

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 87410-1693

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

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 Basin Fruitland Coal		86620 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 Oil Zones - Artificial Lift: Gas & Oil - Flowing: All Gas Zones: <u>Estimated</u> Or Measured Original	a. (Current)	a.	a.
	b. (Original) 200	b.	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  Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data  * If Producing, give date and oil/gas/water rates of recent test (within 60 days)	Date: Rates:	Date: Rates:	Date: Rates:
	Date: Rates:	Date: Rates:	Date: 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:

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

- 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

1 API Number		2 Well Code		3 Well Name	
		86620		Twin Mounds Fruitland Sand - Pictured Cliffs	
4 Property Code		5 Property Name			6 Well Number
		WF Federal			21-1
7 OGRID No.		8 Operator Name			9 Elevation
019219		Richardson Operating Co.			5565'

10 Surface Location

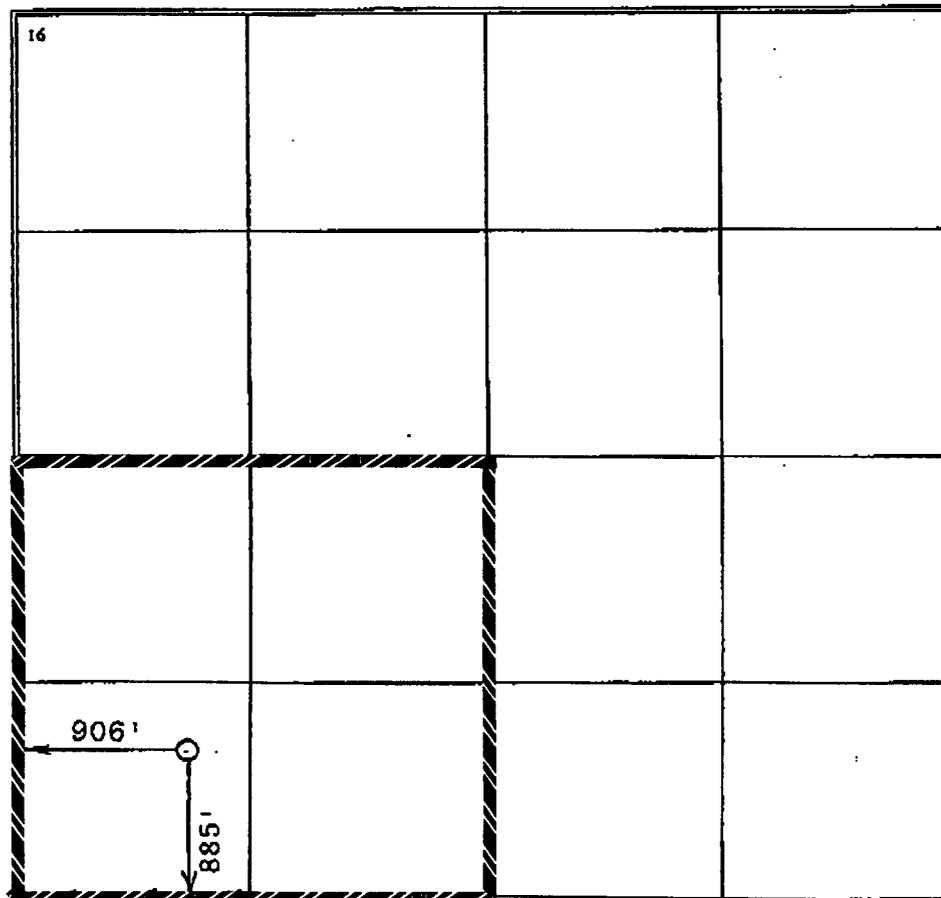
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	21	30 N.	14 W.		885	South	906	West	San Juan

11 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

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 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



17 OPERATOR CERTIFICATION  
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

*David B. Richardson*  
Signature  
David B. Richardson  
Printed Name  
President  
Title  
April 22, 1998  
Date

18 SURVEYOR CERTIFICATION  
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

Date of Survey  
Signature and Seal of (Professional) Surveyor  
*Donald B. Richardson*  
6844  
REGISTERED LAND SURVEYOR  
NEW MEXICO  
6844  
Certificate Number

District I  
PO Box 1980, Hobbs, NM 88241-1980  
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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  
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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		* Pool Code 71629	* Pool Name Basin Fruitland Coal
* Property Code	* Property Name WF Federal		* Well Number 21-1
* OGRID No. 019219	* Operator Name Richardson Operating Co.		* Elevation 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

12 Dedicated Acres 320	13 Joint or Infill Y	14 Consolidation Code	15 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

<p>16</p>	<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 David B. Richardson Printed Name President Title April 22, 1998 Date</p>		
	<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>Date of Survey</p> <p>Signature and Seal of Professional Surveyor</p> <p><i>David B. Richardson</i></p> <p>REGISTERED LAND SURVEYOR 6844</p> <p>Certificate Number 6844</p>		
	<p>906'</p> <p>885'</p>		
	<p>6844</p>		

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:

$$Q_{PCi} = \text{1st Month Production} * \left( \frac{\text{Total Well Test} - \text{FTC Well Test}}{\text{Total Well Test}} \right)$$

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 S-T-R	Date of First Production	Cummulative Production 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>	
Russell #2	33N-30-14	Oct-54	1,629,189	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

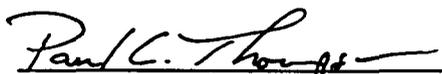
Mr. Garth Berkeland  
Celsius Energy Company  
1331 17th Street, Suite 800  
Denver, CO 80202

