

THE APPLICATION OF CIMAREX ENERGY CO. TO CONSIDER UNITIZATION AND SECONDARY RECOVERY AUTHORITY FOR THE LIBERTY SOUTH (YEGUA) UNIT, LIBERTY, SOUTH FIELD, LIBERTY COUNTY, TEXAS

HEARD BY: Andres J. Trevino P.E., Technical Examiner
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APPEARANCES:

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REPRESENTING:

Cimarex Energy Co.

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Cimarex Energy Co. requests Commission authority for unitization of the Liberty South (Yegua) Unit and approval of secondary recovery operations on the Unit in the Liberty, South Field, Liberty County.

The applicant had originally requested entity for density in the notice. The applicant withdrew the request as the Liberty, South Field has no spacing or density restrictions because it is classified as a piercement type salt dome. This application was unopposed and the examiners recommend approval.

DISCUSSION OF THE EVIDENCE

The Liberty, South Field was discovered in 1925 at approximately 7,000' subsurface depth. Productive intervals range from 1,600 feet to 9,700 feet. The proposed unit is an isolated fault block located on the southern flank of the South Liberty salt dome. The field is governed by Special Rules for piercement type salt domes.

Cimarex Energy is the only operator in the current proposed unit acreage. The proposed unitized interval is from 75' above the top of the Yegua EY-1 Sandstone formation to 75' below the bottom of the Yegua EY-3 Sandstone formation within the

proposed unit area. The proposed unitized reservoir is comprised of two Yegua sandstone stratigraphic depositions: the "EY-1" and "EY-3". The "EY-1" deposition feature is in a horst fault block anticline dipping in a southern direction and ranging in net pay thickness up to 13 feet. The "EY-3" deposition is in a southern direction and ranges in thickness up to 35.7 feet. The sandstone intervals are separated by 518 feet in vertical displacement. The "EY-1" is estimated to contribute 19% of the reservoir volume while the "EY-3" is estimated to contribute 81% of the reservoir volume.

The reservoirs are undersaturated solution gas drive oil reservoirs. Average porosity is 18.9% for the EY-1 and 26.4% for the EY-3. The average initial water saturation is 51.6% for the EY-1 and 42.8% for the EY-3. The permeability of the reservoirs averages 43 md for the EY-1 and 77 md for the EY-3 as determined from core sample analysis. The initial reservoir pressure was about 4,000 psi with the oil having a bubble point of 2,600 psi. The current reservoir pressure is less than 1,100 psi for the EY-1 and 600 psi for the EY-3.

The proposed Liberty South (Yegua) Unit consists of 48 tracts which contain approximately 540.7 acres. The reservoirs contain at least 11,698 acre-feet of net pay and original-oil-in-place of 10.27 million stock-tank barrels of oil.

There are currently 7 producing wells on pump and 4 shut-in wells within the proposed unit area. Current production is approximately 261 BOPD. Cumulative primary production as of December 31, 2010 is 1,264,845 barrels of oil and 1.14 BCF of gas for the EY-3 and 169,763 barrels of oil and 66.2 MMCF of gas for the EY-1. Total cumulative primary production as of December 31, 2010 is 1,434,608 barrels of oil and 1.21 BCF of gas. Estimated ultimate primary recovery is up to 1.808 MM barrels of oil, which is 17.6% of the original-oil-in-place. There will initially be seven producing wells, two injection wells, and a water supply well. The two proposed injection wells will be located in below the oil/water contact in the southern portion of the Unit. It is estimated that an additional 1,220,000 barrels of oil or 11.9% of the original oil in place will be recovered from the secondary recovery water injection program. This projection is based on the Black Oil simulator by Merlin. Production is expected to increase to a peak of 600 BOPD within 2 ½ yrs of beginning the waterflood operations.

Cimarex Energy plans to implement a peripheral drive waterflood by converting two shut-in wells to injection wells. Injection and make-up water will be supplied from a salt water supply well producing from the Frio sands at a depth of 6,500 feet in the unit area.

The proposed secondary recovery project is economically feasible. The estimated capital cost of water injection well conversions and other development costs is approximately \$2.6 million or \$2.13/STBO. The net gross cash flow from the sale of oil produced is estimated at \$103.7 million based on \$85/bbl.

Evidence reflects that 77% of the royalty interest ownership and 100% of the working interest ownership have signed the unit agreement. The participation formula is based on two Phases. Phase 1 will be in effect until the primary estimated ultimate recovery

of the EY-3 oil is produced; Phase 2 formula will be used thereafter. Phase 1 is based on 95% of the current lease production and 5% gross surface acres. Phase 2 is based on 75% of the original oil in place and 25% expected ultimate primary recovery.

