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June 15, 2015

VIA EMAIL (Adrianna.Crowl@waterboards.ca.gov)

Adrianna Crowl, Staff Services Analyst
State Water Resources Control Board
Office of Chief Counsel
1001 "I" Street, 22nd Floor
Sacramento, CA 95814

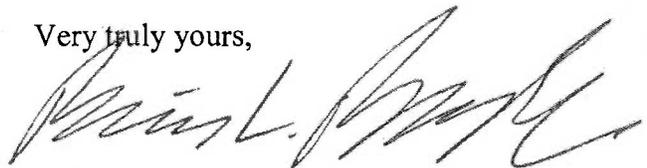
Re: Petition for Review of Regional Board Order dated May 15, 2015,
Directed to Macpherson Operating Company, L.P.

Dear Ms. Crowl:

Enclosed please find Macpherson Operating Company, L.P.'s Petition for Review of Regional Board's Order dated May 15, 2015 (with attached Exhibits 1-9), sent in multiple emails. Because we are submitting the Petition for Review by email, we request confirmation that it has been received. Please arrange for such e-mail confirmation to be sent to bbecker@brightandbrown.com.

Thank you for your consideration. If you have any question, please contact me at (818) 243-2121.

Very truly yours,



Brian L. Becker

BLB:sjb
Enclosure

cc: via email (Clay.Rodgers@waterboards.ca.gov)

Clay L. Rodgers
Assistant Executive Officer Central
Valley Regional Water
Quality Control Board
1685 E Street
Fresno, CA 93706

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Attorneys for Petitioner
Macpherson Oil Company

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

In the Matter of May 15, 2015 Order Of The
Central Valley Regional Water Quality
Control Board Directing Macpherson
Operating Company, L.P. To Submit
Information and Take Other Action With
Respect To 2 Injection Wells (Water Code
Section 13267)

File No. _____

PETITION FOR REVIEW OF REGIONAL
BOARD ORDER, AND FOR HEARING ON
PETITION

(Wat. Code, § 13320; Cal. Code Regs.,
tit. 23, §§ 2050-2068)

PETITION FOR STAY OF REGIONAL
BOARD ORDER PENDING HEARING OR
OTHER ACTION

(Wat. Code, § 13321; Cal. Code Regs.,
tit. 23, § 2053)

Petitioner Macpherson Operating Company, L.P. ("Macpherson Operating") hereby petitions for review by the State Water Resources Control Board (the "State Board") of a May 15, 2015 order (the "Order") of the Central Valley Regional Water Quality Control Board (the "Regional Board"), and a hearing on this Petition.

Macpherson Operating also requests a stay of the Regional Board's Order pending a hearing or other action on this Petition by the State Board. The cost to obtain the information required by the Order is estimated to cost over \$40,000 and would result in substantial lost production. Moreover, Macpherson Operating recently submitted its "Aquifer Exemption Study

West Area of Mount Poso Oilfield” in May 2015 (“Aquifer Exemption Study”) at the request of the Division of Oil Gas and Geothermal Resources (“DOGGR”), which study cost Macpherson Operating \$150,000, that contains the best information available with respect to the water in the subject Vedder formation, namely, geochemistry analysis of the water produced from existing production wells in the Vedder formation with the west area of the Mt. Poso Field. Macpherson Operating provided a copy to the Regional Board as part of its proposed work plan in response to in the Order. There is no reason to shut in the injection wells to obtain formation samples when formation samples are readily obtainable – and have been obtained – from the production wells in the same formation.

A. PETITION FOR REVIEW

1. Name, Address, Telephone Number And E-Mail Address Of The Petitioner.

Macpherson Operating Company, L.P.
24118 Round Mountain Road
Bakersfield, CA 93308
661.368.3969

Please direct notices and other communications to:

Macpherson Operating Company, L.P.
c/o Bright and Brown
550 North Brand Boulevard, Suite 2100
Glendale, CA 91203
818.243.2121
mbright@brightandbrown.com

2. The Action Or Inaction Of The Regional Water Board Being Petitioned, Including A Copy Of The Action Being Challenged.

The Regional Board’s Order directs Macpherson Operating to obtain and submit certain information and take other actions with respect to 2 currently-active water injection wells that are critical to Macpherson Operating’s longstanding oil production operations in the west area of the Mt. Poso Field in Kern County, California. The API numbers of these wells are set forth in the Regional Board’s Order. (A copy of the Regional Board’s Order is attached as Exhibit 1.) The Vedder is an oil-producing formation, and both wells were permitted by the DOGGR for injection. The permitted wells inject produced water into the Vedder formation, which water is originally sourced from the Vedder formation. The Order is based on the authority of the Regional Board pursuant to Water Code section 13267 (“Section 13267”).

3. The Date The Regional Board Acted.

The date of the Regional Board's Order is May 15, 2015.

4. A Statement Of The Reasons The Action Was Inappropriate Or Improper.

The Regional Board's Order is based on its authority under Section 13267 to require specifically described persons to "furnish...technical or monitoring program reports which the regional board requires" in connection with its investigation of the quality of waters within its region." (Wat. Code, § 13267(b)(1).) That authority is subject to the express mandatory limitation, however, that "the burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." (Wat. Code, § 13267(b)(1).) The Regional Board has not met this burden.

First, contrary to the specific requirements of Section 13267, the burden, including costs, of the activity mandated by the Order bears no reasonable relationship either to the need for such activity or any benefit to be obtained by it. Any need for or benefit of this activity is greatly outweighed by the burden, including costs, occasioned by compliance with its requirements.

Second, the Order is based upon factual assumptions that are demonstrably incorrect. Therefore, there is no need for the demanded activity nor any appreciable benefit to be obtained.

Third, contrary to the statutory requirements, no evidence was provided by the Regional Board to justify the need for the Order.

5. How The Petitioner Is Aggrieved.

As more fully explained in the statement of points and authorities below, the activity mandated by the Order serves no substantial purpose and is of no substantial benefit whatsoever. Since the first of the two wells was permitted in May of 2008, the wells have been used to dispose of approximately 63.5 million barrels of produced water in association with oil extracted from west area of the Mt. Poso Field. Contrary to the assumptions in the Regional Board's Order that there is a potential threat to human health from the injection of produced water into the subject wells, the Vedder formation into which the water is injected is oil-bearing.

Furthermore, as the Regional Board is aware from the information furnished in the Aquifer Exemption Study, separate and apart from the fact that the Vedder formation is oil-producing, the water in the Vedder formation is situated at a depth, which, in combination with the location of the nearest accessible community receiving water service and the associated cost

to treat and convey the water, makes recovery for drinking water purposes or other beneficial uses economically impractical.

The Order imposes a significant burden upon the monetary and other resources of Macpherson Operating. As mentioned, the estimated cost to obtain a sample at depth from the two wells is over \$40,000. Both wells are currently operating. Obtaining samples at depth would take each well out of service and would cause the loss of a substantial amount of oil production, as production would need to be reduced because of the reduction in the ability to inject the produced water. The Order also exposes Macpherson Operating to substantial legal penalties for any failure to comply. Finally, the Order leaves Macpherson Operating exposed to an open-ended threat of further potentially required, but as yet unspecified, "additional information or action," and the continuing threat of substantial legal penalties for failure to comply with such further and as yet unspecified requirements.

6. The Action The Petitioner Requests The State Water Board To Take.

Macpherson Operating requests that the Regional Board's Order be set aside and that the Regional Board be directed to take no further action with respect to the subject matter of its Order unless and until it provides evidence demonstrating that further action is warranted.

Macpherson Operating further requests both a hearing on this Petition and that the Regional Board's Order be stayed pending a hearing on this Petition or other action by the State Board.

7. A Statement Of Points And Authorities Of Legal Issues Raised In The Petition.

a. The Regional Board's Order Fails To Comply With The Specific Requirements Of Section 13267.

Section 13267 authorizes the Regional Board to conduct an investigation into the quality of waters of the state for certain purposes, and in connection with such an investigation to "require...*any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste* within its region..., [to] furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires." Section 13267 expressly limits the Regional Board's authority in that regard by requiring that "[t]he burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports."

Because the burden upon Macpherson Operating of complying with the Order greatly outweighs any need for the demanded report beyond what is provided in the Aquifer Exemption Study, and any benefit which might be obtained from it, the Order violates the specific mandatory limitation provided in Section 13267.

b. Summary Of Historical Facts Regarding The Wells.

Well locations and completion data for the subject wells has been compiled and is set forth in the table attached as Exhibit 2 hereto. Both wells were properly permitted. Copies of the well histories are attached collectively as Exhibit 3. As mentioned above the Vedder formation is oil-producing. (Exhibit 4.) The formation water in the Vedder formation has been the subject of injection of produced water for several decades. Approximately 63.5 million barrels of produced water have been injected into the Vedder formation in this location since injection began. (Exhibits 5.)

c. Macpherson Has Provided The Pertinent Information In the Aquifer Exemption Study.

As mentioned above, at the request of the DOGGR, Macpherson Operating submitted the Aquifer Exemption Study to the DOGGR in May 2014. The Aquifer Exemption Study contains extensive data regarding the water quality of the formation and injectate, hydrocarbon bearing formations, production and injection data, geological structures including containment, and the analysis of the economics to reuse the water produced with the oil, including information concerning the quality of the water within the Vedder formation. In particular, the Aquifer Exemption Study contained the geochemical analysis of (i) water from oil wells that produce from the Vedder formation in this portion of the Mt. Poso Field and (ii) a sample of injectate collected from the outlet pipeline of the produced water tank. Those test results are attached here to as Exhibit 6. Macpherson Operating provided a copy of the Aquifer Exemption Study to the Regional Board with Macpherson's June 5, 2015 work plan. The information in the Aquifer Exemption Study obviates the need for the Regional Board's Order.¹

d. Regional Board Order And Petitioner's Responses.

The Regional Board's Order (Exhibit 1) describes two basic required actions, as follows:

¹ Please note that Macpherson Operating's work plan was submitted on June 5 rather than June 3 as requested because the Regional Board mailed the Order to the incorrect (and former) address and incorrect contact person, and Macpherson Operating did not receive the Order until June 3. Macpherson Operating prepared the work plan in 48 hours. Macpherson Operating had notified the Regional Board in writing in August 2014 regarding the correct address and contact person. (Exhibit 7.)

