RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

PROPOSAL FOR DECISION

OIL AND GAS DOCKET NO. 08-0297944/ COMPLAINT 2014-021

THE COMPLAINT OF R. MARK HENKHAUS ON BEHALF OF APACHE CORPORATION (OP. #027200) AGAINST MID-STATES OPERATING COMPANY (OP. #566121) REGARDING THREE COMMERCIAL PERMITS ISSUED FOR THE PHILLIPS LEASE, GARDEN CITY, S. (WOLFCAMP) FIELD, GLASSCOCK COUNTY, TEXAS

APPEARANCES

FOR THE COMPLAINANT:

Brian Sullivan, Attorney Representing Complainant
William "Bill" Hayenga, Attorney Representing Complainant

WITNESSES:

Randis Gallaway
Mark Henkhaus
Aaron Williamson
Dean Gaines

FOR THE RESPONDENT:

John Soule, Attorney Representing Respondent

WITNESSES:

William D. Holmes
Jack Rathbone
Bruce C. Miller

PROCEDURAL HISTORY:

Complaint Filed:	December 16, 2013
Notice of Hearing:	October 15, 2015
Hearing on the Merits:	November 19, 2015 and February 9-10, 2016

Close of Record:	August 25, 2016
Proposal for Decision:	December 21, 2016
Heard by:	Laura Miles-Valdez, Legal Examiner Ryan Lammert Administrative Law Judge Karl Caldwell, Technical Examiner
Prepared by:	Dana Avant Lewis, Administrative Law Judge Karl Caldwell, Technical Examiner

SUMMARY STATEMENT OF THE CASE

This proceeding was called in response to Complaint No. 2014-021, the complaint of R. Mark Henkhaus on behalf of Apache Corporation ("Apache"). Apache argues that Disposal Permit Nos. 14154, 14155, and 14156 issued to Mid-States Operating Company ("Mid-States") for its Phillips Lease, Well Nos. 371D, 471D, and 481D, should be revoked because Mid-States did not give proper notice, did not file their application on the correct form, does not have a good faith claim to operate the disposal wells, and in addition or in the alternative, the permits should be terminated because they violate STATEWIDE RULE ("SWR") 9(6)(A).

The Administrative Law Judge and Technical Examiner find that notice was adequate for the Phillips Lease, Well Nos. 371D, 471D, and 481D, Mid-States' application was filed on the appropriate form, Mid-States has a good faith claim to operate the lease in question, and the permits at issue do not currently violate SWR 9. As such, it is recommended that Apache's complaint be dismissed and Mid-States' permits be extended for 30 months from the date the final order is signed.

ARGUMENTS, EVIDENCE AND ANALYSIS

I. Notice[1]

Apache does not dispute that it actually received timely notice as required by SWR 9, but rather it posits that the content of what they received failed to *strictly* comply with notice

[1] 16 TEX. ADMIN. CODE § 3.9(5) Notice and opportunity for hearing:

(A) The applicant shall give notice by mailing or delivering a copy of the application to affected persons who include the owner of record of the surface tract on which the well is located; each commission-designated operator of any well located within one-half mile of the proposed disposal well; the county clerk of the county in which the well is located; and the city clerk or other appropriate city official of any city where the well is located within the municipal boundaries of the city, on or before the date the application is mailed to or filed with the commission . . .

(E) Protested applications:

(i) If a protest from an affected person or local government is made to the commission within 15 days of receipt of the application or of publication, whichever is later, or if the commission or its delegate determines that a hearing is in the public interest, then a hearing will be held on the application after the commission provides notice of hearing to all affected persons, local governments, or other persons, who express an interest, in writing, in the application.

(ii) For purposes of this section, "affected person" means a person who has suffered or will suffer actual injury or economic damage other than as a member of the general public or as a competitor, and includes surface owners of property on which the well is located and commission-designated operators of wells located within one-half mile of the proposed disposal well.

(F) If no protest from an affected person is received by the commission, the commission's delegate may administratively approve the application. If the commission's delegate denies administrative approval, the applicant shall have a right to a hearing upon request. After hearing, the examiner shall recommend a final action by the commission.

requirements to such an extent that the permits at issue are rendered void *ab initio*.[2] Apache's primary argument is that Mid-States' notice was insufficient: because 1) Mid-States permits do not include all geologic formations in the injection interval, 2) Mid-States permits are on the wrong form, and 3) Mid-States permits are in the wrong field. Mid-States disagrees with all of Apache's points.

1) *Mid-States Permits are on the Wrong Form*

Apache's Position:

Apache claims that Mid-States filed the application on the wrong form. Complainant Apache argues that the permitted disposal interval includes the Glorieta and Clear Fork Formations, which were not listed on Form W-14. Apache argues that the Clear Fork Formation is within the correlative interval for the Spraberry (Trend Area) Field and therefore Mid-States application was filed on the improper form, Form W-14 as opposed to Forms H-1/H-1A.

Mid-States Position:

Mid-States argues that the entire permitted injection interval is non-productive.[3] Thus, Form W-14 is correct.[4] Mid-States notes that Form W-14 was the correct form for the other thirteen commercial disposal well applications in Glasscock County, as well as for Apache's application.[5]

Mid-States argues that Apache's assertion that the identified injection interval includes the Glorieta and a portion of the Clear Fork formation, as well as the San Andres, is contrary to the credible evidence. [6] And even if the credible evidence in the record supported Apache's position, it is not material.[7] Further, Mid-States notes that past or present production within two miles is the criteria for what the Commission considers productive for the purposes of permitting a disposal well.[8] Mid-States maintains that the permitted injection interval from 3,000' to 5,300' is not now, nor ever has been, productive within two miles of the permitted disposal wells.[9] Mid-States contends that the permitted injection interval is not productive, whether it is the San Andres only or San Andres, Glorieta and some portion of the Clear Fork.[10]

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[2] Apache Corporation's Written Closing Argument, page 2. See also *Anadarko E & P Co., L.P. v. R.R. Comm'n of Texas*, 03-04-00027-CV, 2009 WK+L 47112, at *2 (Tex.App.—Austin, Jan. 7, 2009).

[3] *See* Closing Statement of Mid-States Operating Company, Pages 9-10.

[4] *Id.* at 6.

[5] *Id.*

[6] *See* Reply of Mid-States Operating Company to Closing Statement of Apache Corporation, Page 4.

