

DHC 9/9/98

DISTRICT I  
P.O. Box 1980, Hobbs, NM 88241-1980

DISTRICT II  
811 South First St., Artesia, NM 88210-2635

DISTRICT III  
1000 Rio Brazos Rd, Aztec, NM 87410-1893

State of New Mexico  
Energy, Minerals and Natural Resources Department  
OIL CONSERVATION DIVISION  
2040 S. Pacheco  
Santa Fe, New Mexico 87505-6429

Form C-107-A  
New 3-12-96

APPROVAL PROCESS:  
Administrative ☒ Hearing  
EXISTING WELLBORE  
YES ☐ NO ☒

AUG 20 1998

APPLICATION FOR DOWNHOLE COMMINGLING

RICHARDSON OPERATING COMPANY 1700 Lincoln St., Suite 1700 Denver, CO 80203  
Operator Address

W.F. Federal 21-1 M 21 30N 14W San Juan  
Lease Well No. Unit Ltr. Sec. Twp. Rge County

OGRID NO. 019219 Property Code API NO. Spacing Unit Lease Types: (check 1 or more)  
Federal ☒ State ☐ (and/or) Fee ☐

| The following facts are submitted in support of downhole commingling:   | Upper Zone                               | Intermediate Zone | Lower Zone                 |
|---|--|-------------------|----------------------------|
| 1. Pool Name and Pool Code  | 71629<br>Basin Fruitland Coal            |                   | 86620<br>Twin Mounds FT-PC |
| 2. Top and Bottom of Pay Section (Perforations)   | 640-650                                  |                   | 660-670                    |
| 3. Type of production (Oil or Gas)  | Gas                                      |                   | Gas                        |
| 4. Method of Production (Flowing or Artificial Lift)  | Pumping                                  |                   | Pumping                    |
| 5. Bottomhole Pressure<br>Oil Zones - Artificial Lift: Estimated Current<br>Gas & Oil - Flowing: Measured Current<br>All Gas Zones: <u>Estimated</u> Or Measured Original   | a. (Current)<br><br>b. (Original)<br>200 | a.<br><br>b.      | a.<br><br>b. 200           |
| 6. Oil Gravity (°API) or Gas BTU Content  | 1000                                     |                   | 1000                       |
| 7. Producing or Shut-in?  |  |                   |                            |
| Production Marginal? (yes or no)  | Yes                                      |                   | Yes                        |
| • If Shut-in, give date and oil/gas/water rates of last production<br><br>Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data<br><br>• If Producing, give date and oil/gas/water rates of recent test (within 60 days) | Date:<br>Rates:                          | Date:<br>Rates:   | Date:<br>Rates:            |
|   | Date:<br>Rates:                          | Date:<br>Rates:   | Date:<br>Rates:            |
| 8. Fixed Percentage Allocation Formula - % for each zone  | Oil: % Gas: %                            | Oil: % Gas: %     | Oil: % Gas: %              |

9. If allocation formula is based upon something other than current or past production, or is based upon some other method, submit attachments with supporting data and/or explaining method and providing rate projections or other required data.
10. Are all working, overriding, and royalty interests identical in all commingled zones? ☒ Yes ☐ No  
If not, have all working, overriding, and royalty interests been notified by certified mail? ☒ Yes ☐ No  
Have all offset operators been given written notice of the proposed downhole commingling? ☒ Yes ☐ No
11. Will cross-flow occur? ☐ Yes ☒ No If yes, are fluids compatible, will the formations not be damaged, will any cross-flowed production be recovered, and will the allocation formula be reliable. ☐ Yes ☐ No (If No, attach explanation)
12. Are all produced fluids from all commingled zones compatible with each other? ☒ Yes ☐ No
13. Will the value of production be decreased by commingling? ☒ Yes ☐ No (If Yes, attach explanation)
14. If this well is on, or communitized with, state or federal lands, either the Commissioner of Public Lands or the United States Bureau of Land Management has been notified in writing of this application. ☒ Yes ☐ No
15. NMOCD Reference Cases for Rule 303(D) Exceptions: ORDER NO(S) \_\_\_\_\_
16. ATTACHMENTS:  
• C-102 for each zone to be commingled showing its spacing unit and acreage dedication.  
• Production curve for each zone for at least one year. (If not available, attach explanation.)  
• For zones with no production history, estimated production rates and supporting data.  
• Data to support allocation method or formula.  
• Notification list of all offset operators.  
• Notification list of working, overriding, and royalty interests for uncommon interest cases.  
• Any additional statements, data, or documents required to support commingling.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Paul C. Thompson TITLE Agent DATE 4/23/98  
TYPE OR PRINT NAME Paul C. Thompson TELEPHONE NO. ( 505 ) 327-4892

