

06-05-2014 DATE IN	SUSPENSE	MAM ENGINEER	06/06/2014 LOGGED IN	DHC TYPE	PEH1415750546 APP NO.
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ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
 [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
 [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
 [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
 [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
 [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication

☐ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement

☒ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify _____

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or ☐ Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ☐ Offset Operators, Leaseholders or Surface Owner

[C] ☐ Application is One Which Requires Published Legal Notice

[D] ☒ Notification and/or Concurrent Approval by BLM or SLO

U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Susan B. Maunder

Print or Type Name

Susan B. Maunder
Signature

Sr. Regulatory Specialist

Title

6-3-14
Date

Susan.B.Maunder@conocophillips.com

e-mail Address

RECEIVED 200

2014 JUN 13 10 21 AM



Susan B. Maunder
Sr. Regulatory Specialist
Phone: (281) 206-5281

ConocoPhillips Company
600 N. Dairy Ashford Road, Off P10-3096
Houston, TX 77079-1175

June 2, 2014

State of New Mexico
Oil Conservation Division
Attn: Mr. Phillip Goetze
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

SUBJECT: REQUEST FOR APPROVAL OF DOWNHOLE COMINGLING FOR RUBY FEDERAL #20

Dear Mr. Goetze,

ConocoPhillips Company respectfully requests an approval of our plans to Downhole Comingling the Maljamar; Yeso West Pool (44500) and the Maljamar; Grayburg, San Andres Pool (43329) in the Ruby Federal #20 well. The lease is recorded as NM LC 029405B. The well is located in UL I, 2310' from the south line and 910' from the east line of Section 18, Township 17S, Range 32E, Lea County, New Mexico. ConocoPhillips is 100% lessee and 100% working interest owner of the Ruby federal lease in both zones proposed for Downhole Comingling. Royalty interest is the same in both pools. The lease to the west is NM LC 060329 operated by Cimarex Energy Company of Colorado. The granting of this request will prevent waste by providing access to otherwise marginal production.

Enclosed are the following documents in support of this request.

- Administrative Application Checklist
- Copy of the New Mexico Form C-107A (with attachments)
- Copy of letter sent to spacing unit interest owners.

A copy of this letter is being sent to Bureau of Land Management, Carlsbad Field Office. Notification is being provided by separate letter to interest owners in the adjacent spacing unit (as per NMAC 19.15.12) via certified return receipt.

If you have questions regarding this request, I can be reached at 281-206-5281 or via email at Susan.B.Maunder@conocophillips.com.

Sincerely,

A handwritten signature in black ink that reads "Susan B. Maunder".

Susan B. Maunder
Senior Regulatory Specialist
ConocoPhillips Company

ConocoPhillips Company600 N. Dairy Ashford Rd, Office P10-3096; Houston, TX 77079-1175

Operator

Address

Lease

Well No.

Unit Letter-Section-Township-Range

County

Ruby Federal20UL I -Sec. 18 -T17S-R32ELea

OGRID No. 217817Property Code 38653API No. 30-025-40894Lease Type: XFederalStateFee

DATA ELEMENT	UPPER ZONE	INTERMEDIATE ZONE	LOWER ZONE
Pool Name	Maljamar; Grayburg, San Andres	N/A	Maljamar; Yeso West
Pool Code	43329	N/A	44500
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	3534 - 4110' perforated	N/A	5390 - 6625' perforated
Method of Production (Flowing or Artificial Lift)	Artificial	N/A	Artificial
Bottomhole Pressure (Note: Pressure data will not be required if the bottom perforation in the lower zone is within 150% of the depth of the top perforation in the upper zone)	Pi,r = 1733	N/A	Pi,r = 2600
Oil Gravity or Gas BTU (Degree API or Gas BTU)	38.1	N/A	38.2
Producing, Shut-In or New Zone	New	N/A	Producing
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.)	Date: estimate Rates: 20/50/100	Date: Rates:	Date: 04/08/14 Rates: 20/48/279
Fixed Allocation Percentage (Note: If allocation is based upon something other than current or past production, supporting data or explanation will be required.)	OilGas 42%19%	OilGas % %	OilGas 58%81%

ADDITIONAL DATA

Are all working, royalty and overriding royalty interests identical in all commingled zones?
If not, have all working, royalty and overriding royalty interest owners been notified by certified mail?

Yes XNo
YesNo

Are all produced fluids from all commingled zones compatible with each other?

Yes XNo

Will commingling decrease the value of production?

YesNo X

If this well is on, or communitized with, state or federal lands, has either the Commissioner of Public Lands or the United States Bureau of Land Management been notified in writing of this application?

Yes XNo

NMOCD Reference Case No. applicable to this well:

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.) Included in the attached field study
For zones with no production history, estimated production rates and supporting data.
Data to support allocation method or formula.
Notification list of working, royalty and overriding royalty interests for uncommon interest cases.
Any additional statements, data or documents required to support commingling.

PRE-APPROVED POOLS

If application is to establish Pre-Approved Pools, the following additional information will be required:

List of other orders approving downhole commingling within the proposed Pre-Approved Pools
List of all operators within the proposed Pre-Approved Pools
Proof that all operators within the proposed Pre-Approved Pools were provided notice of this application.
Bottomhole pressure data.

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

SIGNATURE Susan B. Maunday TITLE Sr. Regulatory Specialist DATE 6-3-14

TYPE OR PRINT NAME Susan B. Maunday TELEPHONE NO. (281) 206-5281

E-MAIL ADDRESS Susan.B.Maunday@conocophillips.com

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-025-40894	² Pool Code 43329	³ Pool Name Maljamar; Grayburg, San Andres
⁴ Property Code	⁵ Property Name Ruby Federal	⁶ Well Number 20
⁷ OGRID No. 217817	⁸ Operator Name ConocoPhillips Company	⁹ Elevation 3958'

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
I	18	17S	32E		2310'	South	910'	East	Lea

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 40	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. DHC - Pending						

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.

¹⁶ 	¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature: <u>Susan B. Maunder</u> Date: <u>5/30/14</u> Printed Name: Susan B. Maunder E-mail Address: <u>Susan.B.Maunder@conocophillips.com</u>	
	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: _____	
	Certificate Number: _____	

District I
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Form C-102
Revised August 1, 2011
Submit one copy to appropriate
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-025-40894	² Pool Code 44500	³ Pool Name Maljamar; Yeso West
⁴ Property Code 38653	⁵ Property Name Ruby Federal	⁶ Well Number 20
⁷ OGRID No. 217817	⁸ Operator Name ConocoPhillips Company	⁹ Elevation 3958'

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
I	18	17S	32E		2310'	South	910'	East	Lea

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 40	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. DHC - Pending
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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.

