

RECEIVED: 06-22-2017	REVIEWER: 	TYPE: IPI	APP NO: PRG1908132084
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

[e-mail]

**NEW MEXICO OIL CONSERVATION DIVISION**  
 - Geological & 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

**Applicant:** Nicolas Klopp **OGRID Number:** 160825  
**Well Name:** Berry SWD #1 **API:** 30-025-41703  
**Pool:** Berry SWD #1 - Cherry Canyon **Pool Code:** 97003

**SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW**

- 1) **TYPE OF APPLICATION:** Check those which apply for [A]  
 A. Location – Spacing Unit – Simultaneous Dedication  
 NSL       NSP (PROJECT AREA)       NSP (PRORATION UNIT)       SD
- B. Check one only for [ I ] or [ II ]  
 [ I ] Commingling – Storage – Measurement  
 DHC    CTB    PLC    PC    OLS    OLM  
 [ II ] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery  
 WFX    PMX    SWD    IPI    EOR    PPR

- 2) **NOTIFICATION REQUIRED TO:** Check those which apply.  
 A.  Offset operators or lease holders  
 B.  Royalty, overriding royalty owners, revenue owners  
 C.  Application requires published notice  
 D.  Notification and/or concurrent approval by SLO  
 E.  Notification and/or concurrent approval by BLM  
 F.  Surface owner  
 G.  For all of the above, proof of notification or publication is attached, and/or,  
 H.  No notice required

FOR OCD ONLY	
<input type="checkbox"/>	Notice Complete
<input type="checkbox"/>	Application Content Complete

3) **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.**

Nicolas Klopp

Print or Type Name

Signature

6-22-2017  
Date

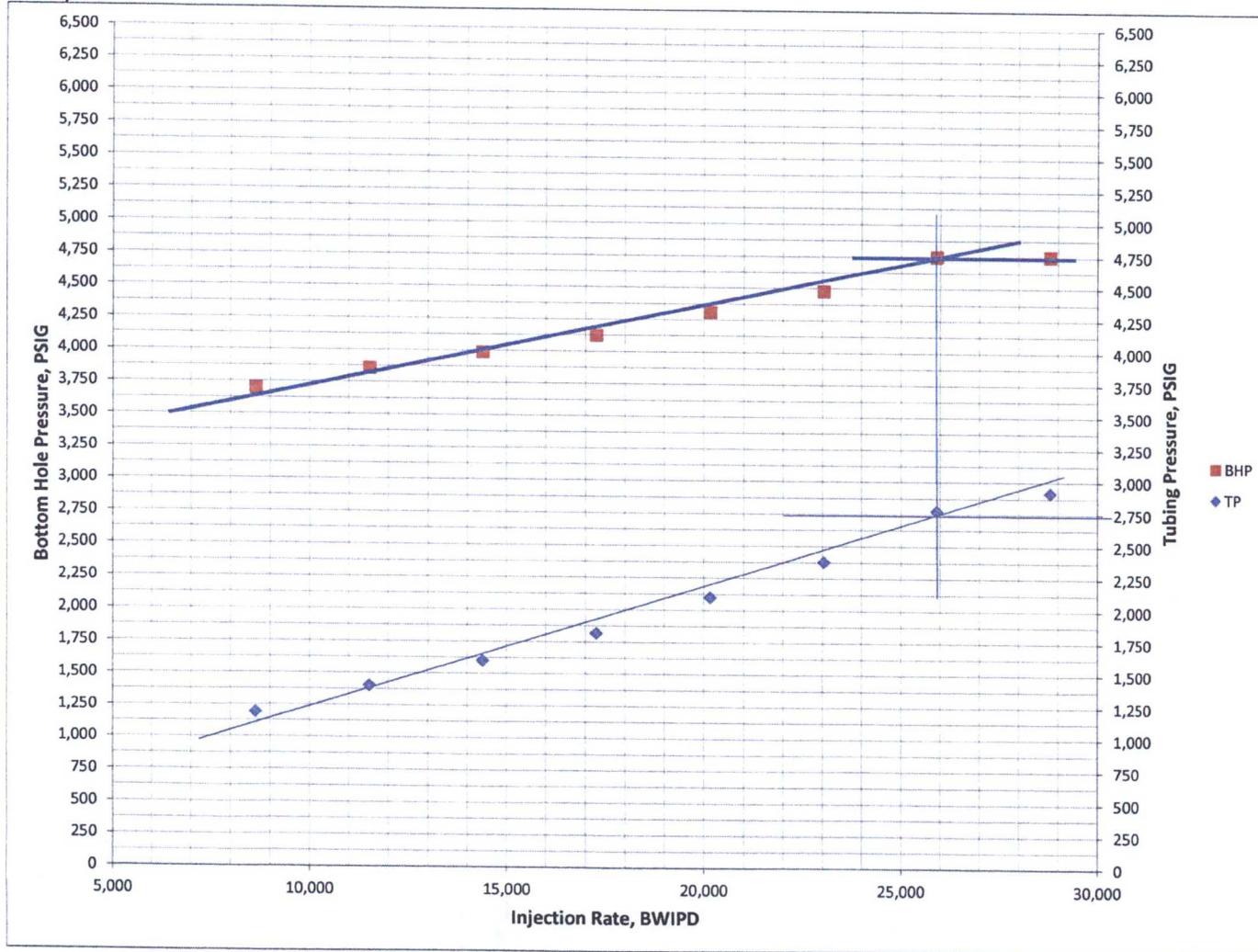
432.684.9696  
Phone Number

nklopp@gmail.com  
e-mail Address



Berry SWD 6.2017

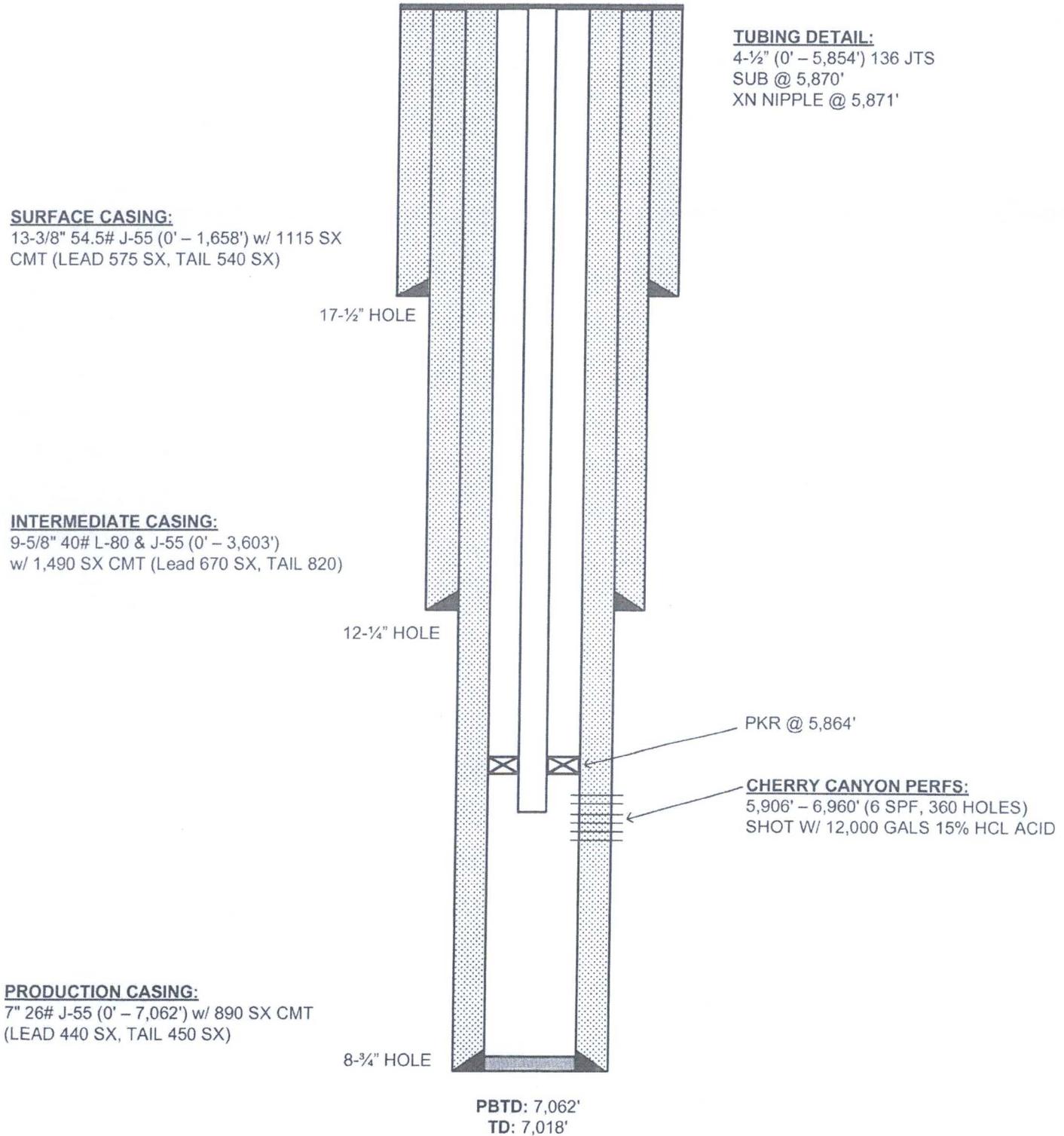
Step	Inj Rate, BPM	Inj Rate, BPD	TP	BHP
1	6.00	8,640	1,190	3,700
2	8.00	11,520	1,401	3,856
3	10.00	14,400	1,600	3,987
4	12.00	17,280	1,818	4,122
5	14.00	20,160	2,100	4,308
6	16.00	23,040	2,379	4,477
7	18.00	25,920	2,776	4,751
8	20.00	28,800	2,918	4,755



# BC OPERATING, INC.

## BERRY SWD #1

API #30-025-41703  
UNIT LETTER "I" 1539' FSL & 304' FEL  
SEC. 35, T20S, R34E  
LEA COUNTY, NEW MEXICO  
CURRENT WELLBORE



## Goetze, Phillip, EMNRD

---

**From:** Nic Klopp <nklopp@bcoperating.com>  
**Sent:** Tuesday, September 12, 2017 10:10 AM  
**To:** Goetze, Phillip, EMNRD  
**Subject:** FW: IPI Request - Berry SWD #1 - Lea Co. NM  
**Attachments:** IPI Request - Berry SWD #1.pdf; Berry SWD 6.2017.xlsx

Hi Phillip, I wanted to follow up on the status of this IPI request for the Berry SWD in Lea county, API: 30-025-41703.

