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* KEY ISSUES: Waste                          *
*             Equidistant Offset Rule        *
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* FINAL ORDER: Withdrawn                     *
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RULE 37 CASE NOS. 0213127 and 108,950
DISTRICT 9

CONSOLIDATED APPLICATIONS OF ENSERCH EXPLORATION, INC. FOR AN EXCEPTION TO STATEWIDE RULE 37 ON THE GRANGE-GERALD-WORD NO. 3 LEASE AND OF PERRY L. LARSON OPERATING COMPANY, INC. FOR A STATEWIDE RULE 37 EXCEPTION ON THE BOBBIE GERALD LEASE, KFC (CHAPPEL) AND WILDCAT FIELDS, HARDEMAN COUNTY, TEXAS

APPEARANCES:	**REPRESENTING:**
FOR APPLICANT/PROTESTANT:	
Frank H. Pope, Jr. (attorney) Thomas F. Sewak Everitt E. Bradley Kim T. Nordstog	Enserch Exploration, Inc.
FOR APPLICANT/PROTESTANT:	
Philip F. Patman (attorney) Perry L. Larson James C. Harwell	Larson Operating Company, Inc.

PROPOSAL FOR DECISION

PROCEDURAL HISTORY

APPLICATIONS FILED:	July 22 and September 6, 1996
NOTICES OF HEARING:	August 23 and September 10, 1996
AMENDED NOTICE OF HEARING:	October 9, 1996
CONSOLIDATED HEARING DATE:	November 19, 1996
TRANSCRIPT RECEIVED:	December 20, 1996
PFD CIRCULATION DATE:	October 3, 1997
HEARD BY:	Mickey R. Olmstead, Hearings Examiner Thomas H. Richter, P.E., Technical Examiner

STATEMENT OF THE CASE

Enserch Exploration, Inc. ("Enserch") seeks an exception to Statewide Rule 37 to directionally drill its proposed Well No. 1 on the 250-acre Grange-Gerald-Word No. 3 Lease in the KFC (Chappel) and Wildcat Fields in Hardeman County, Texas to within 41 feet of the adjacent lease to the north operated by Perry L. Larson Operating Company, Inc. ("Larson"). Larson is protesting Enserch's application as well as seeking its own exception to Statewide Rule 37 to drill its proposed Well No. 4 on the adjacent 320-acre Bobbie Gerald Lease, also in the KFC (Chappel) and Wildcat Fields in Hardeman County, Texas. Larson's proposed Well No. 4 is also to be directionally drilled by re-entering the abandoned Gerald-Grange Well No. 2 and drilling to within 102' of its south lease line and 109' of its west lease line (see copy of Larson's application plat attached hereto as Exhibit "A"). Enserch protested Larson's application; however, at the hearing Enserch conceded that Larson is entitled to a well at its proposed location.

Both the KFC (Chappel) and Wildcat Fields are governed by Statewide Rules mandating spacing of 467' from lease lines and 1,200' between wells, with 40-acre density. Regular locations exist on both the Larson and Enserch leases, and the proposed wells would be the only wells producing from the KFC (Chappel) Field on the respective leases.

Enserch and Larson each presented expert testimony in support of their respective positions and cross-examined the other party's witnesses. The evidence proffered by both parties largely consists of three-dimensional ("3-D") seismic data which the parties participated in together.

The parties agree on most of the parameters of the KFC (Chappel) Field ("subject field" or "subject reservoir"). For instance, the parties agree that the subject field is less than ten acres in areal extent and contains an active water drive, which necessitates that the parties drill to the highest structural position possible on their respective lease. Likewise, the parties agree that the highest structural position of the subject field is located on Larson's lease near the parties' common lease line. The parties further agree that mirror image offsetting wells, each located 100' from the common lease line, would both be within the subject field and that the porosity in the subject field varies from approximately 11% to 35%.

Finally, the parties agree that a single well at the top of the structure of the subject reservoir can completely drain the entire reservoir; however, the parties have not agreed to participate in such a well. In fact, the primary difference between the parties is their respective interpretations of the 3-D seismic data, as the same data was used by both parties. Accordingly, the only issue before the Commission is the 59' difference between Enserch's proposed location (41' south of the common lease line) and a 100' location, mirror imaging Larson's proposed well location because Larson waived its protest to the 100' location on Enserch's lease at the hearing. Therefore, the following discussion of evidence and legal analysis will focus primarily on the parties' respective 3-D seismic interpretations and the resulting effects.