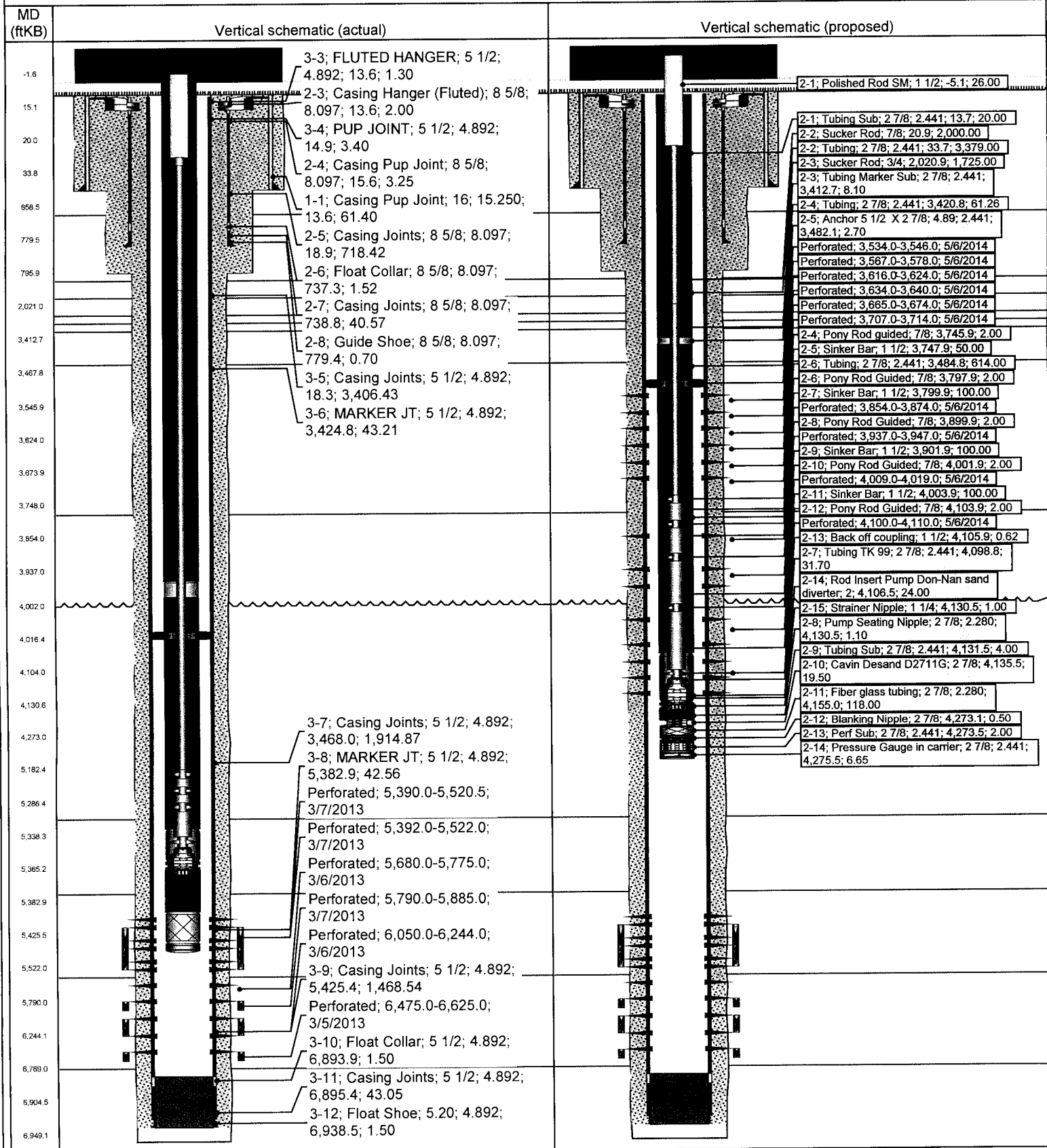
¹⁶ 	¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Susan B. Maunder 5/30/14 Signature Date Susan B. Maunder Printed Name Susan.B.Maunder@conocophillips.com E-mail Address
	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:
	Certificate Number

Most Recent Job

Jobs

Job Category	Primary Job Type	Secondary Job Type	Actual Start Date	End Date
COMPLETIONS	INITIAL COMPLETION		3/4/2013	3/20/2013

VERTICAL - Original Hole, 5/30/2014 12:00:47 PM



Field Study

**Maljamar-Yeso West
and
Grayburg-San Andres Pools Commingle**

Date: April 23, 2014



Maljamar-Yeso West and Grayburg-San Andres Pool Commingle

Commingle Application

Summary

It is proposed to commingle the Maljamar-Yeso West and Grayburg-San Andres pools in ConocoPhillips Company's (COP) Yeso development program in Sections 17 and 18, T17S, R32E, Lea County, New Mexico. The working, net revenue, and royalty interest are the same for both pools on most of COP's Ruby Federal and Mitchell B lease. The fluids from both zones are compatible. The following fixed allocation will be used for production: Oil: Yeso 58%, GB/SA 42%, Gas: Yeso 81%, GB/SA 19%.

Purpose

COP requests to commingle both pools in order to access reserves that would otherwise be stranded. Development of the Grayburg-San Andres with dedicated wells is not economic as initial production rates and recoveries are very low (see Figure 7). Yeso development is economic independently. The commingling of these two pools is expected to enhance production and boost ultimate recovery from the field. This will result in increased income for both the BLM and COP.

With commingling, the total recoverable resource in the GB/SA pool overlying COP's Ruby Federal lease is estimated to be ~3 MMBO and 5 BCFG or an incremental 67 MBO and 133 MMcf per well.

History

ConocoPhillips operates the Mitchell B lease in Sections 17 and 18, T17S R32E. This lease has produced from the GB/SA since the 1950's. Historically, the GB/SA has not been very productive in Mitchell B due to low reservoir permeability and the use of outdated completion techniques. As a result of low productivity, a significant amount of oil has been bypassed. It is believed this resource can be economically produced by modern completions and commingling with Yeso production.

Development of the Maljamar-Yeso West pool in began in 2008 targeting the Paddock and Blinbery formations of the Yeso. The Yeso has proven to be a very successful, high rate of return play. The productive potential of these zones has been unlocked with improvements in completion practice, namely larger frac's. ConocoPhillips plans to continue its Yeso development program throughout Sections 18 and 19, T17S R32E over the next few years.

Reservoir Details

With commingling, Yeso and GB/SA will be developed on 20-acre spacing. Oil gravity between the Yeso and GB/SA reservoirs are similar, 38 and 37 degrees API respectively.

The Yeso is a normally pressured reservoir (~0.465 psi/ft). The Grayburg/San Andres is expected to be normally pressured to slightly under-pressured due to historical production. If the GB/SA reservoir pressure is found to be under-pressured, cross-flow will be mitigated by ensuring the commingled wells are pumped off or producing fluid level is at least below the GB/SA perforations. However, if there is temporary cross-flow into the GB/SA due to a high fluid level, it is expected production will be recovered once the fluid level is pumped back down.

Allocation Method

The production allocation method for both zones is based on a fixed allocation. This allocation is based on the type curves for both the Yeso and GB/SA formations. These type curves were generated using wells which only produce from Yeso or GB/SA within the same geologic area as the commingle candidates, Figure 1. Due to the close proximity of these wells, it is believed existing production provides sufficient insight for commingling allocation.