[7] *Id.*

[8] *Id* at 3.

[9] *Id.* at 4.

[10] *Id.*

Examiners' Analysis:

Mid-States filed each application on Form W-14, an *Application to dispose of oil and gas waste by injection into a formation not productive of oil and gas*. Apache argues that Mid-States should have filed the applications on Forms H-1/H-1A, *Application to inject fluid into a reservoir productive of oil or gas.* The Commission's injection/disposal well manual[11] details whether an application is to be filed on Form W-14 or Forms H-1/H1A. A note on the Commission's website defines what the Commission deems productive: "A productive reservoir is a reservoir with past or current production within a 2-mile radius of the proposed injection well. If any part of the proposed injection zone is or ever has been productive, then the permit application should be filed on Form H-1/H-1A." The Examiners conclude the applications were filed on the proper form.

Apache claims that Mid-States injection interval from 3,000 feet to 5,300 feet includes not only the San Andres Formation, but also the Glorieta, and Clear Fork Formations, which Mid-States did not list on their applications. Apache also argues that the Clear Fork is included in the correlative interval for the Spraberry (Trend Area) Field. The evidence shows none of Apache's wells to date have been perforated in the interval Apache's geologist, Mr. Aaron Williamson, considers to be the Glorieta-Clearfork interval on his log cross sections.

Mid-States disposal wells are permitted in the San Andres Formation from 3,000 feet to 5,300 feet. According to Mr. Williamson, the nearest production from the San Andres Formation is either 15 miles to the west or approximately 20 miles to the north in Howard Glasscock County. Mr. Williamson estimates the nearest production from the Grayberg Formation (above the San Andres Formation), to be approximately 15 miles to the west of Mid-States permitted disposal wells.

Mr. Williamson estimates the nearest production from the interval he has identified as the Glorieta Formation to most likely be in the Howard Glasscock Field, 20 miles to the north. Mr. Williamson is not aware of any production from the Glorieta Formation that is closer than 20 miles to the Mid-States disposal wells. Lastly, Mr. Williamson estimates the nearest production from the interval he has identified as the Clear Fork Formation to be southeast of the Howard Glasscock Field in the northeast portion of Glasscock County. Mr. Williamson concludes this production would be intermittent, and these wells are at least 10 miles from the Mid-States locations.

The evidence in the record shows there is no production, past or present, from any part of the permitted injection interval within a two-mile radius of Mid-States permitted locations. As such, the applications for the three disposal wells were properly submitted on Form W-14.

2) *Mid-States Permits do not Include all Formations in the Injection Interval*

Apache's Position:

[11] http://www.rrc.state.tx.us/oil-gas/publications-and-notices/manuals/injectiondisposal-well-manual/summary-of-standards-and-procedures/administrative-review/.

Mid-States identified the injection interval as the San Andres formation.[12] Apache contends that the notice should have stated that the injection interval includes the Glorieta and a portion of the Clear Fork formation, as well. Apache claims the failure to include these formations is misleading to parties receiving notice.

In support of their contention, Apache again relied on its geology expert, Aaron Williamson, whose testimony was discussed in the previous section. Apache claims its geology testimony, based on area cross-sections,[13] peer-reviewed treatises,[14] and exhibits accepted in another Commission hearing establishing the Spraberry (Trend Area) fields rules,[15] is contrary to Mid-States' position, which is allegedly unsupported by any commonly used industry peer reviewed evidence.[16]

Mid-States Position:

Mid-States asserts that its injection interval was correctly identified as the San Andres on the applications. Mid-States Board Certified Geologist, Bruce Miller, with more than 35 years of experience, indicated that the location of Mid-States' permitted disposal wells are in the Midland Basin, just southwest of the Eastern Shelf.[17] After reviewing permitted disposal and producing wells in Glascock County, Mr. Miller determined that a suitable injection interval for the proposed commercial disposal wells would be in the San Andres formation from 3,000' to 5,300'.[18] Further, Mr. Miller testified that the Glorieta and Clear Fork are not properly identified in the Midland Basin.[19]

While Apache argues that Mid-States should have identified the permitted injection interval as including the Glorieta and a portion of the Clear Fork, along with the San Andres, Mid-States maintains that the only field in Glasscock County with Clear Fork in the field name is seven miles west-southwest of Mid-States' permitted location.[20] The referenced production from the Clear Fork is from the Upper Spraberry formation *below* the permitted interval, according to Mid-States.[21] Further, the only Glorieta production in Glasscock County is from wells in the Howard Glascock Field, 20 miles from Mid-States' permitted location in the far northwest corner of the county. Those wells are located on the Eastern Shelf, not in the Midland Basin.[22]

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[12] Mid-States Oper. Exhibits Nos. 21, 22, and 23 (Mid-States applications for W-14 Permit for the Phillips Lease, Well Nos. 481D, 471D, and 371D, respectively).

[13] Apache Exhibits 28-29.

[14] Apache Exhibits 49-51.

[15] Apache Exhibit 48.

[16] *See* Apache Corporation's Written Closing Argument, Pages 2-3.

[17] *See* Closing Statement of Mid-States Operating Company, Page 5.

[18] *Id.*

[19] Transcript Volume 2, pages 179-181.

[20] *See* Reply of Mid-States Operating Company to Closing Statement of Apache Corporation, Page 4.

[21] *Id.*

[22] *Id.*

Mid-States argues that even if they included other formations on the application, no material information would be added to the application, because the primary focus is the injection interval rather than specific formation names.[23]

Examiners' Analysis:

The Examiners conclude that Apache failed to show that Mid-States did not list all of the formations in its permitted injection interval from 3,000 feet to 5,300 feet on its applications. Based on the evidence, Mid-States permits were administratively approved in a manner that is consistent with prior Commission precedent. Mid-States Exhibit No. 33 shows that three commercial disposal wells have been permitted in Glasscock County with the disposal formation identified as the San Andres Formation, with a similar disposal interval, and filed on Form W-14. These disposal wells are:

i. the Basic Energy Sherrod SWD, Well 2W (W-14 No. 13594) with a permitted disposal interval from 2,950 feet to 5,376 feet in the San Andres Formation;

ii. the Lone Star Anchor Lone Star Sherrod 3W (W-14 No. 13205) with a permitted disposal interval from 2,590 feet to 5,778 in the San Andres Formation; and

iii. the Pyote Well Service G&K West SWD, Well No. 1 (W-14 No. 13644) with a permitted disposal interval from 3,800 feet to 6,000 feet in the San Andres Formation.