Thanks in advance!

Nicolas Klopp  
BC Operating  
Office: (432)684-9696  
Cell: (979)422-2510  
[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)

---

**From:** Nic Klopp  
**Sent:** Thursday, June 22, 2017 4:20 PM  
**To:** Michael.mcmillan@state.nm.us  
**Subject:** IPI Request - Berry SWD #1 - Lea Co. NM

Michael,

See injection pressure increase request attached for the Berry SWD #1 located in Lea Co, NM. Also attached is an excel sheet with BHP, TP, rate and time readings. Please let me know if you need anything else from my end. Should I have a copy submitted via mail to the NMOCD office in Santa Fe as well?

Thanks in advance,

Nicolas Klopp  
BC Operating  
Office: (432)684-9696  
Cell: (979)422-2510  
[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)

P.O. Box 50820  
Midland, Texas 79710  
Phone (432) 684-9696



4000 N Big Spring, Ste. # 310  
Midland, Texas 79705  
Fax (432) 686-0600

June 22, 2017

New Mexico Oil Conservation Division  
1220 South St. Francis Drive  
Santa Fe, NM 87505

Re: Request IPI – Administrative Order No. SWD – 1516 – Berry SWD #1

B.C. Operating, Inc. requests an injection pressure-limit increase to 2750 psig at surface for the subject well. The attached supporting documentation is listed as follows:

1. Administrative Checklist - Injection pressure-limit increase
2. Step-rate test results
3. Wellbore diagram

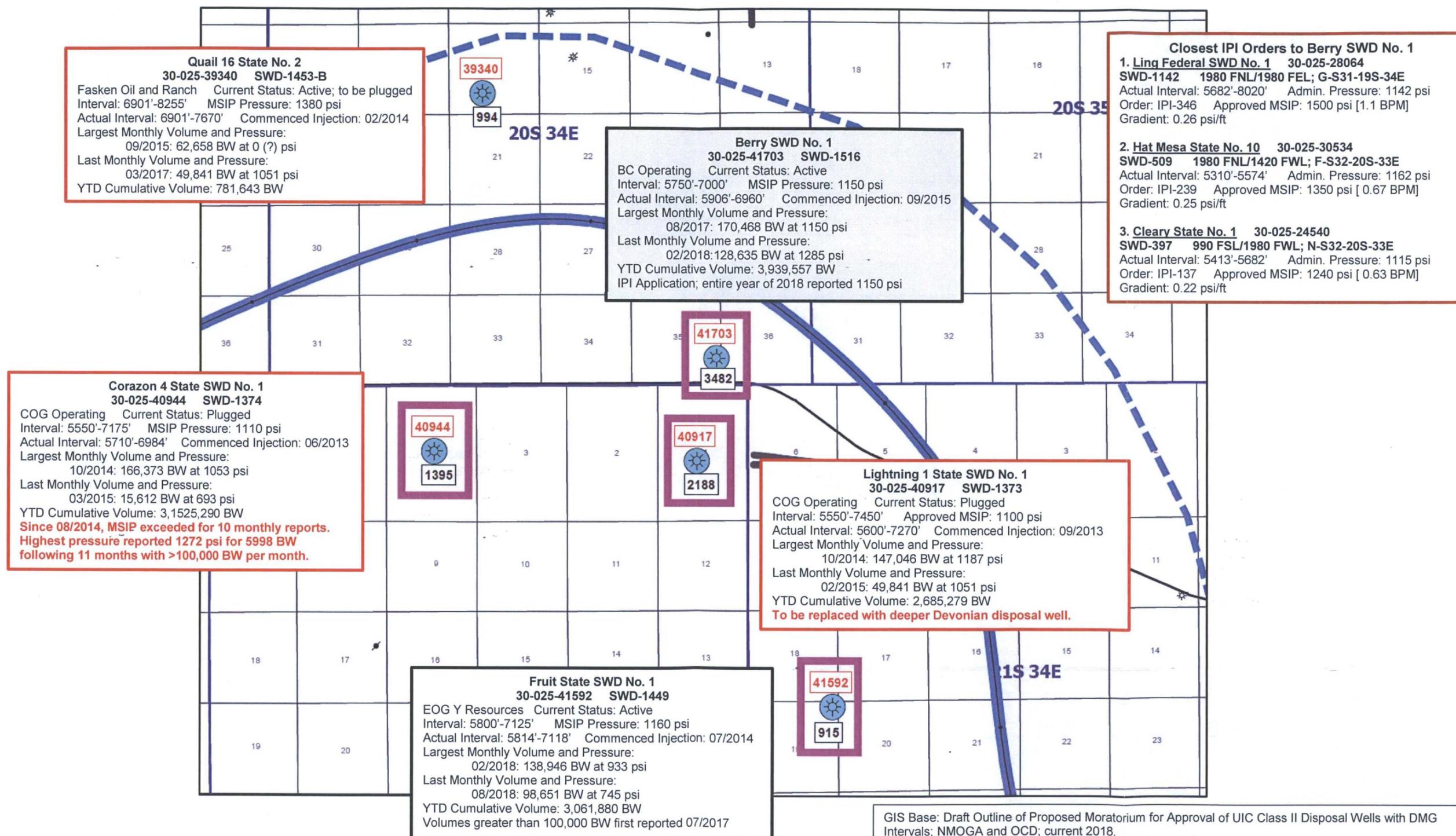
Please contact our office at 432-684-9696 if any further information is needed to complete this request.

Sincerely,

A handwritten signature in blue ink that reads "Nicolas Klopp".

Nicolas Klopp  
Operations Engineer

IPI Application: Berry SWD No.1 (30-025-41703; SWD-1526)



**Quail 16 State No. 2**  
**30-025-39340 SWD-1453-B**  
 Fasken Oil and Ranch Current Status: Active; to be plugged  
 Interval: 6901'-8255' MSIP Pressure: 1380 psi  
 Actual Interval: 6901'-7670' Commenced Injection: 02/2014  
 Largest Monthly Volume and Pressure:  
 09/2015: 62,658 BW at 0 (?) psi  
 Last Monthly Volume and Pressure:  
 03/2017: 49,841 BW at 1051 psi  
 YTD Cumulative Volume: 781,643 BW

**Berry SWD No. 1**  
**30-025-41703 SWD-1516**  
 BC Operating Current Status: Active  
 Interval: 5750'-7000' MSIP Pressure: 1150 psi  
 Actual Interval: 5906'-6960' Commenced Injection: 09/2015  
 Largest Monthly Volume and Pressure:  
 08/2017: 170,468 BW at 1150 psi  
 Last Monthly Volume and Pressure:  
 02/2018: 128,635 BW at 1285 psi  
 YTD Cumulative Volume: 3,939,557 BW  
 IPI Application; entire year of 2018 reported 1150 psi

**Closest IPI Orders to Berry SWD No. 1**  
**1. Ling Federal SWD No. 1 30-025-28064**  
**SWD-1142 1980 FNL/1980 FEL; G-S31-19S-34E**  
 Actual Interval: 5682'-8020' Admin. Pressure: 1142 psi  
 Order: IPI-346 Approved MSIP: 1500 psi [1.1 BPM]  
 Gradient: 0.26 psi/ft  
**2. Hat Mesa State No. 10 30-025-30534**  
**SWD-509 1980 FNL/1420 FWL; F-S32-20S-33E**  
 Actual Interval: 5310'-5574' Admin. Pressure: 1162 psi  
 Order: IPI-239 Approved MSIP: 1350 psi [0.67 BPM]  
 Gradient: 0.25 psi/ft  
**3. Cleary State No. 1 30-025-24540**  
**SWD-397 990 FSL/1980 FWL; N-S32-20S-33E**  
 Actual Interval: 5413'-5682' Admin. Pressure: 1115 psi  
 Order: IPI-137 Approved MSIP: 1240 psi [0.63 BPM]  
 Gradient: 0.22 psi/ft

**Corazon 4 State SWD No. 1**  
**30-025-40944 SWD-1374**  
 COG Operating Current Status: Plugged  
 Interval: 5550'-7175' MSIP Pressure: 1110 psi  
 Actual Interval: 5710'-6984' Commenced Injection: 06/2013  
 Largest Monthly Volume and Pressure:  
 10/2014: 166,373 BW at 1053 psi  
 Last Monthly Volume and Pressure:  
 03/2015: 15,612 BW at 693 psi  
 YTD Cumulative Volume: 3,1525,290 BW  
**Since 08/2014, MSIP exceeded for 10 monthly reports.**  
**Highest pressure reported 1272 psi for 5998 BW**  
**following 11 months with >100,000 BW per month.**

**Lightning 1 State SWD No. 1**  
**30-025-40917 SWD-1373**  
 COG Operating Current Status: Plugged  
 Interval: 5550'-7450' Approved MSIP: 1100 psi  
 Actual Interval: 5600'-7270' Commenced Injection: 09/2013  
 Largest Monthly Volume and Pressure:  
 10/2014: 147,046 BW at 1187 psi  
 Last Monthly Volume and Pressure:  
 02/2015: 49,841 BW at 1051 psi  
 YTD Cumulative Volume: 2,685,279 BW  
**To be replaced with deeper Devonian disposal well.**

**Fruit State SWD No. 1**  
**30-025-41592 SWD-1449**  
 EOG Y Resources Current Status: Active  
 Interval: 5800'-7125' MSIP Pressure: 1160 psi  
 Actual Interval: 5814'-7118' Commenced Injection: 07/2014  
 Largest Monthly Volume and Pressure:  
 02/2018: 138,946 BW at 933 psi  
 Last Monthly Volume and Pressure:  
 08/2018: 98,651 BW at 745 psi  
 YTD Cumulative Volume: 3,061,880 BW  
 Volumes greater than 100,000 BW first reported 07/2017

GIS Base: Draft Outline of Proposed Moratorium for Approval of UIC Class II Disposal Wells with DMG Intervals; NMOGA and OCD; current 2018.  
 Purple outline: SWD Order approved between 2012 and 2016  
 Blue line: solid: current limit of Avalon Shale potential; dashed: proposed limit of moratorium

**Goetze, Phillip, EMNRD**

---

**From:** Kaitlyn A. Luck <Kluck@montand.com>  
**Sent:** Wednesday, March 13, 2019 1:32 PM  
**To:** Goetze, Phillip, EMNRD  
**Cc:** Sharon T. Shaheen; David Ortiz  
**Subject:** [EXT] BC Operating IPI Request - Berry SWD #1 - Lea Co. NM

Good afternoon,

Our client has requested that we obtain a status update from OCD on the above-referenced IPI request. Please let us know the status of the Order when you have a moment.