ENSERCH'S APPLICATION

Enserch Exploration, Inc. presented three expert witnesses and introduced ten exhibits at the hearing. Enserch offered its analysis of the 3-D seismic data and its structural interpretation of the top of the Chappel porosity resulting therefrom. From the 3-D seismic information, Enserch's geophysicist was able to map the top of the Chester Limestone Formation, the top of the Meramec Limestone Formation, and purportedly, the top of the Chappel Dolomite porosity. Using the very limited available well control from the only three wells drilled into the subject field, Enserch proffered a structural representation showing the subject reservoir to be narrow and elongated, with the majority of the productive acreage underlying Enserch's lease, and having an oil-water contact line at approximately -6798 subsea depth (see copy of Enserch Exhibit No. 9 attached hereto as Exhibit "B").

The Forston-Grange No. 1 Well was completed in the KFC (Chappel) Field and is located 1,240' south of Enserch's proposed location. The Forston-Grange No. 1 was completed in September 1986 and produced until September 1989 before watering out. The Forston-Grange No. 1 produced between 4,000 and 7,000 barrels of oil per month for several months before it precipitously declined and then leveled out prior to abandonment. Said well ultimately recovered 102,000 barrels of oil over three years of production. Enserch believes that the Forston-Grange No. 1 Well watered out prematurely, that it is located in the same subject reservoir as Enserch's proposed well location, and that it left up to 16' of unrecovered attic oil remaining in the structure.

Two dry holes exist to the east and northeast of Enserch's proposed location: the Perry L. Larson Operating Company, Inc. Gerald-Grange No. 2 Well, which is approximately 300' away from Enserch's proposed location; and the Larson Gerald-Grange No. 1 Well, which is a few hundred feet further to the east than the Gerald-Grange No. 2. Consequently, these two dry wells are on the northeast flank of the subject field's structure, according to Enserch.

Enserch concedes that the Meramec Limestone, which overlies the KFC (Chappel) Field and generally coincides with the top of the Chappel porosity, is the most accurate seismic reflector above the Chappel porosity that can be structurally mapped. Therefore, Enserch produced its structural map of the Chappel porosity (Exhibit "B") by picking the top of the Meramec Formation and then calculating down to the Chappel porosity using the very limited well control.

Enserch's interpretation of the 3-D seismic data indicates that the highest structural location for the Meramec Limestone Formation, and therefore for the underlying Chappel porosity, <u>on Enserch's lease</u> is 41' south of the common lease line. Enserch concedes, however, that the structurally highest location on the entire Meramec feature is actually north of the lease line on Larson's tract.

From the Forston-Grange No. 1 Well, Enserch has determined that the oil-water contact line is located at approximately -6798' subsea depth. This produces an areal extent for the subject field of only 9.5 acres. Enserch believes that its proposed well location is at -6743' subsea depth, which

is the highest structural position on its lease. Based on its structural mapping and oil-water contact line, Enserch estimated that the total reservoir contains approximately 203 acre-feet. This correlates to only 73,000 barrels of recoverable oil in the entire reservoir, of which, according to Enserch, its lease contains 86.4% while Larson's lease includes only 10.2%. The remaining 3.4% of the subject reservoir volume is on the DeCleva tract, which is due west of the proposed well locations and which is also operated by Enserch (see Exhibit "B").

Under cross-examination, Enserch's witnesses acknowledged that if its application for a location 41' from Larson's lease line were denied, no waste would occur because Larson, occupying the highest structural position, could eventually drain all of the reserves from the subject field. Likewise, Enserch conceded that its mapping of the Meramec Limestone and the top of the Chappel porosity is primarily based on its 3-D seismic interpretation because of the very limited well control in the area.

Enserch's witness testified that, using the 3-D seismic data, he was able to distinguish five-foot differences in vertical structural depth and 60-foot differences in lateral distances. However, under cross-examination, its witness admitted that the lateral accuracy of the data is no more than 82.5', the distance between each seismic trace. Thus, the 82.5' between each seismic trace is subject to interpretation. Enserch's witness further admitted that it was, "hard to call it within 40 feet".

Enserch believes that the top of the Chappel porosity is generally flat at its highest structure, which extends approximately 40' north onto Larson's lease before dropping off sharply. Therefore, under Enserch's interpretation, Larson's proposed 100' offsetting well location will be structurally too low, causing the proposed well to water out prematurely. Enserch's witness further testified that, according to his interpretation, Larson would have to drill a mirror-image well 40' north of the common lease line in order to achieve the highest structural position on its lease and thereby protect its own correlative rights. Such a scenario would absurdly position the two wells only 80' apart in a nine-acre reservoir containing only 73,000 barrels of recoverable oil.

