

DOWNHOLE COMMINGLE WORKGROUP

<u>Member Name</u>	<u>Representing</u>	<u>Mailing Address</u>	<u>Phone No.</u>	<u>Fax No.</u>	<u>I-Net Address</u>
David Catanach	Oil Conservation Division	2040 South Pacheco Santa Fe, N.M. 87401	(505) 827-8184	(505) 827-1389	Dcatanach@state.nm.us
Bill Hawkins	BP Amoco	P.O. Box 3092 Houston, Tx 77253	(281) 366-5450	(281) 366-7143	Hawkinj2@bp.com
Thomas Kellahin	NMOGA	P.O. Box 2265 Santa Fe, NM 87504-2265	(505) 982-4285	(505) 982-2047	t.kellahin@worldnet.att.net
Larry Sanders	Phillips Petroleum Company	4001 Penbrook Odessa, Tx 79762	(915) 368-1488	(915) 368-1507	Lmsande@ppco.com
Jim Lovato	Bureau of Land Management	1235 La Plata Highway Suite A Farmington, NM 87401	(505) 599-6367	(505) 599-8997	Jim_lovato@blm.gov
Ken Collins	Burlington Resources Oil & Gas	P.O. Box 4289 Farmington, NM 87499	(505) 326-9718	(505) 599-4062	Kcollins@br-inc.com
Dave Pearson	Yates Petroleum Corporation	105 S. Fourth Street Artesia, NM 88210	(505) 748-4181	(505) 748-4585	Engypc@pvtnetworks.net
Darrell Carriger	Texaco Exploration & Production Inc.	205 E. Bender Blvd. Hobbs, NM 88240	(505) 397-0426	(505) 397-0450	Carridj@texaco.com

NMOCD Downhole Commingling Workgroup Minutes - June 29, 1999 Meeting

Attendees:

David Catanach - NMOCD
Thomas Kellahin - NMOGA
David Pearson - Yates Petroleum
Larry Sanders - Phillips Petroleum

Jim Lovato - BLM
Ken Collins - Burlington
Bill Hawkins - BP Amoco

David Catanach opened the meeting with a brief review of NMOCD downhole commingling statistics. About 2400 DHC orders have been approved since 1969 with about 1000 in the Permian Basin pools and about 1400 in the San Juan Basin pools. Since the downhole commingling rule was amended in 1996, downhole commingling activity has significantly increased and is averaging about 350 applications per year. The NMOCD workgroup was established to evaluate the current rule with the objective to streamline the downhole commingling application and approval process.

Tom Kellahin gave an overview of the background for the current downhole commingling rule and rule revisions made in 1996. The workgroup discussed current rule requirements and identified a number of technical issues that would need to be addressed in the future rule. The primary concerns were:

Reservoir Pressure - Current rule requires both an original reservoir pressure and current reservoir pressure for all zones to be commingled. The rule limits downhole commingling to zones with current pressures that will not exceed the original pressure of either zone. There was some discussion of the basis of this requirement and several members pointed out that there are probably certain pressure conditions that might cause damage to the formations or possibly become a safety concern. The workgroup would like to see this pressure limitation amended such that commingling does not submit any zones to pressures in excess of the formation fracture pressures. One suggestion was made to develop a graph depicting a 0.433 psi/ft normal pressure gradient curve and a 0.65 psi/ft fracture gradient curve to determine the range of depths of formations allowed for downhole commingling. This would eliminate the need to report pressures and frac gradients for downhole commingling intervals within this range.

Economics - Current rule requires at least one of the zones to be "marginal". This term is not defined but is related to a company's internal economic hurdle which may vary from one company to another. This limitation was a modification of an earlier rule where commingling was restricted to a zone that was uneconomic to develop. Given the current environment of low product prices, mature stages of field depletion, and the need for industry to reduce costs, the workgroup would like to see this limitation eliminated. There is no longer a need for the NMOCD to restrict the practice of downhole commingling except to prevent waste, protect correlative rights and protect the environment.

Compatibility of Fluids - Current rule requires commingled fluids be compatible to prevent formation damage due to clay swelling or formation of precipitates and to prevent waste caused by changing fluid saturation in the formation. The workgroup would like to retain this limitation.