Thanks,



**KAITLYN A. LUCK**

Attorney at Law  
Montgomery & Andrews, P.A.  
Post Office Box 2307  
Santa Fe, New Mexico 87504-2307  
Direct Line: 505-986-2530  
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[kluck@montand.com](mailto:kluck@montand.com)

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**Goetze, Phillip, EMNRD**

---

**From:** Seth McMillan <SMcMillan@montand.com>  
**Sent:** Wednesday, February 6, 2019 3:02 PM  
**To:** Goetze, Phillip, EMNRD  
**Subject:** [EXT] FW: BC Operating IPI Request - Berry SWD #1 - Lea Co. NM  
**Attachments:** Berry SWD Step Rate Test Chart Update 2-2019.xlsx; Berry SWD #1 - Area IPI Comparison Table 2-2019.xlsx

Phil,

BC Operating took another look at the step rate test data that they had already collected and believe they may have found a solution that is correlative to the offset IPI tests that the OCD referenced previously:

1. BC had previously collected additional data below the administratively approved gradient of 0.20 psi/ft, and they have included an additional point in an updated analysis, attached hereto.
2. By calculating the intercept of two linear trend line formulas, which are within the range of data documented in the offset IPIs, BC was able to calculate a parting pressure of 1340 psig (0.227 psi/ft) at the surface for this well. The break is very subtle at high rate, but it is there.

Injection Well	Parting Pressure	Parting Gradient	Approved Pressure	Approved Gradient
Ling Federal #1	1,547	0.272	1,500	0.264
Hat Mesa State #10	1,400	0.264	1,350	0.254
Cleary State #1	1,290	0.238	1,240	0.229
<b>Berry SWD #1</b>	<b>1,340</b>	<b>0.227</b>	<b>1,300</b>	<b>0.220</b>

BC Operating therefore requests that the Maximum Allowable Injection Pressure for this well be raised to 1300 psig (0.220 psi/ft). Please review the attached and let me know if this is do-able.

As ever, thanks much,  
Seth



Seth C. McMillan  
Attorney at Law  
Montgomery & Andrews, P.A.  
325 Paseo de Peralta  
Santa Fe, NM 87501  
P. O. Box 2307  
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---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Monday, December 10, 2018 12:09 PM  
**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Wade, Gabriel, EMNRD <[Gabriel.Wade@state.nm.us](mailto:Gabriel.Wade@state.nm.us)>; Riley, Heather, EMNRD <[Heather.Riley@state.nm.us](mailto:Heather.Riley@state.nm.us)>; Davidson, Florene, EMNRD <[florene.davidson@state.nm.us](mailto:florene.davidson@state.nm.us)>  
**Subject:** RE: BC Operating IPI Request - Berry SWD #1 - Lea Co. NM

Mr. McMillan:

The application will remain suspended pending any additional information BC Operating can provide. If BC Operating provides the supporting information and addresses the Division's concerns, then the proposed pressures supported by the SRT should be available. And the Division will expedite the review with the submission of any additional information. Thank you for your assistance in facilitating this discussion. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Sent:** Monday, December 10, 2018 11:41 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Wade, Gabriel, EMNRD <[Gabriel.Wade@state.nm.us](mailto:Gabriel.Wade@state.nm.us)>; Riley, Heather, EMNRD <[Heather.Riley@state.nm.us](mailto:Heather.Riley@state.nm.us)>; Davidson, Florene, EMNRD <[florene.davidson@state.nm.us](mailto:florene.davidson@state.nm.us)>  
**Subject:** [EXT] BC Operating IPI Request - Berry SWD #1 - Lea Co. NM

Mr. Goetze,

Thank you very much for your response, which I have communicated to BC Operating.

At this point, BC Operating really needs approval to inject at 1500 psig at surface and would like to continue working with NMOCD to this end. We'll hold off on moving to a hearing track for the time being, but please let me know if you think 1500 psig is out of reach once we've done the following:

1. BC Operating will supplement the existing step rate test data with additional points below the 0.2 psi/ft gradient, per your request. I'll submit this data to you just as soon as I've obtained it.
2. In addition, BC will conduct a fall off test, as requested. They hope to schedule the test for some time this week.

Please stay tuned for more data. Thanks for continuing to work with me on this one. I know you're super busy.

Best,  
Seth



Seth C. McMillan  
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Montgomery & Andrews, P.A.  
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---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]

**Sent:** Friday, December 7, 2018 10:11 AM

**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>

**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Wade, Gabriel, EMNRD <[Gabriel.Wade@state.nm.us](mailto:Gabriel.Wade@state.nm.us)>; Riley, Heather, EMNRD <[Heather.Riley@state.nm.us](mailto:Heather.Riley@state.nm.us)>; Davidson, Florene, EMNRD <[florene.davidson@state.nm.us](mailto:florene.davidson@state.nm.us)>

**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM: Request for Hearing

Mr. McMillian:

Very good. As to your client's results, the step-rate test (SRT) failed to provide a demonstration of data points below the administratively-approved gradient of 0.2 psi/ft, and therefore, any break in the plotted data set below the lowest data point provided in the SRT cannot accurately be assessed for a break that would represent fracturing. Following review by the Division and with comments from third party reviewers, the Division would approve a pressure increase to 1181 psi maximum surface injection pressure (MSIP) with the information provided. In his review, Mr. Jones suggested that the application could be supplemented by an additional evaluation by conducting a fall-off test at an injection pressure of approximately 2000 psi MSIP in order to assess for fracturing of the formation. This would address the absence of pressure information at the lower end of the pressure scale and support the results provided in the SRT for the Injection Pressure Increase (IPI) application.

Based on the historical data compiled by NMOGA and the OCD through the joint effort in review of disposal injection in the Delaware Mountain Group, it has become apparent that the 0.2 psi/ft gradient is a common fracture pressure for the injection intervals selected from within the Group. As such, approval of an injection pressure that exceed the formation parting pressure would place the Division in violation of its primacy agreement and its obligations under 40 CFR 146.

With regards to setting a hearing, the administrative application for the IPI was submitted by BC Operating, not the Division. If BC Operating is not satisfied with the proposed MSIP of 1181 psi and wishes to proceed to Division hearing, they have the opportunity to file an application. The Division will decide as to whether to appear in opposition once you have filed the application for hearing on behalf of your client. Please contact me with any questions on the content of this e-mail or prior communications in this matter. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505

Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Sent:** Friday, December 7, 2018 9:10 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** [EXT] IPI Request - Berry SWD #1 - Lea Co. NM: Request for Hearing

Mr. Goetze,

BC Operating would like a hearing on this matter. They want to make a record of the history of this IPI request. Can this matter please be placed on the January 24 docket? Please let me know if this email request is sufficient, or whether something else/more is required to be placed on that docket.

Thanks,  
Seth



Seth C. McMillan  
Attorney at Law  
Montgomery & Andrews, P.A.  
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---

**From:** Seth McMillan  
**Sent:** Tuesday, December 4, 2018 11:14 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil – Thanks for the exhibit. BC Operating is reading between the lines and bracing for the worst. But they do need to know your decision one way or the other so they can plan accordingly. Please advise, when you get a chance, as to the status of your response to this long-pending request for injection pressure increase. Thanks.



Seth C. McMillan  
Attorney at Law  
Montgomery & Andrews, P.A.  
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---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Tuesday, November 27, 2018 10:21 AM  
**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Mr. McMillian:

I have provided my review of the application to Will Jones, the Bureau Engineer, and he provided me a recommendation. I will dig into the current event stack on my desk to find his comments and provide a response this week. Meanwhile, I will offer for your client one of the exhibits I prepared for Will's review. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan  
**Sent:** Tuesday, November 27, 2018 9:05 AM  
**To:** Goetze, Phillip, EMNRD  
**Subject:** [EXT] RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil, I hope you had a restful break – BC Operating is wondering if a short conference call with you and them would be helpful. They'd be happy to discuss any issues and negotiate any terms that might be holding this order up. Please let me know if you think this would be a good idea and I'll proceed to work with everyone on scheduling and circulating call-in information. In the alternative, BC is wondering if they should be requesting a hearing in January? They'd of course prefer not to have to go that route if at all possible. In any event, please advise when you get a moment. Thanks.



Seth C. McMillan  
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F: (505) 982-4289  
[smcmillan@montand.com](mailto:smcmillan@montand.com)

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---

**From:** Seth McMillan  
**Sent:** Wednesday, November 7, 2018 12:12 PM  
**To:** [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)  
**Subject:** FW: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil,

Any update on this one? BC Operating is positively dying of anticipation. If a further reduction in requested injection pressure would help get this done, please let me know.