LARSON'S APPLICATION

The Perry L. Larson Operating Company, Inc. presented two expert witnesses and seven exhibits in its direct case. As previously stated, Larson used the identical seismic data and analytical software used by Enserch; however, Larson came to substantially different conclusions. Using the same 3-D seismic data, Larson mapped the Chester Limestone Formation, as opposed to the Meramec Limestone and Chappel porosity purportedly mapped by Enserch. The Chester Limestone Formation overlays the Meramec Limestone, which in turn overlays the Chappel porosity. Larson's geophysicist testified that the Meramec Formation, being the deeper reflector, is not reliable and that the Chappel porosity cannot be accurately and consistently mapped at all. Larson's geophysicist further testified that he has been associated with the drilling of more than 100 wells in this general area in which he attempted to structurally map the Chappel porosity. He stated that he had been largely unsuccessful in his attempts, as had all other operators who have attempted to map the

Chappel porosity. Larson's witness testified that the highest structural point on the Chester is generally the highest point on the Meramec and also, generally, the highest point on the Chappel porosity. Accordingly, Larson believes that the Chester Limestone is the better seismic indicator of the highest structural position in the Chappel porosity zone.

Larson estimates the top of the Chester to be at approximately -6515' to -6520' subsea depth. Based on his mapping of the Chester Limestone, Larson's witness testified that Larson's proposed well location 102' north of the common lease line is the structurally highest position in the subject reservoir feature. Larson's expert further testified that the 41' and 100' locations on Enserch's lease are essentially structurally flat to each other, both locations being ten to twelve feet lower than the Larson tract. However, Larson's geophysicist did state that the 3-D seismic data used by both parties is only accurate to within plus or minus 40 feet of lateral distance. Likewise, the witness testified that the seismic data is no more accurate than plus or minus ten feet in vertical depth.

Based on the same 3-D seismic data used by Enserch, Larson generated a top of Chester Limestone structure plat indicating its interpretation of the subject field (see copy of Larson Exhibit No. 3 attached hereto as Exhibit "C"). Using the 1294 millisecond contour interval as the limit of the subject reservoir (shown in red on Exhibit "C"), Larson calculated the subject field to consist of 8.2 productive acres. This is comparable to the 9.5 productive acres calculated by Enserch. However, Larson's interpretation differs from Enserch's in that, according to Larson, more of the subject reservoir is located under Larson's tract than under Enserch's lease.

Larson presented uncontroverted evidence that the net pay and porosity should be consistent in the subject reservoir across the common lease line, and that therefore, any "no flow boundary" should occur equidistant between the two proposed wells. Accordingly, if Enserch is granted its exception location 41' south of the common lease line and Larson is granted its exception location 102' north of the common lease line, then the no flow boundary will occur approximately 30' north of the lease line on Larson's tract. This, according to Larson, would constitute net confiscation and violation of its correlative rights.

Larson's witness testified that, according to his reservoir analysis and interpretation, the abandoned producer Forston-Grange Well No. 1 is not completed in the subject reservoir because the reservoir does not extend that far south. Likewise, Larson's witness testified that the currently recoverable reserves in the subject reservoir cannot be calculated because there is no well currently drilled in said reservoir to provide the necessary information of net pay and porosity. Nonetheless, Larson's witness testified that, based on his experience in the Hardeman Basin area, he believes the subject reservoir contains between 100,000 and 200,000 barrels of recoverable oil. Finally, Larson's witness testified that, because the structurally highest position of the subject reservoir occurs at the 102' proposed well location on Larson's tract, waste of substantial oil reserves will occur unless Larson is granted its requested exception permit. Because of the active water drive, the attic oil trapped up-structure cannot be recovered by any existing wells or by any additional wells drilled at regular locations.

EXAMINERS' OPINION

Exceptions to Statewide Rule 37 may be granted to prevent waste or to protect correlative rights. To obtain an exception to Statewide Rule 37 to protect correlative rights, the applicant must show: 1) that it is not possible for the applicant to recover his fair share by placing the well at any regular location; and 2) that the proposed irregular location is reasonable.

An applicant seeking an exception to Rule 37 based on waste must establish three elements: 1) that unusual conditions, different from conditions in adjacent parts of the field, exist under the tract for which the exception is sought; 2) that, as a result of these conditions, hydrocarbons will be recovered by the well for which a permit is sought that would not be recovered by any existing wells or by additional wells drilled at regular locations; and 3) that the volume of otherwise unrecoverable hydrocarbons is substantial.