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        )

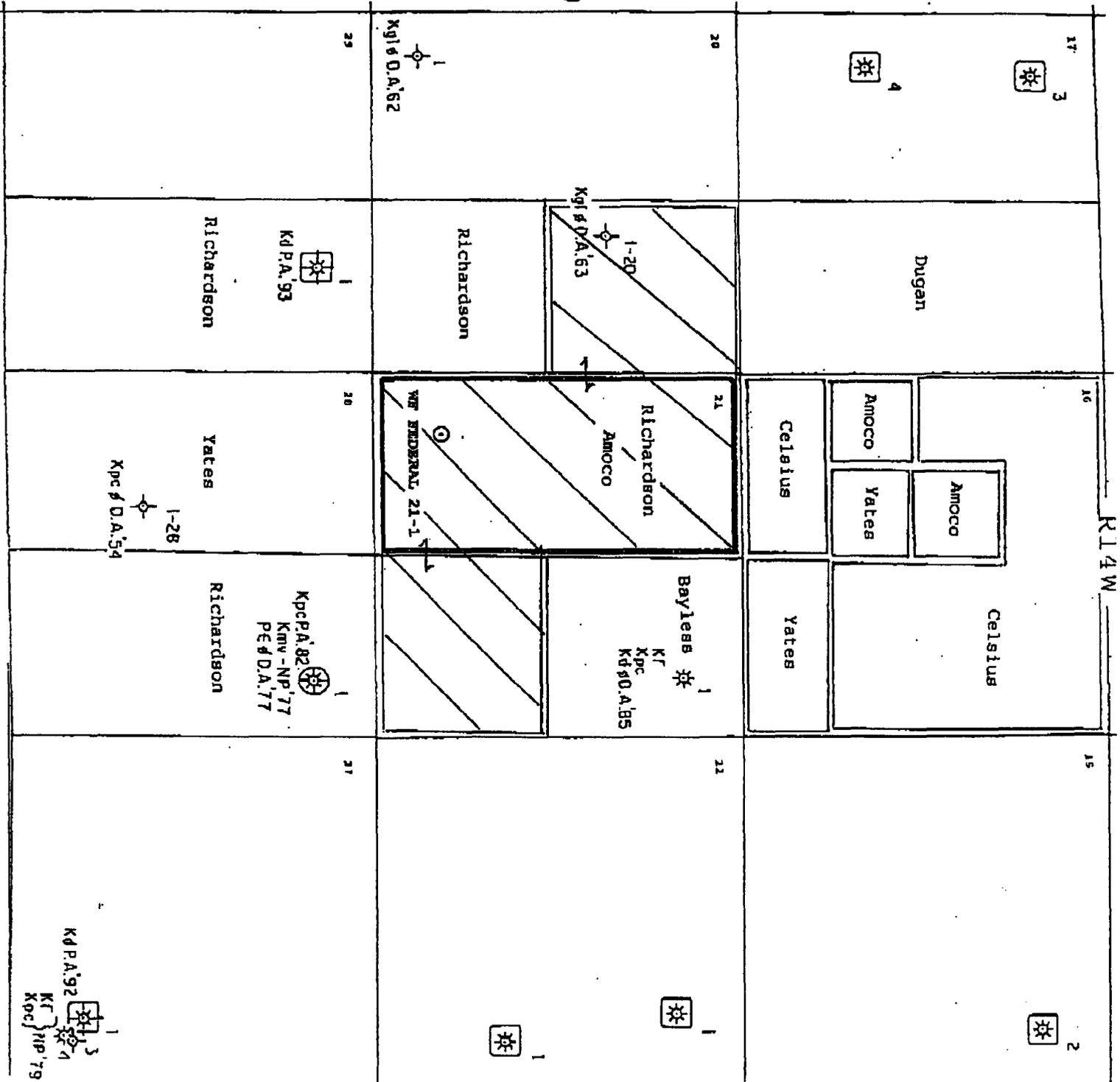
The following instrument was acknowledged before me this 23rd day of April 1998 by Paul C. Thompson.

  
Notary Public

My Commission Expires:  
July 31, 2001

RICHARDSON OPERATING COMPANY  
 WF FEDERAL 21-1  
 SW/4SW/4-Section 21-T30N-R14W  
 885' FSL and 906' FWL  
 San Juan County, New Mexico  
Formation and Spacing Unit:  
 Fruitland Coal W/2  
 Pictured Cliffs SW/4

T  
30  
N





**WALSH** ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping

7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4892

CERTIFIED- 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

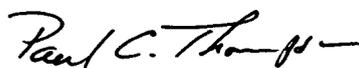
Dear Mr. Poage,

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 NMOCD rules.

If you desire to submit remarks concerning the application, please send them to Ms. Lori Wrottenberry, 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 & PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping

7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4882

CERTIFIED- 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) 327-4882

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CERTIFIED- 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

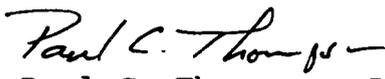
Dear Mr. Berkeland,

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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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 & PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping

7415 East Main  
Farmington, New Mexico 87402  
(505) 327-4892

CERTIFIED- RETURN RECEIPT

April 23, 1998

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

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 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 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*  
Paul C. Thompson, P.E.



**WALSH** ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting  
Lease Management  
Contract Pumping

7415 East Main  
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(505) 327-4892

CERTIFIED- RETURN RECEIPT

April 23, 1998

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

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. Bayless,

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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

- 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:

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

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where:

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

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