***Exhibit "A"***  
**Division Order DHC-2100**

Monthly Gas Production Allocation Formula  
W. F. Federal No. 21-1

- 1) Perform well test on the Fruitland Coal formation and on the total well production.
- 2) Determine the initial production rate from the Pictured Cliffs formation from the actual first months production from the following relation:

$$Q_{PCi} = 1^{\text{st}} \text{ Month Production} * (\text{Total well test} - \text{Fruitland coal test}) / \text{Total well test}$$

- 3) Determine Pictured Cliffs decline from the following equation:

$$D = (Q_{PCi} - Q_{PCa}) / \text{Estimated Total Pictured Cliffs Gas Reserves}$$

where:

$Q_{PCa}$  = Pictured Cliffs rate at abandonment (304 MCF/Month)  
Total Pictured Cliffs Gas Reserves = 108,950 MCF (Average of eight offset wells)

- 4) Calculate Pictured Cliffs rate at any time from the following:

$$Q_{PC} = Q_{PCi} * e^{(-Dt)} \text{ where } t \text{ is time in months since first delivery.}$$

- 5) The Fruitland Coal production will be calculated monthly from the actual measured well production for that month minus  $Q_{PC}$ .

District I  
PO Box 1980, Hobbs, NM 88241-1980  
District II  
PO Drawer DD, Artesia, NM 88211-0719  
District III  
1000 Rio Bravo Rd., Aztec, NM 87410  
District IV  
PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico  
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION  
PO Box 2088  
Santa Fe, NM 87504-2088

Form C-102  
Revised February 21, 1994  
Instructions on back  
Submit to Appropriate District Office  
State Lease - 4 Copies  
Fee Lease - 3 Copies

☐ AMENDED REPORT

# WELL LOCATION AND ACREAGE DEDICATION PLAT

|               |                          |           |  |
|---------------|--------------------------|-----------|--|
| API Number    |                          | Well Code | Well Name                                    |
|               |                          | 86620     | Twin Mounds Fruitland Sand - Pictured Cliffs |
| Property Code | Property Name            |           | Well Number                                  |
|               | WF Federal               |           | 21-1   |
| GRID No.      | Operator Name            |           | Elevation                                    |
| 019219        | Richardson Operating Co. |           | 5565'  |

## Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County   |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|----------|
| M             | 21      | 30 N.    | 14 W. |         | 885           | South            | 906           | West           | San Juan |

## Bottom Hole Location If Different From Surface

| UL or lot no.   | Section         | Township           | Range     | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|-----------------|-----------------|--------------------|-----------|---------|---------------|------------------|---------------|----------------|--------|
|                 |                 |                    |           |         |               |                  |               |                |        |
| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |         |               |                  |               |                |        |
| 160             | Y               |                    |           |         |               |                  |               |                |        |

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

|               |  |  |  |  |  |
|---------------|--|--|--|--|--|
| <div>16</div> |  |  |  |  | <div>17 OPERATOR CERTIFICATION</div> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief</p> <p><i>David B. Richardson</i></p> <p>Signature</p> <p>David B. Richardson</p> <p>Printed Name</p> <p>President</p> <p>Title</p> <p>April 22, 1998</p> <p>Date</p>   |
|               |  |  |  |  |  |
|               |  |  |  |  |  |
|               |  |  |  |  |  |
|               |  |  |  |  | <div>18 SURVEYOR CERTIFICATION</div> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief</p> <p>Date of Survey</p> <p>Signature and Seal of Professional Surveyor</p> <p><i>Paul B. Huddleston</i></p> <p>6844</p> <p>REGISTERED LAND SURVEYOR</p> <p>6844</p> <p>Certificate Number</p> |
|               |  |  |  |  |  |
|               |  |  |  |  |  |
|               |  |  |  |  |  |