Thanks,  
Seth

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Friday, November 2, 2018 10:06 AM  
**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Reviewed by Engineering Bureau. Response being composed today. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Sent:** Monday, October 29, 2018 2:42 PM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>

**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** [EXT] RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil,

Is there a status update I can share with BC on this one? And let me know if there's anything else you need from them.

Thanks,  
Seth



Seth C. McMillan  
Attorney at Law  
Montgomery & Andrews, P.A.  
325 Paseo de Peralta  
Santa Fe, NM 87501  
P. O. Box 2307  
Santa Fe, NM 87504-2307  
T: (505) 986-2519  
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[smcmillan@montand.com](mailto:smcmillan@montand.com)

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---

**From:** Jason Wacker [<mailto:jwacker@bcoperating.com>]

**Sent:** Monday, October 15, 2018 3:53 PM

**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>

**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>; Mike Moylett <[mmoylett@bcoperating.com](mailto:mmoylett@bcoperating.com)>

**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip,

The Berry SWD #1 will support a full column of fluid at 0 surface tubing pressure. Static Bottomhole Pressure is equal to 2,702 psig @ 5,909' (top perforation).

Thanks!

Jason Wacker, P.E.  
VP of Engineering & Operations

BC Operating, Inc.  
4000 N. Big Spring #310  
Midland, Texas 79705

PO BOX 50820  
Midland, Texas 79710

Office (432) 684-9696  
Cell (432) 631-2142

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Monday, October 15, 2018 4:38 PM  
**To:** Nick Klopp; Jason Wacker  
**Cc:** Jones, William V, EMNRD; Seth McMillan; McMillan, Michael, EMNRD  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Jason or Nick:

One final request of data: for the step rate test, what was the BH pressure at 0 surface pressure? This is needed to satisfy one point of concern in that FPP in this area have been demonstrated to be low (at or right above 0.2 psi/ft). When you can as I am trying to empty out the remaining IPI applications that have accumulated during 2018. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Nick Klopp <[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)>  
**Sent:** Friday, January 26, 2018 1:21 PM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Sanchez, Daniel J., EMNRD <[daniel.sanchez@state.nm.us](mailto:daniel.sanchez@state.nm.us)>; Brown, Maxey G, EMNRD <[MaxeyG.Brown@state.nm.us](mailto:MaxeyG.Brown@state.nm.us)>; Jason Wacker <[jwacker@bcoperating.com](mailto:jwacker@bcoperating.com)>; Brian Arnold <[barnold@bcoperating.com](mailto:barnold@bcoperating.com)>; Sarah Presley <[spresley@bcoperating.com](mailto:spresley@bcoperating.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip, see answers to your questions below.

Thanks and let me know if you need anything else,

Nick Klopp  
Operations Engineer  
BC Operating  
979.422.2510

RE: Berry SWD No. 1 (30-025-41703) SWD-1516

Nick:

Per our phone conversation, I am pursuing this IPI application along with a few others that have been lingering due to changing priorities at OCD. While reviewing the package, I found my notes from a prior effort and have additional information requests:

1. Were BHP measurements from a pressure bomb/transducer? If so, at what depth?  
*We had transducers hooked up from the wellhead directly to the recording van, no pressure bomb. See procedure attached.*
2. There is no information on the actual SRT such as the time periods for each step. Please provide any details of field observations/measurements if possible. .  
*See procedure, raw data, and workover report attached. We established injection into the Cherry Canyon at a series of increasing rates, allowing each step to stabilize for 5 minutes.*
3. How long was the well shut-in prior to testing and what was the SI pressure at the beginning of the test?  
*Well was shut in for 24 hrs prior to SRT. Shut in pressure was 250psi.*
4. Is there an observe ISIP following the final step rate of 20 BPM?  
*5min: 1550psi, 10 min: 927psi, 15 min: 863psi, 20min: 813psi. See workover report attached.*
5. What type of fluid was used for the SRT? This is important to established that this was not part of a workover/stimulation effort. .  
*Produced water, see water analysis attached.*

With regards to the well itself, the last C-115 filing for this well is June 2017. This needs to be addressed. Any well testing, including step-rate tests, are worthy of a Sundry Notice (C-103/NOI and Subsequent Report) to be filed with the appropriate District office. This may be especially relevant in cases where there are bradenhead issues with the well being tested. There is no indication that any such paperwork was ever filed for this second SRT included in the IPI application.

*Our land tech is working diligently on getting all C-115 filings for this well up to date. Also, we are working on the Sundry Notice, C-103, regarding this particular SRT and will have it filed no later than Monday. We had changes in personnel and a few items got lost in the transition.*

Please provide the information requested on the SRT as soon as practical and please address the reporting deficiencies. Please contact me with any questions regarding the content of this e-mail. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Nick Klopp [<mailto:nklopp@bcoperating.com>]  
**Sent:** Wednesday, January 24, 2018 9:56 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phillip, hope all is going well. Any updates on the IPI status regarding the Berry SWD?

I really appreciate your help-!  
Nick

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Friday, October 13, 2017 9:43 AM  
**To:** Nic Klopp <[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Nic:

I went through my auto-archived e-mails and found your original forwarded e-mail from September 12<sup>th</sup> (with attachments). I'll make sure that the application will get into the database and we'll proceed with a review. Please check with me if you haven't received a response in the next two weeks. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division  
New Mexico Energy, Minerals and Natural Resources Department  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)



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**From:** Nic Klopp [<mailto:nklopp@bcoperating.com>]  
**Sent:** Friday, October 13, 2017 8:18 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Subject:** FW: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip, please see IPI request attached.

Let me know if you need anything else from me- thanks!

Nick Klopp  
BC Operating  
979.422.2510

---

**From:** Nic Klopp  
**Sent:** Thursday, June 22, 2017 4:20 PM  
**To:** [Michael.mcmillan@state.nm.us](mailto:Michael.mcmillan@state.nm.us)  
**Subject:** IPI Request - Berry SWD #1 - Lea Co. NM

Michael,

See injection pressure increase request attached for the Berry SWD #1 located in Lea Co, NM. Also attached is an excel sheet with BHP, TP, rate and time readings. Please let me know if you need anything else from my end. Should I have a copy submitted via mail to the NMOCD office in Santa Fe as well?

Thanks in advance,

Nicolas Klopp  
BC Operating  
Office: (432)684-9696  
Cell: (979)422-2510  
[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)



**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Subject:** FW: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip, please see IPI request attached.

Let me know if you need anything else from me- thanks!

Nick Klopp  
BC Operating  
979.422.2510

---

**From:** Nic Klopp  
**Sent:** Thursday, June 22, 2017 4:20 PM  
**To:** [Michael.mcmillan@state.nm.us](mailto:Michael.mcmillan@state.nm.us)  
**Subject:** IPI Request - Berry SWD #1 - Lea Co. NM

Michael,

See injection pressure increase request attached for the Berry SWD #1 located in Lea Co, NM. Also attached is an excel sheet with BHP, TP, rate and time readings. Please let me know if you need anything else form my end. Should I have a copy submitted via mail to the NMOCD office in Santa Fe as well?

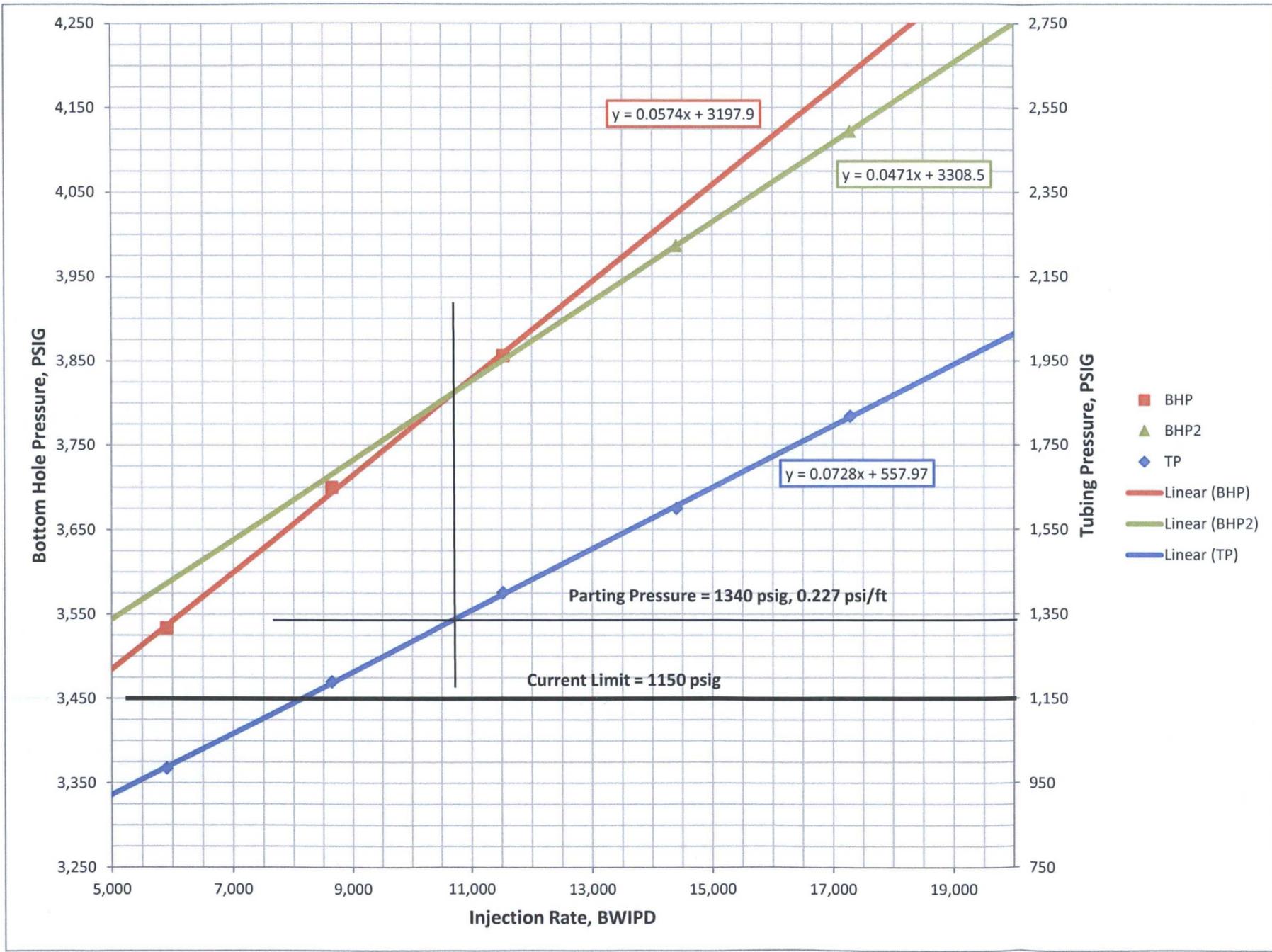
Thanks in advance,

Nicolas Klopp  
BC Operating  
Office: (432)684-9696  
Cell: (979)422-2510  
[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)

