffic and larger vehicles than local county roadways.<sup>236</sup> Mr. Naiser, an expert in roadway and traffic engineering,<sup>237</sup> reviewed the site entrance plan and traffic estimates and concluded that the existing and proposed roadways in Goliad County are sufficient to handle traffic to and from the proposed facility.<sup>238</sup>

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<sup>234</sup> UEC Ex. 5, Underdown Direct, Ex. 8.

<sup>235</sup> UEC Ex. 5, Underdown Direct, Ex. 7.

<sup>236</sup> UEC Ex. 5, Underdown Direct at 24.

<sup>237</sup> UEC Ex. 14, Naiser Direct at 2.

<sup>238</sup> *Id.* at 14.

UEC pointed out that neither Protestant offered any testimony regarding this issue, and only the District has presented any arguments. UEC emphasized that although Commissioner Krenek testified that the responsibilities of the County Commissioners include maintaining county roads,<sup>239</sup> he offered no testimony regarding any anticipated adverse impacts to county roads.

## **2. Protestants**

The District argued that UEC failed to meet its burden that local roadways are adequate to handle traffic to and from the mine permit area. The District claimed that it is unreasonable and not in the public interest for UEC to simply look at whether the roads are adequate and then shift the burden of road maintenance and spill clean-up to the County.

## **3. OPIC**

OPIC did not address this Issue.

## **4. Executive Director**

In agreement with UEC, the ED noted that the sufficiency of local roadways is not a rule requirement for the Mine Application; therefore, it may be considered as part of the public interest evaluation. No Protestant presented evidence concerning this issue. Therefore, the ED did not find that the proposed Class III injection wells would be contrary to the public interest due to roadway conditions or traffic to and from the proposed mine site.

## **B. ALJ's Analysis**

This issue was not significantly contested. Due to the absence of any evidence to the contrary, the ALJ finds that local roadways are sufficient to serve vehicle movement to and from

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<sup>239</sup> Goliad County Ex. 2, Krenek Direct at 1.



the proposed mine site. Also, the local roadways will not be adversely affected by the traffic created by the proposed *in situ* uranium mining operation. The ALJ finds no support for the District's argument that UEC intends to simply rely on local authorities to respond to any spill clean up and to provide road maintenance.

## XVII. ISSUE L

**Whether UEC's proposal for restoration of groundwater to baseline levels, as contained in the permit application is reasonable and adequate.**

### **Recommendation:**

**UEC's proposal for restoration of groundwater to baseline levels is reasonable and adequate, provided that the proposal for restoration is applied to achieve baseline water quality corresponding to the average of all three rounds of baseline sampling for all constituents.**

### **A. Parties' Arguments**

#### **1. UEC**

UEC explained that there is no rule requirement that applies to the Mine Application concerning restoration of groundwater. However, the prescribed application form requires applicants to provide groundwater data quality data giving "a general idea of the water quality in the area they are planning to mine."<sup>240</sup> In addition, applicants are required to submit information regarding proposed restoration procedures and restoration effectiveness.<sup>241</sup>

Chapter 12 of the Mine Application contains a description of UEC's proposed restoration procedures, plans for a restoration demonstration and report to TCEQ regarding the demonstration.<sup>242</sup> The ED reviewed Chapter 12 and determined that it contained all required

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<sup>240</sup> *Id.* at 1225.

<sup>241</sup> *See*, UEC Ex. 6, Holmes Direct, Ex. 13, Chapter 12.

<sup>242</sup> *Id.*

information.<sup>243</sup> In addition, Mr. Underdown and Mr. Holmes testified regarding improvements in restoration techniques that will be employed by UEC.<sup>244</sup>

UEC noted that Protestants presented three arguments attempting to show that UEC's post-mining groundwater restoration proposal is unreasonable and inadequate: (1) UEC should not be trusted to complete its restoration plan because it received a NOV from the TRC during the exploration phase of this project; (2) historically, uranium mining companies have consistently failed to restore groundwater to baseline levels; and (3) disapproval of UEC's six pore volume estimate.<sup>245</sup> UEC responded to the Protestants' arguments as follows:

**a. Compliance History**

Mr. Underdown was confronted on cross-examination with Protestants' argument that UEC should not be trusted because it was issued a NOV by the TRC. He responded that he and his team were not the ones responsible for the exploration activities, but they will be in charge of the restoration; therefore, he knows it will be done right.<sup>246</sup> UEC argued that Mr. Underdown's response was absolutely correct, then further argued there are even more reasons why this lack of "trustworthiness" argument is not persuasive.

UEC acknowledged that the ALJ clearly has the authority to consider the TRC NOV as evidence in this proceeding. However, UEC again argued that TCEQ was legally correct in not considering the TRC compliance history in evaluating UEC's Mine Application.<sup>247</sup> UEC further noted that the nature of the exploration drilling violations do not—from either a legal or practical perspective—lead to the conclusion that UEC is inherently untrustworthy or that UEC's proposal for restoration is unreasonable or inadequate.

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<sup>243</sup> UEC Ex. 6, Holmes Direct, Ex. 12 at 73, Response 121.

<sup>244</sup> UEC Ex. 5, Underdown Direct at 22-23; UEC Ex. 6, Holmes Direct at 53-54, 70.

<sup>245</sup> A "pore volume" is the volume of water required to replace (flush out) water in a certain volume of saturated porous media.

<sup>246</sup> Tr., Vol. 1 at 196, 233-234 (Underdown).

<sup>247</sup> *See supra*, Part I.D.

The exploration drilling violations were (1) failure to mark boreholes with a physical marker (UEC used GPS coordinates instead); (2) housekeeping issues with some of its contract drillers who failed to properly clean up cuttings and drilling mud in certain areas; and (3) failure to follow the plugging procedure in the exploration permit regarding plugs at the surface.<sup>248</sup> UEC admitted that all of these conditions were in contravention of the precise language of the permit, and all of them were therefore properly counted as violations. But, UEC emphasized that it promptly and thoroughly rectified these issues to the satisfaction of the TRC<sup>249</sup> and obtained amendments to its permit to clarify field practices.<sup>250</sup>

According to UEC, none of these violations, separately or together, rise to a level that equates to an automatic indictment of UEC's reliability regarding groundwater restoration.<sup>251</sup> In fact, as Mr. Murry noted in response to a question from OPIC, even if TCEQ had considered the TRC NOV, he did not think it would have affected UEC's compliance history at TCEQ.<sup>252</sup>

**b. Past Restoration Failures**

UEC argued that Protestants' characterization of all past restoration efforts in which a restoration table amendment was obtained as "failures" ignores the legitimacy of the amendment process and glosses over the differences among past amendments.

Under current regulations, the Commission must consider the following in choosing whether an amendment is warranted:

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<sup>248</sup> Goliad County Ex. 4, Darling Direct, Ex. 3, Inspection Narrative from March 2007 NOV and NOV No. 080A.

<sup>249</sup> UEC Ex. 6, Holmes Direct, Ex. 33 at 31-40 (detailing follow-up inspections).

<sup>250</sup> Goliad County Ex. 4, Darling Direct, Ex. 5.

<sup>251</sup> *See supra*, Part I.D and Attachment A.

<sup>252</sup> Tr., Vol. 7 at 1404-1405 (Murry).

- (A) uses for which the groundwater in the production area was suitable at baseline water quality levels;
- (B) actual existing use of groundwater in the production area prior to and during mining;
- (C) potential future use of groundwater of baseline quality and of proposed restoration quality;
- (D) the effort made by the permittee to restore the groundwater to baseline;
- (E) technology available to restore groundwater for particular parameters;
- (F) the ability of existing technology to restore groundwater to baseline quality in the area under consideration;
- (G) the cost of further restoration efforts;
- (H) the consumption of groundwater resources during further restoration; and
- (I) the harmful effects of levels of particular parameter.<sup>253</sup>

The Commission may amend the restoration table if it finds that:

- (A) reasonable restoration efforts have been undertaken, giving consideration to the factors listed in paragraph (1) of this subsection;
- (B) the values for the parameters describing water quality have stabilized for a period of one year;
- (C) the formation water present in the exempted portion of the aquifer would be suitable for any use to which it was reasonably suited prior to mining; and
- (D) further restoration efforts would consume energy, water, or other natural resources of the state without providing a corresponding benefit to the state.<sup>254</sup>

UEC explained that restoration table amendments are processed by balancing a number of different considerations, including original groundwater use class and resources expended in the restoration effort.

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<sup>253</sup> 30 TAC § 331.107(g)(1).

<sup>254</sup> 30 TAC § 331.107(g)(2).

Further, according to UEC, not all amendments are created equal, a point it claimed is highlighted by Dr. Darling's testimony. Dr. Darling attached a copy of the Hall Report, a USGS report on groundwater restoration at uranium *in situ* recovery mines,<sup>255</sup> as one of his exhibits. The author reported that while baseline and amended restoration values were available in TCEQ's records for all 27 mines/77 PAAs,<sup>256</sup> only 22 of the PAAs (from 13 mines) had records that included the actual groundwater restoration values achieved.<sup>257</sup>

UEC argued that this point is significant because in her records review, the author found that—for reasons that are not clear—the amended restoration table values for uranium were not the same as the actual final restoration values for uranium in groundwater at the PAAs.<sup>258</sup> Typically, the amended values were higher than the level of restoration actually achieved.<sup>259</sup> For that reason, Dr. Hall limited her analysis to those PAAs with actual final restoration values in groundwater.<sup>260</sup> UEC claims that Dr. Darling relied upon an out-of-date summary table created by a TCEQ employee rather than a review of actual TCEQ records,<sup>261</sup> and based his opinion on only 13 sites for uranium and 12 for radium that had actual final restoration values, in addition to amended restoration table values. In addition, a closer look at Dr. Darling's report revealed that his observations provide only a partial view of past restoration efforts. For example, one of Dr. Darling's observations was that "[i]n all cases, the Amended and Last Sampled [actual] Concentrations of uranium exceed the PDWS [Primary Drinking Water Standard]."<sup>262</sup> UEC asserts that Dr. Darling neglected to add that out of 73 PAAs, only six had baseline restoration values below the PDWS to begin with.<sup>263</sup> Similarly, Dr. Darling observed that "[i]n all but two cases . . . the Amended Restoration Table Values and the Last Sampled [actual] Concentrations

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<sup>255</sup> Goliad County Ex. 4, Darling Direct, Ex. 12.

<sup>256</sup> *Id.* at 6.

<sup>257</sup> *Id.* at 10.

<sup>258</sup> *Id.*

<sup>259</sup> *Id.*

<sup>260</sup> *Id.*

<sup>261</sup> Goliad County Ex. 4, Darling Direct, Ex. 13 at 1-2.

<sup>262</sup> *Id.* at 4.

<sup>263</sup> *Id.* at Attachment D.

of uranium for the Production Areas . . . exceed the Original Restoration Table Values approved by TCEQ.”<sup>264</sup> However, a closer look at his exhibits shows that out of 13 “Last Sampled” values for uranium, four of them were actually less than the restoration table values.<sup>265</sup>

Moreover, UEC pointed out that the Hall Study focused on the actual restoration values instead of the amended values, and found that: (1) 32% of the actual restored uranium values were less than baseline;<sup>266</sup> (2) 96% of the actual restored radium values were below baseline;<sup>267</sup> (3) 82% of the actual restored arsenic values were less than baseline;<sup>268</sup> and (4) 91% of the actual restored lead values were below baseline.<sup>269</sup>

UEC acknowledged that not all companies have had equal success with restoration, and there can and should continue to be improvement. But, UEC argued that to categorize each and every effort as a failure under the regulations is both simplistic and misleading. Similarly, UEC claimed that Protestants’ sweeping judgment as to the likelihood of UEC’s future restoration success based almost exclusively on past “failures” is wrong.

## 2. Protestants

Protestants position was that UEC’s proposal for restoration of groundwater to baseline levels was unreasonable and inadequate because the history of uranium mining in Texas reflects that groundwater quality is seldom restored to baseline levels. Protestants relied heavily on the testimony of UEC’s Mr. Underwood and Mr. Holmes regarding their past experience with restoration at other uranium mines in Texas. Specifically, Mr. Holmes testified:

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<sup>264</sup> *Id.* at 4 (emphasis added).

<sup>265</sup> *Id.* at Attachments B and D.

<sup>266</sup> Goliad County Ex. 4, Darling Direct, Ex. 12 at 15.

<sup>267</sup> *Id.* at 17.

<sup>268</sup> *Id.* at 18.

<sup>269</sup> *Id.* at 19.

**Q: Now, of those 80 percent of the projects that you've worked on, have any of them ever restored the water back to baseline?**

A: Not to my knowledge, to the strict numbers of the baseline. You mean values in the baseline?

**Q: Right?**

A: No. No, they have not.

**Q: The evidence we have is that restoration has failed in every situation you and Mr. Underdown have been involved in. Correct?**

A: They have not reached restoration levels, so I guess that would be true.

**Q: So elevated levels of some multiple pollutants will be left in the ground. Correct?**

A: That's correct.

**Q: And monitoring may be able to be ceased under this practice of the TCEQ. Correct?**

A: Once it's been restored to their satisfaction, yes. That's the end of it. There would be no further monitoring.

**Q: So at that point, there would be -- if an amendment were granted, there would be contaminants that were left in the ground at this location that would no longer be monitored. Correct?**

A: That's correct.<sup>270</sup>

Protestants pointed out that Mr. Underdown testified that the Goliad project would be his fourth mining site that restoration would be conducted under his leadership.<sup>271</sup> All three prior mines under his supervision did not restore to baseline levels and ultimately requested amendments from the TCEQ to relax clean-up standards.<sup>272</sup>

Protestants further argued that of the 76 production area authorizations issued in Texas, approximately 51 operators have applied for and received amendments to the originally established baseline water quality.<sup>273</sup> According to Goliad County, its expert witness Dr. Darling presented unchallenged testimony that the TCEQ records indicate that the agency has *never*

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<sup>270</sup> Tr. Vol. 2 at 419 (Holmes).

<sup>271</sup> Tr., Vol. 1 at 213 (Underdown).

<sup>272</sup> Tr., Vol. 1 at 213-214 (Underdown).

<sup>273</sup> Goliad County Ex. 4, Darling Direct at 21.

denied an application for an amended restoration table.<sup>274</sup> The vast majority of the 51 amendments allotted for at least a doubling and tripling the amount of permitted contamination to be left in the groundwater.<sup>275</sup> Goliad County claimed that the overwhelming evidence demonstrates that once mined, water quality at that location will be significantly deteriorated and the proposed Goliad project will be no different.