- (1) **“By 3 June 2015** submit a work plan that adequately describes the procedures to collect a representative groundwater sample from the injection zone(s) for each injection well subject to this Order. If a representative sample cannot feasibly be collected from one or more of the injection zones for any of the injection wells subject to this Order within the required timeframe (e.g., due to constraints posed by the design of the injection well), submit a technical report demonstrating that collection of a representative sample from those injection zones is not feasible within the required timeframe, and proposing an alternative sampling procedure and expeditious time schedule for obtaining a representative sample of groundwater from those injection zones. Alternative sampling procedures and time schedules are subject to approval by the Assistant Executive Officer of the Central Valley Water Board.”
- (2) **“By 3 August 2015,** submit a technical report that contains all of the following information:
 - a. The analyses of each of the groundwater samples from the injection zone(s) for each injection well subject to this Order, in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - b. If fluids have been injected into any of the injection wells subject to this Order, an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - c. All available historical chemical analyses of the fluids injected into each injection well subject to this Order.
 - d. All previously obtained analytical data for groundwater samples collected from any injection zones within one (1) mile of each of the injection wells subject to this Order.
 - e. A list and location map of all water supply wells within one mile of each injection well subject to this Order.

- f. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction, borehole geophysical logs; and all analytical results for any water sample(s) collected from each water supply well. Notify Central Valley Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.
- g. For each injection well subject to this Order, the following information for items A-O shall be submitted in a spreadsheet, labeled with the capital letters indicated. The information for items P-R shall be submitted as attachments:
 - A. The name of the owner and/or operator of the injection well;
 - B. API number for the injection well;
 - C. Injection well name and number;
 - D. Name of the field in which the injection well is located;
 - E. County in which the injection well is located;
 - F. Latitude and Longitude (decimal degrees) of well head location;
 - G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;
 - H. Injection well total depth (feet);
 - I. Top injection depth (feet);
 - J. Formation/Zone name at top injection depth;
 - K. Bottom injection depth (feet);
 - L. Formation/Zone name at bottom injection depth;

- M. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);
- N. Total injection volume in barrels by calendar year (to present day);
- O. Attach well construction diagram including all perforation, annular material, and seals;
- P. Attach a description of all sources of fluid injected;
- Q. Attach all data maintained in compliance with California Code of Regulations, title 14, section 1724.10, subdivision (h).
- R. Attach documentation associated with each mechanical integrity test undertaken to comply with California Code of Regulations, title 14, section 1724.10, subdivision (j)."

The Order further describes any failure to comply with these requirements as a misdemeanor subject to "additional enforcement actions," including a potential fine of \$1,000 for each day in which such a violation continues, and reserves the possibility that, based on the information submitted in compliance with the Order, "additional information or action may be required."

In response, Macpherson Operating submitted a work plan dated June 5, 2015, which, as mentioned above was submitted with a copy of the Aquifer Exemption Study (digital format). In the work plan, Macpherson Operating proposes to provide the Regional Board with the Aquifer Exemption Study (which was enclosed) and the radionuclide test results expected in the next 30 days for the wells samples as part of the Aquifer Exemption Study. As mentioned, the geochemical analysis of those samples is included in the Aquifer Exemption Study. The basis for this approach is that the produced water obtained from the Vedder production wells are the best samples obtainable. Samples bailed from the two injection wells will not provide better samples. A copy of Macpherson Operating's work plan is attached hereto as Exhibit 8. Macpherson Operating has not yet received comments to or approval of its work plan as of the date of this Petition.

e. The Burden For Macpherson Operating Of Complying With The Order Far Outweighs Any Need For The Demanded Report, And Any Resulting Benefit.

In seeking to impose on Macpherson Operating the burden of \$40,000 in costs and the cost of lost oil production in order to respond to the Order, the Regional Board has failed to acknowledge at least four plain facts. First, there is no practical need for samples from the injection wells. There are existing producing oil wells in this portion of the Mt. Poso Field where formation water samples are readily obtainable at minimal cost. As stated, Macpherson Operating has already obtained and tested such samples as part of its Aquifer Exemption Study and has provided those test results to the Regional Board.

Second, separate and apart from the fact that the Vedder formation is oil-producing, the water in the Vedder formation is situated at a depth, which, in combination with the location of the nearest accessible community receiving water service and the associated cost to treat and convey the water, makes recovery for drinking water purposes or other beneficial uses economically impractical. (Exhibit 9.)

It should be noted that Macpherson Operating has already spent \$150,000 in order to provide the Aquifer Exemption Study specifically addressing the formation water within the Vedder formation. In addition to those costs, complying with the Order not only will cost Macpherson Operating an additional \$40,000 in contractor costs and millions in lost production, Macpherson Operating would need to devote significant time on the part of several of its professional staff members to monitor the sample collection process, shut in production wells, pull equipment from wells and collect samples, and other activities necessary to obtain and provide all the information requested. (Lovley Declaration. ¶6.)

8. A Statement That Copies Of The Petition Have Been Sent To The Regional Water Board And To The Discharger, If Different From The Petitioner.

A copy of this Petition has been sent to the Regional Water Board.

9. An Explanation Of Why The Petitioner Could Not Raise The Issues Raised In The Petition Before The Regional Board.

Macpherson Operating was unable to present the issues raised in this Petition to the Regional Board prior to issuance of the Order because the Regional Board did not provide Macpherson Operating advance notice or other opportunity to do so. Macpherson Operating had

no advance notice either of the impending Order or of any other pending inquiry or action concerning the subject matter of the Order. While Macpherson is seeking to discuss the Order with the Regional Board, Macpherson Operating will not be able to resolve its concerns over the Order prior to the expiration of Macpherson Operating's time to appeal. As mentioned, although the Order is dated May 15, 2015, Macpherson Operating did not receive the Order until June 3, 2015. In addition, the Order is open-ended, meaning that there could be later disputes between Macpherson Operating and the Regional Board after Macpherson's time to appeal has expired.

B. REQUEST FOR STAY PENDING HEARING OR OTHER ACTION

1. Facts Re The Burden And Costs Of Providing The Report/Information Demanded By The Regional Board Order Bears No Relationship To The Need For The Report And The Benefits To Be Obtained From The Report

Section 13267(b)(1) further requires that the burden, including costs, of providing the ordered technical reports "shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." As referenced above in these points and authorities, there is a better and alternative source for Vedder formation water samples, and Macpherson Operating already has gathered such samples and provided them to the Regional Board. There is no reason to shut in the subject injection wells to obtain further samples.

2. Macpherson Operating Would Suffer An Unreasonable Burden And Incur Substantial Costs That Bear No Reasonable Relationship To The Need For Or Benefit To Be Obtained

As mentioned above, the anticipated cost of complying with the Regional Board's Order is approximately \$40,000, and Macpherson Operating will lose revenue from oil production, as the injection wells are necessary for Macpherson Operating to produce oil in the Round Mountain Field. (Lovley Declaration, ¶6.) In addition to those costs, Macpherson Operating would need to devote significant time on the part of several of its professional staff members and contract additional support to monitor the sample collection process, shut in production wells, pull equipment from wells and collect samples, and other activities necessary to obtain and provide all the information requested. (*Id.*) Macpherson Operating believes that it is being unnecessarily burdened by having to incur substantial costs to collect and gather data and prepare the technical report/information demanded by the Regional Board's Order because those costs bear a disproportionate and unreasonable relationship to the need for that technical

report/information and the benefits to be obtained from the same. California Water Code section 13267(b)(1) requires the Regional Board to provide a written explanation with regard to the need for the report and identify the "evidence" that supports requiring Macpherson Operating to provide the demanded technical report/information. Despite the fact that the Vedder formation is oil-producing, the only statement in the Regional Board's Order purporting to explain the need for collecting, gathering and presenting the demanded data and information to the Regional Board is the unsupported statement that "these aquifers may be suitable for drinking water supply and other beneficial uses." No evidence was included to support that assertion, and Macpherson Operating has attached evidence directly to the contrary.

3. There Will Be Substantial Harm To Macpherson Operating If The Stay Is Not Granted And No Substantial Harm To Any Interested Persons And To The Public Interest If The Stay Is Granted.

For the foregoing reasons, substantial harm will be incurred by Petitioner Macpherson Operating if a stay is not granted because Macpherson Operating will be required to incur substantial additional costs. Conversely, no substantial harm will be suffered by any other interested persons or to the public interest if a stay is granted. As mentioned, Macpherson Operating has already provided the necessary information to the Regional Board. There are substantial questions of fact or law as to whether the burden, including the cost of compliance, bears a reasonable relationship to the need for the data/information and the benefit to be obtained by the same. Therefore, the stay should be granted as requested by Macpherson Operating.

C. CONCLUSION

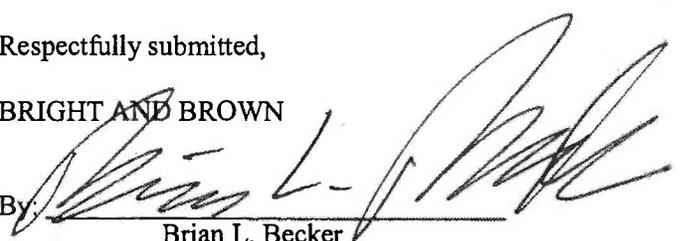
On the basis of the foregoing, Macpherson Operating respectfully requests the Regional Board's Order be set aside and that the Regional Board be directed to take no further action with respect to the subject matter of its Order unless and until it can demonstrate evidence showing that further action is required.

Macpherson Operating further requests that the Regional Board be instructed, should it reasonably determine that further action concerning the subject matter of its Order is required, to direct any further order to an appropriate party in accordance with the provisions of Section 13267 and to provide the evidence upon which such Order is based.

Macpherson Operating further requests both a hearing on this Petition and that the Regional Board's Order be stayed pending a hearing on this Petition or other action by the State Board.

Respectfully submitted,

BRIGHT AND BROWN

By: 

Brian L. Becker

Attorneys for Petitioner

Macpherson Operating Company, L.P.

DATED: June 15, 2015.

**DECLARATION OF TIM LOVLEY IN SUPPORT OF
REQUEST FOR STAY OF REGIONAL BOARD ORDER**

1. I, Tim Lovley, make this Declaration in support of the request of Macpherson Operating Company, L.P. ("Macpherson Operating") for a stay of the May 15, 2015 Order of the Central Valley Regional Water Quality Control Board (the "Regional Board") directing Macpherson Operating to submit information and take other action (the "Order") pending a hearing, or other action by the State Water Quality Control Board (the "State Board"), upon the foregoing Petition for Review of the Order. All of the statements in this Declaration are known to me of my own personal knowledge to be true and correct.