Allocation of Production - Current rule allows a number of different methods to be used in allocating production. This includes fixed allocation based on current production rates or analogy to offset wells and allocation by subtraction of a zone's production using decline curve estimate of existing zone subtracted from total commingled production.

Notice - Current rule requires notice to offset operators and all mineral interest owners if the ownership is not identical for the zones being commingled. NMOCD Notice rule changes which will become effective in July will eliminate this notice to offset operators. New commingling rule needs to be consistent. Need to continue allocations with notice when mineral interests are not common.

David Catanach pointed out that there are some pools such as the Blanco-Mesaverde and the Basin Dakota Gas Pools which have a history of significant downhole commingling activity. The Blanco-Mesaverde and the Basin Dakota Gas Pools have almost 700 approved downhole commingle orders. The workgroup would like to review the NMOCD database of all commingling orders in order to identify other pools that have a significant history of approved downhole commingling.

The following concept was developed by the workgroup in order to simplify the application and approval process. This concept builds on the current practice of establishing reference cases for downhole commingling. Historical NMOCD DHC orders have approved commingling for a number of pools in the state. The workgroup would like to consider those pools for pre-approval of downhole commingling of additional wells. Remaining pools not pre-approved for downhole commingling would be handled administratively by the Division using a form similar to current C-107A to review the technical issues and with notice to all operators in the pools. If protested, these applications would be set for hearing. Once the pools are approved for downhole commingling, applications for individual wells in those pools would be handled similar to sundry notices at the District office. This would only require the production allocation specific to that well with notice to minerals interest owners when the ownership is not identical.

Assignments:

1. Copy DHC order database to diskette and mail to workgroup - David Catanach
2. Review DHC order Database for pools in Permian Basin - David Catanach, Larry Sanders, David Pearson
3. Review DHC order Database for pools in San Juan Basin - Ken Collins, Bill Hawkins, Jim Lovato
4. Prepare draft language for rule incorporating new application and approval concepts
Tom Kellahin

Timetable is to finalize a recommendation by October 1, 1999 that could be reviewed with Regulatory Practices Committee meeting at the NMOGA annual meeting. Plan to docket for hearing in November, 1999.

Next meeting set for 10:00 am, July 15, 1999 in Santa Fe following the NMOCC hearing.

NMOCD Downhole Commingling Workgroup Minutes - July 15, 1999 Meeting

Attendees:

David Catanach - NMOCD
Thomas Kellahin - NMOGA
David Pearson - Yates Petroleum
Larry Sanders - Phillips Petroleum

Jim Lovato - BLM
Ken Collins - Burlington
Bill Hawkins - BP Amoco

David Catanach opened the meeting with a brief review of the agenda and approval of the June meeting minutes. David also reviewed the status of the OCD Artesia District Office plan to vertically consolidate formations in Eddy Co. including formations from the top of the Yates to the top of the Abo. Due to differences in ownership of some of the formations the vertical consolidation may not be viable, but could be handled by downhole commingling reference cases.

Pre-Approved Reference Cases

The group next reviewed the analysis of the NMOCD's DHC database to determine which pools have sufficient downhole commingling history to be considered for pre-approval as a reference case. Ken Collins reviewed the SJB historical downhole commingling activity. The Blanco Mesaverde and Basin Dakota pools have been commingled in 767 wells and should be pre-approved as a reference case. Other formation comminglings such as MV/PC (219 wells), DK/GP (180 wells), PC/FTC (111 wells), MV/CHA (82 wells) and potentially others will be good candidates for pre-approval reference cases but need further review by individual pool. The work group will continue this review next meeting and look at areal distribution of the wells and pools.

Dave Catanach reviewed the Lea County downhole commingled pools. The Blinebry and Drinkard pools have been downhole commingled in 187 wells. There were a number of commingled pools in the Blinebry, Drinkard and Tubbs formations that need further review by the workgroup. Other commingled formations include the Delaware and Bone Springs that have been approved in a number of pools. The group wants to look at areal distribution of the wells and number of commingled wells relative to pool size to better evaluate candidates for pre-approved reference cases.