Berry SWD Step Rate Test Chart Update 2-2019.xlsx

Trendline Intercept  
 $y = 3,814$  Parting BHP  
 $x = 10,738$  BWPD  
 $y = 1,340$  Parting TP

Step	Inj Rate, BPM	Inj Rate, BPD	TP	BHP	Friction
1	4.10	5,904	985	3,534	34
2	6.00	8,640	1,190	3,700	73
3	8.00	11,520	1,401	3,856	128
4	10.00	14,400	1,600	3,987	196
5	12.00	17,280	1,818	4,122	279
6	14.00	20,160	2,100	4,308	375
7	16.00	23,040	2,379	4,477	485
8	18.00	25,920	2,776	4,751	608
9	20.00	28,800	2,918	4,755	746



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Midland, Texas 79710  
Phone (432) 684-9696



4000 N. Big Spring, Suite 310  
Midland, Texas 79705  
Fax (432) 686-0600

March 27, 2018

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division  
New Mexico Energy, Minerals and Natural Resources Department  
1220 South St. Francis Drive  
Santa Fe, NM 87505

RE: Berry SWD IPI Administrative Application

Phillip:

BC Operating, Inc. submitted an Administrative Application for an Injection Pressure increase to NMOCD for our Berry SWD #1 on June 22, 2017.

NMOCD reviewed our IPI Application and requested additional information regarding this submittal on January 26, 2018. BC Operating provided answers to those technical questions on that same day. At this point, NMOCD had all of the required information to administratively approve BC's IPI Application.

NMOCD provided a draft of Step Rate Test protocols to BC Operating on February 12, 2018. BC Operating reviewed the protocols and elected, at our own option, to comply with NMOCD's request to follow the draft guidance. Compliance with the draft protocols would involve running an additional Step Rate Test on the Berry SWD #1 at considerable expense; however, our interest in moving this administrative application forward justified the additional cost.

BC Operating conducted the repeat Step Rate Test using the NMOCD's draft guidance on 2/28/2018. This test resulted in catastrophic failure of the wellbore and significant damage to real property in excess of \$300,000. The well resumed to normal operations on 3/24/2018 after all repair operations were completed.

The goal of the NMOCD's draft Step Rate Test Guidelines is to protect mineral owners, groundwater, people, and property. As written, the draft guidelines do not achieve the intended goal. There are several portions of the Draft Guidance that led to the catastrophic failure of the Berry SWD #1. Please review and consider changes to the Draft Guidance and its application as discussed in the following pages.

A copy of the Draft Guidance received by BC Operating can be seen attached. Specifically, we will be addressing items #5 and #8 from those guidelines.

## Item #5, from Draft Guidance;

*“Bottomhole pressure measurements will be required for wells deeper than 1000 feet (ft) and injection rates greater than one (1) barrel per minute.”*

### Wellbore Integrity

Bottomhole pressure measurements require the hanging of an electronic pressure gauge in the wellbore during the injection test;

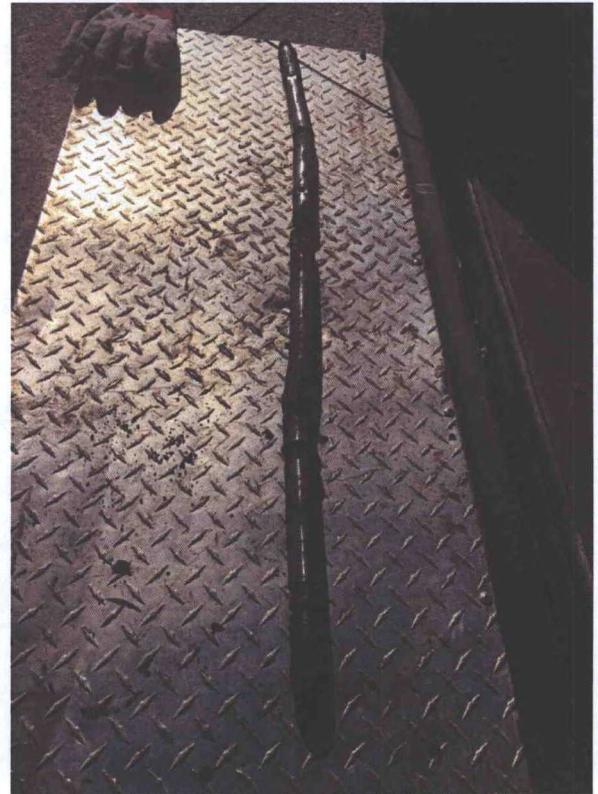
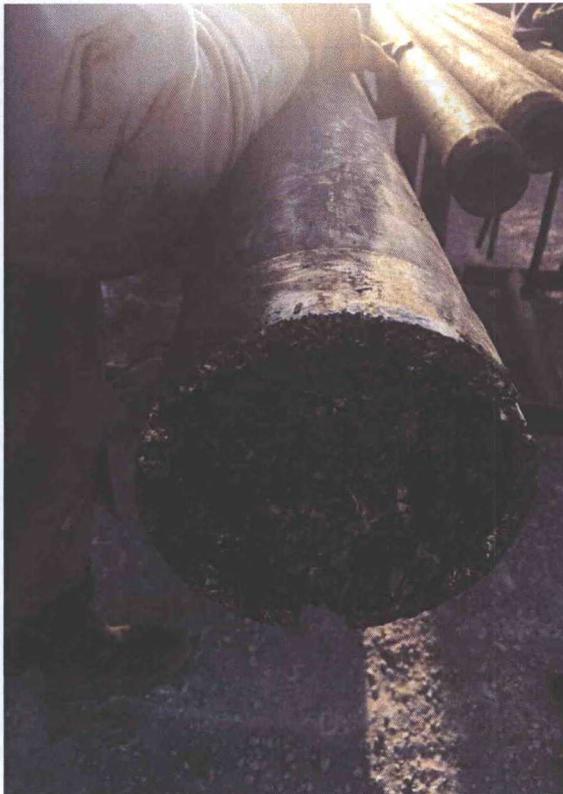
- Wellbores constructed with epoxy, plastic, or PVC lined tubing cannot withstand the friction of slickline against their coatings.
- Wellbores constructed with unlined steel or fiberglass lined steel tubing can endure the cutting action of wire that occurs a slickline run without compromising wellbore integrity.

The PVC lined tubing string in the Berry SWD #1 was compromised by slickline operations;

- The coating was cut and stripped off the ID of the tubing during the injection test and packed off across the well's completed interval and inside the tubing string above the packer.
- The 4-1/2" tubing string had to be pulled and PVC cleaned out of the well to PBTD.
  - The loose PVC lining imparted such drag on the downhole gauges during the test that they were forcefully separated from their rope socket and lost in the hole below the packer.
- The gauges were eventually fished out of the hole in 4 sections; however, no pressure data was recoverable.

In order for the Draft Guidance to honor NMOCD's interest in protecting real property, I offer the following revision:

*“Bottomhole pressure measurements will be required for wells deeper than 1000 feet (ft), injection rates greater than one (1) barrel per minute, and constructed with unlined steel or fiberglass lined steel injection tubing.”*

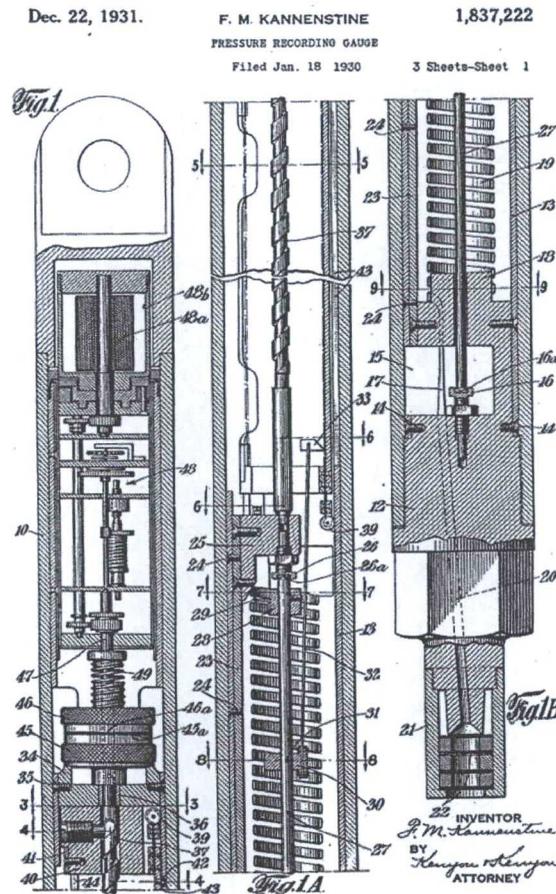


### Friction Pressure

The recommendation from NMOCD to run downhole gauges came from similar 1999 EPA guidelines citing a 1974 Oil & Gas Journal article by Martin Felsenthal on Step Rate Tests. Felsenthal writes:

“Best results were obtained when pressures were measured with a down-hole instrument. For instance, we used Amerada-type pressure recording devices.”