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Revised February 21, 1994  
Instructions on back  
Submit to Appropriate District Office  
State Lease - 4 Copies  
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☐ AMENDED REPORT

### WELL LOCATION AND ACREAGE DEDICATION PLAT

|                       |   |                      |                                     |
|-----------------------|---|----------------------|-------------------------------------|
| * API Number          |   | * Pool Code<br>71629 | * Pool Name<br>Basin Fruitland Coal |
| * Property Code       | * Property Name<br>WF Federal               |                      | * Well Number<br>21-1               |
| * OGRID No.<br>019219 | * Operator Name<br>Richardson Operating Co. |                      | * Elevation<br>5565'                |

#### 10 Surface Location

| UL or lot no. | Section | Township | Range | Lot Ida | Feet from the | North/South line | Feet from the | East/West line | County   |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|----------|
| M             | 21      | 30 N.    | 14 W. |         | 885           | South            | 906           | West           | San Juan |

#### 11 Bottom Hole Location If Different From Surface

| UL or lot no.            | Section                | Township             | Range | Lot Ida     | Feet from the | North/South line | Feet from the | East/West line | County |
|--------------------------|------------------------|----------------------|-------|-------------|---------------|------------------|---------------|----------------|--------|
|                          |                        |                      |       |             |               |                  |               |                |        |
| * Dedicated Acres<br>320 | * Joint or Infill<br>Y | * Consolidation Code |       | * Order No. |               |                  |               |                |        |

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

|   |  |  |  |  |
|---|--|--|--|--|
| <div style="border: 2px solid black; padding: 5px;"> <p>16</p> </div> | <div style="border: 1px solid black; padding: 5px;"> <p>17 OPERATOR CERTIFICATION</p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief</p> <p><i>David B. Richardson</i></p> <p>Signature</p> <p>David B. Richardson</p> <p>Printed Name</p> <p>President</p> <p>Title</p> <p>April 22, 1998</p> <p>Date</p> </div>   |  |  |  |
|   | <div style="border: 1px solid black; padding: 5px;"> <p>18 SURVEYOR CERTIFICATION</p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my belief</p> <p>_____<br/>Date of Survey</p> <p>_____<br/>Signature and Seal of Professional Surveyor</p> <p><i>David B. Richardson</i></p> <p>REGISTERED LAND SURVEYOR</p> <p>6844</p> <p>Certificate Number</p> </div> |  |  |  |
|   |  |  |  |  |
|   |  |  |  |  |

Richardson Operating  
WF Federal #21-1  
Section 21, T30N, R14W

Allocation Formula

The proposed well is a new drill so there is no production data available. There are several Twin Mounds Fruitland Sand - Pictured Cliffs that have produced in this township in the offsetting sections. Please refer to Attachment 1 for a summary of the Fruitland Sand - PC offset wells. The closest Basin Fruitland Coal completion is in Section 31, 30N 14W and has not reported any production.

With the exception of the Russell #2 (33-30N-14W), all of the offsetting Pictured Cliffs wells appear to only be capable of marginal production. Since the production characteristics of the Fruitland Coal formation are unknown at this time, Richardson Operating Company, proposes to down hole commingle the production.

Based on the Bushman #1 (6-29N-14W) both the Pictured Cliffs and the Fruitland Coal zones have very similar bottom hole pressures of approximately 180 psig. Therefore, cross flow will not be a factor. It is anticipated that both zones will produce some water. Neither zone is fluid sensitive and the fluids from the two zones should be compatible.

Due to the lack of production data from the two zones, Richardson Operating proposes to allocate the production according to the following method.

1. Perform well a test on the Fruitland Coal formation and on the total well production.
2. Determine the initial production rate from the Pictured Cliffs formation from the actual first months production from the following relation:

$$Q_{pci} = \text{1st Month Production} * (\text{Total Well Test} - \text{FTC Well Test}) / \text{Total Well Test}.$$

3. Determine Pictured Cliff decline from the following equation:

$$D = (Q_{PCi} - Q_{PCa}) / \text{Estimated Total Pictured Cliffs Reserves}$$

where:

$Q_{PCa}$  = Pictured Cliffs rate at abandonment = 304 MCF/Mo.