Preliminary Supporting Details

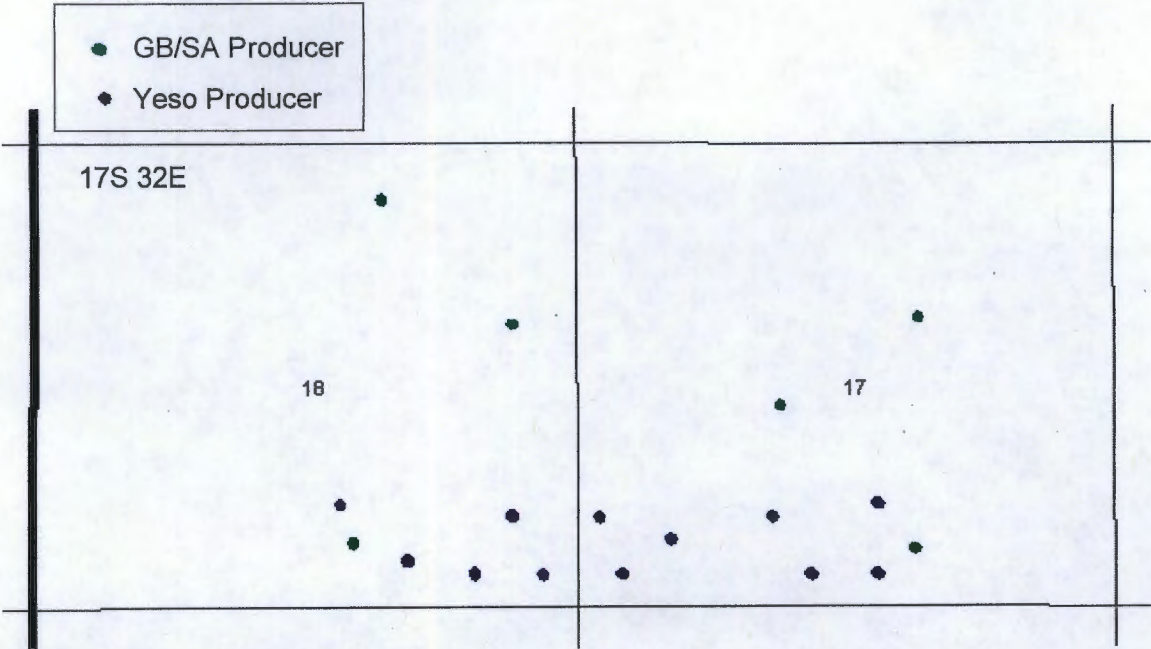


Figure 1: Map of all wells used in the analysis

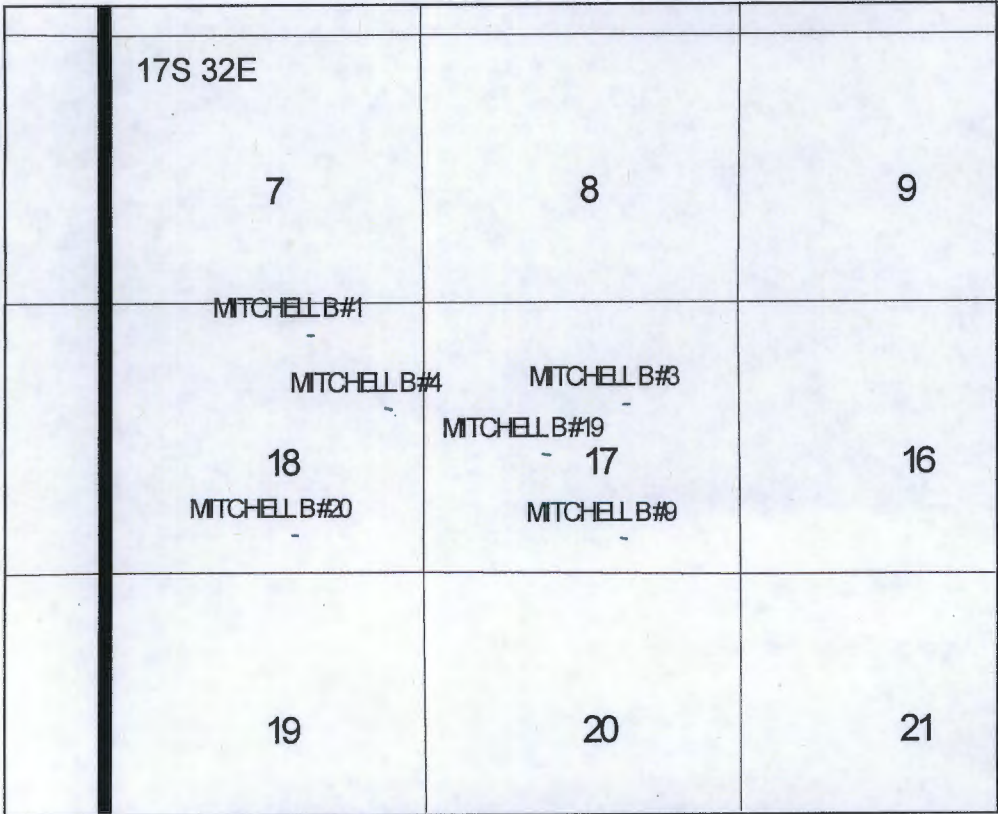


Figure 2: Map of GB/SA wells used in type curve analysis (Mitchell B Lease).

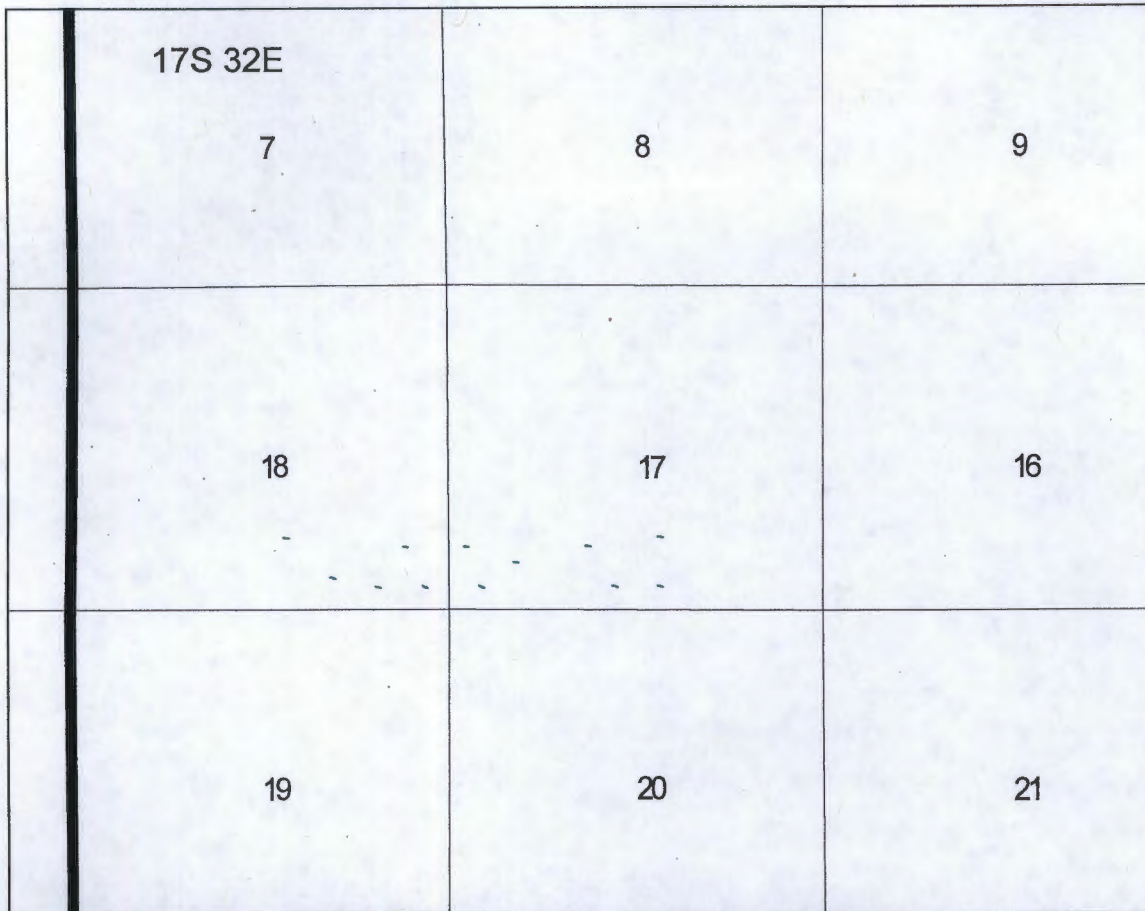


Figure 3: Map of Yeso wells used in type curve analysis (Ruby Federal lease).