Felsenthal’s purpose for running downhole gauges was to more accurately evaluate tubing friction pressure during his step rate tests. Although the Amerada-type pressure recording device, pictured below, was invented 88 years ago and induced what we would now consider to be significant error to Felsenthal’s tests, they generated greater overall test accuracy as opposed to using the tubing friction calculations that were available to him 44 years ago.



Modern tubing friction equations such as Gomez et. al. Mech (2000) were published after the 1999 EPA SRT guidelines were released.

- BC Operating used Gomez et. al. Mech (2000) to calculate tubing friction pressure in its initial step rate test submittal.
- This equation is accurate to within -1.3% average error; which is more precise than the Amerada-type pressure recording devices that Felsenthal advocates using in his technical paper.

Specifically, the use of Gomez et. al. Mech (2000) underestimates tubing friction by an average of 29 psig (-24 to -33 psig) across the range of injection rates used in BC Operating's initial Step Rate Test on Berry SWD #1. Underestimating tubing friction pressure shifts the bottom hole pressure curve of the step rate test down by the amount of error (29 psig). Underestimation does not change the location of the breakover point obtained in the graphical solution of parting pressure on the step rate test. Therefore, a constant -1.3% error in tubing friction pressure does not affect our initial step rate test results.

- On February 12, 2018, NMOCD provided Guidance on the calculation of Friction Pressure in Tubular Goods from a November 1982 article that was published in Petroleum Engineer International. BC Operating has reviewed this information and has been able to identify modern tubing friction equations that are more accurate.
- NMOCD should accept BC Operating's tubing friction calculations as listed in our original SRT submittal as they are in accordance with 1999 EPA Guidelines and honor actual Step Rate Test conditions.

### **Item #8, from Draft Guidance;**

*“Each step shall be at least 30 minutes in duration unless otherwise determined by the OCD. Longer step intervals of 60 minutes shall be required for low permeability injection intervals (less than 0.5 millidarcies) and for open-hole intervals greater than 500 feet in length. The operator may request, in the submission of the Sundry Notice of Intent, a modification of the time length for the step intervals with an explanation for the modification. The goal is for increments with equal time and rate and allow for downhole stabilization of pressure for each step.”*

In working with NMOCD on the design of the second Step Rate Test on Berry SWD #1 that utilized the NMOCD's Draft Guidelines, it became clear that the shortest acceptable Recommended Time for each Injection-Rate Step would be 30 minutes.

- This recommendation from NMOCD came from similar 1999 EPA guidelines citing a 1974 Oil & Gas Journal article by Martin Felsenthal on Step Rate Tests in secondary recovery operations in **low permeability, thin oil reservoirs** located in Texas. Felsenthal's recommendations seem valid for the applications that he discussed in his publication.

Recommended Time for each Injection-Rate Step	
Test Design Value 1	
<b>Given:</b>	
$r_{inv} =$	10 feet
$K_w =$	< 5 md
$K_{rw} =$	0.05 as fraction of $K_w$
$\phi =$	0.2 fraction
$\mu_w =$	0.7 cp
$c =$	1.50E-05 psi-1
<b>Results:</b>	
$t =$	0.8 hours 48 mins
~Value	60 mins

Recommended Time for each Injection-Rate Step	
Test Design Value 2	
<b>Given:</b>	
$r_{inv} =$	10 feet
$K_w =$	> 5 md
$K_{rw} =$	0.1 as fraction of $K_w$
$\phi =$	0.2 fraction
$\mu_w =$	0.7 cp
$c =$	1.50E-05 psi-1
<b>Results:</b>	
$t =$	0.4 hours 24 mins
~Value	30 mins

- When Felsenthal's recommendations are applied to Step Rate Tests conducted in **high permeability, thick water reservoirs** that are generally completed in SWD wells; Felsenthal's recommended test design values no longer apply, and one must use Felsenthal's radius of investigation equation to determine the correct Recommended Time for each Injection Rate Step.

Berry SWD #1				
Top	Btm	Avg Crossplot Porosity	Avg Coates Dumanoir Perm, md	
6,906'	6,916'	0.245	9.961	
6,144'	6,154'	0.211	21.547	
6,250'	6,260'	0.179	11.335	
6,588'	6,598'	0.251	109.41	
6,710'	6,720'	0.188	26.713	
6,950'	6,960'	0.196	29.014	
		<b>0.212</b>	<b>34.663</b>	

**40.0 Avg NODAL Analysis Perm, md - from SRT Data**

- I. The first calculation of Recommended Time for each Injection Rate Step using Felsenthal's equations is based on NODAL Analysis sensitivities of existing SRT data that determined the Average Permeability of the completed interval in Berry SWD #1 to be 40.0 md. Felsenthal's Recommended Step Time is 3.2 minutes.

Recommended Time for each Injection-Rate Step	
Berry SWD #1	
<b>Given:</b>	
$r_{inv} =$	10 feet
$K_{w\_NODAL} =$	40 md
$K_{rw} =$	0.1 as fraction of $K_w$
$\phi =$	0.212 fraction
$\mu_w =$	0.7 cp
$c =$	1.50E-05 psi-1
<b>Results:</b>	
$t =$	0.053 hours
	3.180 mins

- II. The second calculation of Recommended Time for each Injection Rate Step using Felsenthal's equations is based on Average Coates Dumanoir Permeabilities from Schlumberger's well log analysis that determined the Average Permeability of the completed interval in Berry SWD #1 to be 34.7 md. Felsenthal's Recommended Step Time is 3.7 minutes.

Recommended Time for each Injection-Rate Step	
Berry SWD #1	
<b>Given:</b>	
$r_{inv} =$	10 feet
$K_{w\_CD} =$	34.663 md
$K_{rw} =$	0.1 as fraction of $K_w$
$\phi =$	0.212 fraction
$\mu_w =$	0.7 cp
$c =$	1.50E-05 psi-1
<b>Results:</b>	
$t =$	0.061 hours
	3.670 mins

- The calculation of Recommended Time for each Injection-Rate Step using permeabilities from two independent methods is less than 4 minutes. Stabilized injection rates during BC Operating's initial SRT on Berry SWD #1 were achieved in less than that test's 5 minute step time.

P.O. Box 50820  
Midland, Texas 79710  
Phone (432) 684-9696



4000 N. Big Spring, Suite 310  
Midland, Texas 79705  
Fax (432) 686-0600

- During the most recent Step Rate Test conducted in compliance with NMOCD's Draft Guidelines; the required 30 minute steps advanced the failure of the well's PVC lining, resulting in the subsequent loss of downhole electronic gauges and significant property damage.
- NMOCD should accept Felsenthal's rigorous calculation of the Recommended Time for each Injection-Rate Step as they are in accordance with 1999 EPA Guidelines and honor actual Step Rate Test conditions.

## In Conclusion

When NMOCD asked BC Operating to comply with new SRT Draft Guidelines, BC should have done a better job demonstrating to NMOCD that our initial test on Berry SWD #1 is in compliance with those guidelines. Presentation of the above information prior to BC's election to run a second, riskier test surely would have resulted in Administrative Approval of our original IPI application and catastrophe would have been averted.

BC Operating has demonstrated that running slickline inside PVC lined tubing is not a prudent operation. The use of modern tubing friction calculations negates the need for running downhole pressure gauges during a step rate test. The Recommended Time for each Injection Rate Step can be accurately calculated for SWD wells using Felsenthal's equation. 1999 EPA Guidelines for Step Rate Testing are almost 20 years out of date. NMOCD has an opportunity to write better industry guidelines on step rate testing using currently accepted best practices.

BC Operating has shown that our initial Step Rate Test on Berry SWD #1 meets current NMOCD requirements for Administrative Approval. We look forward to continuing this conversation with you to that end.

Sincerely,

A handwritten signature in blue ink that reads "Jason Wacker".

Jason Wacker  
VP of Engineering and Operations

A handwritten signature in blue ink that reads "Nick Klopp".

Nick Klopp  
Operations Engineer

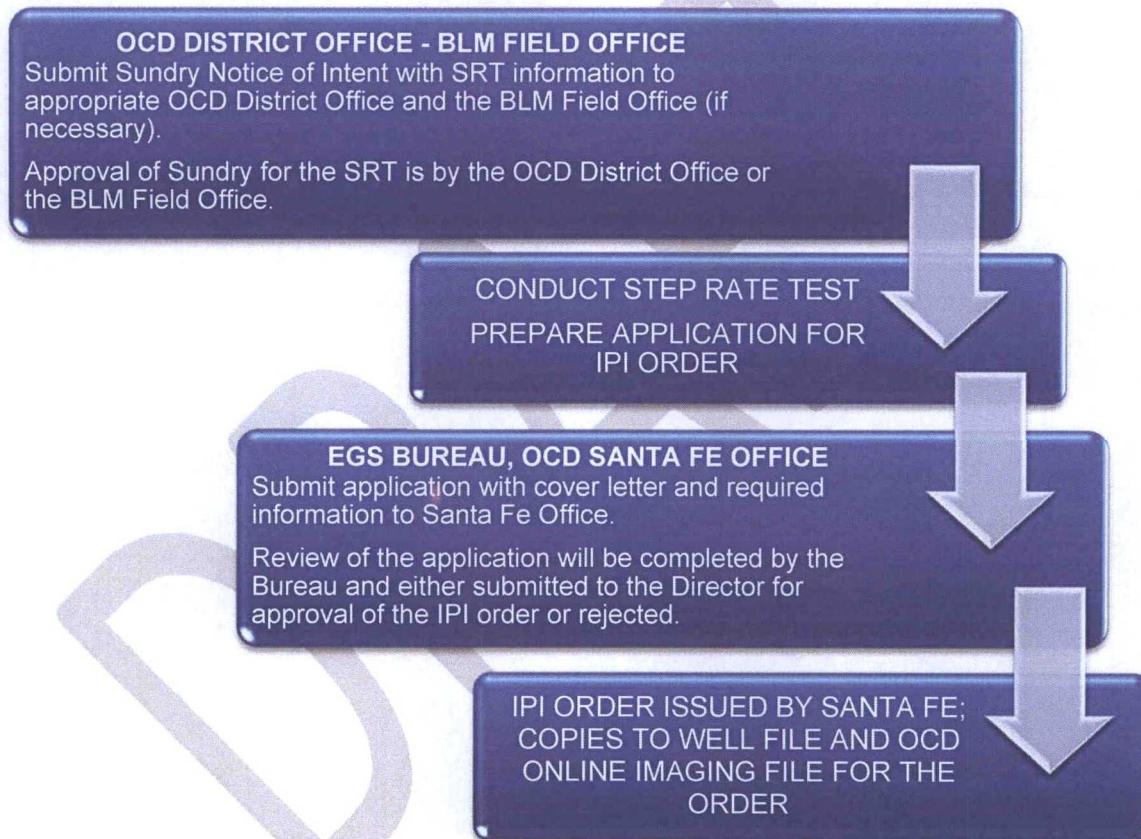


State of New Mexico  
Energy, Minerals and Natural Resources Department  
Oil Conservation Division