Total Pictured Cliffs Reserves = 108,950 MCF which is the average of eight offset wells. (Does not include Russell #2)

4. Calculate Pictured Cliffs rate at any time from the following:

$$Q_{PC} = Q_{PCi} * e^{(-Dt)} \text{ where } t \text{ is time in months since first delivery.}$$

5. The Fruitland Coal production can be calculated from the actual measured production for any month minus  $Q_{PC}$ .

ATTACHMENT 1.

RICHARDSON OPERATING

OFFSET FRUITLAND COAL - PICTURED CLIFFS WELLS

| Well Name      | Location<br>S-T-R | Date of First<br>Production | Cummulative<br>Production<br>MCF | Status  |
|----------------|-------------------|-----------------------------|----------------------------------|---------|
| Mayre #1       | 31P-30-14         | May-75                      | 89,573                           | Active  |
| Bi-Knobs #1    | 32H-30-14         | Sep-87                      | 124,180                          | Active  |
| State Com #45  | 32I-30-14         | Jan-79                      | 95,047                           | P&A     |
| Cline #1       | 33O-30-14         | Jun-71                      | 236,970                          | INA     |
| Aztec 35 #3    | 35D-30-14         | May-79                      | 59,375                           | INA     |
| Winifred #2    | 35G-30-14         | Jul-79                      | 69,966                           | INA     |
| Aztec 35 #4    | 35N-30-14         | Nov-80                      | 195,777                          | Active  |
| Aztec 35 #5    | 35O-30-14         | Feb-81                      | <u>718</u>                       | P&A     |
| <b>Average</b> |                   |                             | <b>108,951</b>                   |         |
| <br>Russell #2 | <br>33N-30-14     | <br>Oct-54                  | <br>1,629,189                    | <br>P&A |

Richardson Operating Company  
W.F. Federal 21 #1  
885'FSL & 906'FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

The following offset Operators have received written notice of the down hole commingling application.

Mr. Chuck Moran  
Yates Petroleum Corporation  
105 South Fourth Street  
Artesia, NM 88210

Mr. Garth Berkeland  
Celsius Energy Company  
1331 17th Street, Suite 800  
Denver, CO 80202

Mr. David Poage  
Dugan Production Company  
P.O. Box 420  
Farmington, NM 87499-0420

Amoco Production Company  
P.O. Box 800  
Denver, CO 80201

Mr. Robert L. Bayless  
P.O. Box 168  
Farmington, NM 87499

I certify that copies of the Application for a non-standard Fruitland Coal well has been mailed to the above Operators.

  
Paul C. Thompson

San Juan County            )  
                                  ) ss  
State of New Mexico        )

The following instrument was acknowledged before me this 23rd day of April 1998 by Paul C. Thompson.