Goliad County pointed out that Mr. Underdown and Mr. Holmes made reference to advanced technology that will increase the likelihood of restoring water quality to baseline. Specifically, Mr. Underdown testified that UEC is “pursuing technologies that will aid in getting the uranium back down to where it should be.”<sup>276</sup> Similarly, Mr. Holmes testified concerning the improved capability of the membranes that will be used. Goliad County then argued that the Mine Application, however, notes that the restoration technology “for restoring groundwater back to levels consistent with baseline involves using native groundwater sweep and reverse osmosis.”<sup>277</sup> According to Goliad County, these proposed techniques for restoration are the same that have been used for more than twenty years.<sup>278</sup> Goliad County asserted that the amendments issued by the TCEQ clearly document that reverse osmosis and groundwater sweep have continuously proven unsuccessful at restoring groundwater to baseline at other mining sites.<sup>279</sup> Even if new technology does exist, there is absolutely nothing to suggest that it is any more effective than past methods. Goliad County referred to the ALJ’s questioning of Mr. Holmes as to whether there had been any “attempt to apply the technology that now exists to the anticipated levels at the end of mining of this location to develop some model, benchmark . . . as to how successful you might be in reaching baseline levels.”<sup>280</sup> Mr. Holmes responded that no pilot plan will be conducted until after this proceeding goes to the Commission for issuance of the

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<sup>274</sup> *Id.* at 22.

<sup>275</sup> Goliad County Ex. 4, Darling Direct, Ex. 13 at Attachment E, generally.

<sup>276</sup> Tr., Vol. 1 at 193 (Underdown).

<sup>277</sup> UEC Ex. 6, Holmes Pre-filed Direct, Ex. 13 at 12-1 (In-Situ Application).

<sup>278</sup> Goliad County Ex. 4, Darling Direct, Ex. 13 at Attachment A, generally.

<sup>279</sup> *Id.*

<sup>280</sup> Tr., Vol. 2 at 527 (Holmes); Tr., Vol 2 at 529 (Holmes).



permit.<sup>281</sup> Thus, according to Goliad County, Mr. Holmes admitted that UEC has not quantified the efficacy of any new technology,<sup>282</sup> and it is a complete unknown at this point.

The District's expert witness, Dr. Richard J. Abitz, testified that "the pore volume estimate does not account for the true volume of sand that will be contaminated and there is no scientific basis for the proposed number of pore volumes to restore the aquifer to baseline values."<sup>283</sup>

### **3. OPIC**

OPIC argued that UEC's application does not adequately and accurately describe baseline conditions of the groundwater at the site. Therefore, OPIC argued, UEC's proposal for restoration of groundwater to baseline levels as contained in the permit application is unreasonable and inadequate. OPIC contended that UEC's restoration proposal relies on altered baseline. Because UEC's noncompliant exploration activities caused artificially elevated levels of uranium and radium in the groundwater at the site, a true baseline for these contaminants has never been established. UEC's own activities have made it impossible to establish true baseline conditions for this site. Given the artificially elevated baseline levels contained in this application, restoration of groundwater to those levels is unreasonable and inadequate.

### **4. Executive Director**

According to the ED, specific requirements for restoration of groundwater after the completion of mining are addressed in the PAA rather than the Class III injection well area permit. Under 30 TAC § 331.107, the aquifer must be restored to pre-mining groundwater quality as provided in the restoration table of a PAA. According to UEC's Mine Application, an assumption of six pore volumes was made in determining projected water use in regards to the

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<sup>281</sup> Tr., Vol. 2 at 529 (Holmes).

<sup>282</sup> Tr., Vol. 2 at 412 (Holmes).

<sup>283</sup> District Ex. 1, Abitz Direct at 41.

initial mine plan. In evaluating UEC's assumption of six pore volumes, the ED took into consideration UEC's claim that restoration will begin as soon as hydraulic separation can be established between the mined portion of an aquifer and the portion that is currently being mined. Before re-injection, mining fluids will be treated using reverse osmosis to reduce the level of constituents in the mining fluid. Based on these considerations, the ED believed the assumption of six pore volumes for aquifer restoration is reasonable. However, the ED points out that the estimate of the number of pore volumes for groundwater restoration is used only for planning and determining initial cost estimates. Ultimately, groundwater must be restored to the restoration table values regardless of the number of pore volumes it may actually take to achieve restoration.

The ED noted that the mine plan submitted in a Class III injection well permit is preliminary, and a subsequent mine plan will be submitted with each application for a PAA. The ED also noted that UEC has committed to provide a restoration demonstration within 18 months of the beginning of *in situ* operations. If the results of that demonstration indicate the assumed number of pore volumes required for aquifer restoration is inadequate, the ED will require the amount of financial assurance for aquifer restoration to be adjusted accordingly.

**B. ALJ's Analysis**

For the same reasons that the ALJ found that UEC's compliance history does not require denial of the Mine Application (Issue B), the ALJ finds that UEC's groundwater restoration proposal should not be found unreasonable or inadequate based on its compliance history.

Regarding the Protestants' claim that UEC's proposal for groundwater restoration should be found unreasonable and inadequate based on historical failures to restore groundwater to baseline levels, the ALJ finds their argument to be unpersuasive for several reasons. First, Protestants claim that water quality will never be restored to baseline levels because it is standard practice (51 out of 76) for mine operators to request restoration table amendments, and TCEQ has never denied an application for an amendment, thus allowing contaminants to remain in the

groundwater at levels much higher than pre-mining levels. Considering all the relevant evidence, the ALJ finds that the Protestants overstate the facts.

Although Protestants acknowledged the testimony of Messers. Holmes and Underdown that new technologies will aid UEC's restoration efforts, they state that the proposed restoration techniques are the same that have been used unsuccessfully for more than 20 years. However, the ALJ finds that Protestants inexplicably ignore the following evidence presented by UEC:

- The use of reverse osmosis on a commercial scale during mining to provide a jump start on restoration.
- The initiation of restoration as soon as mining ends in a production area.
- Continued use of the ion exchange columns to remove residual uranium during restoration rather than only during mining.
- And, even though no restoration model is required, UEC does have a state-of-the-art hydrogeological model that was created by Mr. Kelley and that UEC can use to increase its restoration success in its first production area.<sup>284</sup>

Mr. Underdown also testified that the membranes used in the reverse osmosis process are "specifically designed to function with a longer life span and higher performance in the particular water quality which they will be used."<sup>285</sup>

The ALJ finds that the Protestants' forecast of inevitable restoration failure and disavowal of the existence of improved restoration technologies are contrary to the preponderance of credible evidence.

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<sup>284</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 8; UEC Ex. 5, Underdown Direct at 22-23; UEC Ex. 6, Holmes Direct at 53-54 and 70; UEC Ex. 8, Kelley Direct at 27.

<sup>285</sup> UEC Ex. 5, Underdown Direct at 23.

## XVIII. ISSUE M

**Will the Applicant's proposed activities negatively impact livestock and wildlife, including endangered species?**

### **Recommendation:**

**UEC's proposed *in situ* uranium mining activities will not negatively impact livestock and wildlife, including endangered species.**

### **A Parties' Arguments**

#### **1. UEC**

UEC pointed out that potential ecological impacts are evaluated during the RML application process.<sup>286</sup> In addition, license requirements emphasize the protection of the environment and minimization of danger to the environment.<sup>287</sup>

UEC pointed out that two of its experts addressed Issue M in their direct testimony. First, John Kuhl considered potential impacts on wildlife in general, and endangered species in particular. With respect to wildlife, his analysis included assessing the potential impacts of changes in vegetation that might be caused by the Project.<sup>288</sup> Mr. Kuhl testified that he anticipates no negative impacts on a regional scale, with local impacts being limited to temporary re-location of some wildlife in the immediate area.<sup>289</sup> In other words, impacts on wildlife would be minimal and short-term.<sup>290</sup> Looking specifically at endangered species, Mr. Kuhl testified that no impacts to endangered species of plants or animals are anticipated as result of the Project.<sup>291</sup>

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<sup>286</sup> 30 TAC § 336.1111; *see also*, UEC Ex. 6, Holmes Direct at 71; UEC Ex. 13, Kuhl Direct at 6 and Ex. 2.

<sup>287</sup> 30 TAC § 336.207.

<sup>288</sup> UEC Ex. 13, Kuhl Direct at 10-11.

<sup>289</sup> *Id.* at 11.

<sup>290</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 8.

<sup>291</sup> UEC Ex. 13, Kuhl Direct at 15.

UEC explained that Dr. John Reagor also testified regarding wildlife, but focused particularly on potential impacts to domesticated livestock. In forming his opinions, he evaluated (a) four potential source categories for contaminants, (b) potential exposure pathways, and (c) likely toxicological impacts. Dr. Reagor concluded that livestock will not be negatively impacted by the release of airborne contaminants,<sup>292</sup> the release of contaminants into soil or sediment,<sup>293</sup> the release of contaminants into surface water,<sup>294</sup> or groundwater contamination<sup>295</sup> as a result of the proposed Project. Dr. Reagor's opinions were largely based on his conclusion that contaminants will never reach the potential exposure pathways due to the protective measures set out in UEC's pending RML Application.<sup>296</sup> UEC concluded that if contaminant release is properly controlled and prevented in accordance with RML regulations, there is little chance that contaminants will make it "across the pathway" to livestock or wildlife.

## 2. Protestants

Neither Protestant presented any testimony regarding this issue. However, Goliad County argues that UEC failed to meet its burden of proof that releases from its mining activities would not negatively impact livestock and wildlife. It claimed this failure is because the expert charged with the analysis, Dr. Reagor, based his conclusions fundamentally on assurances provided by UEC.<sup>297</sup> Goliad County claimed that Dr. Reagor relied heavily on information and assurances provided by Mr. Holmes, who admittedly had no expertise in any of the disciplines that were the bases for Dr. Reagor's investigation and assurances.<sup>298</sup> In assessing each potential pathway for contaminants to reach vulnerable receptors, Mr. Holmes assured Dr. Reagor that engineering procedures and mechanisms would be in place so that there would be no significant

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<sup>292</sup> UEC Ex. 12, Reagor Direct at 14.

<sup>293</sup> *Id.* at 22-23.

<sup>294</sup> *Id.* at 24-25.

<sup>295</sup> *Id.* at 28.

<sup>296</sup> *Id.* at 4.

<sup>297</sup> Tr., Vol. 4 at 1005-1006 (Reagor).

<sup>298</sup> Tr., Vol. 1 at 243-245 (Holmes).

release. Dr. Reagor investigated no further and concluded no problems exist because there would be no contaminant in the air, water or soil to start with.

The District argued that livestock can suffer kidney damage by drinking water with elevated uranium and radium-226 concentrations, and in addition, livestock that have consumed high levels of uranium and radium-226 will bring a lower price at the auction. Thus, according to the District, livestock will be negatively impacted.

### **3. OPIC**

OPIC did not address this Issue.

### **4. Executive Director**

The ED states that although there are no TCEQ rule requirements specific to impacts on wildlife, livestock, and endangered species, the ED did evaluate UEC's proposed methods of preventing migration of contaminants from the site. Animals can be impacted only through some contaminant pathway. If there is no contamination of the air, soil, surface water, or groundwater outside the production area, then animals are not impacted. The ED concluded that the UEC's Mine Application complies with the rules designed to eliminate these possible pathways for contamination of animals. According to the ED, the Protestants made no showing at the hearing indicating that livestock, wildlife, or endangered species will be negatively impacted by the proposed mining activities.

## **B. ALJ's Analysis**

The ALJ finds that the testimony of UEC's witnesses, Mr. Kuhl and Dr. Reagor, was substantially unchallenged on cross-examination. The ALJ sustains UEC argument that the proposed uranium mining activities will not negatively impact livestock and wildlife, including endangered species. Protestants presented no controverting evidence.

## XIX. ISSUE N

**Will the Applicant's proposed activities negatively impact the use of property?**

**Recommendation:**

**UEC's proposed *in situ* uranium mining activities will have no substantial negative impact on the use of property.**

**A. Parties' Arguments**

**1. UEC**

UEC pointed out that the existing use of property within and surrounding the proposed mine permit area is examined primarily in the RML application process. But, before the Commission may grant an injection well permit, it must find that no existing rights, including, but not limited to, mineral rights, will be impaired. UEC argued that once it established a prima facie case by demonstrating compliance with the TCEQ regulatory scheme, the burden shifted to the Protestants to produce evidence establishing actual harm to the use of property. UEC argued that Protestants failed produce any such evidence.<sup>299</sup>

Chapters 1 and 3 of the Mine Application contain information regarding the proposed mine location and area land use.<sup>300</sup> In addition, Mr. Kuhl assessed current and historical land uses and concluded that no substantial impacts to existing land use patterns are expected as a result of the Project.<sup>301</sup>

According to UEC, during cross-examination of Mr. Kuhl, Goliad County spent considerable time speculating regarding different types of harm that *might* result from the issuance of the Mine Permit. But, according to UEC, Protestants failed to offer any evidence of

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<sup>299</sup> 30 TAC § 336.1111; UEC Ex. 6, Holmes Direct at 72; UEC Ex. 13, Kuhl Direct at 5-6.

<sup>300</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Chapters 1 and 3.

<sup>301</sup> UEC Ex. 13, Kuhl Direct at 8-9.

negative impacts or incompatibility between present land use and the operation of a technically sound mine.

Protestants argued that the land use portion of Mr. Kuhl's socioeconomic study was inadequate because he did not, for example, do a precise count of the houses in the area, did not know the name of the mayor of the city of Weser, did not know the exact number of church attendees, and did not know the exact number of adjacent property owners. UEC responded that aside from the fact that a house count is not standard for these types of studies,<sup>302</sup> the handful of homes in the area could easily be counted by anyone looking at Figure 3.2 in the Mine Application, where all residential properties are highlighted in yellow.<sup>303</sup> Similarly, the names and addresses of all adjacent property owners are contained in Tables 2.1 and 2.2 in the Mine Application, with Figure 2.1 providing a diagram of the same.<sup>304</sup> UEC further argued that Protestants also failed to make any credible link—because there is none—between how knowing the name of the mayor of Weser or the number of church attendees would in any way affect the content or quality of the land use analysis performed by Mr. Kuhl.