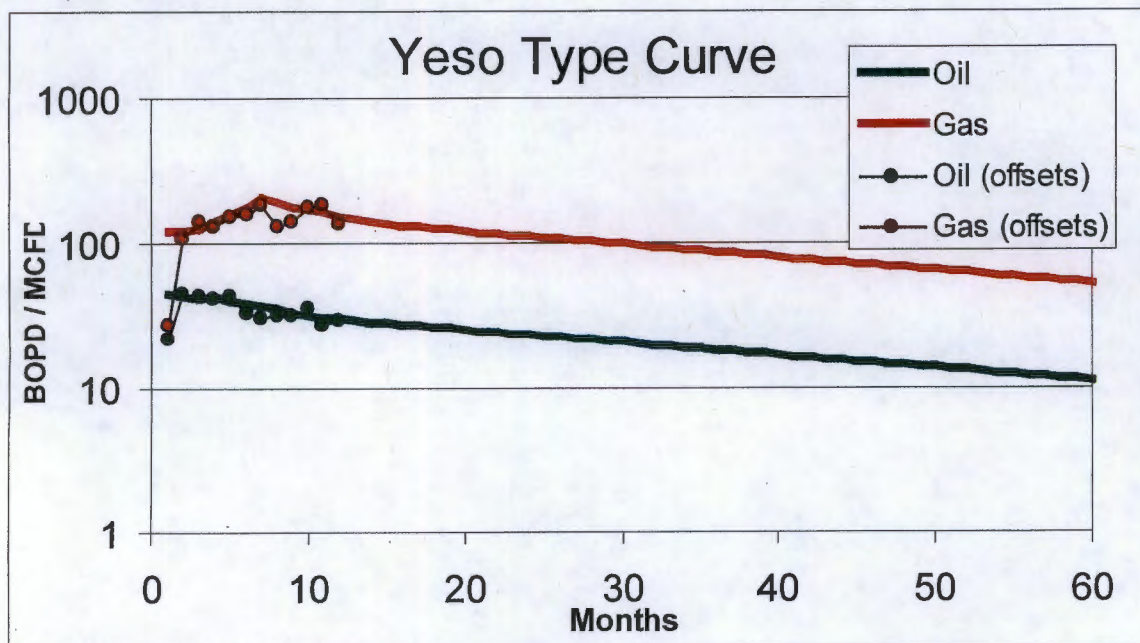


Figure 4: Yeso type curve.