  
Notary Public

My Commission Expires:  
July 31, 2001

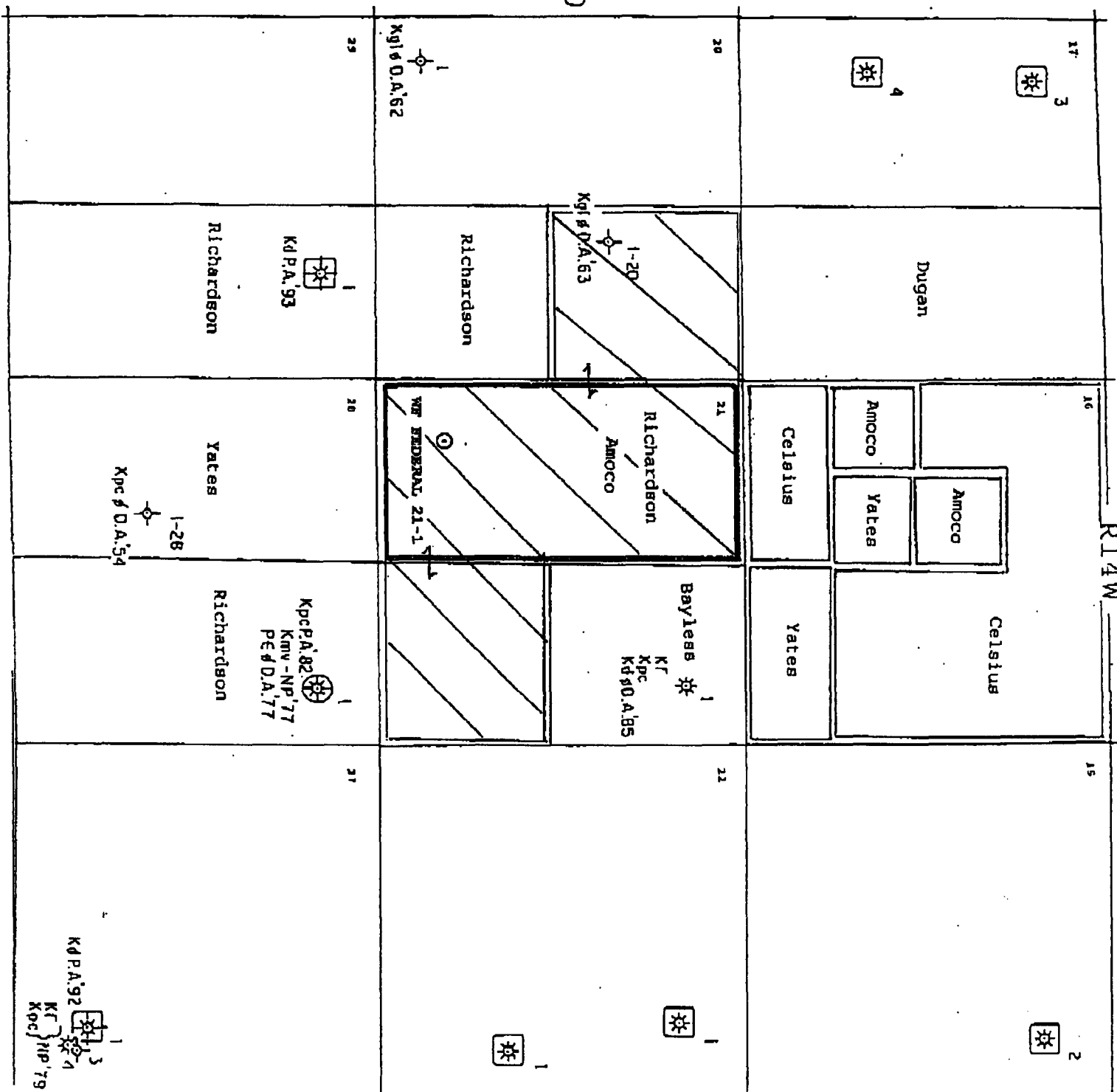


RICHARDSON OPERATING COMPANY  
 HP FEDERAL 21-1  
 SW/4SW/4-Section 21-T30N-R14W  
 885' P3L and 906' P1L  
 San Juan County, New Mexico

---

Formation and Spacing Unit:  
 Fruitland Coal W/2  
 Pictured Cliffs SW/4

T 30 N



**WALSH**

ENGINEERING &amp; PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4892CERTIFIED- RETURN RECEIPT

April 23, 1998

Mr. David Poage  
Dugan Production Company  
P.O. Box 420  
Farmington, NM 87499-0420

Re: Richardson Operating Company  
Down Hole Commingling Application  
W.F. Federal 21 #1  
885' FSL & 906' FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

Dear Mr. Poage,

Richardson Operating Company has applied to the New Mexico Oil and Gas Conservation Division for administrative approval to down hole commingle the production from the Basin Fruitland Coal and Twin Mounds Fruitland Sand - Pictured Cliffs pools in the above referred well. As an offset operator you are being notified of this application pursuant to NMOC rules.

If you desire to submit remarks concerning the application, please send them to Ms. Lori Wrotenberry, Director, New Mexico Oil Conservation Division, Santa Fe, New Mexico, within 20 days from the receipt of this notice. If you have no objection to the proposal, no action is required on your part.