Protestants asked Mr. Kuhl whether he had “done any research on the decline in property values in this part of Goliad County subsequent to the announcement that there was an in-situ mine application.”<sup>305</sup> UEC responded that since TCEQ does not have jurisdiction to consider property values,<sup>306</sup> a quantitative analysis of property values by Mr. Kuhl would be superfluous. From a qualitative perspective, however, based on his experience, Mr. Kuhl was able to opine that:

Implementation of the proposed in situ recovery and satellite plant could, as an industrial land use, limit the potential of adjacent properties for future residential

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<sup>302</sup> Tr., Vol. 5 at 1080 (Kuhl).

<sup>303</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Figure 3.2.

<sup>304</sup> *Id.* at Chapter 2.

<sup>305</sup> Tr., Vol. 5 at 1060 (Kuhl).

<sup>306</sup> ED Ex. ED-10 at 27, Response 37 (noting that “the TCEQ’s jurisdiction is established by the legislature and is limited to the issues set forth in statute. Accordingly, the TCEQ does not have jurisdiction to consider the effects on property values when determining whether to approve or deny a permit application.”).



development during the approximate 9-year life of the mine. This effect should not, however, have substantial negative impacts on adjacent property values as limited future demand for residential development is expected . . . adjacent to the Mine Permit Area compared to a very large supply of available, undeveloped land suitable for residential development throughout the Project Area.<sup>307</sup>

UEC contended that the more noteworthy aspect of this line of questioning is that no Protestant put forth any evidence that the prospect of *in situ* mining in Goliad County has negatively affected property values. UEC claimed that the reason for this omission is that no negative effect has actually occurred.

## 2. Protestants

Protestants contended that UEC totally failed to sustain its burden of proof that UEC's proposed *in situ* mining will have no negative impact on the use of property. They further criticized the ED for failing to even consider negative impacts on use of property.<sup>308</sup> The Protestants additionally alleged: (1) the potential reduced availability of groundwater and (2) reduced cattle prices as clear examples of adverse impacts on the use of property. Regarding their claim of reduced availability of groundwater, the Protestants again referenced the District's ability/necessity to restrict groundwater pumping on property around the mine area. Concerning reduced cattle prices, the Protestants argued that if the cattle are known to have consumed water containing high uranium and radium-226 concentrations, buyers will be skeptical about buying them and the price will be reduced at best. They claim that the stigma will negatively affect cattle prices in Goliad County even if the cattle have not actually consumed contaminated water.

## 3. OPIC

OPIC did not address this issue.

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<sup>307</sup> UEC Ex. 13, Kuhl Direct at 9.

<sup>308</sup> Tr., Vol. 7 at 40 (Murry).

#### **4. Executive Director**

The ED explained that during the hearing and in post-hearing briefs, concepts of “property values” and “property rights” have been conflated and used interchangeably.<sup>309</sup> The ED then pointed out that the law regarding TCEQ’s jurisdiction over impacts on neighboring properties distinguishes these two.

The ED contended that as to property values, it is well-established that the TCEQ does not have jurisdiction to consider effects on property values when determining whether to approve or deny a Class III injection well application. The TCEQ’s jurisdiction is established by the legislature and is limited to the issues set forth in statute, which do not include effects on property values.

With respect to property rights, the ED noted that the TCEQ has limited jurisdiction over issues related to use and enjoyment of neighboring properties. Property rights-related laws and rules under the TCEQ’s jurisdiction are primarily prohibitions against the creation of a nuisance condition, such as nuisance odors. The ED’s draft permit specifically provides that the permit does not authorize any injury to persons or property or an invasion of other property rights, or any infringement of state or local law or regulations and that UEC may be subject to civil liability for damages caused to residents or landowners. The ED further argued that other than issues associated with consumption or contamination of groundwater, each of which are addressed elsewhere, no evidence was submitted at the hearing to suggest that UEC’s proposed activities will negatively impact the use of property in a way that is protected by any law or rule under the TCEQ’s jurisdiction.

#### **B. ALJ’s Analysis**

The ALJ finds that UEC sustained its burden of proof on this issue through the testimony of Mr. Kuhl. Protestants presented no controverting evidence. Moreover, the ALJ finds the

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<sup>309</sup> Tr., Vol. 7 at 36-43 (Murry).

Protestants' arguments that land and cattle values will be negatively impacted because of the "stigma" of uranium contaminated groundwater, are speculative and unsubstantiated in fact. The clear preponderance of the evidence proves that UEC's proposed uranium mining activities will not negatively impact the use of property.

## XX. ISSUE O

### **Will the Applicant's proposed activities adversely affect public health and welfare?**

#### **Recommendation:**

**UEC's proposed *in situ* mining activities will not adversely affect public health and welfare.**

#### **A. Parties' Arguments**

##### **1. UEC**

UEC again pointed out that one of the express purposes of the Injection Well Act is to maintain the quality of fresh water to the extent consistent with the public health and welfare and the operation of existing industries.<sup>310</sup> To grant an injection well permit, the Commission must find that the use and installation of the injection wells are in the public interest. Because Texas Water Code § 27.003 identifies public health and welfare as a policy to be advanced, it is a factor that is considered in making the public interest determination.

UEC asserted that as it discussed under Issues J, L, and R, the evidence establishes that fresh water is adequately and sufficiently protected from pollution. As it discussed under Issue M, the evidence establishes that air is adequately and sufficiently protected from pollution, that soil and vegetation is adequately and sufficiently protected from contamination, and that UEC's proposed activities will not negatively impact livestock and wildlife, including endangered species. UEC asserted that as it discussed under Issue K, the evidence establishes that local

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<sup>310</sup> TEX. WATER CODE § 27.003.

roadways are sufficient to handle traffic to and from the proposed facility. Finally, as discussed under Issue A, UEC asserted that its proposed mining operation and restoration activities will not adversely impact the public interest by unreasonably reducing the amount of groundwater available for permitting by the District.

UEC referred to the ED's statement that: "The rules are designed to protect human health and welfare in the local area through the closure of the site and restoration of the aquifer."<sup>311</sup> UEC concluded that by meeting its burden with respect to the other issues referred by the Commission, UEC has met its burden under this Issue O.

## **2. Protestants**

Protestants re-urged and relied on their "public interest" evidence and arguments submitted in connection with Issue A, with respect to this Issue O.

## **3. OPIC**

OPIC did not separately address this issue.

## **4. Executive Director**

The ED also pointed out that this issue encompasses many of the concerns raised in the more specific issues previously addressed. The ED asserted that no additional categories of concern that could fall under this issue were raised through evidence at the hearing and need to be addressed separately here. The ED concluded that compliance with a permit issued under the applicable statutes and rules is sufficient to maintain the quality of fresh water consistent with the public health and welfare and the operation of existing industries, taking into consideration

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<sup>311</sup> UEC Ex. 6, Holmes Direct, Ex. 12 at 15, Response 13.

the economic development of the state and will prevent underground injection that may pollute fresh water.<sup>312</sup>

**B. ALJ's Analysis**

The ALJ's analysis of this Issue O is subsumed within the public interest determination under Issue A.

**XXI. ISSUE P**

**Whether the proposed mining is within the recharge zone of the Gulf Coast Aquifer (Evangeline component).**

**Recommendation:**

**UEC's proposed *in situ* uranium mining is not within the recharge of the Gulf Coast Aquifer (Evangeline component).**

**A. Parties' Arguments**

**1. UEC**

UEC pointed out that there is no prohibition against *in situ* mining within a recharge zone of an aquifer.<sup>313</sup> UEC then presented the following summary of the evidence it claims shows that the proposed mining is not within the recharge zone of the Gulf Coast Aquifer (Evangeline component).

According to UEC, an outcrop is an exposure of a sedimentary deposit or rock layer at the surface of the Earth.<sup>314</sup> A recharge zone is the area of the outcrop where the majority of

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<sup>312</sup> 30 TAC § 331.1.

<sup>313</sup> ED Ex. ED-10 at 46, Response 69.

<sup>314</sup> UEC Ex. 1, Galloway Direct at 29.

recharge occurs.<sup>315</sup> Importantly, however, many areas of the Gulf Coast have surface-confining layers that greatly impede rainwater infiltration, keeping the moisture in the shallow layers and available to be evaporated or taken up by plants.<sup>316</sup>

UEC contended that the evidence shows that Sand A is overlain by just such a surface-confining layer within the graben between the Northwest and Southeast Faults,<sup>317</sup> so that Sand A does not receive significant recharge from surface precipitation in this area.<sup>318</sup> To the northwest of the Northwest Fault (upthrown side), however, Sand A outcrops and is exposed at the surface.<sup>319</sup> Consequently, significant recharge is possible in this area.<sup>320</sup> UEC pointed out that the focus of this issue is on the area where the proposed mining will occur. No mining will occur in Sand A outside the graben where Sand A outcrops.<sup>321</sup> UEC further explained that both inside and outside the graben, Sand A is isolated from Sand B by the confining unit underlying Sand A.<sup>322</sup> In contrast to Sand A, Sands B, C, and D do not outcrop within the proposed Mine Permit Area and do not receive surface recharge within the proposed Mine Permit Area.<sup>323</sup>

With respect to Protestants' testimony, UEC explained that Dr. Clark first testified that the Goliad Formation "outcrops in the area in a broad sense,"<sup>324</sup> which he later refined to the "Goliad Formation outcrop area here in the northern part of the county."<sup>325</sup> Next, he concluded that "[t]he site is no different from the rest of the Goliad outcrop, it is part of the recharge of the

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<sup>315</sup> UEC Ex. 10, Bennett Direct at 25.

<sup>316</sup> *Id.* at 26.

<sup>317</sup> UEC Ex. 1, Galloway Direct at 29; UEC Ex. 10, Bennett Direct at 34.

<sup>318</sup> UEC Ex. 10, Bennett Direct at 34.

<sup>319</sup> *Id.* at 34; UEC Ex. 1 Galloway Direct at 29; UEC Ex. 6, Holmes Direct, Ex. 12 at 53, Response 75. *See also*, ED Ex. ED -1, Murry Direct at 6.

<sup>320</sup> UEC Ex. 10, Bennett Direct at 34.

<sup>321</sup> *Id.*

<sup>322</sup> *Id.* at 34; UEC Ex. 1, Galloway Direct at 30-31 (testifying that the clay layers are "widespread sheets that extend across and beyond the Mine Permit Area.").

<sup>323</sup> UEC Ex. 10, Bennett Direct at 33-34; UEC Ex. 6, Holmes Direct, Ex. 12 at 53, Response 75.

<sup>324</sup> Goliad County Ex. 1, Clark Direct at 21.

<sup>325</sup> *Id.* at 22.

Evangeline Aquifer.”<sup>326</sup> However, according to Dr. Bennett, not every portion of an outcrop is a recharge area.<sup>327</sup> Furthermore, just because an extremely tiny quantity of water might someday make it through a clay layer overlying an aquifer,<sup>328</sup> does not mean that an area is a “recharge zone.”

UEC argued that logic demands that there be a relative aspect to this inquiry. Otherwise, under Dr. Clark’s analysis, the recharge zone is ubiquitous, and the inquiry is meaningless. UEC contended that the unreasonable nature of Dr. Clark’s interpretation is highlighted by his deposition testimony, where, in an effort to remain consistent with his prefiled testimony, he was forced to hedge when asked about local conditions, *e.g.*, testifying that water will “ultimately” reach Sand B from the ground surface in the Mine Permit Area.<sup>329</sup> UEC claims that besides the fact that this statement is incorrect,<sup>330</sup> it is also—like the rest of Dr. Clark’s analysis regarding this issue—not helpful or relevant. UEC urged that while many things may “ultimately” come to pass, the focus of the inquiries under these issues is a reasonable analysis of their meaning and significance in the context of the Texas UIC regulatory program and UEC’s Mine Application. Dr. Bennett’s expert definition of “recharge zone” as an area that receives significant, or at least measurable recharge, is both scientifically sound and meaningful in the context of this proceeding.

UEC argued that both Dr. Clark and Mr. Blandford offered testimony specifically regarding recharge with respect to Sand A. Dr. Clark testified that he disagrees with Dr. Bennett’s assessment of the impact of the clay layer above Sand A with respect to recharge because “[t]he clay over Sand A is not a continuous sheet.”<sup>331</sup> He supported his testimony by

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<sup>326</sup> *Id.*

<sup>327</sup> UEC Ex. 10, Bennett Direct at 25 (testifying that the recharge zone is the area of the outcrop—rather than the entire outcrop—where the majority of recharge occurs).

<sup>328</sup> *See e.g.*, UEC Ex. 10, Bennett Direct, Ex. 15 at 164-165 (Blandford, recalling that one of his modeling assumptions was .1 or .2 inches per year and that the other was “much less than that.”).

<sup>329</sup> UEC Ex. 10, Bennett Direct, Ex. 16 at 37.

<sup>330</sup> UEC Ex. 11, Bennett Issue P Rebuttal at 4.

<sup>331</sup> Goliad County Ex. 1, Clark Direct at 22.

pointing to statements from the Mine Application.<sup>332</sup> But, UEC pointed out that Dr. Bennett clarified that these statements actually refer to the area northwest of the Northwest Fault, not the area in which mining is contemplated.<sup>333</sup> Elsewhere in Dr. Clark's testimony, in apparent contradiction of his earlier comments regarding the "clay over Sand A,"<sup>334</sup> Dr. Clark tried to imply that the clay is not present over Sand A by questioning the accuracy of the geophysical logs at shallow depths, while at the same time disregarding the driller/lithologic logs.<sup>335</sup> UEC characterized this omission as odd since Dr. Clark referenced the drillers' logs in making his recharge argument, and at a different point in his testimony stated that "[d]riller's logs are another example of valuable information developed by field people."<sup>336</sup> Dr. Bennett, on the other hand, considered both types of logs in forming his opinion regarding the clay layer overlying Sand A.<sup>337</sup>

UEC pointed out that Mr. Blandford, meanwhile, on behalf of the District, stated both that "the proposed mining area is in the recharge zone"<sup>338</sup> and "[r]echarge *likely* occurs to Sand A across the entire site."<sup>339</sup> UEC then argued that in contrast, Dr. Bennett was quite clear in both his direct and rebuttal testimony, explaining that "Sand A does not receive significant recharge from surface precipitation,"<sup>340</sup> which means that the amount of recharge received by Sand A within the graben "would not be measurable."<sup>341</sup>

UEC stated that although Dr. Clark did not specifically address Sands B, C, or D in the context of recharge, he did admit during his deposition that Sands B, C, and D all outcrop outside

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<sup>332</sup> *Id.* at 22.