Approval Process

Dave Catanach led the group discussion in outlining the approval process for various types of downhole commingling:

1. Individual wells in pools that have approved reference cases would be handled with a District Office approval using form C-103 Sundry notice. Data to be included are pool names, perforated intervals, and allocation method with supporting production rate data. Notice of the allocation method would be required to BLM for federal leases, SLO

for state lands, and WI, RI, ORRI for cases with ownership not common between the commingled pools. Several options were discussed regarding notice and period for objections including:

- a. no notice required if using an approved form of allocation,
- b. pre-filed notice with affidavit statement that no objections were received,
- c. filing of application and notice at same time with no waiting period for objections - adjustment of allocation method if protested.

These options need further discussion by the group.

2. Individual wells in pools without approved reference cases would be handled with a Division Office approval using a Form C-107A similar to current form with modifications for the technical data required. Notice would be same as for wells in pools with reference cases.

3. Option to request approval of wells as a reference case for pools with notice to all operators in pool. This would be administrative approval by Division Office with data required in C-107A but with sufficient data coverage to fully represent the pools. The application would be set for hearing if any operator in the pool objected to approval as a reference case.

Review of Technical Requirements for DHC Approval

The workgroup reviewed the current requirements for DHC approval to look at needed changes. For wells in oil zones:

1. Amend 303.C.(1)(a)(i) - the production allocated to each downhole commingled zone should not exceed the allowable for its respective pool.
2. Omit 303.C.(1)(a)(ii) - operator's production method will result in efficient recovery of oil.
3. Omit 303.C.(1)(a)(iii) - total water production should not exceed twice the oil limit
4. Keep 303.C.(1)(a)(iv) - fluid compatibility requirements.
5. Keep 303.C.(1)(a)(v) - commingling will not jeopardize present or future secondary recovery operations.

For wells in gas zones:

1. Omit 303.C.(1)(b)(i) - economic limitation for commingling limited to "marginal" zones
2. Amend 303.C.(1)(b)(ii) - commingling zones will not result in wellbore pressures exceeding the fracture parting pressure of any commingled zone
3. Keep 303.C.(1)(b)(iii) - commingling will not result in permanent loss or reserves to crossflow
4. Keep 303.C.(1)(b)(iv) - protecting fluid sensitive zones
5. Keep 303.C.(1)(b)(v) - fluid compatibility requirements

At next meeting, workgroup will need to develop criteria for wells commingling oil zones and gas zones or determine if above rules are sufficient and will review draft language for rule and approval process.

Assignments:

1. Review DHC order Database for pools in Permian Basin - David Catanach, Larry Sanders, David Pearson
2. Review DHC order Database for pools in San Juan Basin - Ken Collins, Bill Hawkins, Jim Lovato
3. Prepare draft language for rule incorporating new application and approval concepts - Tom Kellahin

Next meeting set for 8:00 am, August 18, 1999 in Santa Fe

NMOCD Downhole Commingling Workgroup
Minutes - August 18, 1999 Meeting

Attendees:

David Catanach - NMOCD
Thomas Kellahin - NMOGA
Larry Sanders - Phillips Petroleum

Jim Lovato - BLM
Ken Collins - Burlington
Bill Hawkins - BP Amoco

Ken Collins presented the group with a brief review of the NMOGA meeting held last month in Farmington. Several DHC issues of interest to NMOGA members were identified including pressure limitations, BLM acceptance of the new rules, and consideration for pre-approval of multiple pools in the same formation.

Pre-Approved Reference Cases

The group continued the analysis of the NMOCD's DHC database to determine which pools have sufficient downhole commingling history to be considered for pre-approval as a reference case. Ken Collins reviewed the SJB historical downhole commingling activity and presented maps of the Blanco Mesaverde and the Pictured Cliffs pools showing areal distribution of wells approved for downhole commingling. Several other maps of the Basin Dakota, Mesaverde, and Pictured Cliffs pools were reviewed but still needed pool boundaries included. Additional maps of the Basin Fruitland Coal and Pictured Cliffs pools will be prepared for next meeting. The work group will continue this review next meeting and look at areal distribution of the wells and pools.