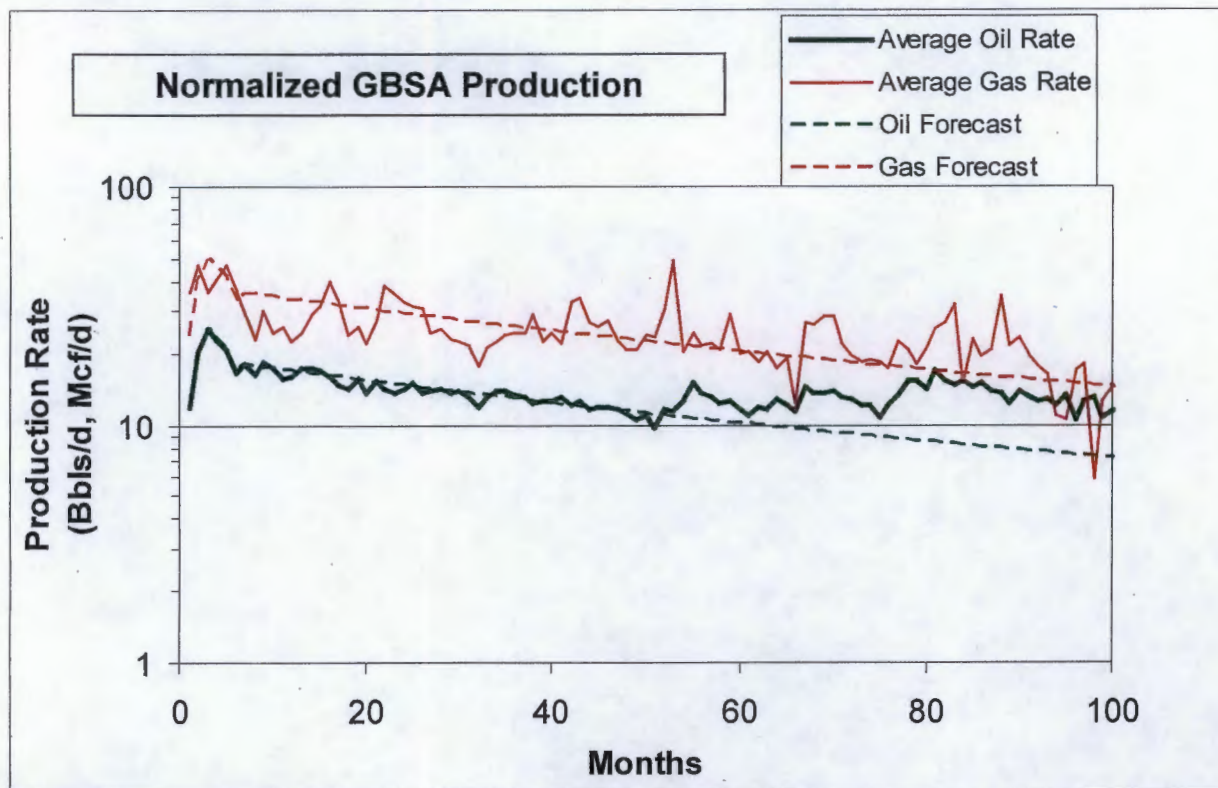


Figure 5: GB/SA type curve

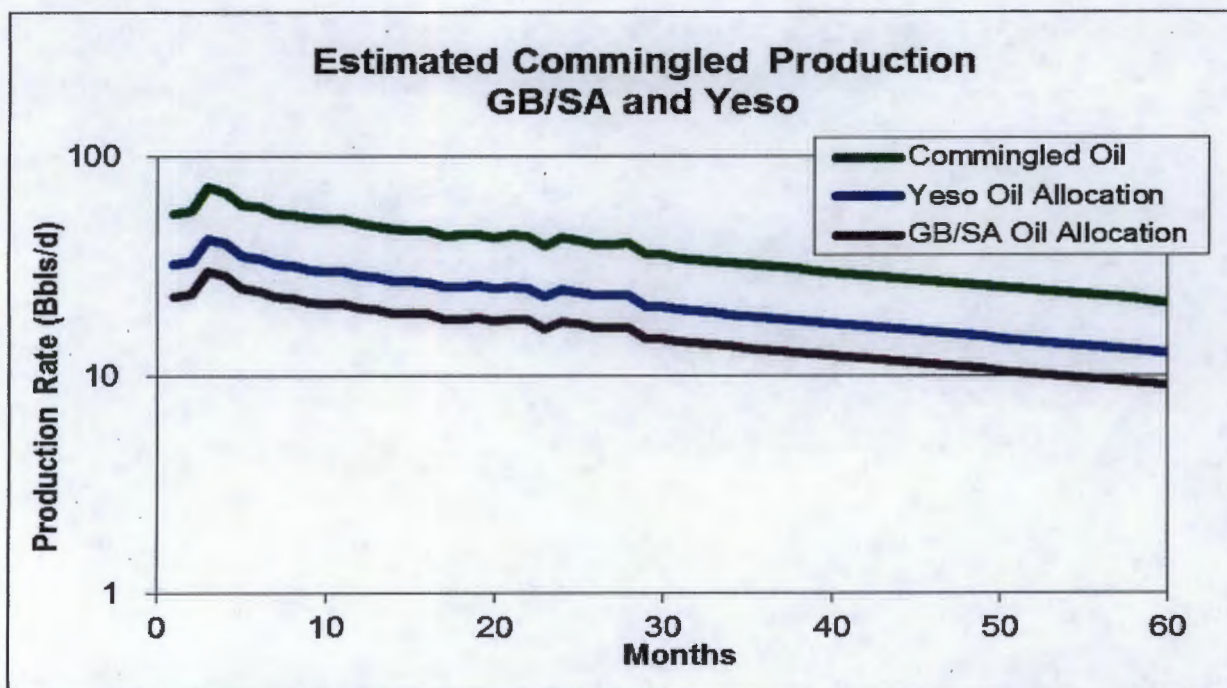


Figure 6: Commingled type curve

Figure 7: Grayburg/San Andres Standalone Economics

Inputs				Outputs				
Start Date	1/1/2014	Capital	\$2,200	Discount Rate	Pretax NPV [M\$]	After Tax NPV [M\$]	Pretax IRR	After Tax IRR
Working Interest	100%	Tax Rate	35%	0%	946	(15)	9%	0%
Net Rev Interest	87.5%	Gas Tax	7.5%	8%	60	(544)		
Oil Price [\$/bbl]	\$85	Oil Tax	4.6%	10%	(74)	(620)		
Gas Price [\$/mcf]	\$4.00	Ad Val Rate	2%	12%	(186)	(683)		
OpEx [\$/bbl]	\$15			15%	(321)	(756)		

	Gross Production		Net Production		Price		Revenue
	Oil Bbls	Gas Mcf	Oil Bbls	Gas Mcf	Oil \$/bbl	Gas \$/Mcf	\$M Total
2014	6.5	11.6	5.7	10.2	85.0	4.0	522
2015	6.5	11.7	5.7	10.2	85.0	4.0	524
2016	5.8	10.4	5.0	9.1	85.0	4.0	466
2017	4.7	8.4	4.1	7.4	85.0	4.0	378
2018	4.2	7.5	3.6	6.6	85.0	4.0	336
2019	3.7	6.7	3.3	5.9	85.0	4.0	300
2020	3.3	6.0	2.9	5.2	85.0	4.0	268
2021	3.0	5.4	2.6	4.7	85.0	4.0	240
2022	2.7	4.8	2.3	4.2	85.0	4.0	214
2023	2.4	4.3	2.1	3.7	85.0	4.0	190
2024	2.1	3.8	1.8	3.3	85.0	4.0	170
2025	1.9	3.4	1.7	3.0	85.0	4.0	152
2026	1.7	3.0	1.5	2.6	85.0	4.0	136
2027	1.5	2.7	1.3	2.4	85.0	4.0	121
2028	0.9	1.6	0.8	1.4	85.0	4.0	73
Total	50.7	91.3	44.4	79.9			4,091

Cum Cash Flow										
	Prod Tax [M\$]	Ad Val Tax [M\$]	Operating Costs [M\$]	Operating CF [M\$]	CapEx	Pre Tax CF [M\$]	Taxes [M\$]	After Tax CF [M\$]	Pre Tax [M\$]	After Tax [M\$]
2014	25	10	85	401	2,200	-1,799	0	-1799	-1799	-1799
2015	25	10	85	403	0	403	141	262	-1395	-1536
2016	22	9	76	358	0	358	125	233	-1037	-1304
2017	18	8	62	291	0	291	102	189	-746	-1115
2018	16	7	55	259	0	259	91	168	-488	-946
2019	14	6	49	231	0	231	81	150	-257	-796
2020	13	5	44	206	0	206	72	134	-51	-663
2021	12	5	39	184	0	184	64	120	133	-543
2022	10	4	35	164	0	164	58	107	298	-436
2023	9	4	31	146	0	146	51	95	444	-341
2024	8	3	28	131	0	131	46	85	575	-256
2025	7	3	25	117	0	117	41	76	692	-179
2026	7	3	22	104	0	104	36	68	797	-112
2027	6	2	20	93	0	93	33	60	890	-51
2028	4	1	12	56	0	56	20	37	946	-15
Total	197	82	666	3,146	2,200	946	961	-15		

Field Study Results

The results from the first 2 recompletions (Ruby Federal #8 & #10) were not conclusive in supporting the current GB/SA type-curve flowstream. The Ruby Federal #10 showed excellent production, exceeding all estimates, while the Ruby Federal #8 initially looked to follow the type curve but fell off of trend after the first month of production. Figure 8 provides production test results and indications of production curves for the two wells in our study. Figure 9 provides additional production data.