Apache's argument that the disposal zone listed on the application did not include all formations included in the interval is unpersuasive. Apache's geologist, Mr. Williamson, considers the location of the Mid-States wells in this area of Glasscock County to be a transition zone between the Eastern Shelf and the Midland Basin.[24] The location of the type log that defines the correlative interval for the Spraberry (Trend Area) Field is in Midland County, approximately 33 miles to the west of Mid-States disposal wells in Glasscock County. It is from this starting point, Midland County, that Apache's geologist estimated the tops of formations deeper than the San Andres Formation at the Mid-States permitted well locations 33 miles away.[25]

Apache's geologist agreed that other geologists may not differentiate and identify the Glorieta-Clear Fork interval that he indicated on his cross sections.[26] Apache's geologist also agrees that much of what he noted as Clear Fork in the Midland Basin is identified by many other geologists as the Upper Spraberry.[27] Mid-States geologist, Bruce Miller, testified that the Glorieta interval does not appear until you get over to the Eastern Shelf, which is east of Mid-States locations.[28] In addition, Mr. Miller's analysis is that the Clear Fork exists on the Central Basin

[23] *Id.* at 4-5.

[24] Transcript Volume 2, Page 73, Lines 14-18.

[25] Transcript Volume 2, Page 76, Lines 21-24.

[26] Transcript Volume 2, Page 77, Lines 13-22.

[27] Transcript Volume 2, Page76, Line 20-Page 77.

[28] Transcript Volume 2, Page 178, Line 6-Page 179, Line 6. *See also* Mid-States Oper. Exhibit 16.

platform and the Northern Shelf.[29] In Mr. Miller's opinion, when you go basinward, the Clear Fork is equivalent to some carbonates within the Upper Spraberry interval.[30]

Mr. Williamson's testimony and description of the San Andres Formation is that the formation becomes shaley as you get deeper in the formation.[31] Therefore, the base on the San Andres Formation should appear shaley on well logs in the area of Mid-States well locations. However, for the Apache-Riley #4713 well located approximately 1,000 feet from one of Mid-States permitted locations, Mr. Williamson estimated the top of the San Andres Formation to be at a depth just above 3,100 feet.[32] Mr. Williamson also estimated the top of the Glorieta-Clearfork to be at a depth of approximately 3,900 feet, and the top of the Spraberry Formation to occur at a depth of approximately 5,670 feet.[33]

On cross examination, Mr. Williamson stated that the gamma ray track does not indicate shale at a depth of 3,900 feet on the Apache-Riley #4713 well log where he had previously estimated the top of the Glorieta-Clearfork Formation.[34] Mr. Williamson stated that shale starts to show up on the well log starting at a depth of 4,940 feet.[35] Thus, one interpretation of the well log, based on Mr. Williamson's previous testimony that the San Andres Formation gets shaley as you get deeper, is that the base of the San Andres Formation is at a depth of at least 4,940 feet. Given the aforementioned evidence, the Examiners conclude that a well log for a well located in Glasscock County, approximately 1,000 feet from one of Mid-States permitted locations, is more representative of the local geology than the type log for the Spraberry (Trend Area) Field located 33 miles away in Midland County.

Additionally, in reviewing the evidence, the Examiners determine that geologists do not always agree on formation tops, not all geologists consider the Clear Fork as an interval in this area, some geologists refer to the Clear Fork as the Upper Spraberry, and the Glorieta Formation rock type changes depending on location in this area. As such, Apache's evidence is unpersuasive to overcome Mid-States'evidence to show its approved permits are consistent with past Commission precedent for commercial disposal wells permitted in Glasscock County with a similar disposal interval and with the disposal formation identified as the San Andres Formation.

Finally, none of the peer-reviewed treatises offered into evidence by Apache describe the area of Glasscock County where the Mid-States' wells are permitted. Apache Exhibit Nos. 50 and 51 describe the Howard Glasscock Field as being the largest field in the Permian section on the Eastern Shelf, and that production from the Howard Glasscock Field comes from the Yates, Seven Rivers, Queen, Grayburg/San Andres, and Glorieta intervals. Apache Exhibit No. 49 focuses on the northern part of the Midland and Delaware Basins.

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[29] Transcript Volume 2, Page 180, Line 7-Page 181, Line 14. *See also* Mid-States Oper. Exhibit 16.

[30] Transcript Volume 2, Page 181, Line 7-14.

[31] Transcript Volume 3, Page 44, Lines 5-8.

[32] Transcript Volume 3, Page 57, Lines 2-6.

[33] Transcript Volume 3, Page 57, Line 17-Page 58, Line 4.

[34] Transcript Volume 3, Page 67, Lines 8-10.

[35] Transcript Volume 3, Page 67, Lines 11-15.

3) Mid-States Permits are in the Wrong Field

Apache's Position:

Apache alleges that Mid-States mislead those entitled to notice by placing the three disposal wells in the Garden City, S (Wolfcamp) Field, instead of the Spraberry (Trend Area) Field.[36] According to Apache, an offset operator would likely pay less attention to an application not placed in a field where their wells are completed and producing.[37] Apache posits that Mid-States is "trying to circumvent notice requirements."[38] Apache indicates a review of its Exhibit 28, a map of local cross-sections showing completion intervals, reveals that the vast majority of nearby wells are completed in the Spraberry (Trend Area) Field.[39]

Mid-States Position:

Mid-States contends that nothing about the field name was misleading, unusual or incorrect as Apache alleges. Mid-States argues that when permitting a disposal well in a non-productive interval on Form W-14, the field name is simply a place holder for the Commission to carry the well on the proration schedule.[40] By definition, the disposal well will not be completed in any field, as fields are productive.[41] Further, Mid-States notes that the field name indicated on the Form W-14 is not intended to provide information regarding the injection interval, or any more than general information regarding the location.[42] Finally, Mid-States notes that the Form W-14 shows the distance and direction to the nearest town and a legal description, which includes calls to the nearest section lines and latitude/longitude information.[43]

Examiners' Analysis:

The Examiners find no basis for the claim by Apache that Mid-States mislead operators regarding the location of the disposal wells. The Form W-14 for each well contains all of the required information regarding the location of each well.[44] Form W-14 lists the name, direction, and distance from the center of the nearest town, as well as the county for each disposal well.[45] A legal description of each well location, the distance and direction from survey lines, as well as the latitude and longitude was indicated on all three Form W-14s, even though the application lists this as optional information. [46]

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[36] *See* Apache Corporations Written Closing Argument, Page 4.