**Application Process for Injection Pressure Increases**

If an operator has decided to request an increase of the maximum surface injection pressure for a well above the administrative gradient of 0.2 pounds per square per foot (psi/ft), then the operator must conduct a step-rate test (SRT) to establish the fracture parting pressure (or formation parting pressure) for the injection interval.

The process for conducting the SRT begins with the Oil Conservation Division (OCD) District office (or the Bureau of Land Management (BLM)) and finishes with the Engineering Bureau of OCD in Santa Fe.



Where the injection well is located on federal surface, the Sundry Notice of Intent describing the proposed SRT operation will be submitted and approved by the BLM Field Office. The operator will supply a copy of the same sundry to the OCD District Office. The BLM may require supplementary testing not related to the SRT and may not require the pre-SRT testing requested by OCD. OCD has the authority for approval of any injection pressure increase for wells operated with orders (permits) issued under Division rule 19.15.26 NMAC.



State of New Mexico  
Energy, Minerals and Natural Resources Department  
Oil Conservation Division

**Guidance for Conducting a Step-Rate Test**

1. The operator must submit Division Form C-103 to the OCD District office with the description of the procedure for the SRT. The procedure will include the following information:
  - A description of the equipment for measurement and data recording (manufacturer and model) Note: the pressure gauge and recorder must have an appropriate range for use during the test.
  - Summary of injection volumes for last five years with average injection pressure.
  - Summary of well treatments and pressures especially any historical Instantaneous Shut-in Pressure (ISIP).
2. Once the operator has an approved Sundry Notice, the operator shall notify the appropriate OCD District office at least 72 hours prior to the scheduled SRT so that OCD personnel may be present to witness the test.
3. A bradenhead test (if required by the District) and mechanical integrity test (MIT) will be performed before the SRT. If the subject well fails either test, then the SRT will be suspended until the mechanical integrity issue(s) has been remediated. The mechanical integrity testing may be modified at the discretion of the District Supervisor.
4. The casing and bradenhead pressures will be monitored during the test. All wellhead equipment must be rated for the anticipated pressures.
5. Bottomhole pressure measurements will be required for wells deeper than 1000 feet (ft) and injection rates greater than one (1) barrel per minute (BPM).
6. Wells currently injecting must be shut-in at least 48 hours before the test unless the shut-in pressures indicate that the well has not adequately stabilized and a longer time is required for the permitted interval to approximate pre-injection conditions.
7. Selection of rates for the SRT will be developed by the operator based on the proposed operation and the historical information of the well. Suggested rates for the test are 5%, 10%, 20%, 40%, 60%, 80% and 100% of the proposed maximum daily injection rate at the corresponding pressure. The intent is to complete a SRT with at least three (3) steps below the 0.5 psi/ft gradient and three (3) steps above the fracture parting pressure (breakdown pressure). Starting pump rates and pressures must be lower than the current rates and pressures if the well is currently injecting. It may be necessary to backflow the well to reduce initial SRT pressures.
8. Each step shall be at least 30 minutes in duration unless otherwise determined by the OCD. Longer step intervals of 60 minutes shall be required for low permeability injection intervals (less than 0.5 millidarcies) and for open-hole intervals greater than 500 feet in length. The operator may request, in the submission of the Sundry Notice of



State of New Mexico  
Energy, Minerals and Natural Resources Department  
Oil Conservation Division

Intent, a modification of the time length for the step intervals with an explanation for the modification. The goal is for increments with equal time and rate and allow for downhole stabilization of pressure for each step.

9. The duration of the step intervals for the SRT must not change during the test or the test results will not be deemed adequate for determining an accurate fracture parting pressure.
10. Pumping equipment must be able to pump at the rates and pressures needed for the test. Rate changes will be 0.5 BPM or smaller unless the OCD witness determines that bigger rate changes are necessary due to small incremental increases in pressure.
11. The operator shall ensure that there is enough water to conduct the entire test.
12. The completed SRT results are to be submitted to the Engineering Bureau in Santa Fe and should include the following information:
  - Administrative application checklist (available on OCD website under Unnumbered Forms on Form webpage).
  - Cover letter with contact information, general description of test and pressure increase being proposed.
  - Complete data summary including injection rates, duration of each step, pressure measurements (surface and bottom hole) and the ISIP.
  - SRT-specific information: location of pressure gauges (depth); initial bottomhole pressure; injection fluid type and specific gravity.
  - Graph summary of pressure versus injection rate with interpretation.
  - Current well completion diagram.
  - Copy of the order authorizing the injection into the well.
13. If a pressure increase is granted, it shall be limited for use in the well with the same tubing, size, length, and type of interior coating as present for the SRT. If these components are changed, the operator must ask the Engineering Bureau to recalculate the surface pressure limit, which may require another SRT.

**Additional Sources:**

Martin Felsenthal, Step-rate Test Determine Safe Injection Pressures in Floods in The Oil and Gas Journal, October 28, 1974.

US Environmental Protection Agency, Step-Rate Test Procedure, Region VIII; January 12, 1999.

## Goetze, Phillip, EMNRD

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**From:** Jason Wacker <jwacker@bcoperating.com>  
**Sent:** Friday, April 20, 2018 9:11 AM  
**To:** Nick Klopp; Goetze, Phillip, EMNRD  
**Cc:** Jones, William V, EMNRD  
**Subject:** RE: Berry SWD IPI request, step rate test review  
**Attachments:** Berry SWD Step Rate Test IPI Letter 3-27-2018.pdf

Phillip,

I sincerely appreciate you taking my call this morning regarding our IPI application. Please give Nick or I a call after you've had a chance to review our letter on Monday.

Nick and I are willing to meet with you and your engineers at your office to briefly present this information. A technical meeting may be the most expeditious way to review this application.

Thanks again!

Jason Wacker, P.E.  
VP of Engineering & Operations

BC Operating, Inc.  
4000 N. Big Spring #310  
Midland, Texas 79705

PO BOX 50820  
Midland, Texas 79710

Office (432) 684-9696  
Cell (432) 631-2142

---

**From:** Nick Klopp  
**Sent:** Wednesday, April 11, 2018 10:24 AM  
**To:** Goetze, Phillip, EMNRD  
**Cc:** Jason Wacker; Jones, William V, EMNRD  
**Subject:** Berry SWD IPI request, step rate test review

Phillip, please let Jason and I know when we can schedule a conference call with you to further review the attached letter regarding the IPI application for the Berry SWD.

Thanks in advance,

Nick Klopp  
Operations Engineer  
979.422.2510

## Goetze, Phillip, EMNRD

---

**From:** Seth McMillan <SMcMillan@montand.com>  
**Sent:** Monday, December 10, 2018 11:41 AM  
**To:** Goetze, Phillip, EMNRD  
**Cc:** Jones, William V, EMNRD; Wade, Gabriel, EMNRD; Riley, Heather, EMNRD; Davidson, Florene, EMNRD  
**Subject:** [EXT] BC Operating IPI Request - Berry SWD #1 - Lea Co. NM

Mr. Goetze,

Thank you very much for your response, which I have communicated to BC Operating.

At this point, BC Operating really needs approval to inject at 1500 psig at surface and would like to continue working with NMOCD to this end. We'll hold off on moving to a hearing track for the time being, but please let me know if you think 1500 psig is out of reach once we've done the following:

1. BC Operating will supplement the existing step rate test data with additional points below the 0.2 psi/ft gradient, per your request. I'll submit this data to you just as soon as I've obtained it.
2. In addition, BC will conduct a fall off test, as requested. They hope to schedule the test for some time this week.

Please stay tuned for more data. Thanks for continuing to work with me on this one. I know you're super busy.

Best,  
Seth



Seth C. McMillan  
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---

**From:** Goetze, Phillip, EMNRD [mailto:Phillip.Goetze@state.nm.us]  
**Sent:** Friday, December 7, 2018 10:11 AM  
**To:** Seth McMillan <SMcMillan@montand.com>  
**Cc:** Jones, William V, EMNRD <WilliamV.Jones@state.nm.us>; Wade, Gabriel, EMNRD <Gabriel.Wade@state.nm.us>;

Riley, Heather, EMNRD <Heather.Riley@state.nm.us>; Davidson, Florene, EMNRD <florene.davidson@state.nm.us>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM: Request for Hearing

Mr. McMillian:

Very good. As to your client's results, the step-rate test (SRT) failed to provide a demonstration of data points below the administratively-approved gradient of 0.2 psi/ft, and therefore, any break in the plotted data set below the lowest data point provided in the SRT cannot accurately be assessed for a break that would represent fracturing. Following review by the Division and with comments from third party reviewers, the Division would approve a pressure increase to 1181 psi maximum surface injection pressure (MSIP) with the information provided. In his review, Mr. Jones suggested that the application could be supplement by an additional evaluation by conducting a fall-off test at an injection pressure of approximately 2000 psi MSIP in order to assess for fracturing of the formation. This would address the absence of pressure information at the lower end of the pressure scale and support the results provided in the SRT for the Injection Pressure Increase (IPI) application.