Figure 8: GB/SA daily oil production tests compared to GB/SA oil typecurve

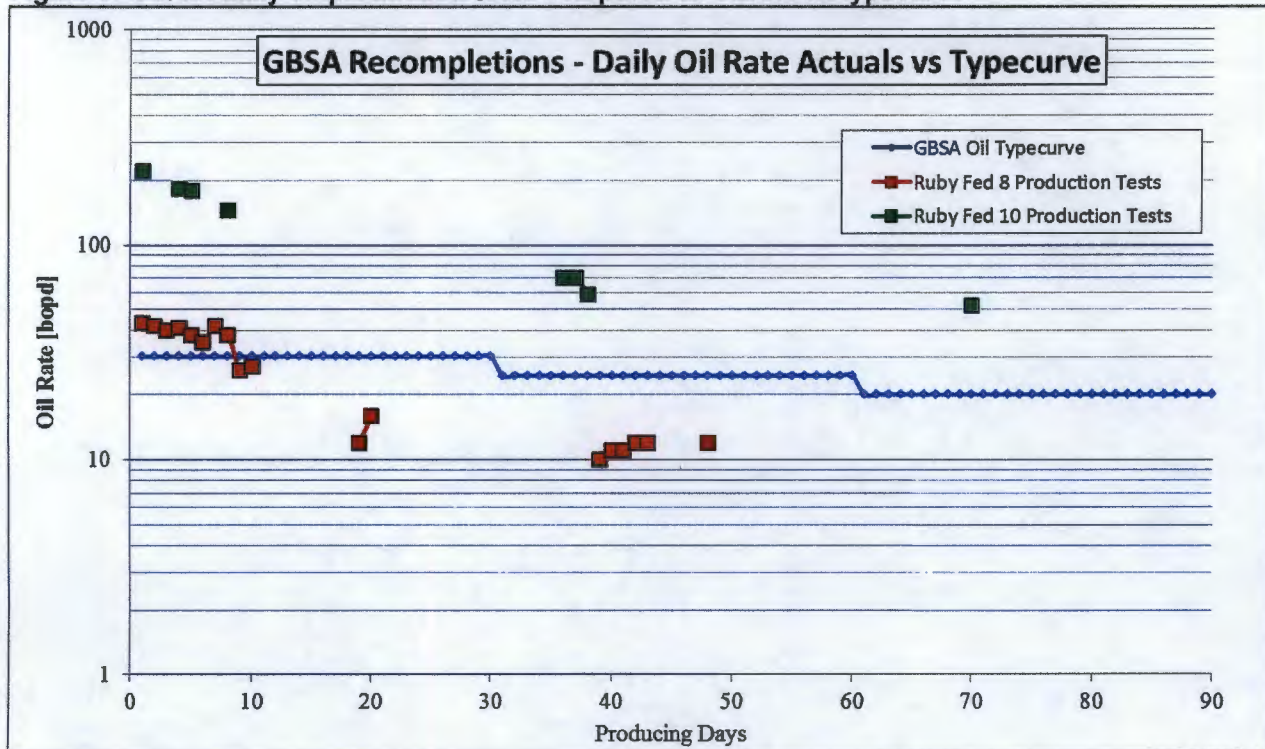
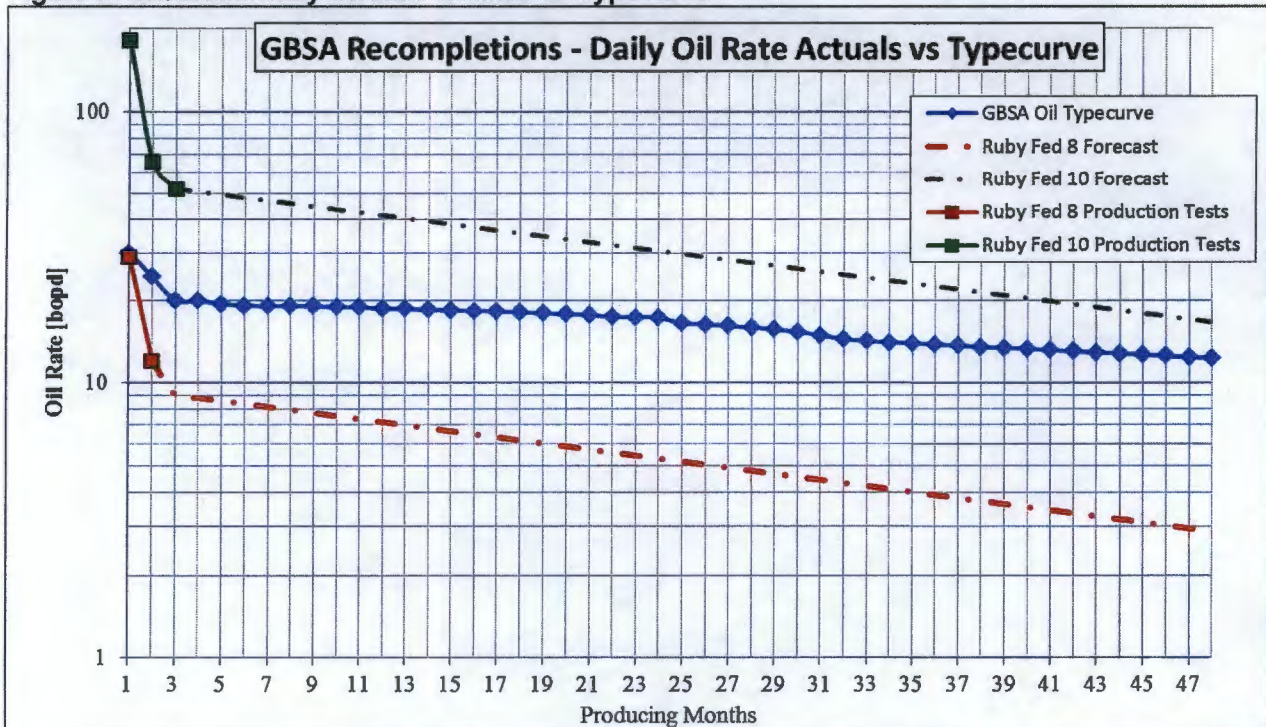


Figure 9: GB/SA Monthly Oil Rate Actuals vs Typecurve



Additional Well Work for Field Study

ConocoPhillips believes addition well work is useful to provide additional data for this field study. The wells listed below will each provide useful data for the field study. Each has been selected to provide specific information.

Well Number	Timing of Commingle	Contribution to Field Study
Ruby Federal 8	Commingle GB/SA & Yeso (zone test complete)	Basis of Allocation
Ruby Federal 10	Commingled after production test of each zone	Basis of Allocation and GB/SA decline
Ruby Federal 2	Commingled after production test of each zone	Confirmation of Allocation
Ruby Federal 12	Commingled after production test of each zone	Confirmation of Allocation
Ruby Federal 20	Commingled after production test of each zone	Confirmation of Allocation
Ruby Federal 24	Commingled from Recompletion of GB/SA	Expected Production Rates (both zones)

COP proposes to commingle the Ruby Federal 8's production by drilling out all plugs over the San Andres and Yeso formations. The Ruby Federal 10 is currently producing from the Grayburg/San Andres only and has far exceeded our type curve. ConocoPhillips wishes to continue producing the Ruby Federal 10 uninterrupted in an attempt to define the decline curve characteristics. Commingling of this well is to be filed at a later date. To further validate our study COP proposes the recompletion of 4 additional, nearby Ruby Federal Yeso wells into intervals of the Grayburg/San Andres – specifically testing the lower San Andres' productivity. The goal of these data points is to provide reinforcement of the initial allocation of 58% Yeso (Paddock/Blaine) production to 42% GB/SA production. This allocation is an average of the type curves presented in Figures 8 and 9. Once this field study is complete it will be used as the basis in determining the contribution of Grayburg/San Andres in newly commingled and drilled wells.

Oil & Gas Composition Tests
Grayburg/San Andres Gas Test (MCA 514, tested on 1/9/14)



LABORATORY SERVICES
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For:	ConocoPhillips	Sample:	Test Separator
	Attention: Cruz Duarte	Identification:	MCA 514
	29 Vacuum Complex Lane	Company:	ConocoPhillips
	Lovington, New Mexico 88260	Lease:	
		Plant:	

Sample Data:	Date Sampled	1/9/2014	9:28 AM
	Analysis Date	1/10/2014	
	Pressure-PSIA	129.1	Sampled by: Dustin Armstrong
	Sample Temp F	53.9	Analysis by: Vicki McDaniel
	Atmos Temp F	41	

H2S = 5,000 PPM

Component Analysis

		Mol Percent	GPM
Hydrogen Sulfide	H2S	0.500	
Nitrogen	N2	2.741	
Carbon Dioxide	CO2	64.602	
Methane	C1	16.938	
Ethane	C2	7.071	1.886
Propane	C3	4.983	1.369
I-Butane	IC4	0.587	0.192
N-Butane	NC4	1.438	0.452
I-Pentane	IC5	0.338	0.123
N-Pentane	NC5	0.333	0.120
Hexanes Plus	C6+	<u>0.469</u>	<u>0.203</u>
		100.000	4.346

REAL BTU/CU.FT.