<sup>333</sup> UEC Ex. 11, Bennett Issue P Rebuttal at 4-5.

<sup>334</sup> Goliad County Ex. 1, Clark Direct at 22.

<sup>335</sup> *Id.* at 10.

<sup>336</sup> *Id.* at 15.

<sup>337</sup> UEC Ex. 11, Bennett Issue P Rebuttal at 6.

<sup>338</sup> District Ex. 3, Blandford Direct at 43.

<sup>339</sup> *Id.* at 44.

<sup>340</sup> UEC Ex. 10, Bennett Direct at 34; UEC Ex. 11, Bennett Issue P Rebuttal at 4.

<sup>341</sup> UEC Ex. 11, Bennett Issue P Rebuttal at 5.



the proposed Mine Permit Area.<sup>342</sup> UEC claimed that he also admitted that water falling on the surface of the proposed Mine Permit Area would not reach Sands B, C, or D within the life of the proposed mine.<sup>343</sup>

UEC argued that while Dr. Clark avoided directly addressing the potential for recharge of Sands B, C, and D within the proposed Mine Permit Area, he once again opined by implication. He testified that the Stauss well southwest of and outside the Mine Permit Area, showed tritium levels, indicating that “water has traveled from surface to depth in this area.”<sup>344</sup> Dr. Clark then hinted that data from this well is relevant to recharge in the deeper sands by noting that nearby logs “typically show alternating sands and clays to depth like at the site itself . . . [and] may be correlated to the sands at the site,” while carefully refraining from mentioning the actual depth of the Stauss well.<sup>345</sup> When asked about the depth of the Stauss well at his deposition, he suggested that it was 180 feet deep,<sup>346</sup> which, if the sands actually did correlate with the Mine Permit Area sands, would place the well in Sand B. UEC argued that this well actually revealed nothing about the potential for recharge to Sands B, C, or D, because as Dr. Bennett testified, the well is only 108 feet deep—which would correlate to the bottom of Sand A.<sup>347</sup> While it is possible that water recharging over 50 years ago could have moved to the Stauss well, as Dr. Bennett concluded, this fact is “meaningless with respect to the wells in the proposed Mine Permit Area inside the graben that are capped by overlying clays.”<sup>348</sup>

UEC further argued that, in an apparent attempt to bolster Dr. Clark’s recollection that farms west of the proposed Mine Permit Area have “sand or a silty sand at the surface” and a “clayey mix” at the surface on the Abrameit property (which is within the Mine Permit Area),<sup>349</sup>

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<sup>342</sup> UEC Ex. 10, Bennett Direct, Ex. 16 at 38.

<sup>343</sup> *Id.* at 39-41; UEC Ex. 6, Holmes Direct, Ex. 13 at 8.

<sup>344</sup> Goliad County Ex. 1, Clark Direct at 23.

<sup>345</sup> *Id.* at 23-24.

<sup>346</sup> UEC Ex. 10, Bennett Direct, Ex. 16 at 143.

<sup>347</sup> UEC Ex. 11, Bennett Issue P Rebuttal at 6.

<sup>348</sup> *Id.* at 6-7.

<sup>349</sup> Goliad County Ex. 1, Clark Direct at 21.

Mr. Kuhl was asked about the classification of topsoil within the proposed Mine Permit Area. As it turned out, Mr. Kuhl's testimony was completely consistent with Dr. Bennett's conclusion that there is no measurable recharge to Sand A within the graben.

According to UEC the average depth from ground surface to the top of Sand A within the graben is 45 feet.<sup>350</sup> Mr. Kuhl testified that he took measurements to a depth of 16 inches.<sup>351</sup> He then identified different classifications of soil from a custom soil resource report excerpt produced by Protestants; no depth was specified.<sup>352</sup> Similarly, Dr. Bennett was asked whether he consulted a soil survey in formulating his opinion regarding recharge, and Dr. Bennett confirmed that he did, but did not find it helpful.<sup>353</sup> Dr. Bennett explained that for purposes of this issue, "[t]he important part is the bottom, not the top . . . what's going on at the top could be completely misleading as to what is going on at the critical juncture, which is . . . the interface between the sand and the overlying unit."<sup>354</sup>

UEC pointed out that Goliad County also asked Dr. Bennett whether the presence of wetlands in two small areas within the proposed Mine Permit Area might indicate areas of recharge. Dr. Bennett, however, based on his experience studying and publishing on this topic, stated that wetlands are actually more common in discharge areas.<sup>355</sup> In other words, Dr. Bennett did not view the presence of wetlands as a reliable indicator of a recharge area.<sup>356</sup>

In summary, UEC argued that neither of these lines of inquiry cast any doubt on where the weight of the evidences lies on this issue—the proposed Mine Permit Area is not within the recharge zone of the Gulf Coast Aquifer. And most significantly, there is no evidence in the

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<sup>350</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 6-12 (Table 6.1).

<sup>351</sup> Tr., Vol. 5 at 1067 (Kuhl).

<sup>352</sup> *Id.* at 1075-1078; Goliad County Cross Ex. 20.

<sup>353</sup> Tr., Vol. 1 at 885 (Bennett).

<sup>354</sup> *Id.* at 887.

<sup>355</sup> *Id.* at 893-894.

<sup>356</sup> *Id.* at 894.

record to support an argument that *in situ* mining would not or should not be allowed within the recharge zone of the Gulf Coast Aquifer even if the Mine Permit Area *was* within it.<sup>357</sup>

## 2. Protestants

According to Protestants, the proposed mining will take place in the Goliad Formation. The Goliad Formation is a part of the Gulf Coast Aquifer. Geology expert witnesses Dr. Clark and Dr. Galloway, agreed that the site is on the outcrop of the Goliad Formation.<sup>358</sup> Recharge to an aquifer takes place when precipitation falls on the outcrop and infiltrates downward until it meets the water table, where it then moves down-gradient and is available to area water wells and as discharge to area streams. As Dr. Clark stated in his pre-filed testimony, based on his site visits and review of the drillers logs, Sand A, a component of the Goliad Formation at the site, outcrops at a number of places across the proposed mine permit site.<sup>359</sup> Protestants claimed that UEC's Mine Application also acknowledges that "Sand A [is] at the surface in the central part of the permit area and no overlying clay is present."<sup>360</sup>

In addition, Protestants argued that the United States Department of Agriculture soil map introduced at the hearing indicates that the site area includes a variety of soils.<sup>361</sup> Generally, the soils were described by UEC's witness, Mr. Kuhl, as sandy or sand involved.<sup>362</sup> Thus, according to Protestants, these areas at the proposed project site are open to receive rainfall and allow it to infiltrate downward. All geology witnesses agree that the sands of the Goliad Formation contain groundwater, and the sands on the site are no exception.

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<sup>357</sup> See, UEC Ex. 10, Bennet Direct at 45 (stating that "there is nothing special about a recharge zone . . . with respect to establishing and maintaining a cone of depression, or with respect to preventing excursions.").

<sup>358</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 7-9 (In-Situ Application); UEC Ex. 1, Galloway Direct at 29-10; Goliad County Cross Ex. 3, Goliad County Ex. 1, Clark Direct at 21-14.

<sup>359</sup> Goliad County Ex. 1, Clark Direct at 21-22.

<sup>360</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 6-14; *Id.* at 7-21 (In-Situ Application).

<sup>361</sup> Goliad County Cross Ex. 19.

<sup>362</sup> Tr., Vol. 5 at 1075-1077 (Kuhl).

Protestants contended there are other indicators that illustrate recharge, or infiltration to the groundwater system, that takes place in the area where mining is proposed. For example, the Stauss well, located southwest of the proposed mine site, is part of the USGS measurement network for the area and it shows the presence of tritium, a relic of atmospheric nuclear testing that took place several decades ago. Thus, Protestants claimed that rainfall containing tritium fell on the surface in the 1940s or 50s, infiltrated and entered the groundwater system and moved to the level of the screen of the Stauss well.<sup>363</sup> Protestants claimed the UEC's testing program also found that the Duderstadt wells, in the vicinity of the Northwest Fault and just outside the proposed permit boundary, showed nitrate levels typically associated with agricultural activities.<sup>364</sup> According to Protestants this observation would indicate that water containing the nitrates has infiltrated and moved to the point of the Duderstadt well screens where it was sampled. In summary, Protestants argued that the proposed mine site is in the recharge zone of the Gulf Coast Aquifer and behaves no differently from the expected hydrogeologic response all across the outcrop of the Goliad Formation.

### **3. OPIC**

OPIC did not address this Issue.

### **4. Executive Director**

According to the ED, there are no rule requirements prohibiting *in situ* mining within an aquifer recharge zone. Therefore, the ED did not attempt to determine whether the proposed mining would take place within the recharge zone of the Gulf Coast Aquifer (Evangeline component). However, the ED noted that Mr. Murry testified that the proposed mining would not occur in the recharge zone of the Gulf Coast Aquifer.<sup>365</sup>

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<sup>363</sup> Goliad County Ex. 1, Clark Direct at 23-25.

<sup>364</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 5-9 (In-Situ Application).

<sup>365</sup> ED Ex. ED-1, Murry Direct at 6.

**B. ALJ's Analysis**

The ALJ finds the testimony of Dr. Bennett most persuasive that the proposed uranium mining is not within the recharge zone of the Gulf Coast aquifer. But more importantly, the evidence is undisputed that there is no statute or rule prohibiting *in situ* mining within an aquifer recharge zone.

**XXII. ISSUE Q**

**Whether the Gulf Coast Aquifer is a confined aquifer in the areas of Goliad County where UEC will conduct UIC activities.**

**Recommendation:**

**All of the Sands that UEC proposes to mine are within the Gulf Coast Aquifer. Sand B, where UEC proposes to commence mining, and Sands C and D are confined. However, Sand A is unconfined.**

**A. Parties' Arguments**

**1. UEC**

UEC stated that aquifer confinement is not a regulatory requirement for *in situ* uranium mining or the designation of an exempt aquifer.<sup>366</sup> However, this does not mean that TCEQ does not evaluate the confined or unconfined nature of an aquifer when issuing individual production area authorizations. In fact, the ED has explicitly stated that confinement will be considered during the evaluation of any and all future UEC production area authorization applications.<sup>367</sup>

UEC explained that apart from the regulatory requirements (or in this case, the lack thereof), several witnesses correctly observed that, from a scientific standpoint, there is more

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<sup>366</sup> ED Ex. ED-10 at 46, Response 69; UEC Ex. 6, Holmes Direct at 75.

<sup>367</sup> ED Ex. ED-10 at 47, Response 69.

than one type of confinement.<sup>368</sup> As Dr. Bennett explained, confinement in the geologic sense generally means that the aquifer in question is bounded above and below by confining beds, but does not take into account groundwater flow.<sup>369</sup> In contrast, in hydrologic or hydraulic terms, a confined aquifer is an aquifer in which the saturated water-bearing zone is bounded by low permeability layers and is under pressure significantly greater than atmospheric pressure.<sup>370</sup> To aid in his explanation, Dr. Bennett included illustrations showing the difference between a hydraulically confined and hydraulically unconfined aquifer, as well as the differences between how an unconfined aquifer responds to pumping and how a confined aquifer responds to pumping.<sup>371</sup>

In addition to explaining confinement as a general scientific concept,<sup>372</sup> Dr. Bennett also testified specifically about the aquifer sands within the proposed Mine Permit Area.<sup>373</sup> In his expert opinion Sands B, C, and D meet every definition of a confined aquifer.<sup>374</sup> Sand A, on the other hand, is hydraulically unconfined but still isolated from the deeper sands by a low permeability layer in most of the Mine Permit Area.<sup>375</sup>

According to UEC, there was no real disagreement among the parties regarding Dr. Bennett's explanation of confinement. There was also a consensus that Sand A is a water table aquifer and hydraulically unconfined,<sup>376</sup> and that Sands B, C, and D are hydraulically

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<sup>368</sup> UEC Ex. 10, Bennett Direct at 12-14; District Ex. 3, Blandford Direct at 44; Goliad County Ex.1, Clark Direct at 22.

<sup>369</sup> UEC Ex. 10, Bennett Direct at 13.

<sup>370</sup> *Id.* at 13-14; ED Ex. ED-1, Murry Direct at 6-7.

<sup>371</sup> UEC Ex. 10, Bennett Direct, Ex. 3, 4, 5 and 6.

<sup>372</sup> UEC Ex. 10, Bennett Direct at 13-17; UEC Ex. 10, Bennett Direct, Ex. 3, 4, 5 and 6.

<sup>373</sup> *Id.* 28-31.

<sup>374</sup> *Id.* at 28; *see also*, UEC Ex. 6, Holmes Direct, Ex. 13, Chapter 6 at 6-10, 6-14, 6-16, Chapter 7 at 7-19, 7-21, 7-22 and Figures 6.7-6.13; UEC Ex. 6, Holmes Direct, Ex. 12 at 47, Response 69.

<sup>375</sup> *Id.*

<sup>376</sup> District Ex. 3, Blandford Direct at 44; ED Ex. ED-1, Murry Direct at 7; UEC Ex. 10, Bennett Direct at 28.

confined.<sup>377</sup> UEC contended that initially Dr. Clark appeared to be the lone dissenting voice on this issue, but in actuality, he was not. Rather, Dr. Clark's testimony focused on the "intuitive" definition of confinement—"blocked by walls on all six sides."<sup>378</sup> Dr. Clark's *hydrogeologic* definition of confinement is actually quite similar to the one agreed upon by all the other witnesses.<sup>379</sup> But, he chose to sidestep the scientific definition in favor of the intuitive "six sides" concept in reaching his opinion that the sands at the proposed mining site are "not confined."<sup>380</sup> UEC posited that since it has never claimed that the four sands proposed to be mined consist of six-sided hydrogeologic boxes—and the regulations certainly do not require them to be for purposes of mining—Dr. Clark's opinion regarding confinement is not meaningful in considering this issue.