[37] *Id.*

[38] *Id.*

[39] *Id.*

[40] *See* Closing Statement of Mid-States Operating Company, Page 12.

[41] *Id.*

[42] *Id.*

[43] *Id*, and *see* Mid-States Oper. Exhibits Nos. 21, 22, and 23.

[44] *See* Mid-States' Exhibits Nos. 21, 22, and 23.

[45] *Id.*

[46] *Id.*

Apache argues that in the application Mid-States misled those entitled to notice by placing the three disposal wells in the Garden City, S. (Wolfcamp) Field instead of the Spraberry (Trend Area) Field. The Examiners find this argument to be without merit given the record on this issue. There is no evidence in the record of any disposal wells in Glasscock County, at the time Mid-States permits were granted, that identified the Spraberry (Trend Area) Field as the field name on a disposal well application.

Apache's own witness, Mr. Henkhaus, acknowledges that a large number of commercial disposal wells in Glasscock County are not permitted in the Spraberry (Trend Area) Field.[47] Mr. Henkhaus is not aware of any other disposal wells that are permitted in the Spraberry (Trend Area) Field aside from Apache's own disposal well, which was applied-for after Mid-States applications were approved.[48] In addition, the testimony of Apache's engineering expert witness contradicts the claim the field name is misleading, as Mr. Henkhaus agreed that when a Form W-14 (SWR 9 application) is filed, the field name listed is a placeholder in the proration schedule, and he would not look up a well by where it is held field-wise.[49]

In summary, the Examiners find that the Mid-States applications were properly filed on the correct form with information that is consistent with past precedent. All three applications were determined to be complete by Underground Injection Control staff and approved administratively, with no protests received by the Commission in the timeframe specified by Statewide Rule 3.9(3)(E)(i).

Accordingly, the Examiners determine that Apache's complaint arguing Mid-States did not give proper notice because 1) Mid-States' permits do not include all geologic formations in the injection interval, 2) Mid-States' permits are on the wrong form, and 3) Mid-States' permits are in the wrong field is without merit.

II. Subsequent Commission Action Pursuant to SWR 9(6)(A)[50]

Apache's Position:

Apache argues that all parts of SWR 9(6)(A) apply except 9(6)(A)(vi)(seismic activity). Apache avers that under 9(6)(A)(i), the original information furnished by Mid-States has

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[47] Transcript Volume 2, Page 115, Line 22-Page 116, Line 12.

[48] Transcript Volume 2, Page 115, Line 22–Page 116, Line 8.

[49] Transcript Volume 2, Page 116, Line 9–Page 117, Line 2.

[50] 16 TEX. ADMIN. CODE § 3.9 (6) Subsequent commission action.

(A) A permit for saltwater or other oil and gas waste disposal may be modified, suspended, or terminated by the commission for just cause after notice and opportunity for hearing, if:

(i) a material change of conditions occurs in the operation or completion of the disposal well, or there are material changes in the information originally furnished;
(ii) freshwater is likely to be polluted as a result of continued operation of the well;
(iii) there are substantial violations of the terms and provisions of the permit or of commission rules;
(iv) the applicant has misrepresented any material facts during the permit issuance process;
(v) injected fluids are escaping from the permitted disposal zone;
(vi) injection is likely to be or determined to be contributing to seismic activity; or
(vii) waste of oil, gas, or geothermal resources is occurring or is likely to occur as a result of the permitted operations.

materially changed because it is inaccurate, incomplete, and misleading.[51] Mid-States permits should be terminated under 9(6)(A)(ii) and (iii) because fluids injected cannot be confined to the injection interval, thereby risking freshwater and violating the terms of the permits.[52] Mid-States' permits should be terminated under 9(6)(A)(v) because fluids *will* escape the injection interval and the Commission should be pro-active rather than reactive.[53] Finally, Mid-States' permits should be terminated pursuant to 9(6)(A)(vi) because waste of oil and gas is *likely* to occur as a result of the permitted operation.[54]

Mid-States Position:

Mid-States asserts, as previously discussed, that its notice was proper, its application was filed on the correct form with the correct information, and therefore, its permits are valid.

Mid-States contends that it is premature to consider Apache's confinement complaint.[55] Mid-States postulates that all of Apache's arguments are based solely on SWR 9(6)(A)(v) (injection fluids will escape from the permitted injection interval) and 9(6)(A)(vii) (disposal operations will cause waste). Mid-States maintains that no injection fluids can be escaping from the permitted injection interval, and no waste is being caused by disposal operations, because no fluids have been injected.[56] Mid-States argues that Apache's evidence only *suggests* that waste *might* result from the permitted disposal operations.[57] Mid-States claims that if there is any problem at all, it is the lack of cement behind casing in some of Apache's wells, which was not created by Mid-States, and is not a legal justification for revoking any of Mid-States' permits.[58]

Mid-States notes in its response to Apache's closing argument that an Apache witness testified that Apache has no cement behind casing through a portion of the permitted injection interval in few of its wells, that there is no bradenhead pressure on any of its wells, and that the San Andres is over pressured in Glasscock County.[59] Mid-States maintains that all three statements cannot be true.[60] If the well has no cement behind the casing and no bradenhead pressure, then the San Andres cannot be over-pressured.[61] If the San Andres is over-pressured and there is no bradenhead pressure, then there has to be cement behind the pipe.[62]

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[51] Referring to Apache's argument that 1) Mid-States permits do not include all geologic formations in the injection interval, 2) Mid-States permits are on the wrong form, and 3) Mid-States permits are in the wrong field. *See* Apache Written Closing Argument, pg. 10.

[52] *See* Apache Written Closing Argument, pg. 10.

[53] *Id.*

[54] *Id* at 10-11.

[55] *See* Closing Statement of Mid-States Operating Company, pg. 14.

[56] *See* Reply of Mid-States Operating Company to Closing Statement of Apache Corporation, pg. 2.

[57] *Id.*

[58] *Id.* at 3.