All persons with interests within the area reasonably defined by development have been provided the opportunity to join the current proposed unit and have been given notice of the application and the hearing date. The notice of hearing in this matter has been published in *The Vindicator*, a newspaper of general circulation in Liberty County where the proposed unit is located.

FINDINGS OF FACT

1. Notice of this hearing was sent to all operators and royalty interest owners within the proposed unit and to offset operators and mineral owners of unleased tracts.
2. The Notice of Hearing was published in *The Vindicator*, a newspaper of general circulation in Liberty County, Texas, on June 23, June 30, July 7 and July 14, 2011.
3. The proposed unit consists of 48 tracts which contain 540.7 acres.
4. The proposed unitized interval is from 75' above the top of the Yegua EY-1 Sandstone formation to 75' below the bottom of the Yegua EY-3 Sandstone formation within the proposed unit area.
5. Cumulative recovery from the leases proposed for unitization is 1,434,608 BO through December 31, 2010. Remaining primary recovery is estimated to be 373,609 BO. Secondary recovery operations will result in the recovery of an estimated 1,220,000 BO, which would otherwise go unrecovered.
6. The cost to implement the project does not exceed the value of additional reserves to be recovered.
7. The participation formula is based on two Phases. Phase 1 will be in effect until the primary estimated ultimate recovery of the EY-3 oil is produced; Phase 2 formula will be used thereafter. Phase 1 is based on 95% of the current lease production and 5% gross surface acres. Phase 2 is based on 75% of the original oil in place and 25% expected ultimate primary recovery.
8. The secondary recovery project will not be successful unless the area is unitized.
9. The secondary recovery program will use salt water from the Frio sand at a depth of 6,500 feet as the injection fluid.

10. The agreement was voluntarily executed by all parties affixing their signatures thereto and no person has been compelled or required to enter into the agreement. The unit agreement binds only those persons who have executed it, their heirs, successors, assigns, and legal representatives. The rights of all owners of interests in the field will be protected under the operation of the unit, regardless of whether an owner signed the unit agreement.
11. The owners of interest in the oil and gas under each tract of land within the area reasonably defined by development have been given an opportunity to enter into the unit on the same yardstick basis as owners of interest in the oil and gas under the other tracts in the unit.
12. The proposed injection program will move hydrocarbons across lease lines, and unitization is necessary in order to protect the correlative rights of the various interest owners.
13. The unitization agreement is necessary to accomplish the purposes of establishing a unit to effect secondary recovery operations and to operate cooperative facilities necessary thereto. Other available or existing methods or facilities for secondary recovery operations are inadequate for the purpose of secondary recovery.
14. The unit agreement does not provide, either directly or indirectly, for the cooperative refining or marketing of crude petroleum, distillate, condensate, or gas, or any byproduct thereof.
15. The unit agreement is subject to all valid orders, rules and regulations of the Railroad Commission.
16. The unit agreement contains no provision regarding field rules, nor does it limit the amount of production of oil or gas from the unitized area. The unit agreement does not release the operator from his obligation to reasonably develop lands or leases as a whole.
17. The unit agreement is a voluntary agreement entered into for the purpose of conducting secondary recovery operations.
18. The unit agreement does not provide for the location of wells.
19. There are no state lands in the unit.
20. The unit agreement is in the interest of public welfare as being reasonably necessary to prevent waste and to promote conservation.

21. The reservoir described in the unit agreement is identified as a single reservoir for Commission purposes and is a suitable reservoir for the proposed secondary recovery operation.
22. The unit agreement contains only the acreage reasonably necessary to accomplish the proposed secondary recovery project.
23. The unit agreement has been ratified by 100% of the working interest ownership and by 77% of the royalty interest ownership.

CONCLUSIONS OF LAW

1. Proper notice was given to all persons legally entitled to notice.
2. All things have occurred or have been accomplished that are necessary to give the Commission jurisdiction in this matter.
3. Applicant's proposed secondary recovery project satisfies all of the requirements set out in Tex. Nat. Res. Code Ann. §101.001-101.052 (Vernon 2011).
4. Approval of the proposed unit agreement and secondary recovery operations is in the public interest and is necessary to prevent waste and to promote the conservation of oil or gas or both.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend approval of the proposed Liberty South (Yegua) Unit and secondary recovery operations project as set out in the attached order.

Respectfully submitted,

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Technical Examiner

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