2. I am the Manager of Health, Safety and Environmental for Macpherson Oil Company, one of the owners of Macpherson Operating, to whom the Order was directed, and which is the Petitioner in this matter. My office is in the Central Valley facilities of Macpherson Operating, in the Round Mountain Field north of Bakersfield.

3. The Order was received in Macpherson Oil Company's office in Santa Monica, California on June 3, 2015 by mail. The substantial delay in Macpherson Operating's receipt of the Order resulted from the Regional Board sending it to the wrong address. Macpherson Operating had previously notified the Regional Board in writing of the correct contact person and address. (See Exhibit 7.) A copy of the Order is attached to the within Petition as Exhibit 1.

4. The Order addresses 2 wells as formally identified on the Order, located within the west area of the Mt. Poso Field as designated by the DOGGR. The Regional Board's Order directs Macpherson Operating to obtain and submit certain information and take other actions with respect to each of the wells by August 3, 2015, and is based on the authority of the Regional Board pursuant to Water Code section 13267.

5. As of the date of the Order both wells were in operation, and they continue to be in operation.

6. The cost to obtain the information required by the Order is estimated to cost \$40,000. Macpherson Operating would also suffer the loss of revenue from oil production, as the required testing would force Macpherson Operating's injection wells to be shut in while samples are gathered, and Macpherson Operating's production is dependent on its injection wells being in operation. In addition to those costs, Macpherson Operating would need to devote

significant time on the part of several of its professional staff members and contract additional support to monitor the sample collection process, shut in production wells, pull equipment from wells and collect samples, and other activities necessary to obtain and provide all the information requested. It should be noted that Macpherson Operating has already spent \$150,000 in order to provide the Aquifer Exemption Study specifically addressing the formation water within the Vedder formation in this part of the Mt. Poso Field.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed by me on June 15, 2015, at Bakersfield, California.



Tim Lovley

EXHIBIT 1

EXHIBIT 1



JUN - 3 2015



EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

15 May 2015

CERTIFIED MAIL
7014 3490 0001 7023 3057

Scott Macpherson, Agent
Macpherson Operating Company, L.P.
2716 Ocean Park Boulevard, #3080
Santa Monica, CA 90405

ORDER PURSUANT TO CALIFORNIA WATER CODE SECTION 13267. You are legally obligated to respond to this Order. Read this Order carefully.

Macpherson Operating Company, L.P. is the operator of injection wells identified as American Petroleum Institute (API) numbers 02987404, and 03042925 (hereinafter "injection wells subject to this Order"). The California Division of Oil, Gas, and Geothermal Resources (Division) has informed the Central Valley Regional Water Quality Control Board (Central Valley Water Board) that the injection wells subject to this Order have been injecting fluids produced by oil or gas extraction activities into an aquifer that may not have been properly designated as an exempt aquifer under the federal Safe Drinking Water Act (42 U.S.C. § 300f et seq.). The aquifer may be suitable for drinking water supply and other beneficial uses.

As described further below, for each injection well subject to this Order, Macpherson Operating Company, L.P. is required to submit technical reports containing information about (1) the injection well, (2) the fluid that has been injected, (3) the quality of the groundwater within the zone(s) where fluids have been injected, and (4) nearby water supply wells. The issuance of this Order has been coordinated with the Division.

The Central Valley Water Board's authority to require technical reports derives from section 13267 of the California Water Code, which specifies, in part, that:

(a) A regional board...in connection with any action relating to any plan or requirement authorized by this division, may investigate the quality of any waters of the state within its region.

(b)(1) In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region...that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

KARL E. LONGLEY SCD, P.E., CHAIR | PAMELA C. CREEDON P.E., BCEE, EXECUTIVE OFFICER

1685 E Street, Fresno, CA 93708 | www.waterboards.ca.gov/centralvalley

The Central Valley Water Board is concerned about the potential threat to human health and potential impacts to water quality posed by the discharge of waste associated with the injection of fluids into aquifers that may be suitable for drinking water supply and other beneficial uses. The technical information and reports required by this Order are necessary to assess the potential threat to human health and potential impacts to water quality. The need to understand the potential threat to human health and potential impacts to water quality justifies the need for the information and reports required by this Order. Based on the nature and possible consequences of the discharges of waste, the burden of providing the required information, including reporting costs, bears a reasonable relationship to the need for the report, and the benefits to be obtained. Macpherson Operating Company, L.P. is required to submit this information and reports because it is the operator of the injection wells subject to this Order. If Macpherson Operating Company, L.P. and its predecessors in interest have never injected fluids into the injection wells subject to this Order, please advise Central Valley Water Board staff of this in writing as soon as possible.

Under the authority of California Water Code section 13267, the Central Valley Water Board hereby orders Macpherson Operating Company, L.P. to:

23. **By 3 June 2015** submit a work plan that adequately describes the procedures to collect a representative groundwater sample from the injection zone(s) for each injection well subject to this Order. If a representative sample cannot feasibly be collected from one or more of the injection zones for any of the injection wells subject to this Order within the required timeframe (e.g., due to constraints posed by the design of the injection well), submit a technical report demonstrating that collection of a representative sample from those injection zones is not feasible within the required timeframe, and proposing an alternative sampling procedure and expeditious time schedule for obtaining a representative sample of groundwater from those injection zones. Alternative sampling procedures and time schedules are subject to approval by the Assistant Executive Officer of the Central Valley Water Board.
24. **By 3 August 2015**, submit a technical report that contains all of the following information:
 - a. The analyses of each of the groundwater samples from the injection zone(s) for each injection well subject to this Order, in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - b. If fluids have been injected into any of the injection wells subject to this Order, an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - c. All available historical chemical analyses of the fluids injected into each injection well subject to this Order.
 - d. All previously obtained analytical data for groundwater samples collected from any injection zones within one (1) mile of each of the injection wells subject to this Order.
 - e. A list and location map of all water supply wells within one mile of each injection well subject to this Order.
 - f. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction; borehole geophysical logs; and all analytical results for any water sample(s) collected from each

water supply well. Notify Central Valley Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.

- g. For each injection well subject to this Order, the following information for items A-O shall be submitted in a spreadsheet, labeled with the capital letters indicated. The information for items P-R shall be submitted as attachments:
- A. The name of the owner and/or operator of the injection well;
 - B. API number for the injection well;
 - C. Injection well name and number
 - D. Name of the field in which the injection well is located;
 - E. County in the which the injection well is located;
 - F. Latitude and Longitude (decimal degrees) of well head location;
 - G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;
 - H. Injection well total depth (feet);
 - I. Top injection depth (feet);
 - J. Formation/Zone name at top injection depth;
 - K. Bottom injection depth (feet);
 - L. Formation/Zone name at bottom injection depth;
 - M. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);
 - N. Total injection volume in barrels by calendar year (to present day);
 - O. Attach well construction diagram including all perforations, annular material, and seals;
 - P. Attach a description of all sources of fluid injected;
 - Q. Attach all data maintained in compliance with California Code of Regulations, title 14, section 1724.10, subdivision (h).
 - R. Attach documentation associated with each mechanical integrity test undertaken to comply with California Code of Regulations, title 14, section 1724.10, subdivision (j).

All required work plans and technical information must be submitted in an electronic format compatible with the State's GeoTracker system following the requirements of California Code of Regulations, title 23, section 3893 (available at http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf). A unique case identifier (Global ID) is assigned for each well subject to this Order contained in Attachment B.

Based on the information submitted in the work plan and/or technical report, additional information or action may be required.

Additionally, please submit a hard copy to the attention of:

Ron Holcomb
Central Valley Water Board
1685 E Street
Fresno, CA 93706

All information is to be copied to the Division, to the attention of:

Steven R. Bohlen, State Oil and Gas Supervisor
Department of Conservation, DOGGR
801 K Street
Sacramento, CA 95814-3500

Submissions pursuant to this Order need to include the following statement signed by an authorized representative of Macpherson Operating Company, L.P.:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The failure to furnish the required report, or the submission of a substantially incomplete report or false information, is a misdemeanor, and may result in additional enforcement actions, including issuance of an Administrative Civil Liability Complaint pursuant to California Water Code section 13268. Liability may be imposed pursuant to California Water Code section 13268 in an amount not to exceed one thousand dollars (\$1,000) for each day in which the violation occurs.

Any person aggrieved by this Order of the Central Valley Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320. The State Water Board must receive the petition by 5:00 p.m., within 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations, and instructions applicable to filing petitions, are at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml, or will be provided upon request.

Be advised that sections 13260 and 13264 of the California Water Code require any person who proposes to discharge waste that could affect waters of the state to submit a Report of Waste Discharge for any new discharge or change in the character, volume, or location of an existing discharge. Fluids produced by oil or gas extraction activities that can no longer be disposed of in the injection wells subject to this Order cannot be discharged to land or waters of the state prior to the issuance of Waste Discharge Requirements, and cannot be discharged to waters of the United States prior to the issuance of an National Pollutant Discharge Elimination System (NPDES) Permit. Failure to comply with these requirements may constitute a misdemeanor under Water Code section 13265 or a felony under Water Code section 13387, and may also subject Macpherson Operating Company, L.P. to judicial or administrative civil liabilities.

Scott Macpherson
Macpherson Operating Company, L.P.

- 5 -

15 May 2015

Any questions regarding this matter should be directed to me at (559) 445-5116 or at Clay.Rodgers@waterboards.ca.gov.



Clay L. Rodgers
Assistant Executive Officer

Enclosure:

Attachment A - Water Quality Sampling, Analysis and Reporting

Attachment B – GeoTracker Upload Instructions and Assigned Global Identification Number(s)

ATTACHMENT A
Water Quality Sampling, Analysis, and Reporting

Water Quality Sampling

All groundwater sampling is to be performed by a qualified person. A qualified person is any person with the knowledge and training in proper sampling methods, chain of custody, and quality assurance/quality control protocols. Any person conducting groundwater sampling, other than personnel from a certified laboratory, shall consult with the certified laboratory to ensure that the sampler understands and follows the proper sampling collection procedures and protocols. All procedures to sample groundwater supply wells shall be consistent with US EPA Science and Ecosystem Support Division Operating Procedure for Groundwater Sampling (March 2013) (available at <http://www.epa.gov/region4/sesd/fbqstp/Groundwater-Sampling.pdf>).