[59] *Id.*

[60] *Id.*

[61] *Id.*

[62] *Id.*

Examiners' Analysis:

Although Apache argues that all parts of SWR 9(6)(A) apply except 9(6)(A)(vi)(seismic activity), the Examiners find that the only potentially applicable provisions are 9(6)(A)(ii) (freshwater *is likely* to be polluted as a result of continued operation of the well) and 9(6)(A)(vii) (waste of oil, gas, or geothermal resources is occurring or *is likely* to occur as a result of the permitted operations).[63]

1. Freshwater is Likely to be Polluted as a Result of Continued Operation of the Well

Apache's claim that fluids will escape the injection interval and contaminate fresh water in violation of SWR 9(6)(A)(ii), is not supported by the evidence. The Examiners give no weight to Apache's geologist's opinion that it is possible for fluids to escape out of the top of the San Andres Formation. Apache's geologist stated that he did not know if the San Andres Formation, and what he is calling the Glorieta or Clearfork Formations, have been approved for disposal in Glasscock County, and stated that he really did not pay too much attention to disposal well permits.[64]

Form W-14 requires applicants to submit a well log with the application. The applications were approved by Commission staff. In addition, the San Andres Formation has been approved for disposal in numerous disposal wells in Glasscock County, including Apache's own disposal well located approximately 2 miles away. There is no evidence in the record of injected fluids escaping from the top of the San Andres Formation due to a lack of geological barrier to flow. In addition, Apache's engineering witness described swelling shales and clays encountered in drilling to the top of the San Andres Formation in the nearby Riley 4809 well, and Mid-States engineering witness stated that clays and salts were encountered above the San Andres Formation in drilling the Phillips 481D.

Waste of Oil, Gas, or GeothermalRresources is Occurring or is Likely to Occur as a Result of the Permitted Operation

SWR 9(6)(A)(vii) requires evidence showing that waste of oil, gas, or geothermal resources is occurring or is likely to occur as a result of the permitted operations, in order for the permits for saltwater or other oil and gas waste disposal to be modified, suspended, or terminated by the commission for just cause. Apache argues that Mid-States' permits should be terminated because they violate SWR 9 and will cause waste by negatively impacting nearby production. The Examiners conclude that there is not substantial evidence to show that the permits currently violate SWR 9(6)(A)(vii).

As of the date of the hearing, Mid-States had only drilled one of the three permitted wells, the Phillips 481D. No fluid has been injected into this well. Hence, injected fluids cannot be

[63] The Examiners conclude that there has been no *material* change pursuant to SWR 9(6)(A)(i); there is no *substantial* violations of the terms and provisions of the permit or of commission rules pursuant to SWR 9(6)(A)(iii); the applicant has not misrepresented any *material* facts during the permit issuance process; and injected fluids are not, at this time, escaping from the permitted disposal zone pursuant to SWR 9(6)(A)(iii).

[64] Transcript Volume 2, Page 78, Line 17–Page 79, Line 8.

escaping from the permitted disposal zone, and there cannot be any substantial violations of the terms and provisions of the permit or Commission rules at this time.

The basis of Apache's argument is that some of Apache's wells within one-half mile of Mid-States permitted well locations are not cemented across the entire injection interval. Apache's engineering witness, Mr. Henkhaus, stated that Apache did not cement across this interval as a result of either an economic decision or a decision based on the conditions of the well.[65] Mr. Henkhaus acknowledged that Statewide Rule 9 does not require an Applicant to identify wells within one-quarter or even one-half mile of proposed disposal wells that do not have cement behind casing in the injection interval.[66]

The mere presence of existing producing wells that are not cemented across the disposal interval is not unique to Mid-States' permitted disposal facilities in this area. Apache has permitted a disposal well approximately 2 miles from the three subject disposal wells.[67] Apache's well was permitted after Mid-States' wells were permitted. The injection interval in Apache's disposal well also includes the San Andres Formation.[68] Apache's engineering witness acknowledges that Apache does have some wells in close proximity to its disposal well in the area.[69]

The Examiners conclude that Apache's claim that waste of oil, gas, or geothermal resources is occurring or is likely to occur as a result of the permitted operations is insufficient to terminate the permits as the claim is not supported by the evidence. While Apache's engineering witness described *concepts* such as casing leaks, water dumps, movement of fluid in the wellbore annulus, and bradenhead pressure issues that Apache may have experienced in other areas,[70] there is no

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[65] Transcript Volume 2, Page 111, Lines 3-8.

[66] Transcript Volume 2, Page 93, Line 8-23-Page 94, Line 3.

[67] Transcript Volume 2, Page 82 Line 17-Page 83, Line 4. *See also* Apache Exhibit 40, Apache's Form W-14 Application to Dispose of Oil and Gas Waste by Injection into a Formation Not Productive of Oil and Gas.

[68] Transcript Volume 2, Page 130, Lines 5-11.

[69] Question (by Mr. Soule): "That well, though, does have an Apache producing well, a Spraberry (Trend Area) well that's only about 900 feet away, doesn't it?" Mr. Henkhaus: "It does have some wells that are closely located; yes sir." Transcript Volume 2, Page 108, Lines 12-16.

[70] For example, Apache's engineering witness Mr. Henkhaus stated:

> What our experience has been, in cases like I've drawn here where we do not have a cement top that's tied back into the intermediate or brought to the surface, this casing is exposed to the San Andres and the Clear Fork. And those formations are, by their nature, very corrosive. They contain a very saline water. They're high in H_2S, which is corrosive. And even of its own accord, these become casing leaks, sometimes shortly, but it's almost a definite you'll experience a casing leak in a well like this. That's why we try to bring cement, is to protect this well. By bringing cement to the surface, the cement sheath isolates the casing from the San Andres to the Clear Fork, and that tends to prolong the life of the well.
>
> What the Mid-States permitted disposal wells will do to us, ... if you interject [sic] outside water that reaches this casing, it's even more corrosive. That will start working on that casing and create a casing leak, which will actually eat the casing--sometimes part the casing completely; sometimes create holes. It's an external corrosion process, electrolysis-type process. What this causes is a dump flood of the San Andres and the Clear Fork water into this well, and it will preferentially go into the Spraberry Formation because it's very, very low pressured.

evidence of any wells experiencing casing leaks or other problems in the area of Mid-States permitted well locations.