## 2. Protestants

Protestants argued that the Gulf Coast Aquifer is not confined in the area where UEC proposes to conduct injection activities. They say that all parts of the aquifer in the area of the Goliad Formation outcrop and are unconfined,<sup>381</sup> groundwater makes its way through the aquifer system from recharge to discharge through water wells or into streams, albeit sometimes through a long and tortuous path. They contend this proposed mine site is not isolated or somehow set apart from the Gulf Coast Aquifer system. The concept of confinement has meaning at several levels. To a layperson, the word "confined" connotes a restriction or containment on all sides. The hydrogeologic idea of confinement involves containment by low permeability geologic materials above and below an aquifer (but not on four sides) coupled with hydraulic behavior demonstrating that confinement takes place.

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<sup>377</sup> District Ex. 3, Blandford Direct at 44; ED Ex. ED-1, Murry Direct at 7; UEC Ex. 10, Bennett Direct at 28.

<sup>378</sup> Goliad County Ex. 1, Clark Direct at 22-23.

<sup>379</sup> *Id.* at 22-23.

<sup>380</sup> *Id.* at 23.

<sup>381</sup> Goliad County Ex. 1, Clark Direct at 22-23.

According to Protestants, Sand A, the shallowest sand depicted by UEC in its Mine Application, is clearly unconfined both by bounding layers and hydraulically. Dr. Bennett testified that “Sand A . . . [is] not bounded by the low permeability layer above it. So, while it is isolated, it is not hydraulically confined.”<sup>382</sup> According to Protestants, their witnesses explained that water can enter the surface in the mine permit site area and move downward to the water table.<sup>383</sup> This can occur at some distance below the ground surface<sup>384</sup> and below any clays that may bound Sand A above. Therefore, Protestants claimed that Sand A is also unconfined in hydrogeologic terms since: (1) Sand A in the mine permit area is not bounded over the entirety of the mine site by a low permeability clay layer above,<sup>385</sup> (2) water in Sand A is under water table conditions, and (3) water in Sand A does not rise above its upper bound in existing wells. Furthermore, they contended that Sand A is unconfined in the area where UEC plans to mine uranium, which is along the Northwest Fault. They further claim that an outcropping of Sand A at the surface in the vicinity of the ore body in Sand A is illustrated by cross-sections A-A', B-B' and E-E' of the Mine Application.<sup>386</sup> Protestants contended that these cross-sections offer additional support that Sand A is hydraulically unconfined.

### **3. OPIC**

OPIC did not address this Issue.

### **4. Executive Director**

In his testimony Mr. Murry described a confined aquifer as one in which the groundwater is isolated from the atmosphere at the point of discharge by impermeable geologic formations. He further testified that groundwater in a confined aquifer generally is subject to pressure greater

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<sup>382</sup> Tr., Vol. 4 at 880 (Bennett).

<sup>383</sup> Goliad County Ex. 1, Clark Direct at 22; District Ex. 3, Blandford Direct at 44.

<sup>384</sup> UEC Ex. 6, Holmes Direct, Ex. 13, figure 6-22.

<sup>385</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at 7-21.

<sup>386</sup> UEC Ex. 6, Holmes Direct, Ex. 13, Appendix C, figures 6.8a[A-A'], 6.9a[B-B'], 6.12[E-E'].



than atmospheric, and that when a well is completed in a confined aquifer, the water level in the well will rise above the top of the confined aquifer.<sup>387</sup>

The ED explained that there are no rule requirements relating to mining in a confined or unconfined aquifer. Therefore, the ED did not evaluate the Mine Application to determine whether the Gulf Coast Aquifer is confined or unconfined in the area where UEC proposes to conduct *in situ* mining activities. However, as Mr. Murry testified, in section 6.2.1 of the application, UEC identifies Sand A as being unconfined in the proposed permit area. In the same section, UEC identifies Sand B, Sand C, and Sand D as being confined in the proposed permit area.<sup>388</sup> The ED stated that he accepted these statements as true, but did not need to rely on them in order to find that the Mine Application complies with any rule requirement.

According to the ED, the evidence suggests that designated Sand A is under unconfined conditions. While there is no rule prohibiting Class III injection into an unconfined aquifer, if it is determined that groundwater in Sand A is under unconfined conditions, the ED will evaluate whether the unconfined nature of Sand A requires additional monitoring or operational requirements, if and when UEC chooses to include Sand A as a production zone in a future PAA application.

## **B. ALJ's Analysis**

The ALJ finds that the preponderance of the evidence confirms that Sands B, C, and D, are confined and Sand A is unconfined. Although no statute or rule prohibits *in situ* mining in an unconfined aquifer, the ALJ notes the ED's stated intention, if and when UEC submits a PAA application to mine Sand A, to fully evaluate the unconfined nature of Sand A and establish monitoring and operational requirements appropriate for that condition.

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<sup>387</sup> ED Ex. ED-1, Murry Direct at 6-7.

<sup>388</sup> ED Ex. ED-1, Murry Direct at 7.

### XXIII. ISSUE R

**Whether mining fluids will migrate vertically or horizontally and contaminate an underground source of drinking water (USDW).**

#### **Recommendation:**

**Until the issue of the transmissivity of the Northwest Fault is resolved, the ALJ concludes that mining fluids may migrate vertically or horizontally and may contaminate a USDW.**

#### **A. Parties' Arguments**

##### **1. UEC**

According to UEC's expert witness, Dr. Bennett, fluid or water movement is not the same as the movement of constituents within the fluid or water.<sup>389</sup> This concept applies with equal respect to uranium and radium-226.<sup>390</sup> Further, because constituents are "subject to a number of geochemical processes and reactions that are known to retard their movement[,] . . . these geochemical processes and reactions must be considered."<sup>391</sup>

With respect to vertical migration, UEC provided evidence about the continuous nature of the confining layers within the proposed Mine Permit Area.<sup>392</sup> Moreover, UEC contended there is no evidence that Sand A is hydraulically connected with Sands B, C, or D,<sup>393</sup> and that mining fluids are not likely to migrate vertically during mining operations.<sup>394</sup> As additional protection, and as required by the regulations, UEC will put monitor wells in aquifers in

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<sup>389</sup> UEC Ex. 10, Bennett Direct at 19; *see also*, UEC Ex. 1, Galloway Direct at 13-14 (explaining that dispersion through the aquifer matrix may also slow the migration rate of dissolved constituents).

<sup>390</sup> *See e.g.*, UEC Ex. 11, Bennett PAA-1 Rebuttal at 9 (noting that "[u]ranium is an example of a reactive solute—it is naturally present in the aquifer, it undergoes reaction, and it can be retarded."); UEC Ex. 11, Issue R Rebuttal, Bennett at 6-7 (noting that beyond being a barrier to fluid flow, clay constitutes "a *chemical* barrier to migration of Ra-226"); UEC Ex. 4, Erskine Issue C Rebuttal at 16-17 (calculating the retardation factor associated with radium moving through sand).

<sup>391</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 2.

<sup>392</sup> UEC Ex. 1, Galloway Direct at 27-28.

<sup>393</sup> UEC Ex. 10, Bennett Direct at 31-32.

<sup>394</sup> UEC Ex. 10, Bennett Direct at 35-37.

overlying production zones<sup>395</sup> and will test the mechanical integrity on all production and injection wells.<sup>396</sup>

With respect to horizontal migration, during its mining operations, UEC will use a cone of depression,<sup>397</sup> well ring monitoring,<sup>398</sup> and corrective action if an excursion is detected.<sup>399</sup> UEC contended that these operational controls will help UEC prevent the horizontal migration of mining fluids during operations.<sup>400</sup> After mining is completed, as discussed under Issue L, UEC will restore each production area.<sup>401</sup>

**a. Vertical Migration Arguments**

**i. Conductivity of Confining Units**

Protestants argued that mining fluids can and will move through the clay confining layers between the sands. Protestants asserted that the vertical hydraulic conductivity of the confining units is relatively high due to (1) the heterogeneity of the confining layers themselves and (2) anomalies and artificial conduits in and through the layers. UEC responded that the preponderance of the evidence shows that both of these claims are unfounded.

UEC contrasted the testimony of the parties' expert witnesses. The District's expert witness, Mr. Blandford, testified that water and associated contaminants could move across a 20-foot clay layer within several months and across a 40-foot clay layer within a year.<sup>402</sup> He based that conclusion on an assumption of a vertical hydraulic conductive rate of 0.056 feet per day. In

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<sup>395</sup> UEC Ex. 5, Underdown Direct at 8-9.

<sup>396</sup> UEC Ex. 6, Holmes Direct at 9.

<sup>397</sup> UEC Ex. 5, Underdown Direct at 6-7; UEC Ex. 10, Bennett Direct at 38-41.

<sup>398</sup> UEC Ex. 5, Underdown Direct at 9-10 (providing the example of the PA-1 monitor well ring); UEC Ex. 6, Holmes Direct, Ex. 13 at 9.

<sup>399</sup> UEC Ex. 5, Underdown Direct at 7-9; UEC Ex. 10, Bennett Direct at 43-44; *see also*, UEC Ex. 8, Kelley Direct at 26-27 (discussing how the B-Sand model can be used to help prevent and manage excursions).

<sup>400</sup> UEC Ex. 10, Bennett Direct at 42-43.

<sup>401</sup> UEC Ex. 5, Underdown Direct at 22-23; UEC Ex. 6, Holmes Direct at 53-54, and 70.

<sup>402</sup> District Ex. 3, Blandford Direct at 26.

response, Dr. Bennett testified that the assumption was an absurdly high value to assign to the clay layers.<sup>403</sup> UEC argued that there was no reasonable basis for the choice,<sup>404</sup> given the extensive body of scientific information about the hydraulic properties of clay.<sup>405</sup>

UEC's expert witness, Dr. Galloway, explained that although the confining layers are heterogeneous, by percentage, very little of the confining layers is sand.<sup>406</sup> As a result, according to Dr. Galloway, the vertical hydraulic conductivity of these layers is low.<sup>407</sup> Similarly, Dr. Galloway asserted that the sand channels in the confining layers, ". . . constitute a small part of the total volume of the confining layers and there is typically several tens of feet of confining layer either above or below or both where the two or three examples of such sands . . . are seen."<sup>408</sup> Moreover, Dr. Galloway testified that a sandy clay could actually have a lower vertical hydraulic conductivity than a clay if the sediments are poorly sorted.<sup>409</sup>

Mr. Blandford testified that although the Mine Application contains qualitative information regarding the clay layers, it does not contain a specific number for the vertical hydraulic conductivity of the confining layers.<sup>410</sup> Dr. Bennett responded that the properties of clays and shales are well understood because they have been evaluated for decades.<sup>411</sup> Mr. Blandford testified that his conductivity calculations were applicable only to "conservative contaminants that migrate at the same velocity as the groundwater."<sup>412</sup>

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<sup>403</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 12.

<sup>404</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 13.

<sup>405</sup> *Id.* at 13-15; UEC Ex. 8, Kelley Issue R Rebuttal at 28-29.

<sup>406</sup> Tr., Vol. 1 at 86-87 (Galloway).

<sup>407</sup> Tr., Vol. 1 at 87 (Galloway).

<sup>408</sup> Tr., Vol. 1 at 106-107 (Galloway).

<sup>409</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 15.

<sup>410</sup> Tr., Vol. 6 at 1155 (Blandford).

<sup>411</sup> Tr., Vol. 4 at 937-938 (Bennett).

<sup>412</sup> District Ex. 3, Blandford Direct at 26.

**ii. Northwest Fault**

UEC challenged the expert testimony of witnesses for Protestants and the ED about vertical migration of mining fluids along the Northwest Fault. These arguments are discussed in detail in the analysis of Issue G.

**iii. Artificial Conduits through Confining Units**

UEC noted that Mr. Blandford also raised the issue of potential anomalies, which to him indicated a lack of continuity in the clay confining units.<sup>413</sup> However, according to UEC, the example he provided showed the confining unit to be more than 40 feet thick at the location he indicated.<sup>414</sup> Mr. Blandford also suggested that older pre-UEC boreholes are likely vertical conduits. UEC argued that Mr. Blandford's concern was unwarranted because (as he testified) the borehole walls are likely to collapse.<sup>415</sup> Dr. Bennett similarly testified that if a borehole were not plugged to applicable standards, it would collapse.<sup>416</sup>

**b. Horizontal Migration Arguments**

**i. Cone of Depression**

UEC pointed out that as with vertical migration, the Protestants raised a number of arguments as to why horizontal migration of mining fluids is likely. However, as UEC noted, some of these arguments are specific to the PAA-1 production area and are addressed in the discussion of PAA-1. UEC argued that with respect to Protestants' questioning of Mr. Murry concerning the potential insufficiency of a 1% bleed, Mr. Murry clarified that in Texas, 1% bleed

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<sup>413</sup> *Id.* at 22-23.

<sup>414</sup> UEC Ex. 1, Galloway Issue R Rebuttal at 31.

<sup>415</sup> UEC Ex. 11, Bennett Direct, Ex. 15 at 85-86; Tr., Vol 1 at 219 (Underdown).

<sup>416</sup> Tr., Vol. 4 at 947-956 (Bennett); *see also*, UEC Ex. 11, Bennett Issue R Rebuttal at 2-7.

is the norm, not the exception.<sup>417</sup> Moreover, according to UEC, Protestants' aspersions were effectively squelched by the rebuttal testimony of Dr. Bennett and Mr. Kelley.<sup>418</sup>

UEC also pointed out that, in cross-examining both Mr. Underdown and Mr. Kelley, the District questioned how a production area that is subject to a cone of depression can be kept "in balance" and mining fluids contained. Mr. Underdown responded by explaining his personal experience, which Mr. Kelley subsequently reiterated, explaining:

The purpose of balancing a well field is so that you have all the water all the way around the PAA coming into, and we do that with . . . monitoring the water levels. If we are injecting and we see the water level rising on one side of the PAA and dipping on the other, we know we are out of balance; we throw it back in balance.<sup>419</sup>

In other words, UEC argues that the water levels are monitored regularly and pumping is adjusted where and when needed to provide horizontal confinement.

## ii. Northwest Fault

The hydraulic qualities of the Northwest Fault were of concern to Protestants. Goliad County argued that lateral migration should be presumed based upon the juxtaposition of sands on certain cross-sections.<sup>420</sup> UEC argued that the water levels in wells on both sides of fault show a substantial decrease in static elevations because all the sands show a dramatic drop in water level across the fault, with an extremely high gradient (change in water table elevation divided by distance).<sup>421</sup> Dr. Bennett asserted that this indicates a marked decrease in hydraulic conductivity.<sup>422</sup> According to UEC, this data is particularly significant because it is independent of the Northwest Fault pump test.