Water Quality Analysis

Groundwater samples collected from wells and injection zones shall be analyzed by a laboratory certified by the Environmental Laboratory Accreditation Program, using current applicable EPA-approved analytical methods. The methods of analysis and the detection limits used shall be appropriate for the expected concentrations. The analytical method having the lowest method detection limit (MDL) shall be selected from among those methods that would provide valid results in light of any matrix effects or interferences. Analyze samples for the following:

- A. Total dissolved solids
- B. Metals listed in California Code of Regulations, title 22, section 66261.24, subdivision (a)(2)(A)
- C. Benzene, toluene, ethylbenzene, and xylenes
- D. Total petroleum hydrocarbons for crude oil
- E. Polynuclear aromatic hydrocarbons (including acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene)
- F. Radionuclides listed under California Code of Regulations, title 22, Table 64442, which includes Gross Alpha particle activity (excluding radon and uranium), Uranium, Radium-226, and Radium-228.
- G. Methane
- H. Major and minor cations (including sodium, potassium, magnesium, and calcium)
- I. Major and minor anions (including nitrate, chloride, sulfate, alkalinity, and bromide)
- J. Trace elements (including lithium, strontium, boron, iron, and manganese)

Water Quality Reporting

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system.

Technical Report that includes

- Site plan with the location(s) of the wells sampled
- Description of field sampling procedures
- Copies of analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods.
- Waste management and disposal procedures
- Table(s) of analytical results organized by well number (including API number).
- A list and location map of all the water supply wells located within a one mile radius of the injection well(s)

All GeoTracker uploads should consist of a GeoReport, GeoMap(s), and an EDF of laboratory data, if applicable.

ATTACHMENT B
GeoTracker Upload Instructions and Assigned Global Identification Number(s)

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system. To begin the process:

- Log in or create a password
- Claim your site(s) (i.e. global ID)
- Add field point name(s)
- Upload the following:
 - Work plan/Technical report and associated data (GeoReport)
 - *laboratory report (EDF)
 - *Site Maps (GeoMAP)

For more information, please contact the GeoTracker Help Desk at Geotracker@waterboards.ca.gov or (866) 480-1028.

Injection Well	Assigned Global ID number
02987404	T10000006904
03042925	T10000006905

*GeoTracker submittal may not be required for all document types.

EXHIBIT 2

EXHIBIT 2

TABLE 1.
 UIC WELL LOCATION AND COMPLETION DATA
 MACPHERSON OIL COMPANY WEST POSO FIELD
 KERN COUNTY, CALIFORNIA

API	UIC Project #	WellName	Field	Formation	Latitude	Longitude	Section	Township	Range	Production Total	Disposal Total	Top/Bottom Perf.	Deny / Tank Number
02987404	48818026	RING 18 #21	Mt. Poso	Vedder	35.57733	-118.999994	18	27S	28E	2685	5,363,690	2,339'-2,397'	West Poso
03042925	48818026	RING 18 WD-1	Mt. Poso	Vedder	35.57904	-118.996573	18	27S	28E		4,826,781	2,383'-2,797'	West Poso

EXHIBIT 3

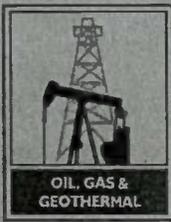
EXHIBIT 3

API No. 030-42925

Intent & Type	Drill / WD	Rwk / WID		
"P" Report No.	P411-0360			
Supp. No.				
Proposed Pool	10	10		
Completed Pool				
STATUS & DATE	WD / 5-23-11			

	Checked	Hold	Checked	Hold	Checked	Hold	Checked	Hold
Notice	✓							
History	✓	✓						
Summary/Signature	✓	✓						
E-Log <i>XV</i>	✓							
Density/Neutron								
SWS								
Core								
Mud Log								
CBL								
Final Plat								
<i>S/PT</i>	✓							
<i>RA</i>	✓							
BLM Fan								
Directional Survey								
"T" Report								
Environmental								
Location	✓							
Elevation w/Datum	1199' KB						Map Change	<i>X</i>
MAP LETTER	440	12-1-11					Dry Hole (Year/TD)	
Drill Card	2860' TD	9-9-11					Lease Line	
Initial Production								
6 Mo. Production								
Hold (Date & Init.)	<i>AL</i>	8/19/11						
RECORDS APPROVED	<i>AL</i>	9/9/11						
EDP Clerk								
Confidential Clerk								
Form 121		<i>8/13/11</i>						
Bond No. Date								
Bond Release Date								
Form 150 (Release)								

Remarks:



DEPARTMENT OF CONSERVATION
 DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
 4800 Stockdale Hwy., Suite 100 Bakersfield, CA 93309 - 0279
PERMIT TO CONDUCT WELL OPERATIONS

No. P414-4438

	Old	New
FIELD CODE	488	488
AREA CODE	18	18
POOL	10	10

WATER DISPOSAL PROJECT
Vedder Zone

Mr. Scott Macpherson
 Macpherson Operating Company, L.P. (M0955)
 2716 Ocean Park Blvd. #3080
 Santa Monica, CA 90405

BLM

Bakersfield, California
 June 23, 2014

Your proposal to **Rework well "Ring 18" WD-1, A.P.I. No. 030-42925, Section 18, T. 27S, R. 28E, MD B. & M., Mount Poso field, West area, Vedder pool, Kern County, dated 6/17/2014, received 6/18/2014** has been examined in conjunction with records filed in this office. (Lat: 35.579042 Long: -118.996573 Datum:83)

THE PROPOSAL IS APPROVED PROVIDED:

1. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
2. Blowout prevention equipment, as defined by this Division's publication No. M07, shall be installed and maintained in operating condition and meet the following minimum requirements:
 - a. Class II 2M, with hydraulic controls, on the 9 5/8" & 7" casing.
 - b. A 2M lubricator for wireline operations.
3. The 7" casing is cemented with sufficient cement to fill behind the casing from the shoe to the surface.
4. Injection is through tubing with packer set in cemented casing immediately above the approved zone of injection.
5. **THIS DIVISION SHALL BE NOTIFIED TO:**
 - a. Witness a standard annular pressure test of the 7" casing prior to commencing injection. A 24-hour notification is requested; please call between 8:00 am and 5:00 pm.
 - b. Witness a mechanical integrity test within three months after injection has commenced. A 24 hour notification is requested; please call between 8:00 am and 5:00 pm.
6. This well shall conform to the provisions set forth in our letter dated 2/26/1993, approving the project.
7. No program changes are made without prior Division approval.

NOTE:

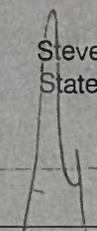
1. Hydrogen sulfide gas (H₂S) is known to be present in this area, adequate safety precautions shall be taken prior to and during well operations.
2. Hole fluid disposal must comply with Regional Water Quality Control Board regulations.

Blanket Bond Dated:9/6/2011

CC: BLM
 Engineer Matt Stikes
 Direct (661) 334-3654
 Office (661) 322-4031

MWS/bgr

Steven Bohlen
 State Oil and Gas Supervisor

By 
 Dan Wermiel, District Deputy

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

UIC Project No. 48818026



NATURAL RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

FOR DIVISION USE ONLY			
Bond	Forms		
	OGD114	OGD121	
<i>B.P.</i>			

NOTICE OF INTENTION TO REWORK / REDRILL WELL

Detailed instructions can be found at: www.conservation.ca.gov/dog/

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework / redrill well Ring 18 #WD-1, API No. 030-42925
(Check one)

Sec. 18, T. 27S, R. 28E, MD B&M., Round Mountain Field, Kern County.

The complete casing record of the well (present hole), including plugs and perforations, is as follows: (Attach wellbore schematics diagram also.)

See attached wellbore diagram

6/18/14
6/21/14 mws

The total depth is: 2800' feet.

The effective depth is: 2800' feet.

Present completion zone(s): Vedder

(Name)

Anticipated completion zone(s): Vedder

(Name)

Present zone pressure: 150 psi.

Anticipated/existing new zone pressure: 150 psi.

Is this a critical well as defined in the California Code of Regulations, Title 14, Section 1720(a) (see next page)? Yes No

For redrilling or deepening only, is a California Environmental Quality Act (CEQA) document required by a local agency? Yes No If yes, see next page.

The proposed work is as follows: (A complete program is preferred and may be attached.)

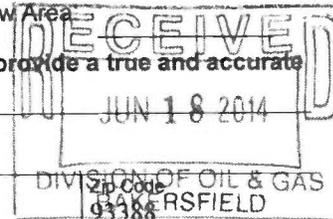
See attached proposed program to run inner 7" casing.

If well is to be redrilled or deepened, show proposed coordinates (from surface location) and true vertical depth at total depth: _____ feet and _____ feet Estimated true vertical depth: _____
(Direction) (Direction)

Will the Field and/or Area change? Yes No If yes, specify New Field: _____

New Area

The Division must be notified immediately of changes to the proposed operations. Failure to provide a true and accurate representation of the well and proposed operations may cause rescission of the permit.



Name of Operator
Macpherson Oil Company

Address
P.O. Box 5368

City/State
Bakersfield Ca

Name of Person Filing Notice
Zack Macpherson

Telephone Number:
661 393 3204 EXT 116

Signature

Date
6/17/2014

Individual to contact for technical questions:
Zack Macpherson

Telephone Number:
661 393 3204 EXT 116

E-Mail Address:
zack_macpherson@macphersonoil.com

This notice and an indemnity or cash bond must be filed, and approval given, before the workover begins. (See the reverse side for bonding information.) If operations have not commenced within one year of the Division's receipt of the notice, this notice will be considered cancelled.

Macpherson Oil Company

**Post Office Box 5368
Bakersfield, CA 93388
Phone: (661) 393-3204
Fax: (661) 393-8065**

Well Remedial/Workover Program

6-17-2014

Well: Ring 18 #WD-1 (API # 030-42925)

Reason for Workover: Install Inner casing.

Planned Work: Run Inner 7" Casing, Cement.

Well Conditions/Casing: (Completed 5/23/2011)

Elevation GL: 1030' DF: 1043'

13-3/8" 40# K-55 STC csg 960'. Cemented with 900 ft³ cement. TOC @ Surface'

9-5/8", 36# casing @ 2,430'. Cemented with 1000 ft³ Cmt. TOC @ Surface'

7", 23# Liner hung @ 2,800', Top @ 2,383'. Perfs .040"X64RX6CX2"S from 2797' to 2416'

Total Depth: 2800' **Effective Depth:** 2800'.