None of the wells identified by Apache to be at risk as a result of Mid-States permitted disposal wells are perforated or producing from the Spraberry interval. The uppermost producing interval in Apache's producing wells in the vicinity of Mid-States permitted locations is the Upper Wolfcamp Formation. Mid-States' geologist performed a study of all wells within a three-mile radius of each of Mid-States' permitted well locations in this area. The results showed a total of 332 Wolfcamp interval and deeper producing wells. There is only one well with open perforations in the Upper Spraberry and a total of three wells with open perforations in the Lower Spraberry within a three-mile radius of any of Mid-States' three permitted well locations.[71]

The Examiners note that Statewide Rule 13 (Casing, Cementing, Drilling, Well Control, and Completion Requirements) was amended effective January 1, 2014, requiring casing to be cemented across and above all formations permitted for injection under SWR 3.9 at the time the well is completed. This applies to a well within one-quarter mile of the proposed well pursuant to SWR 3.13(a)(4)(C). Further, casing shall be cemented across and above all productive zones, potential flow zones, and/or zones with corrosive formation fluids per SWR 3.13(a)(4)(D). Each of these requirements may be met in an alternative manner, as otherwise approved by the district director in accordance with SWR 3.13(a)(4)(C)(v) and 3.13(a)(4)(D)(v). The Commission has identified the San Andres Formation in Glasscock County as a formation *that may* require isolation during completion due to high flows, H_2S, and corrosiveness.[72]

Only one of the wells identified by Apache was spud after January 1, 2014, which was after Mid-States three disposal wells had been permitted. The Hartley No. 18 was spud in March 2014.[73] Apache did not cement the casing across entire San Andres Formation in this well either. Mr. Henkhaus stated that typically the Commission's district office will not make Apache take remedial action because Apache came close to circulating.[74] Mr. Henkhaus also said that Apache did not attempt to squeeze cement or to do a top job to ensure casing was not exposed to the San Andres Formation.[75] The fact that Apache did not make any effort, upon determining that a portion of the casing in this well was not cemented across the San Andres Formation, and the fact that the district office did not require Apache to perform any remedial work to ensure this well was cemented across the entire San Andres Formation, supports a conclusion that the exposed casing is not at risk.

> The Spraberry is the main reason we cannot get cement to the top because it won't support that hydrostatic head. However, you open that casing up to that San Andres or the Clear Fork, that dump flood occurs, you'll water out the Spraberry. And in a short order your next well, which may be 600, 900 feet away, it will then water out because of this action. And on these offset wells, you can typically determine if that's what the case is because your production will turn sour overnight. You'll start seeing H_2S in your produced water. And that's indicative of a San Andres or Clear Fork leak. That's why it's so critical that we preserve these wells.

[71] Transcript Volume 2, Page 192, Lines 12-23.

[72] Apache Exhibit No. 37.

[73] Transcript Volume 2, Page 131, Lines 3-18.

[74] Transcript Volume 2, Page 131, Lines 25-Page 132, Line 2.

[75] Transcript Volume 2, Page 132, Lines 5-8.

Apache claims that Mid-States permits should be terminated because the San Andres Formation is over-pressured, or because of Bradenhead pressure on Apache's wells, is not supported by the evidence. Apache's engineering witness, Mr. Henkhaus, has not inspected Apache's wells within a half-mile of Mid-States permitted injection wells. Thus, there is no evidence of any Bradenhead pressure issues in the area of Mid-States well locations. Mr. Henkhaus is aware that Apache does have some bradenhead pressure issues in Reagan County. However, the Reagan County line is at least 15 miles south of Mid-States permitted injection wells.

Both Apache and Mid-States provided drilling reports and engineering witness testimony that drilling mud in the 9.5 to 10 pounds per gallon (ppg) range is used in drilling from below the surface casing to the top of the San Andres Formation where intermediate casing is typically set. However, the mud weight is not an indicator of formation pressure in this instance, but indicative of the properties of rocks encountered in drilling the wells to the top of the San Andres Formation.

According to Mr. Henkhaus, Apache uses higher mud weights at shallow depths due to drilling through what is referred to as the red beds, which he describes as a very salty, swelling clay. Mr. Henkhaus claimed if one does not properly brine up the mud system, the fresh water will allow that clay to swell up and make it impossible to get out of the hole. Therefore, Apache tends to be more proactive in retarding that shale and clay from swelling by using a brine or some type of inhibited fluid. The fluid that Apache uses is in the 9.5 to 10 ppg range.

In drilling the Phillips 481D, Mid-States spud the well with 8.4 ppg mud weight. Mr. Rathbone, founder and partner in Mid-States, stated that in drilling the Phillips 481D the mud weight started to increase on its own. From a depth of 1,000 to 1,500 feet salt intervals were encountered. Thus, the mud weight increased to 10.4 ppg because the drill bit had penetrated the salt section and the drilling fluid was dissolving salt as the well was being drilled. In drilling the well from 1,631 feet to 3,002 feet with 10 ppg mud, Mid-States kept adding fresh water but continued to dissolve salts in reaching the depth at which intermediate casing was set at 3,002 feet.

Mr. Henkhaus testified that Apache typically sets intermediate casing at the top of the San Andres Formation. According to Mr. Henkhaus there is an interval at the top of the San Andres Formation that will tend to flow to the surface. Therefore, Apache wants to set intermediate casing into the top of the San Andres so they can case that off to protect the well from the effects of that water flow as they drill through the San Andres Formation. Mid-States engineering witness disagreed with Mr. Henkhaus' description of an upper zone in the San Andres Formation that tends to flow. Mr. Rathbone testified that at no time was it necessary to increase the mud weight due to encountering abnormally high pressure in any of the intervals that were penetrated in drilling the Phillips 481D.

The Examiners conclude that there is no evidence to support the claim that there is an interval at the top of the San Andres Formation that tends to flow. The evidence in the record indicates Mid-States' well and Apache's wells in this area are drilled with 9.5 to 10 ppg mud weight to the top of the San Andres Formation where intermediate casing is set to either prevent shale and clay intervals from swelling, or as a result of salt intervals being dissolved in drilling the wells, or both.

There is no evidence relating the mud weight to the San Andres Formation being over-pressured. Conversely, both Apache's and Mid-States drilling reports indicate that the San Andres Formation is not over-pressured in this area. Apache's drilling report for the Riley 4809 that shows that after intermediate casing was set at a depth of 3,225 feet, the mud weight used to drill through the San Andres Formation decreased to 8.4 ppg.