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<sup>417</sup> Murry Cross-Examination, Tr., Vol 7 at 1399-1400; ED Ex. ED-17 at 66, Response 93.

<sup>418</sup> UEC Ex. 11, Bennett Rebuttal at 22-24; UEC Ex. 8, Kelley Rebuttal at 30-31.

<sup>419</sup> Underdown Cross-Examination, Tr., Vol 1 at 206.

<sup>420</sup> Tr., Vol. 7 at 1329-1333 (Murry).

<sup>421</sup> UEC Ex. 11, Bennett Issue G Rebuttal at 9-10.

<sup>422</sup> *Id.* at 10.

### iii. Migration of Constituents

UEC contended that Protestants' arguments assumed that the movement of mining fluids equates to movement of constituents, such as uranium and radium.<sup>423</sup> UEC's Dr. Bennett explained that all dissolved constituents are subject to hydrodynamic dispersion, such that the inevitable result is that the concentration of a dissolved contaminant must decrease down-gradient.<sup>424</sup>

UEC argued that uranium and radium involve at least two strong geochemical forces that work against their migration: reduction and retardation. Radium is strongly affected by sorption or retardation. UEC pointed out that almost all of the experts agreed that radium adheres to the surface of iron oxides and clays, which impedes it from migrating with groundwater.<sup>425</sup> Radium is also affected by decay.<sup>426</sup>

UEC contended that with respect to uranium, the bulk of the proposed mining area is located in a geochemically reducing environment.<sup>427</sup> UEC argued that Dr. Sass and Dr. Abitz testified about the natural reducing powers of the aquifer within the proposed Mine Permit Area.<sup>428</sup>

## 2. Protestants

Mr. Blandford testified that any boreholes left unplugged "are likely conduits for

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<sup>423</sup> See e.g., District Ex. 3, Blandford Direct at 22 (discussing potential vertical migration of "leach fluids.").

<sup>424</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 9.

<sup>425</sup> UEC Ex. 11, Bennett Direct, Ex. 15 at 133-135; UEC Ex. 11, Bennett Direct, Ex. 19 at 74-78; UEC Ex. 11, Bennett Direct, Ex. 20 at 54-55; UEC Ex. 11, Bennett Issue R Rebuttal at 8; UEC Ex. 4, Erskine Issue R Rebuttal at 32.

<sup>426</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 9.

<sup>427</sup> Tr., Vol. 1 at 31 (Galloway).

<sup>428</sup> Tr., Vol. 6 at 1144 (Sass); Tr., Vol 7 at 1116 (Abitz).

migration between sand units, and vertical migration through these old exploratory boreholes should be expected, particularly in the vicinity of injection wells.”<sup>429</sup> Protestants argued that Mr. Blandford determined that “61 of the [Moore Energy] boreholes [are] within the Sand B Production and Mine areas.”<sup>430</sup> Protestants claimed that UEC’s witness, Dr. Bennett, failed to controvert that the old boreholes are pathways for vertical migration of mining fluid or contaminated groundwater. They asserted that these boreholes are pathways for mining fluids to migrate vertically, fostering direct communication between the pregnant fluids (containing the solubilized uranium) and each respective overlying and underlying portion of the aquifer. Protestants specifically alleged that in Sand B, solubilized uranium has the potential to migrate vertically into Sands A and C.

Protestants also argued that the latest round of data collected by UEC from the Overlying Monitoring Wells (“OMWs”) indicates the water above PAA-1 is suitable for drinking. They claimed the highest reading of all nine OMWs for uranium is .016 mg/L, which is well within the EPA drinking water standard.<sup>431</sup> Similarly, the highest reading from any of the OMWs for radium concentration is 1 pCi/L, also well within the EPA drinking water standard.<sup>432</sup> Protestants concluded that this water is in jeopardy of being forever contaminated if mining is permitted to be conducted at the proposed site.

Protestants also argued that Dr. Bennett had no pump test data from the Southeast Fault,<sup>433</sup> and in fact, no witness for UEC testified that the Southeast Fault is sealing. As previously discussed, Protestants claimed the pump test data reveals that the Northwest Fault is transmissive. Protestants argued that mining fluids will potentially migrate horizontally outside the proposed mining areas and to existing water wells.

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<sup>429</sup> District Ex. 3, Blandford Direct at 13-14.

<sup>430</sup> District Ex. 3, Blandford Direct at 14.

<sup>431</sup> District Ex. 3, Sass Direct, Ex. 13, OMW 6.

<sup>432</sup> County Ex. 3, Sass Direct, Ex. 13, OMW 3.

<sup>433</sup> Tr., Vol. 4 at 914 (Bennett).



Protestants argued that the evidence is basically unchallenged that no mine site has been reclaimed to the original restoration table levels. They pointed out that in all cases studied by Dr. Darling and known to Mr. Holmes, the reclamation tables have been amended to leave behind higher levels of contaminants than was the case prior to mining. Further, Mr. Murry of the TCEQ testified that there are no requirements that such contamination be monitored after the amendment of the reclamation tables. Therefore, Protestants argued that the contamination of the USDW's is likely to occur.

### **3. OPIC**

OPIC did not address this issue.

### **4. Executive Director**

The ED referred to 30 TAC § 331.102, a rule that requires a mine operator to confine mining solutions to the production zone within the area of designated production zone monitor wells. Mr. Murry testified that the TCEQ rules require the use of a bleed and a ring of monitor wells in the production zone. The ED argued that the application meets the rule requirements for prevention and detection of migration of mining fluids.

## **B. ALJ's Analysis**

As the ED's witness, Mr. Murry, correctly noted, the TCEQ rules specifically address the obligation to confine mining solutions to the production zones within the areas of designated production zone monitor wells.<sup>434</sup> The questions of fact in this analysis included: (1) whether the applicant's proposed processes are appropriate for that purpose, and (2) whether the geology and hydrology of the proposed mining area are amenable to the confinement of mining solutions.

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<sup>434</sup> 30 TAC § 331.102.

**1. Whether the applicant's proposed processes are appropriate**

UEC's proposed methods of confinement have long been supported by the ED and accepted by the Commission. The use of a bleed is well-established as a method of forcing mining solutions to seek a nearby and maintained down-gradient point of exit. But, the evidence did not resolve the question of whether a 1% bleed or another percentage is most effective in achieving this goal. At best, UEC's and the ED's position seemed to be that the practice in Texas has been to rely on a 1% bleed. However, Texas' historical acceptance of a 1% bleed is not a substitute for an engineering-based explanation about the effectiveness of the use of one percentage over another. But, in the end, the Protestants' evidence was more in the nature of questions, challenges to sufficiency, rather than persuasive evidence that these methods were not sufficient. Thus, the ALJ concludes the preponderance of the evidence supports UEC's position, as supported by the ED's testimony.

The use of monitor well rings is another of the well-established processes that have been used in other *in situ* mines in Texas. Although the parties similarly disagreed on some of the technical details associated with the monitoring of the data, UEC's evidence on this point was not effectively challenged by the Protestants.

**2. Whether the geology and hydrology of the proposed mining area are amenable to the confinement of mining solutions**

This was the more difficult issue of the two issues, and the parties presented evidence on two fact-based sub-issues: (1) whether the boreholes compromised the natural protections of the existing geologic and hydrologic formations and (2) whether the characteristics of the naturally occurring characteristics of the earth are sufficient to protect the aquifers from pollution by the mining processes.

**(a) Whether the boreholes compromised the natural protections of the existing geologic and hydrologic formations**

The making of the boreholes preceded UEC's exploratory activities. The evidence was that these structures were poorly marked, and, more problematically, poorly documented about their depth and plugging, if any. Protestants' concerns, as supported by their experts' evidence, were based on the potential that these anomalies might provide conduits through which mining fluids might travel from one stratum of sand to another. In contrast, UEC's experts placed their faith, in part, on the lack of structural integrity of the boreholes themselves. The structures, contended UEC's experts, had likely collapsed because of: (1) the external pressure on these small uncased vents and (2) the natural weakness of uncased boreholes made in shale, clay, and sand. According to UEC, the certainty of their collapse ensures that the boreholes could not become a source of transmission of mining fluids.

The types of evidence that the ALJ would have found most persuasive on these issues would have included an engineering study of borehole transmissivity, a more complete examination of the existing boreholes, and the ED's history, if any, of seeking administrative action against a mine operator for its failure to detect and resolve excursions from boreholes. In their absence, the issue became a debate among hydrogeologists about the potential for problems related to boreholes.

The preponderance of the evidence is that the mine will be monitored carefully by UEC and will be subject to scrutiny by the ED during the initial phases of its development. Although Protestants' evidence raised questions about safety issues, the evidence presented by UEC and the ED was sufficient to provide assurance that the boreholes will be among the first points to be examined by them during the testing phase of the mining activities.

- (b) **Whether the naturally occurring characteristics of the earth are sufficient to protect the aquifers from pollution by the mining processes**

The primary question that emerged in this subissue was whether the Northwest Fault was transmissive. That question is addressed in detail in the analysis of Issue G and will not be reexplored here. The ALJ readopts the analysis on that point as the analysis of this subissue.

#### **XXIV. ISSUE S**

**Whether there are any USDWs within the injection zones proposed by UEC.**

**Recommendation:**

**There are USDWs within the injection zones proposed by UEC.**

**A. Parties' Arguments.**

**1. UEC**

UEC explained that a USDW is defined as an aquifer: (1) that supplies drinking water for human consumption; or (2) in which the groundwater contains fewer than 10,000 milligrams per liter total dissolved solids (TDS); and (3) that is not an exempted aquifer.<sup>435</sup> Importantly, UEC noted that an aquifer's status as an USDW does not necessarily mean that it contains water that meets federal or state drinking water quality standards.<sup>436</sup>

UEC referred to Figures 1.4 and 4.1 in the Mine Application showing that there are no drinking water wells within the proposed aquifer exemption area.<sup>437</sup> But, relying on the USDW definition of aquifer, UEC explained that the area within the proposed aquifer exemption boundary is not currently an exempt aquifer and the groundwater within the proposed Mine

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<sup>435</sup> 30 TAC § 331.2(107).

<sup>436</sup> UEC Ex. 10, Bennett Direct at 32.

<sup>437</sup> UEC Ex. 6, Holmes Direct, Ex. 13.

Permit Area contains fewer than 10,000 mg/l TDS.<sup>438</sup> Consequently, Sands A, B, C, and D are considered USDWs. UEC contended that it is not disputed that Sands A through D are USDWs; their USDW status is the reason UEC has requested an aquifer exemption.<sup>439</sup>

## **2. Protestants**

Protestants re-urged their argument made in connection with Issue E that water within the proposed injection zone currently serves as a source of drinking water for human consumption because there is no barrier to prevent water within the proposed mine area from migrating down-gradient to nearby domestic water wells. Protestants otherwise agreed with UEC that Sands A through D are USDWs.

## **3. OPIC**

OPIC did not address this Issue.

## **4. Executive Director**

The ED noted that it appears uncontroverted that there are USDWs within the injection zones proposed by UEC.

## **B. ALJ's Analysis**

The ALJ finds it is uncontroverted that there are USDWs within the injection zones proposed by UEC.

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<sup>438</sup> *Id.* at Chapter 5; Appendix A.

<sup>439</sup> ED Ex. ED-10 at 50, Response 72 (explaining that “UEC has requested an aquifer exemption . . . because the uranium ore bodies they [*sic*] wish to mine in this area occur in a water-bearing zone that meets the definition of an underground source of drinking water . . . .”); ED Ex. ED-1, Murry Direct at 6.

## XXV. ISSUE T

**Whether any USDWs within Goliad County will be adversely impacted by UEC's proposed in situ uranium operations.**

### **Recommendation:**

**Until the issue of the transmissivity of the Northwest Fault is resolved the ALJ concludes that USDWs within Goliad County outside the proposed aquifer exemption area may be adversely impacted by UEC's proposed *in situ* uranium operations.**

### **A. Parties' Arguments**

#### **1. UEC**

UEC explained that it cannot inject into the formation without an aquifer exemption.<sup>440</sup> Because of the regulatory distinction between USDWs and exempted portions of aquifers (discussed in Issues E and S), the only way that any USDWs within Goliad County would be adversely impacted by UEC's proposed operations is if mining fluids containing contaminants migrate out of the exempted aquifer area into surrounding USDWs.

UEC argued that as it discussed in detail under Issue R, the preponderance of the evidence shows that mining fluids will not migrate vertically or horizontally and contaminate a USDW.

#### **2. Protestants**

Goliad County reiterated its arguments about Issue E in which Goliad County explained the hydraulic connection between the proposed exemption zone and domestic water wells. Specifically, Goliad County contended that the two Braquet wells and the church wells to the southeast and all wells northwest of the proposed aquifer exemption area were demonstrated to

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<sup>440</sup> ED Ex. ED-7 at 1.

be down-gradient. Goliad County contends that based on the absence of any evidence that the southeast fault is sealing, and the indication that the Northwest Fault is transmissive, all water contaminated within the proposed exemption area will potentially migrate to any of the water wells that currently exist, which are depicted on Figure 4.1 of the Mine Application.

According to Goliad County, TCEQ rules make very clear that “no permit shall be allowed where an injection well causes or allows the movement of fluid that would result in the pollution of an underground source of drinking water.”<sup>441</sup> Thus, Goliad County concluded that the hydrogeologic characterization suggests there is no barrier to prevent the contaminated water within the injection zone from migrating towards adjacent domestic water wells used by neighboring citizens of Goliad County.

### **3. OPIC**

OPIC did not address this Issue.

### **4. Executive Director**

The ED pointed out that the aquifer within the permit area will be impacted by UEC’s proposed *in situ* mining operations. If the request for aquifer exemption is granted, then this portion of the aquifer is not a USDW. Portions of the aquifer outside the proposed exemption area may still qualify as USDWs. If the permits and aquifer exemption are granted, UEC will be required to confine mining solutions within the area of the designated production zone monitor wells to protect USDWs. After mining is completed, UEC will be required to restore the groundwater to the levels in the restoration table of each production area. The ED expected that no USDWs will be adversely impacted by UEC’s proposed operations as long as UEC complies with the statutes, rules, and any permits it is issued.

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<sup>441</sup> 30 TAC § 331.5.

**B. ALJ's Analysis**

The ALJ adopts the analyses of Issues G and R by reference without further elaboration here.