Although Enserch conceded that Larson is entitled to its requested 102' lease-line exception location, said exception location is necessary to prevent waste. Both parties agree that the highest structural location is located on Larson's lease, although Enserch believes that the structural high is located only 40' north of the common lease line as opposed to Larson's 102' requested location. It is undisputed that the very limited aerial extent of the subject reservoir (8.2 to 9.5 acres) with its structural high point located near the common lease line, coupled with an active water drive, constitute unusual subsurface conditions existing under Larson's tract, which are different from conditions in adjacent parts of the reservoir. Likewise, it is undisputed that as a result of these conditions, a substantial volume of hydrocarbons will be recovered by the proposed Larson well that would not be recovered by any existing wells or by additional wells drilled at regular locations.

The remaining issues are whether Enserch is entitled to an offsetting well based on either the prevention of waste and/or confiscation and the location of such a well. Unlike Larson, Enserch is not entitled to a well at its proposed location, 41' from the common lease line, based on waste. Enserch conceded that the highest structural position of the subject reservoir is on Larson's lease. Enserch further agreed that, because of the strong water drive, even were it granted its requested 41' exception location, some unquantified amount of attic oil would remain unrecovered on Larson's lease unless Larson were granted a Rule 37 exception permit as well.

However, Enserch is entitled to protect its own correlative rights and to prevent confiscation of its underlying oil reserves by the proposed Larson well. It is undisputed that Enserch cannot recover its fair share of the underlying reserves by drilling its proposed well at a regular location; and Larson has waived its protest to Enserch's drilling a well at a 100' equidistant or "mirror image" location to Larson's proposed well. The resulting question then is whether Enserch's proposed 41' exception location is reasonable. The examiners do not believe that it is.

Based on its interpretation of the subject reservoir, i.e. Exhibit "B", Enserch believes that the Chappel Dolomite porosity zone drops off sharply just 40' north of the common lease line. Enserch further believes that 86.4% of the reservoir volume lies under its tract. Therefore, Enserch argues that it is entitled to 86.4% of the total underlying oil reserves, which it estimates to be approximately 73,000 barrels of recoverable oil. However, Enserch acknowledged that it is difficult to map the Chappel porosity north of the common lease line because there is no well control in that direction. Enserch based its interpretation on its seismic projection of the Gerald-Grange Nos. 1 and 2 Wells, which are located several hundred feet east of the proposed locations. Likewise, under questioning by the examiners, Enserch's witness admitted that, if Enserch were granted an equidistant location 100' south of the common lease line, only a very small area of Enserch's tract would be drained by Larson's proposed well.

Therefore, the matter of contention before the Commission is whether or not enough certainty exists in the 3-D seismic evidence to discriminate between 100' and 40' on either side of the common lease line. The parties agree that plus or minus ten feet of vertical depth and plus or minus 40 feet of lateral distance is the least margin of error of the 3-D seismic data relied on by both parties. Yet Enserch attempts to support its proposed 41' offsetting location based on 5' vertical elevation and 40' lateral distance distinctions. The examiners believe that such differentiations are too narrow and that the quality of the science presented in support thereof is not sufficiently accurate.

The parties agree that the highest structural position of the subject reservoir on the Enserch tract is essentially flat, decreasing from five to ten feet in vertical elevation moving south from the common lease line to the 100' equidistant well location on Enserch's lease. The parties further agree that both equidistant 100' offsetting well locations are within the limits of the subject reservoir. Likewise the parties concur that 200' is an insufficient distance between two producing wells in this type of reservoir; however, the parties apparently have been unable to agree on how or where to drill a single well to drain the subject reservoir, although they do agree that one well is sufficient. The examiners believe that an equidistant exception location 100' south of the common lease line on Enserch's tract will allow Enserch to prevent confiscation and thereby, protect its own correlative rights. The relative location of wells on an applicant's tract vis-à-vis offsetting wells on an adjoining tract can be an important factor in considering the reasonableness of a requested exception location. See, e.g., *Shell Oil Co. v. Railroad Comm'n*, 133 S.W.2d 791 (Tex. Civ. App.-Austin 1939, writ dism'd judgm't cor.); *Falvey v. Simms Oil Co.*, 92 S.W.2d 292 (Tex. Civ. App.-Austin 1936, no writ); *Trapp v. Shell Oil Co.*, 145 Tex. 323, 198 S.W.2d 424 at 436 (1946).

The examiners do not believe that Enserch's requested 41' exception location is reasonable because less irregular locations exist on Enserch's lease which will provide it with a reasonable opportunity to recover its fair share of the oil reserves underlying its lease. Because the evidence indicates that the 41' and 100' locations on Enserch's lease are essentially structurally flat to each other, the examiners recommend an equidistant offsetting location 100' from Larson's lease line which will provide to Enserch the opportunity to recover its fair share of

the underlying reserves and which will establish the no-flow boundary between the two proposed wells at approximately the common lease line. For the above reasons, the examiners recommend that the Perry L. Larson Operating Company, Inc. be granted its requested exception location 102' north of the common lease line, that Enserch Exploration, Inc.'s requested exception location 41' south of the common lease line be denied, and that Enserch Exploration, Inc. be granted an equidistant exception location 100' south of the common lease line.