Based on the historical data compiled by NMOGA and the OCD through the joint effort in review of disposal injection in the Delaware Mountain Group, it has become apparent that the 0.2 psi/ft gradient is a common fracture pressure for the injection intervals selected from within the Group. As such, approval of an injection pressure that exceed the formation parting pressure would place the Division in violation of its primacy agreement and its obligations under 40 CFR 146.

With regards to setting a hearing, the administrative application for the IPI was submitted by BC Operating, not the Division. If BC Operating is not satisfied with the proposed MSIP of 1181 psi and wishes to proceed to Division hearing, they have the opportunity to file an application. The Division will decide as to whether to appear in opposition once you have filed the application for hearing on behalf of your client. Please contact me with any questions on the content of this e-mail or prior communications in this matter. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Sent:** Friday, December 7, 2018 9:10 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** [EXT] IPI Request - Berry SWD #1 - Lea Co. NM: Request for Hearing

Mr. Goetze,

BC Operating would like a hearing on this matter. They want to make a record of the history of this IPI request. Can this matter please be placed on the January 24 docket? Please let me know if this email request is sufficient, or whether something else/more is required to be placed on that docket.

Thanks,  
Seth



Seth C. McMillan  
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325 Paseo de Peralta  
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P. O. Box 2307  
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---

**From:** Seth McMillan  
**Sent:** Tuesday, December 4, 2018 11:14 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil – Thanks for the exhibit. BC Operating is reading between the lines and bracing for the worst. But they do need to know your decision one way or the other so they can plan accordingly. Please advise, when you get a chance, as to the status of your response to this long-pending request for injection pressure increase. Thanks.



Seth C. McMillan  
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---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Tuesday, November 27, 2018 10:21 AM

**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>

**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>

**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Mr. McMillian:

I have provided my review of the application to Will Jones, the Bureau Engineer, and he provided me a recommendation. I will dig into the current event stack on my desk to find his comments and provide a response this week. Meanwhile, I will offer for your client one of the exhibits I prepared for Will's review. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan  
**Sent:** Tuesday, November 27, 2018 9:05 AM  
**To:** Goetze, Phillip, EMNRD  
**Subject:** [EXT] RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil, I hope you had a restful break – BC Operating is wondering if a short conference call with you and them would be helpful. They'd be happy to discuss any issues and negotiate any terms that might be holding this order up. Please let me know if you think this would be a good idea and I'll proceed to work with everyone on scheduling and circulating call-in information. In the alternative, BC is wondering if they should be requesting a hearing in January? They'd of course prefer not to have to go that route if at all possible. In any event, please advise when you get a moment. Thanks.



Seth C. McMillan  
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Montgomery & Andrews, P.A.  
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---

**From:** Seth McMillan  
**Sent:** Wednesday, November 7, 2018 12:12 PM  
**To:** [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)  
**Subject:** FW: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil,

Any update on this one? BC Operating is positively dying of anticipation. If a further reduction in requested injection pressure would help get this done, please let me know.

Thanks,  
Seth

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Friday, November 2, 2018 10:06 AM  
**To:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Reviewed by Engineering Bureau. Response being composed today. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>  
**Sent:** Monday, October 29, 2018 2:42 PM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>  
**Subject:** [EXT] RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phil,

Is there a status update I can share with BC on this one? And let me know if there's anything else you need from them.

Thanks,  
Seth



Seth C. McMillan  
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Montgomery & Andrews, P.A.  
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P. O. Box 2307

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---

**From:** Jason Wacker [<mailto:jwacker@bcoperating.com>]  
**Sent:** Monday, October 15, 2018 3:53 PM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Seth McMillan <[SMcMillan@montand.com](mailto:SMcMillan@montand.com)>; McMillan, Michael, EMNRD <[Michael.McMillan@state.nm.us](mailto:Michael.McMillan@state.nm.us)>; Mike Moylett <[mmoylett@bcoperating.com](mailto:mmoylett@bcoperating.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip,

The Berry SWD #1 will support a full column of fluid at 0 surface tubing pressure. Static Bottomhole Pressure is equal to 2,702 psig @ 5,909' (top perforation).

Thanks!

Jason Wacker, P.E.  
VP of Engineering & Operations

BC Operating, Inc.  
4000 N. Big Spring #310  
Midland, Texas 79705

PO BOX 50820  
Midland, Texas 79710

Office (432) 684-9696  
Cell (432) 631-2142

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Monday, October 15, 2018 4:38 PM  
**To:** Nick Klopp; Jason Wacker  
**Cc:** Jones, William V, EMNRD; Seth McMillan; McMillan, Michael, EMNRD  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Jason or Nick:

One final request of data: for the step rate test, what was the BH pressure at 0 surface pressure? This is needed to satisfy one point of concern in that FPP in this area have been demonstrated to be low (at or right above 0.2 psi/ft). When you can as I am trying to empty out the remaining IPI applications that have accumulated during 2018. PRG

Phillip Goetze, PG  
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1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Nick Klopp <[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)>  
**Sent:** Friday, January 26, 2018 1:21 PM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Cc:** Jones, William V, EMNRD <[WilliamV.Jones@state.nm.us](mailto:WilliamV.Jones@state.nm.us)>; Sanchez, Daniel J., EMNRD <[daniel.sanchez@state.nm.us](mailto:daniel.sanchez@state.nm.us)>; Brown, Maxey G, EMNRD <[MaxeyG.Brown@state.nm.us](mailto:MaxeyG.Brown@state.nm.us)>; Jason Wacker <[jwacker@bcoperating.com](mailto:jwacker@bcoperating.com)>; Brian Arnold <[barnold@bcoperating.com](mailto:barnold@bcoperating.com)>; Sarah Presley <[spresley@bcoperating.com](mailto:spresley@bcoperating.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Phillip, see answers to your questions below.

Thanks and let me know if you need anything else,

Nick Klopp  
Operations Engineer  
BC Operating  
979.422.2510

RE: Berry SWD No. 1 (30-025-41703) SWD-1516

Nick:

Per our phone conversation, I am pursuing this IPI application along with a few others that have been lingering due to changing priorities at OCD. While reviewing the package, I found my notes from a prior effort and have additional information requests:

1. Were BHP measurements from a pressure bomb/transducer? If so, at what depth?  
**We had transducers hooked up from the wellhead directly to the recording van, no pressure bomb. See procedure attached.**
2. There is no information on the actual SRT such as the time periods for each step. Please provide any details of field observations/measurements if possible. .  
**See procedure, raw data, and workover report attached. We established injection into the Cherry Canyon at a series of increasing rates, allowing each step to stabilize for 5 minutes.**
3. How long was the well shut-in prior to testing and what was the SI pressure at the beginning of the test?  
**Well was shut in for 24 hrs prior to SRT. Shut in pressure was 250psi.**
4. Is there an observe ISIP following the final step rate of 20 BPM?  
**5min: 1550psi, 10 min: 927psi, 15 min: 863psi, 20min: 813psi. See workover report attached.**
5. What type of fluid was used for the SRT? This is important to established that this was not part of a workover/stimulation effort. .  
**Produced water, see water analysis attached.**

With regards to the well itself, the last C-115 filing for this well is June 2017. This needs to be addressed. Any well testing, including step-rate tests, are worthy of a Sundry Notice (C-103/NOI and Subsequent Report) to be filed with the appropriate District office. This may be especially relevant in cases where there are bradenhead issues with the well being tested. There is no indication that any such paperwork was ever filed for this second SRT included in the IPI application.

Our land tech is working diligently on getting all C-115 filings for this well up to date. Also, we are working on the Sundry Notice, C-103, regarding this particular SRT and will have it filed no later than Monday. We had changes in personnel and a few items got lost in the transition.

Please provide the information requested on the SRT as soon as practical and please address the reporting deficiencies. Please contact me with any questions regarding the content of this e-mail. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division, NM EMNRD  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)

---

**From:** Nick Klopp [<mailto:nklopp@bcoperating.com>]  
**Sent:** Wednesday, January 24, 2018 9:56 AM  
**To:** Goetze, Phillip, EMNRD <[Phillip.Goetze@state.nm.us](mailto:Phillip.Goetze@state.nm.us)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Hi Phillip, hope all is going well. Any updates on the IPI status regarding the Berry SWD?

I really appreciate your help-!  
Nick

---

**From:** Goetze, Phillip, EMNRD [<mailto:Phillip.Goetze@state.nm.us>]  
**Sent:** Friday, October 13, 2017 9:43 AM  
**To:** Nic Klopp <[nklopp@bcoperating.com](mailto:nklopp@bcoperating.com)>  
**Subject:** RE: IPI Request - Berry SWD #1 - Lea Co. NM

Nic:

I went through my auto-archived e-mails and found your original forwarded e-mail from September 12<sup>th</sup> (with attachments). I'll make sure that the application will get into the database and we'll proceed with a review. Please check with me if you haven't received a response in the next two weeks. PRG

Phillip Goetze, PG  
Engineering Bureau, Oil Conservation Division  
New Mexico Energy, Minerals and Natural Resources Department  
1220 South St. Francis Drive, Santa Fe, NM 87505  
Direct: 505.476.3466  
E-mail: [phillip.goetze@state.nm.us](mailto:phillip.goetze@state.nm.us)



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**From:** Nic Klopp [<mailto:nklopp@bcoperating.com>]  
**Sent:** Friday, October 13, 2017 8:18 AM