**XXVI. ISSUE U**

**Whether there is a “practical, economic and feasible alternative to an injection well reasonably available” within the meaning of that term as set forth in TEX. WATER CODE § 27.051(d)(2).**

**Recommendation:**

**There is no practicable, economic and feasible alternative to an injection well reasonably available within the meaning of TEX. WATER CODE § 27.051(d)(2).**

**A. Parties' Arguments**

**1. UEC**

UEC explained that the Mine Application includes an analysis of the alternative methods for recovering uranium -- *i.e.*, underground and open pit (surface) mining.<sup>442</sup> As explained therein, both of these alternative methods involve de-watering the production zone sands and removing huge quantities of surface and subsurface material (*i.e.*, the overburden) through the use of heavy equipment. According to UEC, both of these methods result in the creation of substantial amounts of solid waste (*i.e.*, tailings).<sup>443</sup> The *in situ* process, on the other hand, does not require the de-watering of the aquifer or the removal of overburden, and it does not result in the creation of tailings.<sup>444</sup> Thus, UEC argued that as compared to the available alternatives, *in situ* mining greatly minimizes physical damage to the land and subsurface and results in much

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<sup>442</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at viii-x; *see also*, UEC Ex. 6, Holmes Direct at 78-80.

<sup>443</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at ix-x.

<sup>444</sup> *Id.* at viii-x.



less solid waste.<sup>445</sup> UEC also pointed to the ED's response to public comments regarding the Mine Application where the ED states "that the advantages of *in situ* mining techniques as compared to surface mining or underground mining are that surface destruction is minimized and there are fewer tailings or overburden wastes produced."<sup>446</sup> As the ED also noted, "This enables the land to be decommissioned and reclaimed back to its pre-mining character."<sup>447</sup> In addition, the ED explained that "[u]nderground mining is more dangerous for workers than other methods because of exposure to gases trapped in the underground mining tunnels."<sup>448</sup>

According to UEC, the advantages of *in situ* mining as compared to open pit mining were further highlighted in the direct testimony of Dr. Reagor, a veterinary toxicologist. Dr. Reagor conducted veterinary diagnostic work on cattle that became ill during the operation of an adjacent open pit uranium mine in Karnes County.<sup>449</sup> He testified that "once the mining operator switched from the open pit mining process to the *in situ* process and cleaned up the surface contamination associated with the open pit mining, the health problems with the adjacent cattle ceased."<sup>450</sup>

UEC also claimed as it explained in the Mine Application, given the nature of the deposits in Goliad, both underground and open pit mining are cost-prohibitive in the current market.<sup>451</sup> UEC concludes that for all of these reasons, neither underground nor open pit mining is a practical, economic or feasible alternative to the use of injection wells.

UEC pointed out that neither of the Protestants offered any specific testimony on this issue. Also, during cross-examination of UEC's witnesses and the ED's witness at the hearing, neither of them questioned the determination that there are no practical, economic, and feasible

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<sup>445</sup> *Id.*

<sup>446</sup> UEC Ex. 6, Holmes Direct, Ex. 12, Response No. 38 at 28; *see also, Id.* at Response No. 11 at 13-14.

<sup>447</sup> *Id.*

<sup>448</sup> UEC Ex. 6, Holmes Direct, Ex. 12, Response No. 11 at 14.

<sup>449</sup> UEC Ex. 12, Reagor Direct at 3.

<sup>450</sup> *Id.* at 3-4.

<sup>451</sup> UEC Ex. 6, Holmes Direct, Ex. 13 at x; *see also, UEC Ex. 6, Holmes Direct at 79.*

alternatives to the use of injection wells for uranium mining at the Mine Permit Area. Instead, the County implied, through its cross-examination of Mr. Murry, that the ED should have considered possible alternative locations for the injection wells.<sup>452</sup> UEC argued that this argument is without merit for at least two reasons. First, as explained above, TEX. WATER CODE § 27.051(d) requires TCEQ, as part of its public interest analysis, to consider whether there is a practical, economic and feasible alternative to the installation and use of an injection well, not whether may be an alternative location for the injection well.<sup>453</sup> Second, it is obviously not possible (much less practical, economic, and feasible) to recover the uranium at the Mine Permit Area through the installation and use of injection wells that are located elsewhere.

## 2. Protestants

Protestants argued that Goliad County is only one of many uranium deposits proposed to be mined in Texas. According to Goliad County, UEC has recently purchased an operation that is already in the process of extracting uranium. It claims these other mines are alternatives to extracting the deposits identified at the Goliad Project. The water quality at the Goliad Project has not been shown to be unusable. Other locations may have poorer water quality. For example, Mr. Murry testified that it would be preferable to conduct in-situ mining in locations where the water exceeded 10,000 TDS.<sup>454</sup> Goliad County pointed out that every water quality sample taken at the proposed Goliad Project detected less than 1,000 TDS, which is the Texas drinking water standard. It also claimed that the water quality for all constituents appears to have been below drinking water standards prior to UEC's presence. According to Goliad County, some Texas county governments support uranium mining. Goliad County and its citizens have been opposed to uranium mining since the inception of uranium mining in the area. Goliad County argued that UEC should pursue mining in another county where the water is of poorer quality and the presence of UEC will be welcomed.

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<sup>452</sup> Tr., Vol. 6 at 1236-1238 (Murry).

<sup>453</sup> See *supra*, Section I.D.3 (citing TEX. WATER CODE ANN. § 27.051(d)(2) (Vernon Supp. 2009); Pilgrim's Pride Proposal for Decision at 39.

<sup>454</sup> Tr., Vol. 6 at 1238 (Murry).

In determining if the use or installation of an injection well is in the public interest under subsection (a)(1), the Commission is required to consider “. . . whether there is a practical, economic, and feasible alternative to an injection well reasonably available.”<sup>455</sup> Goliad County asserted that the ED appears to have not considered alternative sites in his evaluation of practicable and feasible alternatives to the proposed Goliad Project.<sup>456</sup> According to the Protestants, the determination that this project has no practical, economic, and feasible alternative overlooked two primary components – clean water and opposition from concerned citizens.

Goliad County argued that the importance of the consideration of another site becomes more important in the context of the evidence that reclamation has never been satisfactorily concluded in Texas and that every mine has sought an amendment from the original restoration levels. It claims the past poor performance of *in situ* mining in Texas must be considered in the analysis of site suitability. At the least, sites should be found that are not surrounded by groundwater users as is this site in Goliad County. Protestants claim that contaminated water will remain after mining, will not be remediated, and will migrate off-site to despoil nearby water wells. Goliad County has opposed this mine site because of the potential threat to its water quality. A serious and informed analysis of alternative sites should be required prior to the issuance of this permit.

### **3. OPIC**

OPIC did not address this issue.

### **4. Executive Director**

The ED explained that the Project Overview section of the Class III injection well application describes surface mining and underground mining as alternative techniques for

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<sup>455</sup> TEX. WATER CODE § 27.051(d)(2).

<sup>456</sup> Tr., Vol. 6 at 1237 (Murry).

recovering uranium. In a response to a Notice of Deficiency, UEC provided additional information regarding how the Class III well is in the public interest.<sup>457</sup> The response addresses alternatives to the use of an injection well, among other things. The ED evaluated the information submitted, including the alternatives of surface and underground mining and concluded that there is no practical, economic, and feasible alternative to an injection well reasonably available.

## **B. ALJ's Analysis**

The ALJ recognizes the sincerity of Goliad County's attempts to persuade UEC to go someplace else to find uranium where they will be more welcome. However, the ALJ finds no support for this position in law. The issue is whether there is a better alternative means to mine the uranium than the *in situ* process. The issue is not whether there is another location where uranium can be mined. Thus, the ALJ finds it is undisputed that there is no practical, economic, and feasible alternative to the use of injection wells for *in situ* mining of uranium at the Goliad site.

## **XXVII. APPLICATION FOR PAA-1**

UEC's PAA-1 application was directly referred for SOAH's determination of whether the application complies with all applicable statutory and regulatory requirements.<sup>458</sup> The application must include a: (1) mine plan; (2) restoration table; (3) baseline water quality table; (4) control parameter upper limits; (5) monitor well locations; (6) cost estimate for aquifer restoration and well plugging and abandonment; and (7) other information reasonably required by the ED to evaluate the application.<sup>459</sup> If found to be compliant with all regulatory requirements, issuance of the PAA is contingent on the issuance of the Mine Permit.

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<sup>457</sup> UEC Ex. 6, Holmes, Ex. 13, Class III UIC application, Project Overview at x-xiii.

<sup>458</sup> 30 TAC §55.210(b).

<sup>459</sup> 30 TAC § 305.49(b).

**A. Mine Plan**

A mine plan is defined as a plan for operations at a mine, consisting of: (A) a map of the permit area identifying the location and extent of existing and proposed production areas; and (B) an estimated schedule indicating the sequence and timetable for mining and any required aquifer restoration.<sup>460</sup> Mine plans are “living” documents, which are updated every year as part of a mine permit’s annual report.<sup>461</sup> The adequacy of UEC’s mine plan was not disputed.

**B. Restoration Table and Baseline Water Quality Table**

Protestants relied substantially on the evidence and arguments presented in connection with Issues B, C, and L. The ALJ adopts by reference his proposed findings and recommendations with respect to those issues, including that the baseline water quality table and the restoration table should be amended to reflect the average of all three rounds of baseline groundwater quality sampling for all constituents. Thus, the ALJ finds that the PAA-1 Application fails to comply with the statutory and regulatory requirements for the baseline water quality table and the restoration table unless amended.

**C. Control Parameter Upper Limits**

Control parameters are any physical parameter or chemical constituent of groundwater monitored on a routine basis used to detect or confirm the presence of mining solutions in a designated monitor well.<sup>462</sup> Control parameter upper limits for production zone monitor wells shall be determined from pre-mining groundwater sample data from production zone monitor wells, and control parameter upper limits for nonproduction zone monitor wells shall be

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<sup>460</sup> 30 TAC § 331.2(63).

<sup>461</sup> See, ED Ex. ED-6, Part V.G.5.d. (requiring, as part of UEC’s draft mine permit, an annual report that includes “[a]n updated mine plan showing the estimated schedule of the sequence and timing for mining and aquifer restoration in each production area authorization.”); 30 TAC § 331.85.

<sup>462</sup> 30 TAC § 331.2(28).

determined from pre-mining groundwater sample data from nonproduction zone monitor wells.<sup>463</sup> TCEQ's PAA application form instructs applicants to provide a proposed control parameter table based on the groundwater analysis summary table with the control parameter upper limit being either 25% or 5 mg/l above the highest value for each control parameter.<sup>464</sup>

UEC proposed to use chlorides and conductivity as control parameters.<sup>465</sup> In this case, conductivity is a measure of water's ability to conduct electrical current, and is influenced by the composition of the material in the water.<sup>466</sup> Because of the production process, the mining fluid will contain elevated levels of chlorides.<sup>467</sup> The proposed upper limits control parameters are contained in Table 6.5 in the PAA-1 Application<sup>468</sup> and Attachment 5 of the Draft PAA-1.<sup>469</sup> The control parameters were calculated by adding 25% to the highest recorded values for chloride and conductivity for both the production zone and non-production zone monitor wells.<sup>470</sup>

Protestants did not oppose the use of chlorides and conductivity as control parameters, but they did oppose the upper control limits set by UEC. Goliad County argued that UEC set the upper limits by adding 25% to the highest sample taken rather than the average sample concentrations. It claims that by setting the upper limits too high excursions will go undetected. Thus, it urges that the upper limits be set by adding 25% to the average sample concentrations.

Both of the District's witnesses addressed control parameters in their testimony. Mr. Blandford argued that UEC's proposed control parameter values do not meet the applicable regulatory requirements in that they will not provide for timely detection because their threshold

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<sup>463</sup> 30 TAC § 331.104(e).

<sup>464</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Application Form at 9.

<sup>465</sup> UEC Ex. 6, Holmes Direct, Ex. 20 at 6.

<sup>466</sup> UEC Ex. 5, Underdown Direct at 7.

<sup>467</sup> *Id.* at 8.

<sup>468</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Chapter 6.

<sup>469</sup> UEC Ex. 6, Holmes Direct, Ex. 19, Attachment 5.

<sup>470</sup> UEC Ex. 6, Holmes Direct, Ex. 20 at 6.

levels are set too high.<sup>471</sup> Dr. Abitz opined that UEC's choice of control parameters was insufficient because uranium was excluded.<sup>472</sup>

UEC responded to Protestants that in setting the upper limits for the control parameters, UEC followed TCEQ's explicit instructions.<sup>473</sup> In addition, Mr. Underdown testified that based on his previous experience working at *in situ* uranium mines, upper limits as proposed by UEC are sensitive enough to allow operators to detect changes in groundwater, even, at times, when incursions of natural groundwater containing higher levels of the control parameters occur.<sup>474</sup> UEC asserted that the ED agrees that the proposed control parameters are properly set. In his Response to Comments for the PAA-1 Application, the ED explained that the method of 1.25 times the highest value "has been successful in detecting excursions at South Texas *in situ* uranium mining sites."<sup>475</sup>

Regarding Dr. Abitz's opinion that UEC's choice of control parameters was insufficient because uranium was excluded,<sup>476</sup> UEC responded by referring to the testimony of Dr. Bennett where he explained:

A good control parameter is one that is a strong indicator of the *in situ* mining process and that is not subject to significant retardation. As I explained previously, uranium is redox-sensitive, meaning that while it readily drops into solution when it encounters oxidants such as mining fluids, it likewise readily drops out of solution when it encounters reductants. Both Dr. Erskine and Dr. Sass have emphasized the reducing capacity of the aquifers in the Mine Permit Area. Uranium is an example of a reactive solute – it is naturally present in the aquifer, it undergoes reaction, and it can be retarded. The ideal control parameter

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<sup>471</sup> District Ex. 3, Blandford Direct at 42.

<sup>472</sup> District Ex. 1, Abitz Direct at 34-35.

<sup>473</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Application Form.

<sup>474</sup> Tr., Vol. 1 at 211-213 (Underdown).

<sup>475</sup> ED Ex. ED-17 at 67, Response 95.

<sup>476</sup> District Ex. 1, Abitz Direct at 34-35.

is present in the mining fluid, and it is a conservative, *e.g.*, chloride. Uranium would be a poor choice for a control parameter.<sup>477</sup>

As explained in the ED's Response to Comments, the ED does not consider uranium to be a necessary control parameter because uranium is not readily mobile as it travels from the oxidized conditions in the production zone of the production area toward the non-oxidized conditions at a monitor well. The ED also approves the methodology for determining the upper limits by adding a percentage to the highest pre-mining level measured in a monitoring well.<sup>478</sup>

Considering the totality of the evidence the ALJ finds that the control parameter upper limits proposed by UEC and contained in the draft PAA comply with the applicable statutory and regulatory requirements.