Thank you for your consideration in this matter and if you have any questions, please do not hesitate to call upon me.

Sincerely,

  
Paul C. Thompson, P.E.

**WALSH**

ENGINEERING &amp; PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4882CERTIFIED- RETURN RECEIPT

April 23, 1998

Mr. Chuck Moran  
Yates Petroleum Corporation  
105 South Fourth Street  
Artesia, NM 88210

Re: Richardson Operating Company  
Down Hole Commingling Application  
W.F. Federal 21 #1  
885' FSL & 906' FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

Dear Mr. Moran,

Richardson Operating Company has applied to the New Mexico Oil and Gas Conservation Division for administrative approval to down hole commingle the production from the Basin Fruitland Coal and Twin Mounds Fruitland Sand - Pictured Cliffs pools in the above referred well. As an offset operator you are being notified of this application pursuant to NMOCD rules.

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Thank you for your consideration in this matter and if you have any questions, please do not hesitate to call upon me.

Sincerely,

Paul C. Thompson, P.E.

**WALSH**

ENGINEERING &amp; PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4882CERTIFIED- RETURN RECEIPT

April 23, 1998

Mr. Garth Berkeland  
Celsius Energy Company  
1331 17th Street, Suite 800  
Denver, CO 80202

Re: Richardson Operating Company  
Down Hole Commingling Application  
W.F. Federal 21 #1  
885' FSL & 906' FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

Dear Mr. Berkeland,

Richardson Operating Company has applied to the New Mexico Oil and Gas Conservation Division for administrative approval to down hole commingle the production from the Basin Fruitland Coal and Twin Mounds Fruitland Sand - Pictured Cliffs pools in the above referred well. As an offset operator you are being notified of this application pursuant to NMOC rules.

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Sincerely,

Paul C. Thompson, P.E.

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Petroleum Engineering Consulting  
Lease Management  
Contract Pumping7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4892CERTIFIED- RETURN RECEIPT

April 23, 1998

Amoco Production Company  
P.O. Box 800  
Denver, CO 80201Re: Richardson Operating Company  
Down Hole Commingling Application  
W.F. Federal 21 #1  
885' FSL & 906' FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

Dear Land Manger,

Richardson Operating Company has applied to the New Mexico Oil and Gas Conservation Division for administrative approval to down hole commingle the production from the Basin Fruitland Coal and Twin Mounds Fruitland Sand - Pictured Cliffs pools in the above referred well. As an offset operator you are being notified of this application pursuant to NMOC rules.

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Sincerely,

Paul C. Thompson, P.E.

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April 23, 1998

Mr. Robert L. Bayless  
P.O. Box 168  
Farmington, NM 87499Re: Richardson Operating Company  
Down Hole Commingling Application  
W.F. Federal 21 #1  
885' FSL & 906' FWL  
Sec. 21, T30N, R14W  
San Juan County, New Mexico

Dear Mr. Bayless,

Richardson Operating Company has applied to the New Mexico Oil and Gas Conservation Division for administrative approval to down hole commingle the production from the Basin Fruitland Coal and Twin Mounds Fruitland Sand - Pictured Cliffs pools in the above referred well. As an offset operator you are being notified of this application pursuant to NMOC rules.

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Sincerely,

Paul C. Thompson, P.E.

***Exhibit "A"***  
**Division Order DHC-2100**

Monthly Gas Production Allocation Formula  
W. F. Federal No. 21-1

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- 2) Determine the initial production rate from the Pictured Cliffs formation from the actual first months production from the following relation:

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$$D = (Q_{PCi} - Q_{PCa}) / \text{Estimated Total Pictured Cliffs Gas Reserves}$$

where:

$Q_{PCa}$  = Pictured Cliffs rate at abandonment (304 MCF/Month)

Total Pictured Cliffs Gas Reserves = 108,950 MCF (Average of eight offset wells)

- 4) Calculate Pictured Cliffs rate at any time from the following:

$$Q_{PC} = Q_{PCi} * e^{(-Dt)} \text{ where } t \text{ is time in months since first delivery.}$$

- 5) The Fruitland Coal production will be calculated monthly from the actual measured well production for that month minus  $Q_{PC}$ .