

**THE APPLICATION OF CULVER & CAIN PRODUCTION LLC TO CONSIDER
UNITIZATION AND SECONDARY RECOVERY AUTHORITY FOR THE CROW UPPER
RODESSA WATERFLOOD UNIT, CROW (RODESSA, UP.) FIELD, WOOD COUNTY,
TEXAS**

HEARD BY: Richard D. Atkins, P.E. - Technical Examiner
Marshall F. Enquist - Legal Examiner

DATE OF HEARING: October 13, 2010

APPEARANCES:

REPRESENTING:

APPLICANT:

George C. Neale
Cary McGregor
Matt Culver
Bud Worthan

Culver & Cain Production LLC

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Culver & Cain Production LLC ("Culver & Cain") requests Commission authority for unitization of the Crow Upper Rodessa Waterflood Unit and approval of secondary recovery operations on the Unit.

This application was unopposed and the examiners recommend approval.

DISCUSSION OF THE EVIDENCE

The Crow (Rodessa, Up.) Field was discovered in May 1976 at an average depth of 9,200 feet. There one producing well carried on the proration schedule. Field Rules provide for 660'-1,867' well spacing, 160 acre density and allocation based on 100% acres. The top allowable is 435 BOPD with a casinghead gas limit of 870 MCFGPD. Cumulative production from the field through July 2010 is 430.0 MBO and 530.8 MMCFG.

The unitized formation is the subsurface portion of the Unit Area commonly known as the Upper Rodessa Formation between the subsurface depths of 9,101 feet and 9,234 feet as shown on the log of the Culver & Cain Production LLC - J. H. Allen Lease, Well No. 2 (API No. 42-499-30291), Joseph Knight Survey, Abstract 346, Wood County, Texas.

OIL AND GAS DOCKET NO. 06-0266709

The proposed Crow Upper Rodessa Waterflood Unit consists of eight tracts which contain 385 acres. The productive interval contained within the Upper Rodessa Formation is a sand which is a stratigraphic trap that has no structural component. Solution gas drive is the primary drive mechanism. The proposed unit contains all of the productive portions of the Crow (Rodessa, Up.) Field, as demonstrated by a cross section and structure map provided by Culver & Cain. The sand has an average porosity of 12%, an average water saturation of 20% and an average net pay thickness of 15 feet.

Culver & Cain propose to implement a waterflood initially by re-completing a deeper depleted Crow (Rodessa) Field well, the Barney Holmes Lease, Well No. 1, into the Crow (Rodessa, Up.) Field. After the well is recompleted, it will be converted to injection. Culver & Cain will inject produced salt water and additional makeup fresh water from the Nacogdoches Formation located at an average depth of approximately 500 feet.

Culver & Cain calculated the original oil in place to be 3.3 MMBO. Primary recovery from the field is projected to be 481 MBO or 15% of the original oil in place. Culver & Cain estimates that secondary recovery will be equal to 122% of the primary recovery or approximately 587 MBO. The project will result in an ultimate recovery for the field of 32% of the original oil in place. The total cost to implement and operate the secondary recovery project is expected to be \$2.6 million. The estimated break even point will only require the production of 45,000 BO. This calculation is based on an oil price of \$75 per barrel.

The participation formula for the Unit is based entirely on the surface acres contained in each Tract. At the time of the hearing, 97.6% of the working interest ownership and 93.6% of the royalty interest ownership had signed the unit agreement. There are no state owned lands in the proposed unit. Culver & Cain anticipate 100% sign up of the working and royalty interest ownership by the time the project is initiated, but will conduct monthly well tests to allocate production to wells on tracts for which 100% sign-up was not achieved.

FINDINGS OF FACT

1. Notice of this hearing was sent to all operators and royalty interest owners within and adjacent to the proposed unit. Notice was published in *The Winnsboro News*, a newspaper of general circulation in Wood County, for four consecutive weeks beginning August 19, 2010.
2. The proposed Crow Upper Rodessa Waterflood Unit consists of eight tracts which contain 385 acres.
3. The unitized formation is the subsurface portion of the Unit Area commonly known as the Upper Rodessa Formation between the subsurface depths of 9,101 feet and 9,234 feet as shown on the log of the Culver & Cain Production LLC - J. H. Allen Lease, Well No. 2 (API No. 42-499-30291),

OIL AND GAS DOCKET NO. 06-0266709

Joseph Knight Survey, Abstract 346, Wood County, Texas.

4. The productive interval contained within the Upper Rodessa Formation is a sand which is a stratigraphic trap that has no structural component. Solution gas drive is the primary drive mechanism.
5. At the time of the hearing, 97.6% of the working interest ownership and 93.6% of the royalty interest ownership had signed the unit agreement. Culver & Cain anticipate 100% sign up of the royalty interest ownership by the time the project is initiated.
6. Secondary recovery operations are expected to result in the recovery of an estimated 587 MBO which would otherwise go unrecovered.
7. The total cost to implement and operate the secondary recovery project is expected to be \$2.6 million. The estimated break even point will only require the production of 45,000 BO. The cost does not exceed the value of additional reserves to be recovered.
8. The participation formula for the Unit is based entirely on the surface acres contained in each Tract.
9. The secondary recovery project will not be successful unless the area is unitized.
10. Culver & Cain propose to implement a waterflood initially by re-completing a deeper depleted Crow (Rodessa) Field well, the Barney Holmes Lease, Well No. 1, into the Crow (Rodessa, Up.) Field. After the well is recompleted, it will be converted to injection. Culver & Cain will inject produced salt water and additional makeup fresh water from the Nacogdoches Formation located at an average depth of approximately 500 feet.
11. 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.
12. 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.

OIL AND GAS DOCKET NO. 06-0266709

13. 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.
14. 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.
15. 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.
16. The unit agreement is subject to all valid orders, rules and regulations of the Railroad Commission.
17. 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.
18. The unit agreement is a voluntary agreement entered into for the purpose of conducting secondary recovery operations.
19. The unit agreement does not provide for the location of wells.
20. There are no state owned lands in the proposed unit.
21. The unit agreement is in the interest of public welfare as being reasonably necessary to prevent waste and to promote conservation.
22. The reservoir described in the unit agreement is identified as a single reservoir for Commission purposes and is a suitable reservoir for a water injection secondary recovery operation.
23. The unit agreement contains only the acreage reasonably necessary to accomplish the proposed secondary recovery project.
24. Monthly well tests will be conducted to allocate production to wells on tracts for which 100% sign-up was not achieved.

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 et seq.
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.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend approval of the proposed Crow Upper Rodessa Waterflood Unit and secondary recovery operations project as set out in the attached order.

Respectfully submitted,

Richard D. Atkins, P.E.
Technical Examiner

Marshall F. Enquist
Legal Examiner