#### **D. Monitor Well Locations**

The subchapter F standards of Chapter 331 specify how production and non-production zone monitoring wells shall be spaced. For production zone monitoring:

Designated production zone monitor wells shall be spaced no greater than 400 feet from the production area, as determined by exploratory drilling. The angle formed by lines drawn from any production well to the two nearest monitor wells will not be greater than 75 degrees.<sup>479</sup>

And for non-production zone monitoring:

At a minimum, designated non-production zone monitor wells shall be completed in the production area in any freshwater aquifer overlying the production zone. These wells shall be located . . . with a minimum of one per every four acres of production area for wells completed in the first overlying freshwater aquifer . . .<sup>480</sup>

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<sup>477</sup> UEC Ex. 11, Bennett PAA-1 Rebuttal at 9; *see also*, ED Ex. ED-17 at 61, Response 84.

<sup>478</sup> ED Ex. ED-17, Responses 81 and 84.

<sup>479</sup> 30 TAC § 331.103(a).

<sup>480</sup> 30 TAC § 331.103(b).



According to Protestants, UEC has developed a monitoring well system that is inadequate to protect groundwater outside the proposed project area. The Commission's rules require that "designated production zone monitor wells shall be spaced no greater than 400 feet from the production area, as determined by exploratory drilling." 30 TAC § 331.103(a). The District's expert witness, Dr. Blandford, testified that the monitor wells were exactly 400 feet from the production area,<sup>481</sup> the furthest distance allowable by the TCEQ rules. Protestants argued that the wording of the rule indicates that the Commission has discretion as to whether to accept the placement and number of monitor wells proposed by an applicant. Dr. Blandford testified, "the regulations do not require that Production Zone monitor wells be placed 400 feet from the Production Zone, rather the 400 foot constraint is a maximum."<sup>482</sup>

Protestants contended that 400 feet is too far away to serve the purpose of "monitor[ing] for excursions that may occur during the mining operation and allow for timely corrective action."<sup>483</sup> Dr. Blandford ran simulations for migration of contaminants at the project site and concluded that "there is extremely little chance, if any, that horizontal excursions will be detected at any of the Production Zone monitor wells during the period of active mining, let alone be detected in sufficient time to actually allow for remedial action to be implemented."<sup>484</sup> Protestants also claimed that Mr. Murry agreed with Dr. Blandford's opinion that, at those flow rates, contaminants would not reach the monitor wells 400 feet away.<sup>485</sup> In summary, Protestants argued that if UEC is going to have any ability to ensure control over contaminants, it is vital that the monitor well system be brought in closer than the maximum distance of 400 feet.

In response, UEC pointed out there is no dispute that the monitoring well system satisfies applicable regulatory requirements. On the other hand, Protestants contend that UEC should be required to do more than satisfy the statutory and regulatory requirements. UEC urged that Protestants' position is based on arguments that UEC's experts showed to have no merit. For

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<sup>481</sup> District Ex. 3, Blandford Pre-filed Direct at 31.

<sup>482</sup> *Id.* at 32.

<sup>483</sup> *Id.*

<sup>484</sup> *Id.* at 39.

<sup>485</sup> Tr., Vol. 7 at 1269 (Murry).

example, Mr. Blandford expressed concern that given the flat gradient and speed of groundwater movement, “[t]here is extremely little chance, if any”<sup>486</sup> that groundwater,<sup>487</sup> even when injected at an “extreme”<sup>488</sup> rate of 93 gallons per minute with no attempt at containment through bleed, will make it to the monitoring well ring during mining operations.<sup>489</sup> However, according to UEC there are a number of reasons why Mr. Blandford’s concern is not a troubling one in the context of this proceeding. First, UEC’s monitoring well ring meets the applicable regulatory requirements. Second, as Dr. Bennett pointed out, Mr. Blandford’s modeling did nothing to support his ultimate conclusion that contaminated water will be left in place at the end of mining,<sup>490</sup> because he did not model containment measures or restoration.<sup>491</sup> Third, there is evidence in the record that the monitoring system actually *will* work.<sup>492</sup> Fourth, Mr. Blandford overlooked the point that the baseline monitoring wells will be used not only for measuring water quality, but also for measuring water levels to ensure containment of fluids within the production area.<sup>493</sup>

The ED found that the location of the monitoring wells meets the requirements of 30 TAC § 331.103(a) and (b).

The ALJ finds there is no real dispute as to whether UEC’s proposed monitoring well system satisfies the applicable statutory and regulatory requirements. Moreover, based on the preponderance of the evidence the ALJ finds unpersuasive the Protestants’ position that there should be a greater number of monitor wells located in closer proximity.

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<sup>486</sup> District Ex. 3, Blandford Direct at 39.

<sup>487</sup> *Id.* at 37.

<sup>488</sup> *Id.* at 39.

<sup>489</sup> *Id.*

<sup>490</sup> District Ex. 3, Blandford Direct at 40.

<sup>491</sup> UEC Ex. 11, Bennett Issue R Rebuttal at 23-24.

<sup>492</sup> Tr., Vol. 1 at 206-207 (Underdown); Tr., Vol 3 at 761 (Kelley).

<sup>493</sup> *See supra*, at Part II.R.3.b.

### **E. Cost Estimates for Aquifer Restoration and Well Plugging and Abandonment**

The financial assurance requirements for production area authorizations are set forth in 30 TAC § 331.143.<sup>494</sup> The applicable portions of this rule require: (a) the preparation of written cost estimates of plugging and abandonment and aquifer restoration;<sup>495</sup> (b) that these cost estimates take into account all costs related to these activities and be kept at the facility for the life of the project;<sup>496</sup> and (c) that these estimates be reviewed and updated as necessary on an annual basis, including adjustments for inflation.<sup>497</sup> With respect to well plugging, 30 TAC § 331.143 incorporates by reference the requirements listed in 30 TAC §§ 331.46 and 331.86.<sup>498</sup>

The applicable portions of 30 TAC § 331.46 contain requirements that well plugs shall not allow the movement of fluids through the wells, out of the injection zone or to the land surface and shall consist of cement or an equally protective material;<sup>499</sup> closure plans must demonstrate that no movement of contaminants that will cause pollution from the production zone into a USDW will occur;<sup>500</sup> and lists factors for consideration in determining the adequacy of plugging and abandonment plans.<sup>501</sup>

While 30 TAC § 331.46 concerns the closure standards and plan, 30 TAC § 331.86 lays out the timeframe for effectuating plugging and abandonment and requires written acknowledgment from the ED after the fact.<sup>502</sup>

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<sup>494</sup> See e.g., 30 TAC § 331.142(a) (pointing to § 331.143 for the determination of the amount of financial assurance required for Class III wells).

<sup>495</sup> 30 TAC § 331.143(a); see also, UEC Ex. 6, Holmes Direct, Ex. 20 at 8 (noting that “[w]ith the adoption of new rules as of March 12, 2009, applicants are required to provide a cost estimate for groundwater restoration in a production area authorization application.”).

<sup>496</sup> 30 TAC § 331.143(b), (c).

<sup>497</sup> 30 TAC §§ 331.143(d), 37.131.

<sup>498</sup> 30 TAC § 331.143(b)(1).

<sup>499</sup> 30 TAC § 331.46(e).

<sup>500</sup> 30 TAC § 331.46(j).

<sup>501</sup> 30 TAC § 331.46(k).

<sup>502</sup> 30 TAC § 331.86.

According to UEC, Chapter 8 of the PAA-1 Application contains a plugging and abandonment cost estimate, which covers the plugging of monitoring wells, baseline wells and injectors/extractors.<sup>503</sup> The closure plan also specifies that the plugging material will be cement,<sup>504</sup> and details the quantity of cement needed to cement each well from bottom to top, which will prevent movement of fluids through the wells, out of the injection zone or to the land surface.<sup>505</sup> The methodology for protecting surrounding USDWs during closure is described in Chapters 4 and 7 of the PAA-1 Application.<sup>506</sup> Specifically, updated restoration techniques will be employed,<sup>507</sup> and bleed<sup>508</sup> and monitoring<sup>509</sup> will be maintained during restoration.

UEC explained that a detailed cost estimate for the restoration of groundwater is included in PAA-1.<sup>510</sup> This estimate factors in pumping and electrical costs, treatment costs, repairs and maintenance, labor, laboratory analysis, and operating expenses, while taking into account the number and size of well patterns, screen lengths, effective porosity and a flare factor.<sup>511</sup>

UEC emphasized that the ED conducted a thorough review and declared the PAA-1 Application, including the financial assurance information, to be both administratively and

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<sup>503</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Table 8.1.

<sup>504</sup> *Id.* at Table 8.3 (listing components of the well plugging and abandonment cost estimate).

<sup>505</sup> *Id.* at Table 8.4 (detailing cement cost estimates for all wells within PA-1); *see also*, UEC Ex. 6, Holmes Direct, Ex. 13 at 8.

<sup>506</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Chapters 4 and 7; *see also*, UEC Ex. 6, Holmes Direct, Ex. 13 at 9-15 (stating that “[t]his negative pressure gradient system will remain in place throughout operations and until the affected production zones have been fully restored to pre-mining uses.”).

<sup>507</sup> *Id.* at 7.

<sup>508</sup> *Id.* at 4; *see also*, UEC Ex. 6, Holmes Direct, Ex. 13 at 9-15 (stating that “[t]his negative pressure gradient system will remain in place throughout operations and until the affected production zones have been fully restored to pre-mining uses.”).

<sup>509</sup> *Id.* at 4; *see also*, UEC Ex. 6, Holmes Direct, Ex. 11 at 5, Sections 3 and 4 (detailing restoration and stability sampling requirements).

<sup>510</sup> UEC Ex. 6, Holmes Direct, Ex. 20, Table 8.5.

<sup>511</sup> *Id.*

technically complete.<sup>512</sup> Moreover, neither Protestant presented any evidence disputing UEC's compliance with the financial surety requirements for PAA-1.

It appears to the ALJ that at the bottom line Protestants' are concerned regarding the adequacy of UEC's cost estimates and financial assurance because they believe it will likely cost more to restore groundwater if Protestants prevail on the baseline water quality issue. In other words, if UEC is required to restore groundwater to lower concentrations, then the cost will be more.

The ED views the cost estimates to be adequate and substantially undisputed. However, the ALJ agrees with Protestants that if UEC is required to restore groundwater to the levels represented by the average of all three rounds of baseline groundwater quality sampling it will likely cost more than has been estimated to conduct restoration to the baseline levels now set forth in the proposed restoration table. Therefore, the ALJ recommends that UEC be required to revise its cost estimates accordingly.

### **XVIII. ASSESSMENT OF REPORTING AND TRANSCRIPTION COSTS**

Protestants requested that the Commission require that UEC pay all transcript costs; and UEC requested that transcript costs be assessed 33.3% to UEC and 33.3% to each Protestant. The ALJ recommends that the Commission assess 75% of the reporting and transcription costs against UEC and 25% against the Protestants, including and giving credit for the costs Protestants paid for their copy of the transcript.

The Commission's rules at 30 TAC § 80.23(d) list the factors that the Commission shall consider in assessing reporting and transcription costs. The factors and analyses relevant to this case include the following:

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<sup>512</sup> ED Ex. ED-1, Murry Direct at 14-15.

<b>Factor</b>	<b>ALJ's Analysis</b>
"The party who requested the transcript."	The ALJ ordered the transcript.
"The financial ability of the party to pay costs."	UEC is a newly organized for-profit corporate entity. The Protestants are public governments that participated in this proceeding on behalf of their constituents using public funds. Protestants were able to hire attorneys to represent their interests. Both UEC and Protestants have the financial ability to pay for the transcript.
"The extent to which the party participated in the hearing."	The ALJ finds that the questioning of witnesses by all of the attorneys was generally to the point and directed towards relevant issues. Therefore, the ALJ finds that the extent of participation by all the parties was appropriate and that none of the parties unduly burdened the transcript with frivolous arguments or unnecessary questioning of witnesses.
"The relative benefits to the various parties of having a transcript."	Sharing the transcript costs equally is fair. The ALJ finds that, as the party bearing the burden of proof, UEC could anticipate the greatest potential benefit from an ability to cite and reassemble the information within the record. However, all parties benefitted from having a transcript in preparing their closing statements.
"The budgetary constraints of a state or federal administrative agency participating in the proceeding."	The rules preclude the Commission from assessing costs against the ED and OPIC who cannot appeal a Commission decision. 30 TAC § 80.23(d)(2).
"Any other factor which is relevant to a just and reasonable assessment of costs."	The ALJ does not find any other factor that should affect the assessment of transcription costs.

Considering all of the factors set out in the Commission's rules, the ALJ finds that UEC's potential benefit from having a transcript weighs in favor of assessing a greater portion of the transcription costs against UEC. Therefore, the ALJ recommends that the Commission allocate

75% of the transcription costs to UEC and 25% to Protestants, including and giving credit for the costs Protestants paid for their copy.

### **XXIX. CONCLUSION AND RECOMMENDATION**

The ALJ recommends that the Mine Application and the PAA-1 Application be remanded for UEC to conduct a Northwest Fault pump test with equipment known to be operating properly, conducted by a testing official known to be skilled and experienced with the use of the equipment, and performed on wells in the same sand on opposite sides of the Northwest Fault to determine whether the Northwest Fault is sealed or transmissive. Further, that the record be reopened for admission of that additional pump test evidence and for cross-examination. Also, if the pump test shows the Northwest Fault is transmissive further evidence should be presented as to the effect, if any, on the ability to conduct the proposed *in situ* uranium mining without undue risk of polluting ground and surface water outside the exemption area. If the Commission determines that such remand is not feasible or desirable then the ALJ recommends that the Mine Application and the PAA-1 Application be denied. The ALJ also recommends that the Commission allocate transcript costs 75% to UEC and 25% to Protestants, including and giving credit for the cost Protestants paid for their copy of the transcript.

**SIGNED September 28, 2010.**

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**RICHARD R. WILFONG  
ADMINISTRATIVE LAW JUDGE  
STATE OFFICE OF ADMINISTRATIVE HEARINGS**