Project/Workover Procedure:

1. MIRU workover rig. Kill well. Install BOPE.
2. Pull tubing and packer out of hole.
3. MU bailer and RIH to top of fill. Clean out to 2385', if needed.
4. Rig up and run 9-5/8" casing scraper to 2383', POOH.
5. MIRU wireline unit. MU 9-5/8", 36# Drillable Bridge Plug and centralizer. RIH & set @ 2383'. POOH. RDMO wireline unit.
6. Run 7" 23# Inner casing and cement in-place @ 2383'. POOH.
7. Cut off old head and well on New 6" 600 series head on 7" casing and install BOPE.
8. Pressure test casing
9. Make up 6-1/8" bit on 4 3/4" drill collars and 2 7/8" N80 tubing, run in hole and clean out to 2800'. POOH.
10. Remove BOPE. Install well head.
11. RDMO . Place well on Injection.

Macpherson Oil Company

Field: Mount Poso

Well No: Ring 18 WD-1

Sec 18, T27S, R 28E, MD B&M
1951' N & 697' W from the SE corner of sec.

Drawing Date: 5/24/2011

Commenced Drilling: 5/15/2011

Completed Drilling: 5/23/2011

On Production:

WBD As of :

Lease Ser. #: CAS037934

Unit or CA #:

All measurements from DF

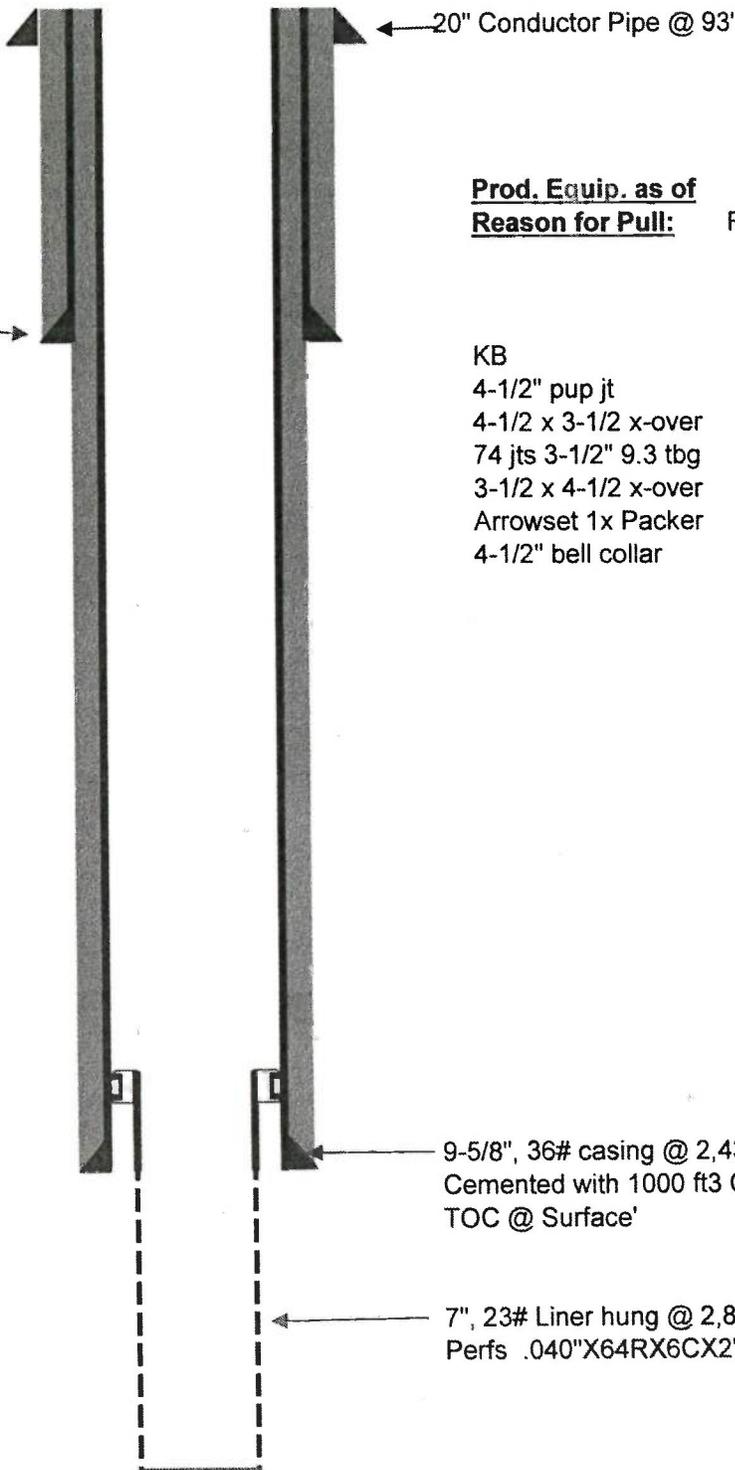
GL: 1030'

DF: 1043'

API No.: 030-42925

Bit Record

24"	13' - 93'
17-1/2"	93' - 960'
12 1/4"	960' - 2,430'
8-3/4"	2,430' - 2,800'



13-3/8" 40# K-55 STC csg 960'
Cemented with 900 ft3 cement.
TOC @ Surface'

Prod. Equip. as of 9/1/11
Reason for Pull: Ran Packer

	<u>Length</u>	<u>Depth</u>
KB	13.00	
4-1/2" pup jt	3.62	16.62
4-1/2 x 3-1/2 x-over	1.10	17.72
74 jts 3-1/2" 9.3 tbg	2293.85	2311.57
3-1/2 x 4-1/2 x-over	0.87	2312.44
Arrowset 1x Packer	8.30	2320.74
4-1/2" bell collar	0.52	2321.26

Vedder Top @ 2430'

TD @ 2,800'

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES
HISTORY OF OIL OR GAS WELL

Operator Macpherson Oil Company Field Mount Poso County Kern
Well Ring 18 WD-1 Sec. 18 T. 27S R. 28E MD B.&M.
A.P.I. No. 030-42925 Name Ron Palmer Title Production Engineer
Date 9.8.11 (Month, day, year) (Person submitting report) (President, Secretary, or Agent)
Signature Ron Palmer
Address P.O. Box 5368 Bakersfield, Ca. 93388 Telephone Number 661 393 3204

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment, with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests, and initial production data.

Drill New Water Disposal Well

Date

5/16/11

Move-In Rig Up Key Rig #68 in Sec. 18 T27S-R28E - on Ring 18 WD-1. GL= 1,030', Rig KB = 13' = 1,043' w/ 20" Conductor set at 80' GL or 93' KB. Start daywork at 12:30 hrs 05/16/11. Mix spud mud. NU class II BOPE w/ 6" diverter and function test OK. M/U 17-1/2" bit. SPUD well w/ 17-1/2" bit @ 1530 hrs 5/16/11. Rotary control drill f/ 93' to 511 w/ full circulation. Survey / wipe hole f/ 511' to 93'.

5/17/11

Rotary control drill f/ 511' to 850 w/ full circulation. Wipe hole f/ 823' to 93'. Rotary control drill f/ 823' to 960' w/ full circulation. Wipe hole f/ 960' T/ 460' to run 13-3/8 csg. POOH, brake bit. LD/ 17-1/2" bit and stbs. Stand back DC's. Weld on the 13 3/8" SOW guide shoe, HSM, RU West Coast Casing tongs & equipment. PU & ran 22 jnt's.(963') of 13-3/8", 48 #, K-55, ST&C production csg, (10) centralizers (1) @ 14' Every 3rd jt. Thereafter w/ shoe @ 960' w/ insert @ 900'. Install cmt. head.

5/18/11

Loader work on roads get cementers in on location. RU & HSM w/ Excalibur, Established circulation, test surface lines to 1500 # psi, Pump 20 bbl water ahead. Mix & pump 500 ft³.(175) sx. of Thixotropic cmt. slurry @ 12.5 ppg, tail in 400 ft³ 256 Sks of tail cmt. slurry mixed @ 14.5 ppg, Drop wiper plug & displace w/ 145 bbl. of lease water, Bump plug w/ 850 #psi. 500 #psi over lift psi. Check float, Float held. CIP @ 1130 hrs. 5/18/11. (30 bbls back) WOC. Wash out stack land csg @ 1430 remove cmt head, nipple down, lift 20" BOPE, ruff cut 13-3/8 csg. lay out. Remove the 20" annular w/ assist of loader, Cut & remove 20" conductor w/ starting flange. Dress 13-3/8" stub, Install starter head, NU 12X900 class II BOPE function test BOP/BLM regulations. Make up 12-1/4 bit. RIH clean out insert @ 900', shoe track and shoe at 960'. Rotary drill to 1008' /survey @ 999'. POOH pick up BHA, RIH to 960'. Rotary Drill /survey ahead at 1008' to 1058' w/ full returns

5/19/11

Rotary Drlg /survey ahead at 1058' to 1338' w/ full returns. Wipe hole f/ 1338 to shoe @ 960'. Rotary Drlg /survey ahead at 1338' to 1497' w/ full returns. Survey @ 1497'. Rotary Drlg /survey ahead at 1497' to 1776' w/ full returns. Wipe hole f/ 1776' to shoe @ 960'. Rotary Drlg /survey ahead at 1776' to 2006' w/ full returns. Survey @ 2006'. Rotary Drlg /survey ahead at 2006' to 2031' w/ full returns

5/20/11

Rotary Drlg /survey ahead 12-1/4" hole f/ 2031' to 2430' w/ full returns. POOH 20k over pull. Linkage on clutch came apart, POOH lay down stbs. RIH to shoe. Make repairs to rig, mechanic replace arm on clutches. RIH t/ 1309'. Spot ream f/ 1,309' to 2,430'. Circ/cond hole for e-logs. POOH f/ e-logs. HSM, Rig Up Loggers. RIH w/ Caliper/SP/GR HRI f/ 2430' to 950'.

