



east. Cholla Petroleum drilled approximately 16 wells to develop the eastern area and production peaked in 2001 to 1,200 BO per month. Production and reservoir pressure have declined in the subject field, and the current production from the proposed unit area is 500 BO per month (a per well daily average of approximately 2 BO per day per well).

The proposed unit consists of 7 seven tracts and is 1121.5 acres. There are no state-owned lands in the proposed Unit. The zone of interest is the upper Caddo Lime Formation, where the upper 20% to 30% of the gross Caddo Lime interval is the productive portion. The lower portion of the Caddo Lime is water-wet. The zone of interest, or the proposed unitized interval, is shown on the well log for the Medders-Edwards Deep, Well No. 1A (API No. 42-009-42146) from 5,186 feet to 5,256 feet, which is the upper zone of porosity of the Caddo Lime.

The original reservoir pressure for the field interval was 2,418 psig while the current reservoir pressure is 300 psig. The reservoir porosity is 9%. The Caddo Lime is a single porosity zone in this area, has had significant reservoir pressure reduction, and is a good candidate for waterflood operations, as secondary recovery operations will increase ultimate recovery. Unitization is desirable since waterflood operations will cause the movement of reservoir fluids across lease lines and the proposed unit participation formula will protect the correlative rights of all the working and royalty interest underlying the Unit.

An isopach map superimposed over the proposed 1,121.5-acre Unit area shows the zone of interest is up to 40 feet thick in the heart of the field. Greg Cloud, P.E., Cholla's engineering witness, believes that the area of the reservoir between the estimated floodable limit line and the zero isopach line will not be effectively flooded. This is important because one of the participation factors in the Unit Agreement takes the estimated floodable limit into account. The tract participation formula that the parties have agreed to is a four-factor participation formula:

- 1) 10% future primary oil recovery.
- 2) 30% Ultimate primary oil recovery.
- 3) 50% floodable reservoir volume.
- 4) 10% future gas reserves.

When the field is unitized, this area will be assigned a single RRC lease number, which is the reason for the tract participation formula, as everyone is treated equally.

Mr. Cloud testified that the implementation of the proposed unitization and waterflood will recover 550,000 barrels of additional oil over the life of the project. The cost to implement the project is approximately \$2,000,000. An additional 550,000 barrels of oil at the current oil price greatly exceeds the cost to implement the project. Cholla has already obtained injection permits for several wells on the proposed Unit and the

proposed final development plan is to have 16 producing wells and 10 injection wells on the unit.

The June 1, 2018 oil proration schedule for the Scotland (Caddo Lime) Field shows there are two operators of wells in the field: Cholla and Texas Energy Operations, LC. Cholla is the only operator of wells on the Unit acreage and will be the Unit Operator. Texas Energy Operations, LC operate two wells in the Scotland (Caddo Lime) Field. These wells are located approximately 2.4 miles from the proposed Unit. Mr. Cloud testified that Texas Energy Operations, LC's two wells are unaffected by this application and believes the wells were placed in the Scotland (Caddo Lime) Field for administrative convenience.

Notice of the application and notice of the hearing were served on the working interest owners and the royalty interest owners in the proposed Unit. Working and royalty interest owners have been offered into the unit on the same yardstick basis. To-date, 100% working interest owners have executed the Unit agreement and 99.2% of the royalty interest owners have signed the Unit Agreement. Cholla will separately measure production from Tract 1, the Lindemann-Edwards Lease (Lease No. 01241), which is the only tract where 100% sign-up was not achieved. Production from the Lindemann-Edwards Lease will be delivered to its own separate tank battery, which will allow for 100% accuracy when measuring production. Lindemann Properties, Ltd., the entity that did not sign the Unit Agreement, will be protected by separate lease production measurement and payment of royalties.

Approximately 7 miles to the south of the proposed Unit is the Scotland, South (Caddo 5100) Field where Walsh & Watts, Inc. operate the S. Scotland Caddo Unit, a small unit in that field with a similar zone of interest to Cholla's proposed unitized interval. The Scotland, South (Caddo Field) began producing in 1959 and is a very mature field, similar to the Scotland (Caddo Lime) Field. In late-1998 water injection began on the S. Scotland Caddo Unit and production increased from approximately 100 BO per month up to 600 BO per month. Secondary recovery operations on this comparable unit in a similar nearby field with a similar zone of interest has been a very successful flood, with secondary oil as a percent of primary recovery of 45%. Cholla is anticipating similar results for the proposed waterflood unit. In this case, the subject field has produced 1,000,000 BO, and Mr. Cloud estimates 55% recovery of secondary oil as a percent of primary oil, resulting in an estimated 550,000 BO to be recovered from secondary recovery operations on the proposed Unit.