At 14.65 DRY	543.2
At 14.65 WET	533.7
At 14.696 DRY	544.9
At 14.696 WET	535.6
At 14.73 DRY	546.1
At 14.73 Wet	536.7

Specific Gravity

Calculated 1.3295

Molecular Weight 38.5078



LABORATORY SERVICES
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

ASTM DISTILLATION

ConocoPhillips
Attention: Cruz Duarte
20 Vacuum Complex Lane
Lovington, New Mexico 88260

Sampled By: Dustin Armstrong
Sample Date: 1/9/14

Sample ID: MCA 514

<u>Percent Distilled</u>	<u>Temperature</u>		
IBP	97		
5	148		
10	188		
20	250	%Recovered =	91.0
30	326	% Residue =	5.0
40	414	% Loss =	4.0
50	505		
60	563		
70	585		
80	612		
90	646		
EP	675		

<u>Total Sulfur</u>	<u>API Gravity</u>	<u>Specific Gravity</u>
0.7069 wt. %	38.1	0.8343

Oil & Gas Composition Tests
Yeso Gas Test (Ruby 28, tested on 2/21/14)



PERMATEL SERVICES
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For:	ConocoPhillips	Sample:	Separator
	Attention: Josh Hill	Identification:	Ruby #28
	29 Vacuum Complex Lane	Company:	ConocoPhillips
	Lovington, New Mexico 88260	Lease:	
		Plant:	

Sample Data:	Date Sampled	2/21/2014	12:00 PM	
	Analysis Date	2/24/2014		
	Pressure-PSIA	150	Sampled by:	Logan McIlroy
	Sample Temp F	74	Analysis by:	Vicki McDaniel
	Atmos Temp F	65		

H2S = 8 PPM

Component Analysis

		Mol Percent	GPM
Hydrogen Sulfide	H2S	0.001	
Nitrogen	N2	5.671	
Carbon Dioxide	CO2	2.793	
Methane	C1	60.994	
Ethane	C2	16.278	4.342
Propane	C3	9.954	2.735
I-Butane	IC4	1.077	0.352
N-Butane	NC4	2.171	0.683
I-Pentane	IC5	0.368	0.134
N-Pentane	NC5	0.308	0.112
Hexanes Plus	C6+	0.385	0.167
		100.000	8.524

REAL BTU/CU.FT.		Specific Gravity	
At 14.65 DRY	1309.1	Calculated	0.8501
At 14.65 WET	1286.2		
At 14.696 DRY	1313.1		
At 14.696 WET	1290.8	Molecular Weight	24.6218
At 14.73 DRY	1316.1		
At 14.73 Wet	1293.4		



LABORATORY SERVICES
Natural Gas Analysis

www.permianls.com
575.397.3713 2609 W Marland Hobbs NM 88240

ASTM DISTILLATION

ConocoPhillips
Attention: Josh Hill
29 Vacuum Complex Lane
Lovington, New Mexico 88260

Sampled By: Logan McIlroy
Sample Date: 2/21/14

Sample ID: Ruby #28

Percent Distilled

Temperature

IBP	112
5	160
10	190
20	262
30	310
40	395
50	505
60	614
70	700
80	745
90	772
EP	775

%Recovered = 93.5
% Residue = 4.5
% Loss = 2.0

Total Sulfur

API Gravity

Specific Gravity

0.6251 wt. %

38.2

0.8338

Attention:Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 23051

Region: Buckeye Field

Sample ID: AB41358

Location: MCA Station 2 Battery

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Transfer Pump

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Down Stream Valve

Analyses	Result	Unit
Dissolved CO2	530	mg/L
Dissolved H2S	68.4	mg/L
pH	8	
Pressure	50	psi
Temperature	65	° F

Cations	Result	Unit
Iron	1.915	mg/L
Manganese	0.393	mg/L
Barium	0.069	mg/L
Strontium	216.6	mg/L
Calcium	7700	mg/L
Magnesium	2121	mg/L
Sodium	52878.21	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.02
Barite BaSO4 SI	-0.34
Calcite CaCO3 PTB	127.3
Calcite CaCO3 SI	1.13
Celestite SrSO4 PTB	100.0
Celestite SrSO4 SI	0.47
Gypsum CaSO4 PTB	176.5
Gypsum CaSO4 SI	0.08
Hemihydrate CaSO4 PTB	74.4
Hemihydrate CaSO4 SI	0.04

Saturation Index Calculation (Tomson-Oddo Model)

Analyses	Result	Unit
Ionic Strength	3.00	
Resistivity	0.039	ohms - m
Total Dissolved Solids	165200.6	mg/L
Conductivity	258122	µS - cm3
Specific Gravity	1.113	
Bicarbonate	305	mg/L

Anions	Result	Unit
CHLORIDE	99977.46	mg/L
SULFATE	2000	mg/L

Comments:

Attention: Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 23057

Region: Buckeye Field

Sample ID: AB47037

Location: Ruby Battery

Batch ID: 3-4-14 TG SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Transfer Pump

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 03/05/2014

Sample Point: Down Stream Valve

Analyses	Result	Unit
Dissolved CO2	650	mg/L
Dissolved H2S	51.3	mg/L
pH	8	
Pressure	53	psi
Temperature	55	° F

Cations	Result	Unit
Iron	1.069	mg/L
Manganese	.111	mg/L
Barium	.059	mg/L
Strontium	348.3	mg/L
Calcium	12230	mg/L
Magnesium	2564	mg/L
Sodium	63365.50	mg/L

Scale Type	Result
Anhydrite CaSO4 PTB	145.2
Anhydrite CaSO4 SI	0.12
Barite BaSO4 SI	-0.35
Calcite CaCO3 PTB	188.8
Calcite CaCO3 SI	1.48
Celestite SrSO4 PTB	180.1
Celestite SrSO4 SI	0.64
Gypsum CaSO4 PTB	244.8
Gypsum CaSO4 SI	0.17
Hemihydrate CaSO4 PTB	165.1
Hemihydrate CaSO4 SI	0.13

Saturation Index Calculation (Tomson-Oddo Model)

Analyses	Result	Unit
Ionic Strength	3.83	
Resistivity	0.031	ohms - m
Total Dissolved Solids	206303.2	mg/L
Conductivity	322347	µS - cm3
Specific Gravity	1.143	
Bicarbonate	402.6	mg/L

Anions	Result	Unit
CHLORIDE	125971.6	mg/L
SULFATE	1420	mg/L

Comments:

Attention:Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 22737

Region: Maljamar Field

Sample ID: AB41355

Location: Ruby Lease

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/11/2014

Equipment: Well 8

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Well Head Valve Up Stream of Choke

Analyses	Result	Unit
Dissolved CO2	240	mg/L
Dissolved H2S	119.7	mg/L
pH	8	
Pressure	150	psi
Temperature	50	° F