RECEIVED
SEP - 8 2011

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES
HISTORY OF OIL OR GAS WELL

5/21/11

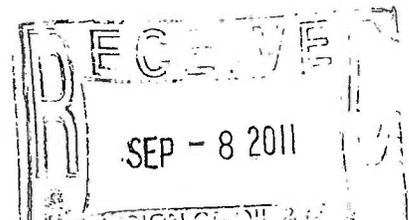
Run E-Logs over 12-1/4 hole, HRI/Cal/SP/GR/. RIH and shoot SWC's as directed. RIH t/ 2430' circ bottoms up/survey POOH, brake bit.LD/ BIT, stbs. Stand back DC's. Weld on the 9 5/8"SOW guide shoe, HSM, RU West Coast Casing tongs & equipment. PU & ran 62 jnt's.(2433') of 9 5/8",36 #,K-55,ST&C production csg, (30)centralizers (1) @ 40' Every 2rn jt there after, Shoe @ 2430' w/ insert @ 2389'. Install cmt. head. RU & HSM w/ Excalibur, Establish circ, Test surface lines t/ 1500 # psi, Pump 20 bbl. water ahead Mix & pump 400 ft3 (140) sx. of Thixotropic cmt. slurry @12.5 ppg,Tail in 600 ft3.(384)sx.of tail Cmt. slurry @ 14.5 ppg, Drop wiper plug & displace w/ 183 bbl. of lease water, Bump plug w/ 950 #psi.500 #psi over lift psi. Check float, Float held. CIP @ 2230 hrs.5/21/11.(30 bbls back) WOC. Wash out stack land csg @ 0130 remove cmt head, nipple down, lift 12" BOPE, ruff cutt 9 5/8 csg. lay out. Remove the 12"annular Cut & remove 13 3/8 w/ starting flange. Dress 9 5/8"stub, Install well head test t/ 1000 psi (OK) Start NU 12x900 cls II BOPE.

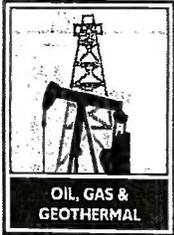
5/22/11

Nipple up cls II BOPE and function test, OK. /Clean mud pits & fill pits with lease water. Run in hole with 8 3/4" bit to 2389', test BOP and 9-5/8" csg. to 500 psi. OK. Drill inset @ 2389' and shoe track to shoe @ 2430'. Mix 3% KCL HEC/ Polymer and roll hole over to same. Drill 8 3/4" hole from 2430' to 2800' (TD) w/full returns. Sweep hole, POOH t/ shoe. RIH t/ 2800 (TD), No fill. POOH t/ stand back tools. Rig up schlumberger run E-logs,caliper,temp,SP/GR/Restivity. RIH t/ 2800' circ & condition mud for 7" liner POOH.

5/23/11

Circ/cond hole for 7" slit. Liner. POOH stand back tools. Rig up casers. Run 7" 23# K-55 LTC slit. Liner (.040x64Rx6"Cx2"S) f/2,416' to 2,800' w/ 30' of Blank on top, where TOL be at 2,383'. Land liner at 2800'. Roll hole over w/ SIDC breaker fluid. Release from liner. POOH. RIH w/ SSA and drive positive seal adaptor on top of liner w/ TOL @ 2383'. POOH and LD / DP & DC's. Nipple down cls II BOPE. Secure well. Release Key rig #68 @ 2400hrs 5/23/11. Rig down & prep rig to move to Thomas 325 (Start rig move @ 0700 5/24/11.





DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES

No. P411-0360

PERMIT TO CONDUCT WELL OPERATIONS

	Old	New
FIELD CODE	=	<u>488</u>
AREA CODE	=	<u>18</u>
POOL	=	<u>10</u>

WATER DISPOSAL PROJECT
Vedder Zone
BLM

Mr. Joseph Butler
Macpherson Oil Company (M0950)
P.O. Box 5368
Bakersfield, CA 93388

Bakersfield, California
April 27, 2011

Your proposal to Drill well "Ring 18" WD-1, A.P.I. No. 030-42925, Section 18, T. 27S, R. 28E, MD B. & M., Mount Poso field, West area, Vedder pool, Kern County, dated 11/9/2010, received 11/15/2010 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. If this activity will necessitate cutting vegetation or other surface disturbance you must obtain a BLM Surface Disturbance Conditions of Approval prior to move-in.
2. Copies of all logs and records shall also be filed directly with the Bureau of Land Management.
3. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
4. Sufficient cement shall be used to fill the annular space of the 20" and 9 5/8" casing(s) to the surface.
5. The well shall be equipped with a minimum 6" diverter system on the conductor pipe.
6. The specified blowout prevention equipment, as defined by DOGGR Manual M07, is considered minimal and shall be maintained in operating condition at all times on the 9 5/8" casing, DOGGR Class II 2M and hole fluid monitoring equipment A.
7. Sufficient surveys shall be run within 90 days after the injection begins to confirm that the injection fluid is confined to the intended zone of injection.
8. THIS DIVISION SHALL BE NOTIFIED TO:
 - a. WITNESS a standard annular pressure test, prior to commencing injection. A 24 hour notification is required.
 - b. WITNESS within 90 days after injection is started, sufficient surveys to confirm that the injection fluid is confined to the intended zone of injection. A 24 hour notification is required.
9. The operations and surveillance of this well shall conform to the requirements outlined in our project approval letter dated 2/26/93.
10. No change in the proposed program shall be made without prior approval of this Division.

NOTE: Issuance of this report was held in abeyance pending "Ring 18" 16 and "Ring 20" 16 wells.

Blanket Bond

Elena M. Miller
State Oil and Gas Supervisor

Engineer Rich Thesken
Direct (661) 334-3661
Office (661) 322-4031

By 
for Randy Adams
District Deputy

RT/js

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.
Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.



DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES

Bakersfield, California
November 18, 2010

Mr. Joseph Butler
Macpherson Oil Company (M0950)
P.O. Box 5368
Bakersfield, CA 93388

This Division has received your Notice of Intention to Drill dated 11/9/2010, for "Ring 18" WD-1, API. --, Mount Poso field, Sec. 28, T. 27S, R. 28E, MD B&M, Kern County.

THIS NOTICE IS BEING HELD IN ABEYANCE PENDING THE COMPLETION OF THE ABANDONMENT WORK ON "RING 18" 19. WHEN THIS WORK IS COMPLETED PLEASE CONTACT ME SO I CAN PROCEED WITH THE "RING 18" wd-1 REPLACEMENT PROGRAM.

If you have any questions, you may contact Rich Thesken at (661) 334-3661.

Elena M. Miller
State Oil and Gas Supervisor

By Richard Thesken for
Randy Adams
Deputy Supervisor

PRELIMINARY WELL LOCATION FOR
 MACPHERSON OIL CO.
 SECTION 18 WELL RING WD 1

SEC. 18

E 1/4 COR.
 SEC. 18

S89° 00' 11"E
 2641.02

SEC. 18
 RING WD 1
 N. 758117.07
 E. 1703910.37
 EL. = 1029.38

697.21

THE PRELIMINARY LOCATION FOR THE MACPHERSON OIL CO. SECTION 18 WELL RING WD 1 IS APPROXIMATELY 1951.38' NORTH ALONG THE EAST SECTION LINE AND THEN 697.21' WEST AT RIGHT ANGLES FROM THE SOUTHEAST CORNER OF SECTION 18, T. 27 S., R. 28 E., MDM., COUNTY OF KERN, STATE OF CALIFORNIA.

2652.68
 S0° 51' 03"W

2649.79
 S0° 52' 51"W

1951.38



S 1/4.
 COR.
 SEC. 18



T. 27 S., R. 28 E.,
 MDM

S89° 03' 56"E
 2639.62

SE. COR.
 SEC. 18

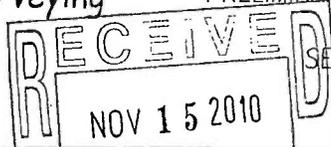
SCALE 1" = 500'

Well Name	Latitude	Longitude	
RING WD 1	35.579042°N	118.996573°W	NAD 83
	35.579088°N	118.995641°W	NAD 27

THE COORDINATES AND ELEVATIONS FOR THIS WELL ARE BASED UPON GPS OBSERVATIONS OF MONUMENTS FOUND ON OR NEAR THE MACPHERSON OIL CO. LEASES, ALL COORDINATES ARE PROJECTED IN CA ZONE 5 NAD 27 VALUES. ALL BEARINGS AND DISTANCES ARE GRID. MULTIPLY ALL DISTANCES BY 1.000023 TO OBTAIN GROUND DISTANCES. ALL ELEVATIONS ARE BASED ON ELEVATIONS OBTAINED BY GPS OBSERVATIONS OF THE USGS CONTROL POINT, MT. POSO, PID FU3530. AN ELEVATION OF 1213.89' AT THE STATION WAS USED.

Soles Surveying
 civil engineering land surveying

442 Orcas St., Morro Bay, Ca 93442
 805 771-8915 661 805-3763 Cell
 solsurv@charter.net



PRELIMINARY WELL PLAT FOR THE MACPHERSON OIL CO.
 SECTION 18 WELL RING WD 1,
 SECTION 18, T. 27 S., R. 28 E., M.D.M.
 KERN COUNTY, CALIFORNIA

MACPHERSON

O I L C O M P A N Y

P.O. BOX 5368
BAKERSFIELD, CALIFORNIA 93388
TEL: 661 393-3204 FAX: 661 393-8065

2716 OCEAN PARK BOULEVARD,
SUITE 3080
SANTA MONICA, CALIFORNIA 90405
TEL: 310 452-3880 FAX: 310 452-0058

November 15, 2010

Department of Conservation
Division of Oil, Gas and Geothermal Resources
District 4
4800 Stockdale Hwy., Suite 417
Bakersfield, Calif. 93309-4031

Re: Proposed replacement of Water Disposal well
Ring 18 #19.
Project # 48818026, Vedder Zone

Gentlemen:

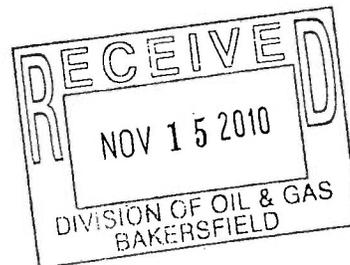
We would like to ask for approval to add a water disposal well to project # 48818026, Vedder zone water disposal. We currently have a class II permit to inject a maximum of 65,000 bwpd into three wells and are injecting into two wells, Ring 18 #9 and Ring 18 #21. Ring 18 #19 is also on the permit but has not been injecting for several years and has mechanical problems. We plan to permanently plug and abandon Ring 18 #19 and would like to replace it with Ring 18 WD-1. The permit to P&A Ring 18 #19 has been submitted to the BLM and we do not plan to drill WD-1 until 18 #19 is P&A'd. We are submitting the permit to drill Ring 18 WD-1 with this letter and wanted to provide this letter to help explain our intentions.