FINDINGS OF FACT

1. Notice of the hearing on the applications were mailed to all designated operators, lessees of record for tracts that have no designated operator, and owners of record of unleased mineral interests for each adjacent tract and each tract nearer than 467 feet to the proposed well.

2. Enserch Exploration, Inc. ("Enserch") has applied on Form W-1 for a permit to directionally drill its proposed Well No. 1 on the 250-acre Grange-Gerald-Word No. 3 Lease in the KFC (Chappel) and Wildcat Fields in Hardeman County, Texas to within 41 feet of the adjacent lease to the north operated by Perry L. Larson Operating Company, Inc. ("Larson").

3. Larson protests Enserch's application and has applied on Form W-1 for its own permit to directionally drill its proposed Well No. 4 on the 320-acre Bobbie Gerald Lease, also in the KFC (Chappel) and Wildcat Fields in Hardeman County, Texas by re-entering the abandoned Gerald-Grange Well No. 2 and drilling to within 102' of its south lease line and 109' of its west lease line.

4. Enserch protested Larson's application; however, at the hearing Enserch conceded that Larson is entitled to a well at its proposed location.

5. Both the KFC (Chappel) and Wildcat Fields are governed by Statewide Rules mandating spacing of 467' from lease lines and 1,200' between wells, with 40-acre density.

6. Regular locations exist on both the Larson Lease and the Enserch Lease, and both proposed wells would be the only wells producing from the KFC (Chappel) Field ("subject field" or "subject reservoir") on the respective leases.

7. The subject reservoir is less than ten acres in areal extent and contains an active water drive.

8. The highest structural position is located on Larson's Bobbie Gerald Lease near the parties' common lease line.

9. The porosity in the subject field varies from approximately 11% to 35%.

10. A single well at the top of the structure of the subject reservoir would completely drain the entire reservoir.

11. The limited aerial extent of the subject reservoir with its structural high point located near the common lease line and the reservoir's active water drive constitute unusual subsurface conditions, different from conditions in adjacent parts of the reservoir, existing under Larson's tract.

12. A substantial volume of otherwise unrecoverable hydrocarbons will be recovered by the proposed Larson No. 4 Well that would not be recovered by any existing wells or by additional wells drilled at regular locations.

13. Enserch cannot recover its fair share of the underlying reserves by drilling its proposed well at a regular location.

14. Larson has waived its protest to Enserch's drilling a well at a 100' offsetting location, equidistant to Larson's proposed well.

15. The subject reservoir contains recoverable reserves of 73,000 to 200,000 barrels of oil.

16. Both equidistant 100' offsetting proposed well locations are within the limits of the subject reservoir.

17. An equidistant exception location 100' south of the northerly north lease line on Enserch's Grange-Gerald-Word No. 3 Lease will provide Enserch with a reasonable opportunity to recover its fair share of the oil reserves underlying the lease, and thus, prevent confiscation.

CONCLUSIONS OF LAW

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

2. All things have occurred and/or have been done to give the Commission jurisdiction to decide these matters.

3. Exceptions to the lease-line spacing requirements are necessary to permit drilling the applied-for wells.

4. Approval of Larson's application is necessary to prevent waste.

5. Approval of Enserch's application is not necessary to prevent waste.

6. Enserch's proposed location 41 feet south of its northern lease line is not reasonable because less irregular locations exist at which the mineral interest owners can recover their fair share of hydrocarbons from beneath Enserch's lease.

7. Approval of a permit to drill a well at a location 100 feet south of Enserch's northern lease line is necessary to give Enserch a reasonable opportunity to recover its fair share of hydrocarbons in the applied-for fields underlying its lease, or the equivalent in kind, and to mitigate net drainage, thereby preventing confiscation.

8. The 100 foot exception location on Enserch's lease is reasonable because no less irregular locations exist at which Enserch can recover its fair share of hydrocarbons from under its lease.

RECOMMENDATION

The examiners recommend that the above findings of fact and conclusions of law be adopted and that Enserch Exploration, Inc. and the Perry L. Larson Operating Company, Inc. be granted equidistant offsetting exceptions to Statewide Rule 37 in accordance with the attached Final Orders.

Respectfully submitted,

Mickey R. Olmstead
Hearings Examiner

Thomas H. Richter, P.E.
Technical Examiner