Cations	Result	Unit
Iron	2.725	mg/L
Manganese	0.25	mg/L
Barium	0.088	mg/L
Strontium	86.44	mg/L
Calcium	2713	mg/L
Magnesium	1927	mg/L
Sodium	40734.74	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.48
Barite BaSO4 SI	-0.02
Calcite CaCO3 PTB	121.7
Calcite CaCO3 SI	0.62
Celestite SrSO4 PTB	20.5
Celestite SrSO4 SI	0.18
Gypsum CaSO4 SI	-0.19
Hemihydrate CaSO4 SI	-0.20
Saturation Index Calculation (Tomson-Oddo Model)	

Analyses	Result	Unit
Ionic Strength	2.08	
Resistivity	0.053	ohms - m
Total Dissolved Solids	119765.2	mg/L
Conductivity	187129	µS - cm3
Specific Gravity	1.08	
Bicarbonate	427	mg/L

Anions	Result	Unit
CHLORIDE	70984	mg/L
SULFATE	2890	mg/L

Comments:

Attention:Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 22634

Region: Maljamar Field

Sample ID: AB41356

Location: MCA Unit 3-B Header

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Well 122

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Well Head Valve Up Stream of Choke

Analyses	Result	Unit
Dissolved CO2	760	mg/L
Dissolved H2S	51.3	mg/L
pH	8	
Pressure	60	psi
Temperature	40	° F

Cations	Result	Unit
Iron	15.59	mg/L
Manganese	1.333	mg/L
Barium	0.138	mg/L
Strontium	48.65	mg/L
Calcium	2355	mg/L
Magnesium	917.2	mg/L
Sodium	24540.96	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.74
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.24
Calcite CaCO3 PTB	1423.8
Calcite CaCO3 SI	1.49
Celestite SrSO4 SI	-0.12
Gypsum CaSO4 SI	-0.28
Hemihydrate CaSO4 SI	-0.23
Saturation Index Calculation (Tomson-Oddo Model)	

Analyses	Result	Unit
Ionic Strength	1.26	
Resistivity	0.086	ohms - m
Total Dissolved Solids	74784.63	mg/L
Conductivity	116825	µS - cm3
Specific Gravity	1.046	
Bicarbonate	3660	mg/L

Anions	Result	Unit
CHLORIDE	40990.76	mg/L
SULFATE	2255	mg/L

Comments:

NALCO Champion

An Ecolab Company

Water Analysis Report

Attention:Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 115385

Region: Maljamar Field

Sample ID: AB41359

Location: Ruby Lease

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Well 35

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Well Head Valve Up Stream of Choke

Analyses	Result	Unit
Dissolved CO2	640	mg/L
Dissolved H2S	34.2	mg/L
pH	8	
Pressure	150	psi
Temperature	65	° F

Cations	Result	Unit
Iron	1.953	mg/L
Manganese	0.14	mg/L
Barium	0.073	mg/L
Strontium	339.7	mg/L
Calcium	10740	mg/L
Magnesium	2250	mg/L
Sodium	61483.62	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.09
Barite BaSO4 SI	-0.53
Calcite CaCO3 PTB	46.5
Calcite CaCO3 SI	0.95
Celestite SrSO4 PTB	130.2
Celestite SrSO4 SI	0.43
Gypsum CaSO4 SI	-0.07
Hemihydrate CaSO4 SI	-0.11
Saturation Index Calculation (Tomson-Oddo Model)	

Analyses	Result	Unit
Ionic Strength	3.62	
Resistivity	0.033	ohms - m
Total Dissolved Solids	195915.4	mg/L
Conductivity	306115	µS - cm3
Specific Gravity	1.136	
Bicarbonate	122	mg/L

Anions	Result	Unit
CHLORIDE	119972.95	mg/L
SULFATE	1005	mg/L

Comments:

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Water Analysis Report

Attention: Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 115389

Region: Maljamar Field

Sample ID: AB41360

Location: MCA Unit

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Well 512

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Well Head Valve Up Stream of Choke

Analyses	Result	Unit
Dissolved CO2	420	mg/L
Dissolved H2S	85.5	mg/L
pH	8	
Pressure	200	psi
Temperature	70	° F

Analyses	Result	Unit
Ionic Strength	1.64	
Resistivity	0.066	ohms - m
Total Dissolved Solids	96435.83	mg/L
Conductivity	150677	µS - cm3
Specific Gravity	1.061	
Bicarbonate	3416	mg/L

Cations	Result	Unit
Iron	2.569	mg/L
Manganese	0.226	mg/L
Barium	0.069	mg/L
Strontium	73.67	mg/L
Calcium	2598	mg/L
Magnesium	995.2	mg/L
Sodium	32657.27	mg/L

Anions	Result	Unit
CHLORIDE	53987.83	mg/L
SULFATE	2705	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.45
Barite BaSO4 SI	-0.25
Calcite CaCO3 PTB	1501.9
Calcite CaCO3 SI	1.73
Celestite SrSO4 PTB	9.9
Celestite SrSO4 SI	0.09
Gypsum CaSO4 SI	-0.22
Hemihydrate CaSO4 SI	-0.24
Saturation Index Calculation (Tomson-Oddo Model)	

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Water Analysis Report

Attention: Jeromie Pickering

Customer: ConocoPhillips (1505033)

Location Code: 118437

Region: Maljamar Field

Sample ID: AB41361

Location: MCA Unit

Batch ID: 2014-02-21_MFA_SWICPWET

System: Production System

Collection Date: 02/10/2014

Equipment: Well 514

Receive Date: 02/20/2014

Lab ID: ABU-1031

Report Date: 02/28/2014

Sample Point: Well Head Valve Up Stream of Choke

Analyses	Result	Unit
Dissolved CO2	340	mg/L
Dissolved H2S	188.1	mg/L
pH	8	
Pressure	150	psi
Temperature	61	° F

Cations	Result	Unit
Iron	1.116	mg/L
Manganese	0.23	mg/L
Barium	0.082	mg/L
Strontium	48.41	mg/L
Calcium	2266	mg/L
Magnesium	816.9	mg/L
Sodium	33758.44	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-0.57
Barite BaSO4 SI	-0.13
Calcite CaCO3 PTB	428.6
Calcite CaCO3 SI	1.09
Celestite SrSO4 SI	-0.10
Gypsum CaSO4 SI	-0.28
Hemihydrate CaSO4 SI	-0.29
Saturation Index Calculation (Tomson-Oddo Model)	

Analyses	Result	Unit
Ionic Strength	1.67	
Resistivity	0.066	ohms - m
Total Dissolved Solids	96571.56	mg/L
Conductivity	150891	µS - cm3
Specific Gravity	1.063	
Bicarbonate	1098	mg/L

Anions	Result	Unit
CHLORIDE	55987.38	mg/L
SULFATE	2595	mg/L

Comments:

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

BLM
 Carlsbad Field office
 600 E. Greene St
 Carlsbad, NM
 88220

2. Article Number

(Transfer from service label)

7013 3020 0000 4635 4660

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *[Signature]*

☐ Agent

☒ Addressee

B. Received by (Printed Name)

Cory Hernandez

C. Date of Delivery

6/6/14

D. Is delivery address different from item 1?

☐ Yes

If YES, enter delivery address below:

☐ No

3. Service Type

☐ Certified Mail®

☐ Priority Mail Express™

☐ Registered

☐ Return Receipt for Merchandise

☐ Insured Mail

☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee)

☐ Yes