The Geological and Formation Data for Ring 18 #WD-1 are the same as originally stated in the Proposal for Project # 48818026. All fluids are the same as in the other wells in the project. We anticipate injection rates will not exceed the existing approved rate of 65,000 bbls day. Please feel free to contact Ron Palmer at 393.3204 ext.105 if you have any questions.

Sincerely,



Ron Palmer
Sr. Production Engineer
Macpherson Oil Company



MACPHERSON

O I L C O M P A N Y

P.O. BOX 5368
BAKERSFIELD, CALIFORNIA 93388
TEL: 661 393-3204 FAX: 661 393-8065

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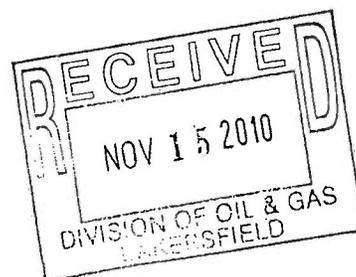
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Sincerely,



Ron Palmer
Sr. Production Engineer
Macpherson Oil Company



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0136
Expires July 31, 2010

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
CAS037934

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and No.
CACA23573X

8. Lease Name and Well No.
RING 18 WD-1

9. API Well No.
04-030-42925-00-X1

10. Field and Pool, or Exploratory
MT POSO WEST

11. Sec., T., R., M., or Blk. and Survey or Area
Sec 18 T27S R28E Mer MDM
SME: BLM

12. County or Parish
KERN

13. State
CA

17. Spacing Unit dedicated to this well

20. BLM/BIA Bond No. on file

23. Estimated duration
7 DAYS

1a. Type of Work: DRILL REENTER

1b. Type of Well: Oil Well Gas Well Other: OTH Single Zone Multiple Zone

2. Name of Operator
MACPHERSON OIL COMPANY
Contact: ZEKE JONES
E-Mail: ZEKE_JONES@MACPHERSONOIL.COM

3a. Address
P.O. BOX 5368
BAKERSFIELD, CA 93388

3b. Phone No. (include area code)
Ph: 661-393-3204 Ext: 111

4. Location of Well (Report location clearly and in accordance with any State requirements.)*
At surface NESE 1951FSL 697FEL 35.579042 N Lat, 118.996573 W Lon
At proposed prod. zone NESE 1951FSL 697FEL 35.579042 N Lat, 118.996573 W Lon

14. Distance in miles and direction from nearest town or post office*
12 MILES NORTH EAST FROM BAKERSFIELD AIRPORT

15. Distance from proposed location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
1951' TO THE SOUTH SECTION LINE

18. Distance from proposed location to nearest well, drilling, completed, applied for, on this lease, ft.
ON RING 18 #19.

21. Elevations (Show whether DF, KB, RT, GL, etc.)
1029 GL

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature (Electronic Submission) Name (Printed/Typed) ZEKE JONES Ph: 661-393-3204 Ext: 111 Date 11/09/2010

Title AUTHORIZED REPRESENTATIVE

Approved by (Signature) (Electronic Submission) Name (Printed/Typed) GABRIEL GARCIA Date 04/29/2011

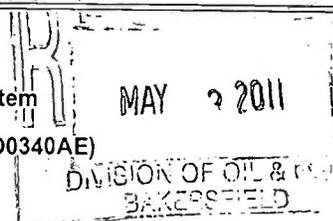
Title AFM, MINERALS Office Bakersfield

Application approval does not warrant or certify the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Additional Operator Remarks (see next page)

Electronic Submission #97099 verified by the BLM Well Information System
For MACPHERSON OIL COMPANY, sent to the Bakersfield
Committed to AFMSS for processing by WANDA OATS on 11/09/2010 (11WFO0340AE)



Bureau of Land Management

OPERATOR: Macpherson Oil Company
LEASE NO.: CAS 037934
WELL NO.: Ring 18 WD-1
API NO.: 030-42925
SEC.: 18 T27S, R28E; MDB&M
FIELD/AREA: Mount Poso
COUNTY: Kern
STATE: California

Government Contacts

OFFICE: Bakersfield Field Office
ADDRESS: 3801 Pegasus Drive
Bakersfield, California 93308-6837
OFFICE PHONE: (661) 391-6000
FAX NUMBER: (661) 391-6156
OFFICE HOURS: 7:30 A.M. to 4:15 P.M.
Monday through Friday

AFTER OFFICE HOURS, WEEKENDS, HOLIDAYS call (661) 391-6130

AUTHORIZED OFFICER'S DESIGNATED REPRESENTATIVES

Gabriel Garcia	Assistant Field Manager Authorized Officer	Work Phone: (661) 391-6139
Silvet Holcomb	Petroleum Engineer	Work Phone: (661) 391-6137 Home Phone: (661) 663-8920 Cell Phone: (661) 619-0113
Lisa Ashley	Natural Resource Specialist	Work Phone: (661) 391-6162 Cell Phone: (661) 619-9553
Pamela Jackson	Petroleum Engineering Technician	Work Phone: (661) 391-6047 Cell Phone: (661) 203-7928

**A COPY OF THESE CONDITIONS OF APPROVAL MUST BE FURNISHED TO
YOUR FIELD REPRESENTATIVE AND BE AVAILABLE AT THE WELL SITE**



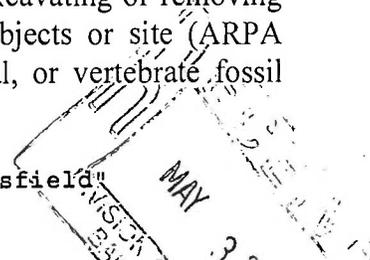
Bureau of Land Management
GENERAL CONDITIONS OF APPROVAL
APPLICATION FOR PERMIT TO DRILL

Lease: CAS 037934

Well: Ring 18 WD-1

All lease operations are subject to the lease terms and stipulations, the regulations of 43 CFR Part 3100, Onshore Oil and Gas Orders, Notices to Lessees (NTLs), the approved Sundry Notice and any written instructions or orders of the Authorized Officer. **This approval is only for the surface disturbance associated with each of these water disposal well. All downhole approvals are the responsibility of the CDOGGR which has primacy for all Class II UIC operations, including steam injection wells.** Any change in plans such as completing the well as a producer or a non-UIC injector require a separate approval prior to the operator being allowed to proceed. The following requirements are emphasized:

1. **APPROVAL OF THIS SUNDRY NOTICE** does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct drilling operations [43 CFR 3162.3-1(i)].
2. **DRILLING DEADLINE:** This permit is valid for a period of two years from the day of approval or until lease expiration/termination, whichever is shorter. If the permit terminates, any surface disturbance created under the application shall be reclaimed in accordance with the approved plan. Upon written request by the operator, a one-time two (2) year extension to this time period may be granted by the Authorized Officer with the concurrence of the appropriate Surface Management Agency.
3. **CHANGE OF PLANS:** Plans and/or Operations that deviate from the approved Sundry Notice and/or Conditions of Approval shall receive prior written approval from the Authorized Officer. Emergency approval may be obtained orally but such approval does not waive the written report requirement.
4. **COMPLIANCE WITH APPLICABLE LAWS and REGULATIONS:** All lease exploration, development, production, and construction operations shall be conducted in a manner which complies with all applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to oil and gas operations on Federal leases.
5. **HISTORIC, CULTURAL, and PALEONTOLOGICAL RESOURCES:**
The operator shall be responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical (see below), or vertebrate fossil objects or site (ARPA 1979. (as amended) Sec. 6, Sec. 7). If archaeological, historical, or vertebrate fossil



materials are discovered, the operator shall suspend all operations that further disturb such materials and immediately contact the Authorized Officer.

This area may contain historic items related to the development of the Kern County oil industry. All historic artifacts, features, and historic trash piles are to be avoided during the drilling/plugging operations, including items that are often deemed "junk" by non-cultural resource personnel. If ground disturbing activities unearth any of the above mentioned items, all work at the location must cease and the Bakersfield Field Office BLM archaeologist must be contacted in order to determine the age and significance and to identify proper mitigation procedures.

Within five (5) business days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant cultural or scientific values.

The operator shall be responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator shall be allowed to resume operations.

Any questions regarding this COA, contact the BLM Archaeologist.

6. **ENDANGERED SPECIES:** The operator shall comply with the requirements of the Endangered Species Act of 1973 (16 USC 1531, et. seq.) and its implementing regulations (60 CFR Chapter IV). Except as provided in an approved SURFACE USE PLAN OF OPERATIONS, the operator shall conduct all operations to maintain and protect fisheries, wildlife and plants and their habitats.
7. **PRODUCTION START UP:** Completion as a producer is not permitted without submission of a separate Sundry Notice (Form 3160-5).
8. **FAILURE TO COMPLY:** Failure to comply with the provisions of this permit, including the regulations of 43 CFR Part 3100, Onshore Oil and Gas Orders, Notices to Lessees (NTLs), and Conditions of Approval, will be considered a violation subject to the enforcement provisions of 43 CFR 3163.
9. **RIGHT OF APPEAL:** The right to have a State Director Review of the provisions of this permit, including the regulations of 43 CFR Part 3100, Onshore Oil and Gas Orders, Notices to Lessees (NTLs) and Conditions of Approval, is set forth in 43 CFR 3165.3. The right to appeal, if adversely effected by the State Director's decision, to the Interior Board of Land Appeals (IBLA) is set forth in 43 CFR 3165.4. For further information concerning the review and appeal rights contact the Bakersfield Field Office.
10. **CONDITIONS OF APPROVAL FOR SURFACE:**



VISUAL RESOURCE MANAGEMENT (VRM):

The following mitigation measures are included as additional conditions of approval for Visual Resource Management (VRM), in conformance with VRM Objective Class III. These mitigation measures are divided into three phases: Construction, Interim Reclamation, and Final Reclamation.

Construction

The operator will limit vegetation removal and the degree of surface disturbance wherever possible. Where surface disturbance cannot be avoided, all practicable measures will be utilized to minimize erosion and stabilize disturbed soils until a self-perpetuating non-weed native plant community has stabilized the site. Stabilization efforts shall be finished within 30 days of the completion of construction activities. The following types of interim stabilization are appropriate; jute netting, hydro-mulch, straw wattles, or similar.