As a comparison, the density of fresh water is 8.33 ppg. In addition, the Apache Riley 4713 was drilled through the San Andres Formation with 8.34 ppg mud after intermediate casing was set at the top of the San Andres Formation and cement circulated to surface. The drilling summary for the Mid-States Phillips 481D well shows that after intermediate casing was run to a depth of 3,002 feet, the mud weight used to drill the well from 3,002 feet to 5,260 feet was 8.4 ppg. The final mud weight in the hole at the depth of 5,260 feet was increased to 8.8 ppg to secure the hole and ensure the well was killed until final completion.

Given the evidence in the record, the Examiners conclude that the San Andres Formation is not over-pressured at the location of the Mid-States' wells based on no reported Bradenhead pressure issues, and an 8.4 ppg mud weight used to drill through the San Andres Formation in both Apache's Riley 4809 well and Mid-States Phillips 481D. Additionally, the Examiners give no weight to the pressure front calculations performed by Apache or Mid-States. Both parties failed to show the input values used are representative of the disposal interval at the subject well locations.

Apache used an initial disposal interval pressure based on a 10 ppg mud being indicative of the San Andres Formation pressure. However, the evidence shows Apache used 10 ppg mud before reaching the San Andres Formation to prevent the red beds from swelling. Apache sets intermediate casing in this area just below the top of the San Andres Formation. Mr. Henkhaus acknowledged that after Apache drills out the intermediate casing, the mud is lightened up.[76]

Therefore, the evidence in the record does not support that 10 ppg mud weight is indicative of the San Andres Formation pressure in this area. In addition, the drilling of the actual Mid-States Phillips 481D does not support Apache's use of an initial San Andres Formation pressure equivalent to 10 ppg mud. After intermediate casing was set at a depth of 3,002 feet and cement was circulated to surface, the mud weight decreased to 8.4 ppg, slightly above a fresh water gradient.

Mr. Henkhaus also acknowledged that the reservoir data sheet Apache used for its pressure front calculations was largely based on the Howard-Glasscock field reservoir information. Therefore, input parameters used by Apache in its pressure front calculations, including permeability, were based on parameters from the productive Howard Glasscock Grayburg-San Andres interval, more than 20 miles away. In this area of Glasscock County, the San Andres Formation is not productive. As such, the Examiners cannot conclude that the results of Apache's pressure front calculations are valid or representative of actual conditions in this area.

[76] Transcript Volume 2, Page 131, Line 1-2.

Mid-States input parameters of porosity, permeability, and net thickness for its pressure front calculations were based on a review of logs in the area as well as experience with a Mid-States disposal well 40 or more miles away. Again, the Examiners do not find that the results of Mid-States pressure front calculations are valid or representative of actual conditions in this area.

Both Apache and Mid-States have drilled a disposal well in the San Andres Formation within 2 miles of the three subject permits. However, neither party analyzed a log of these wells to estimate San Andres Formation parameters for use in their pressure front calculations. Thus the parties failed to provide the Examiners with substantial evidence of the appropriate pressure front calculations.

III. Mid-States Does Not Have a Good Faith Claim to Title

Apache's Position:

Apache has mineral leases underlying all three permitted disposal wells, and Apache's landman, Randis Gallaway, provided the Apache mineral leases for all three sections where the Mid-States disposal wells are located.[77] Apache claims it has mineral rights from surface to either 10,000-11,000 feet or the center of the earth.[78] As such, Apache cites to Commission precedent in the *Don H. Wilson* docket, for the proposition that the permits should be void because the disposal operator does not have a good faith claim to the legal right to operate a disposal well into a productive interval.[79]

Mid-States Position:

Mid-States reiterates that the entire permitted injection interval is non-productive. Mid-States proffered its disposal agreement with the surface owner,[80] indicating the agreement is all that is necessary for Mid-States to have a good faith claim to operate a disposal wells for injection into a non-productive interval on the land where its commercial permits are located.[81] As discussed above, Mid-States maintains that the field name shown on the Form W-14 is no more than a place holder and was in no way misleading to anyone.[82] Further, Mid-States asserts that arguments made by Apache regarding the use of Form W-14 and lack of a good faith claim are frivolous.[83]

Examiners' Analysis:

Apache bases its stance that Mid-States does not have a good faith claim on the supposition that Mid-States' disposal wells will be injecting into a productive formation. As discussed

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[77] Apache Exhibits 16-23.

[78] Transcript Volume 1, Page 49, Lines 10-25.

[79] *See* O & G Docket 06-0264337.

[80] Mid-States Oper. Exhibits 1-2.

[81] *See* Reply of Mid-States Operating Company to Closing Statements of Apache Corporation.

[82] *Id.* at 6.

[83] *Id.*

previously, the Examiners find that Apache's position lacks merit. Therefore, the Examiners conclude that Mid-States does have a good faith claim to operate the Phillips Lease, Well Nos. 371D, 471D, and 481D as permitted.

IV. Apache Corporation's Request to Void Mid-States' Permits for the 371D & 471D Wells Because They are Expired

Apache's Position:

On August 23, 2016, Complainant filed Apache Corporation's Request to Void Mid-States' Permits for the 371D & 471D Because They are Expired. Apache points out that 371D and 471D were permitted on August 22, 2013. The permits require Mid-States to begin drilling operations under the permits within three years or the permits expire.[84] Mid-States has not drilled these two wells, and the permits expired on August 22, 2016. Apache argues that although a complaint was filed, Mid-States' permits for these wells remained active with no regulatory impediment or hold.[85]

Further, Apache notes that Mid-States realized in April 2016 that its permits would be expiring, as it requested an extension of the August 22, 2016 deadline in its written closing arguments, yet it did not get a ruling on its request prior to the expiration of the permits.[86] Apache maintains that Mid-States failed to take the necessary action to extend the permits prior to the expiration. Thus, the permits have expired and are void.

Mid-States Position:

On August 24, 2016, Respondent filed Reply of Mid-States Operating Company to Apache Corporation's Request to Void Mid-States' Permits for the 371D and 471D. Mid-States argues that it is solely due to the complaint filed by Apache that Phillips 371D and 471D have not been drilled.[87] Mid-States notes that it had already drilled Phillips 381 for disposal when Apache filed its complaints in October and December of 2013. Mid-States did not know of the complaint until the Commission forwarded it in February of 2014, as Apache did not send a copy to Mid-States when filed. According to Mid-States, from February 2014 through August 2015, the parties were trying to resolve the alleged issues by agreement.