Larry Sanders reviewed the commingling activity in Eddy County. The Red Lake Queen Grayburg San Andres and the Northeast Red Lake Glorieta Yeso pools have the most commingling activity with 5 wells approved. Due to the number of small pools in Eddy county additional work will be needed to map the pools to evaluate if additional pools should be pre-approved. From the previous meeting, in Lea County there were a number of commingled pools in the Blinberry, Drinkard and Tubbs formations that need further review and mapping to evaluate pools for pre-approval. Other commingled formations include the Delaware and Bone Springs that have been approved in a number of pools. The group wants to look at areal distribution of the wells and number of commingled wells relative to pool size to better evaluate candidates for pre-approved reference cases. Dave Catanach will work with David Pearce to prepare this evaluation.

Due to the complexity of the of the Southeast pools, the group suggested that NMOGA DHC subcommittee should assist in providing further analysis. For instance, should a different method be considered for those pools such as commingling all deep Pennsylvanian Gas.

The group also discussed reviewing DHC approvals and denials issued from hearings to include in the database.

Form 107 - DHC Commingling of wells in Non-reference Pools

Dave Catanach led the group discussion in determining data elements for the form 107. Since this form will be used for wells in pools that have not been approved as reference cases, the form will need much of the same data as the current form. Primary changes will be:

Item 5. Bottomhole Pressures - this will be changed to require an estimated current BHP (method may be at discretion of applicant but supporting data will need to be attached) and an estimated fracture pressure (may use 0.65 times depth of shallowest perfs or other data if available).

Item 7. Production Marginal? - this will be eliminated.

Item 10 Have offset operators been notified - this will be eliminated.

Item 11 Will crossflow occur ... - this will be eliminated.

Other changes will be to include instructions on back of form.

Assignments:

1. Review DHC order Database for pools in Permian Basin and prepare maps for SE pools- David Catanach, Larry Sanders, David Pearson
2. Review DHC order Database for pools in San Juan Basin and prepare maps for NW pools- Ken Collins, Bill Hawkins, Jim Lovato
3. Prepare draft language for rule incorporating new application and approval concepts - Tom Kellahin
4. Review hearing orders for DHC approval and denials - Tom Kellahin

Next meeting set for September 14, 1999 in Santa Fe

NMOCD Downhole Commingling Workgroup Minutes - September 14, 1999 Meeting

Attendees:

David Catanach - NMOCD
David Pearson - Yates Petroleum
Darrell Carriger - Texaco

Jim Lovato - BLM
Ken Collins - Burlington
Bill Hawkins - BP Amoco

The status of the DHC workgroup efforts to date was reviewed with new member Darrell Carriger from Texaco. The group had a lively discussion of the pros and cons for a rule concept which allows downhole commingling in any zones unless certain conditions are met vs. an exception type rule where downhole commingling is only granted after application and demonstration that no waste would occur. The group finally agreed to not pursue a rule allowing downhole commingling in any zones unless certain conditions are met for two primary reasons:

- 1) It would be extremely difficult to specify all conditions where downhole commingling is not appropriate; and
- 2) It would be impossible to track and audit if operators were adhering to the rule.

Pre-Approved Reference Cases

The group continued the analysis of the NMOCD DHC database to determine which pools have sufficient downhole commingling history to be considered for pre-approval as a reference case. All of commingled pools in the Blinbry, Drinkard and Tubbs formations in Lea County were mapped and reviewed for pre-approval. The group looked at areal distribution of the wells and number of commingled wells relative to pool size to better evaluate candidates for pre-approved reference cases. At the end of the meeting, the group discussed creating a geographical area which would allow downhole commingling for any Blinbry, Drinkard and Tubbs formations.

At the next meeting, the group will continue the review the SJB historical downhole commingling activity. The work group will review areal distribution of the wells in the primary pools that have been commingled. This will include Basin Dakota and Blanco Mesaverde, Basin Dakota and Gallup, Blanco Mesaverde and Chacra, Blanco Mesaverde and Pictured Cliffs, Basin Fruitland Coal and Pictured Cliffs, and possibly others.