Cholla agreed on the record that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order shall be effective on the date a Master Order relating to this Final Order is signed.

#### **FINDINGS OF FACT**

1. Notice of the application and notice of the hearing were served on the working interest owners and the royalty interest owners in the proposed

Unit. The only other operator in the Scotland (Caddo Lime) Field other than Cholla is Texas Energy Operations, LC.

- a. Cholla is the only operator of wells on the Unit acreage and will be the Unit Operator.
  - b. Texas Energy Operations, LC operate two wells in the Scotland (Caddo Lime) Field. The two wells are located approximately 2.4 miles from the proposed Unit and are unaffected by this application.
2. The proposed Unit consists of seven separate tracts and 1121.5 acres.
  3. The zone of interest in the Unit is the upper Caddo Lime Formation, where the upper 20% to 30% of the gross Caddo Lime interval is the productive interval. The lower interval of the Caddo Lime is water-wet. The productive interval consists of a single zone of porosity having an average porosity of 9%. The zone of interest, or the proposed unitized interval, is shown on the well log for the Medders-Edwards Deep, Well No. 1A (API No. 42-009-42146) from 5,186 feet to 5,256 feet, which is the upper zone of porosity of the Caddo Lime.
  4. At the time of the hearing, 100% of the working interest and 99.2% of the royalty interest within the unit area have agreed to and executed the unit agreement.
  5. Secondary recovery operations are expected to result in the recovery of 550,000 barrels of oil that would otherwise go unrecovered.
  6. The cost to implement the project is approximately \$2,000,000. An additional 550,000 barrels of oil at the current oil price greatly exceeds the cost to implement the project and the cost of the proposed project does not exceed the value of additional reserves to be recovered.
  7. The participation formula for the Unit as stated in the Unit Agreement is a four-factor participation formula as follows:
    - a. 10% future primary oil recovery.
    - b. 30% Ultimate primary oil recovery.
    - c. 50% floodable reservoir volume.
    - d. 10% future gas reserves.
  8. The proposed secondary recovery project will not be successful unless the area is unitized.

9. The Unit 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.
10. The owners of interests 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 interests in the oil and gas under the other tracts in the Unit.
11. 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.
12. The unitization agreement is necessary to accomplish the purposes of establishing a Unit to effect secondary recovery operations for water injection 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.
13. 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 by-product thereof.
14. The Unit Agreement is subject to all valid orders, rules and regulations of the Railroad Commission.
15. The Unit Agreement contains no provision regarding the field rules, nor does it limit the amount of production of oil and 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.
16. The Unit Agreement is a voluntary agreement entered into for the purpose of conducting secondary recovery operations.
17. The Unit Agreement does not provide for the location of wells.
18. There are no state-owned lands in the proposed Unit.
19. The Unit Agreement is in the interest of public welfare as being reasonably necessary to prevent waste and to promote conservation.

- 20. The proposed Unit contains only the acreage reasonably necessary to accomplish the proposed secondary recovery project.
- 21. Production will be separately measured for wells on tracts for which 100% sign-up was not achieved.
- 22. At the hearing, the applicant agreed on the record that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order shall be final and effective on the date a Master Order relating to this Final Order is signed.

**CONCLUSIONS OF LAW**

- 1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051.
- 2. All notice requirements have been satisfied. 16 Tex. Admin. Code § 1.45.
- 3. Applicant's proposed secondary recovery project satisfies all of the requirements set out in Tex. Nat. Res. Code Ann. §§ 101.001-052.
- 4. Approval of the proposed unit agreement for 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.
- 5. Pursuant to § 2001.144(a)(4)(A), of the Texas Government Code, and the agreement of the applicant on the record, this Final Order can be final and effective when a Master Order relating to this Final Order is signed.

**EXAMINERS' RECOMMENDATION**

Based on the above findings of fact and conclusions of law, the Examiners recommend approval of the proposed Scotland Waterflood Unit and secondary recovery operations on the Unit as set out in the attached order.

Respectfully submitted,



Karl Caldwell  
Technical Examiner



Jennifer Cook  
Administrative Law Judge