When it became clear that an agreement could not be reached, the parties set the complaint for hearing, which began in November 2015 and concluded in February of 2016. Mid-States maintains that the extension of three years from the date of the final order in this docket, as

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[84] This permit will expire when the Form W-3, Plugging Record, is filed with the Commission. Furthermore, permits issued for wells to be drilled will expire three (3) years from the date of the permit unless drilling operations have commenced. Mid-States Operating Company, Exhibits Nos. 24 and 25 (Language in Drilling Permits for 371D and 471D).

[85] *See* Apache Corporation's Reply to Mid-States' Response to Void Mid-States' Permit for the 371D & 471D Because They are Expired.

[86] *Id.*

[87] *See* Reply of Mid-States Operating Company to Apache Corporation's Request to Void Mid-States' Permits for the 371D and 471D.

requested in its written closing statement, should be granted, and Apache's motion to void the permits should be denied.[88]

Examiners' Analysis:

By drilling the Phillips 381 well within the first six months from the time the permit was issued, Mid-States demonstrated an intention to drill Phillips 371D & 471D within three years as well. The examiners find it credible that Mid-States halted work on the wells once it knew of Apache's complaint. Apache does not disagree that the parties were trying to resolve the dispute by agreement for well over a year. There is no evidence in the record to suggest that Mid-States had any motive for ceasing work on the wells other than to wait for resolution of the challenge to its permits.

While Mid-States requested the permits be extended for three years from the date of the final order, the Examiners find it is appropriate to toll the time period allotted for the permits starting on the date Mid-States was informed of the complaint, February 21, 2014,[89] which was six months after the permits were granted. As such, Mid-States would have had an additional 2.5 years (30 months) to complete the wells if not notified of the complaint.

The Examiners find that Apache Corporation's Request to Void Mid-States' Permits for the 371D & 471D Because They are Expired should be DENIED, and Mid-States' Permits for the 371D & 471D wells should be extended for 30 months from the date the final order is signed.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

The Administrative Law Judge and Technical Examiner make the following Findings of Fact and Conclusions of Law:

Findings of Fact:

1. All things have occurred and been accomplished to give the Commission jurisdiction to decide this matter.

2. Proper notice of hearing was timely given to all persons legally entitled to notice.

3. Hearings were held on November 19, 2015, and February 9-10, 2016.

4. Railroad Commission of Texas staff ("staff") administratively approved the permits for the disposal wells on August 22, 2013.

5. Apache did not timely file a protest to the applications for the disposal wells.

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[88] *See* Closing Statement of Mid-States Operating Company, Page 19.

[89] Mid-States Oper. Exhibit 4.

6. The Form W-14s for the Phillips Lease, Well Nos. 371D, 471D and 481D ("the wells") contain adequate information regarding the identified injection interval.

7. The Form W-14s for the wells contain adequate information regarding the field name of each well.

8. The wells are permitted in a non-productive formation, therefore Form W-14 is the appropriate form for the disposal permit applications.

9. The permitted injection interval is and has been non-productive within two miles of the Mid-States' well locations.

10. The permitted injection interval is and has been non-productive within Glasscock County, Texas.

11. Thirteen other commercial disposal wells have been permitted by the Commission in Glasscock County, Texas.

    a. The thirteen applications were filed on Form W-14 (injection into a non-productive interval).

    b. The Mid-States injection interval is within the applied for and permitted injection intervals for one or more of the other commercial disposal wells.

    c. Two of the thirteen applications also identify the Glorieta or Clear Fork as non-productive in the permitted injection interval.

12. San Andres is an appropriate identification for the permitted interval.

13. All thirteen commercial disposal well applications approved by the Commission in Glasscock County are permitted in intervals that overlap the permitted interval for the Mid-States wells. All applications identified the injection interval as including the San Andres.

14. The locations of the permitted Mid-States disposal wells are in the Midland Basin.

15. While some geologists disagree regarding whether to correlate the Glorieta and Clear Fork formations from the Eastern Shelf into the Midland Basin, the correlated intervals are not productive.

16. No injection fluids are currently escaping the permitted injection interval.

17. The is no evidence of bradenehead pressure on any Apache well in Glasscock County, including all Apache wells that directly offset the permitted Mid-States wells, to include wells that are not cemented behind the casing through a portion of the permitted injection interval

18. Mid-States has an agreement with the surface owner that allows disposal operations.

19. Mid-States' permits for the 371 and 471 wells expired August 22, 2016.

20. Although Apache filed a complaint in October and December of 2013, Mid-States did not receive notice of the complaint until February of 2014.

21. Mid-States ceased drilling its disposal wells while attempting to resolve the complaint at issue in this case, and has not resumed operations pending final resolution.

22. By drilling the 481D well within the first six months of permitting, Mid-States demonstrated an intent to drill the additional two wells within the permit period.

23. Mid-States requested an extension of the August 22, 2016 permit prior to the expiration deadline.

Conclusions of Law:

1. The Commission has jurisdiction pursuant to TEX. NAT. RES. CODE §81.051.

2. Proper notice of hearing was timely given to all persons legally entitled to notice pursuant to 16 TEX. ADMIN. CODE § 1.45.

3. Mid-States provided legally sufficient notice of the disposal well permit applications for the Phillips Lease, Well Nos. 371D, 471D and 481D, to all required entities in compliance 16 TEX. ADMIN. CODE § 3.9(5).

4. Mid-States has a good faith claim to operate Phillips Lease, Well Nos. 371D, 471D and 481D, as permitted.

5. No protest of disposal well permit applications for the Phillips Lease, Well Nos. 371D, 471D and 481D was received by staff pursuant to 16 TEX. ADMIN. CODE § 3.9(5)(E).

6. Commission staff properly approved the Phillips Lease, Well Nos. 371D, 471D and 481D applications pursuant to 16 TEX. ADMIN. CODE § 3.9(5)(F).

7. There is legally insufficient evidence to support suspension, modification or cancellation of the Phillips Lease, Well Nos. 371D, 471D and 481D permits pursuant to 16 TEX. ADMIN. CODE § 3.9(6).

RECOMMENDATION

The Administrative Law Judge and Technical Examiner recommend that the attached Final Order be adopted, ordering that the relief sought by R. Mark Henkhaus on behalf of Apache Corporation be denied and the complaint be dismissed.

RESPECTFULLY SUBMITTED,

DANA AVANT LEWIS
Administrative Law Judge

KARL CALDWELL
Technical Examiner