Next meeting set for 8:00 am, October 19, 1999 in Santa Fe

NMOCD Downhole Commingling Workgroup
Minutes - October 19, 1999 Meeting

Attendees:

David Catanach - NMOCD
David Pearson - Yates Petroleum
Darrell Carriger - Texaco

Tom Kellahin - NMOGA
Ken Collins - Burlington
Bill Hawkins - BP Amoco

Pre-Approved Reference Cases

Southeast NM Pools

The group agreed to the creation of a geographical area which would allow downhole commingling for any Blinebry, Drinkard and Tubbs formations. The Blinebry, Drinkard and Tubbs formations contain 506 commingled wells or about 62% of the historical commingling activity in Lea County. There was a discussion on the merits of including the Paddock with the Blinebry, Drinkard and Tubbs commingling approval. Darrell Carriger agreed to research this pool.

The group looked at the remaining pools in Lea County with downhole commingling history of 3 or more wells. Dave Catanach reviewed the pool maps showing areal distribution of the wells and number of commingled wells relative to pool size. The group agreed to pre-approved reference cases recommended by Dave that contain 161 commingled wells or about 20% of the historical commingling activity in Lea County.

In Eddy County, the group agreed to pre-approved reference case for the RedLake Queen-Grayburg-San Andres & Northeast Red Lake -Glorieta Yeso Pools with 6 downhole commingled wells. There was a discussion on the merits of establishing pre-approval for the various Atoka and Morrow pools. There are 13 commingled wells in the database. David Pearson agreed to research this group of pools.

Northwest NM Pools

The group continued the review the SJB historical downhole commingling activity. Ken Collins reviewed pool maps areal distribution of the wells in the primary pools that have been commingled. The pools currently being considered for pre-approval include:

Basin Dakota and Blanco Mesaverde
Blanco Mesaverde and the various Pictured Cliffs pools
Basin Dakota and the various Gallup pools

Next meeting we will continue with our review of:

Blanco Mesaverde and the various Chacra pools
Basin Fruitland Coal and the various Pictured Cliffs pools

Downhole Commingling Rule Language

The group reviewed the draft rule language prepared by Tom Kellahin. The group agreed to remove the limitation for commingling only those wells with production less than top allowable. Current language has a separate set of conditions for commingling wells involving oil pools and wells involving gas pools. A proposal was made to combine these conditions into a single set for commingling any pools.

Assignments:

1. Research including Paddock with Blinbry, Drinkard and Tubbs commingling pre-approvals - Darrell Carriger
2. Research Atoka and Morrow pools for commingling pre-approvals - David Pearson
3. Research following pools for discussion of commingling pre-approval: Blanco Mesaverde / Aztec PC and Gobenador PC; Ft. Coal/ PC (need fairway map); PC/ Dasin Dakota (hearing orders); Blanco Mesaverde and various Chacra pools (need maps) - Ken Collins
4. Update Rule Language - Tom Kellahin
5. Prepare Draft Form 107 - Dave Catanach

Next meeting set for 8:00 am, December 7, 1999 in the NMOCD Santa Fe office.

NMOCD Downhole Commingling Workgroup
Minutes - January 13, 2000 Meeting

Attendees:

David Catanach - NMOCD
Ken Collins - Burlington
Darrell Carriger - Texaco
Larry Sanders - Phillips Petroleum

Tom Kellahin - NMOGA
Jim Lovato - BLM
Bill Hawkins - BP Amoco

Michael Stogner - NMOCD Observer

Pre-Approved Reference Cases

The group reviewed the list of pre-approved pools for the hearing and clarified the Paddock was included in combination with the Blinebry Pool and Drinkard Pool. Ken Collins reviewed final pool maps of the wells in the primary pools that have been commingled.

Downhole Commingling Rule Language

The group reviewed the draft rule language prepared by Tom Kellahin. The group made minor revisions to language including using the 0.433 psi/ft gradient for normal pressure pools and using 150% factor for depth of perforations for commingled pools that did not have to report reservoir pressures.

Report to Commission 2/25/2000

The group reviewed the hearing outline and developed the following presentation plan:

Historical Background - Kellahin
Commingling Criteria Changes - Catanach
Streamlined Process - Catanach
Pre-approved Pools - NW Pools, Bill Hawkins - SE Pools - Larry Sanders
Recommended Rule Language - Catanach,
Form 107A changes - Catanach
Questions and Answers - Carriger