The operator will remove all available topsoil (depths vary from 1.5 inches on ridges to 6+ inches in bottoms) from constructed well locations including areas of cut and fill, and stockpile at the site. Topsoil will also be salvaged for use in reclamation on all other areas of surface disturbance (roads, pipelines, etc.). Clearly segregate topsoil from excess spoil material. Any topsoil stockpiled for one year or longer will be signed and stabilized in a fashion to preserve the seed bank (maximum surface area).

The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.

With the overall objective of minimizing surface disturbance and retaining land stability and productivity, the operator shall utilize equipment that is appropriate to the scope and scale of work being done for roads and well pads (utilize equipment no larger than needed for the job).

To minimize disturbance, the operator will place the utility corridor within the roadway. All utilities and pipelines should be placed below ground if possible and when not, they shall be located low to the ground at the back (southern edge) of well pads and roads.

All permanent above-ground structures (e.g., production equipment, pipes, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for the Round Mountain Unit is Slate Gray for those facilities which are unavoidably placed on ridgelines and have sky as their backdrop and Carlsbad Canyon, for all other facilities.

Interim Reclamation

A portion of the preserved topsoil should be used as a top layer on cut and fill slopes and elsewhere on the site not needed for continued operation. Those areas not needed for production should be landscaped to the surrounding topography as soon as possible (within 2 years).

The operator should collect seed from the local area at the end of this year's flowering season to be used for reseeding disturbed areas.

In the absence of locally collected seed the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, the seed mix should include the following:

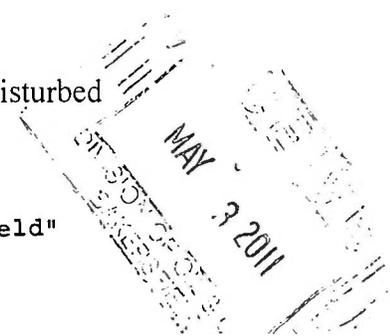
Species at Site	
alkali goldenbush <i>Isocoma acradenia</i> var. <i>bracteosa</i>	California mustard <i>Guillenia lasiophylla</i>
common saltbush <i>Atriplex polycarpa</i>	hillside daisy <i>Monolopia lanceolata</i>
bladderpod <i>Isomeris arborea</i>	lacy phacelia <i>Phacelia tanacetifolia</i>
common peppergrass <i>Lepidium nitidum</i> var. <i>nitidum</i>	blue dicks <i>Dichleostemma</i>
miner's lettuce <i>Claytonia perfoliata</i>	

Collected seed or seed mix will broadcast and secured to a depth of 0.5 inch preventing soil and seed losses. Seed should be applied at a rate of approximately 12 lbs per acre. Reseeded areas should be protected from livestock to allow plants (especially shrubs) to successfully re-establish.

The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.

Final Reclamation

Disturbed lands will be re-contoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.



Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling platform and access road on the contour, to a depth of at least 12 inches. The rippers are to be no farther than 24 inches apart.

Distribute the topsoil evenly over the entire location and other disturbed areas. Prepare the seedbed by disking to a depth of 4-to-6 inches following the contour. This area should be reseeded with either locally collected seed or the previously described seed mix.

The operator will follow the above guidance to specifically achieve the following:

1. The reclaimed area shall be stable and exhibit none of the following characteristics:
 - a. Large rills or gullies.
 - b. Perceptible soil movement or head cutting in drainages.
 - c. Slope instability on, or adjacent to, the reclaimed area in question.
2. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
3. Vegetation production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:
 - a. Successful onsite establishment of species included in the planting mixture or other desirable species.
 - b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
4. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.



Macpherson Oil Company

Post Office Box 5368

Bakersfield, CA 93388

Phone: (661) 393-3204, ext. 105

Fax: (661) 393-8065

Proposed Drilling Program

Mt. Poso

Well Name: Ring 18 #WD-1

API #: xxx-xxxxx

AFE#: RM xxxx

**Surface location: 697.21' W and 1951.38' N
from the SE corner of Sec. 18 T27S R28E**

Planned bottom hole location:

Same as surface location

Ground level: 1029.38'

November 9, 2010

MAY 3 2011

Drilling Program (all depths reference KB, 13' above GL)

1. Notify BLM 24 hours prior to spudding well @ 391-6151
2. Install and function test 6" diverter (diverter line to have no turns or internal restrictions) on 20" conductor and BOPE. Remote controls for the diverter MUST be installed on the rig floor and readily accessible by the driller.
3. Drill a 12-1/4" to ~2450'. Minimize risk of lost circulation by time drilling at a rate of 60' per hour, no greater. If we lose circulation, spot an LCM pill and attempt to heal it. If we maintain circulation drill a 12-1/4" hole to top of the Walker sand @ 2450' MD. POOH and run E-logs.
4. Please give loggers a 24 hour and a 6 hour notification. Run open hole logs from 93' to 2450'. (including caliper, temperature, SP, GR and resistivity). Call Ron Palmer to confirm casing point.
5. RU cementers. Run and cement 9-5/8" 36# BTC/LTC casing to 2450' or adjusted shoulder depth using 500 Cuft of Thixotropic w/ 35% SF followed by 400 Cuft of Class G cement w/ 35% SF. WOC minimum of 3 hrs.
6. Cut off 20" conductor at ground level and land 9-5/8" casing. Install well head and test weld to 1000 psi.
7. Install Class II Annular BOPE and function test.
8. RIH with a 8-3/4" bit and drill out float equipment. Change over mud system to Xanvis/Lease water while drilling out shoe joint. Drill 8-3/4" hole to TD at 2700' MD and condition hole for logging.
9. Please give loggers a 24 hour and a 6 hour notification. Run open hole logs from 2700' to 2450'. (including caliper, temperature, SP, GR and resistivity). RD loggers
10. Condition hole for running liner. Run and set 7" 23# K-55 LTC liner from TD (2700') to 30' inside the casing shoe (2370') with circulating shoe on the bottom, .060x36Rx6"Cx2"S from 2700'-2420' and 30'

blank on top. Release from liner, spot a polymer breaker pill and POOH.

11. RIH with drive on positive seal adapter to top of liner, drive on adapter and POOH LD DP.
12. Install tubing hanger with BPV. Nipple down BOPE, secure well, and RDMO rig and equipment.



Macpherson Oil Company
Drilling Program
Ring 18 #WD-1 (Water Disposal)
Lease No.: CAS037934/CACA 23573X

Location: Proposed Surface Location: 697.21' W & 1951.38' N from the SE corner of Sec. 18, T27S, R28E, MDBM

Elevation: 1029.38' GL

Proposed Bottom Hole Location: Same as surface location.

1. Estimated Formation Tops:

<u>Formation</u>	<u>TVD</u>
T/Vedder sand	2450'
Total Depth	2700'

2. Water, Oil and Gas Bearing Formations:

No fresh water bearing sands are expected to be encountered in this well [no fresh water in Round Mountain Field – Main Area]. See above “Estimated Formation Tops” of potential hydrocarbon bearing formations. All hydrocarbon bearing zones will be isolated by casing and cementing (*see attached “Proposed Drilling Program & Procedures”*).

3. Blowout Prevention Equipment:

Pressure control equipment, consisting of 2000 psi rated annular preventer and 6” diverter system will be installed on the 20” conductor pipe [*See Figure 1*].

4. Casing Program:

80' of 20” Conductor – Cemented to surface.
9-5/8”, 36# K55, LTC/BTC to 2200' MD (2450' TVD) - Cemented to surface
7”, 23# K55, BTC Liner hung from 2420' to 2700'.

5. Cement (amount and type)

Cement 9-5/8” 36# BTC/LTC casing to 2450' or adjusted shoulder depth using 400 Cuft of Thixotropic w/ 35% SF followed by 400 Cuft of Class G cement w/ 35% SF, (Cement to Surface). WOC minimum of 3 hrs.

MAY 9 2011

6. Mud Program:

0' - 2700' Gel/Water/Polymer 8.8 ppg

7. Logging and Coring:

93' - 2700' Resistivity

8. Pressures and Unusual Hazards:

Maximum anticipated BHP = 1169 psi (0.433 psi/ft) at 2700' TVD (Vedder Sands).

Expected BHP = 200 psi at 2700' TVD (Walker Sands).

No potentially hazardous volumes of H₂S are expected to be encountered.

9. Additional information (if any).

MAY 3 2011

SURFACE USE PROGRAM

Lease No.: CAS037934 / CACA 23573X

Operator: MACPHERSON OIL COMPANY
P.O. Box 5368
Bakersfield, CA 93388
(661) 393-3204 ext. 105

Proposal: Drill and complete Water Disposal Well, Ring 18 #WD-1

Proposed Surface Location: 697.21' W and then 1951.38' N of the SE corner of Section 18, T27S/R28E, MDB&M.

Elevation: 1029.38' GL

Proposed Bottom Hole Location: Same as surface location.

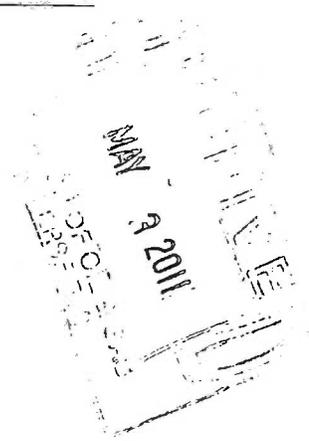
1. **Existing Roads:** *See PLAT #1*
2. **Planned Access:** No new roads are required for this project. The location is an extension of existing roads and pad at our Ring 18 #19 well location [*See PLAT #1 and Plat #4a*].
3. **Location of existing wells:** *See PLAT #2.*
4. **Existing and proposed facilities:** *PLAT #3* indicates the location of existing facilities and anticipated flow line routes.
5. **Water supply:** Water for drilling and completion operations will be supplied via existing Round Mountain Unit kill water system and vacuum trucking as needed.
6. **Construction material:** The total volume of cut will be 223 cubic yards and the fill volume will be 188 cubic yards using 1:1 shrinkage.
7. **Waste disposal:** Drill cuttings and waste drilling fluids will be stored in a reserve pit during drilling operations. Only non-hazardous drilling waste will be stored in the reserve pit. The waste drilling fluids will be removed and disposed of in an appropriate manner. Following the completion of the well, the reserve pit drill cuttings (solids) will be dry blended and back filled using original top soil. Other refuse will be contained in an appropriate container, transported and disposed of at the nearest County disposal site. Portable chemical toilets will be used during drilling / completion operations.

RECEIVED
GENERAL INVESTIGATION
DIVISION
JAN 9 2011

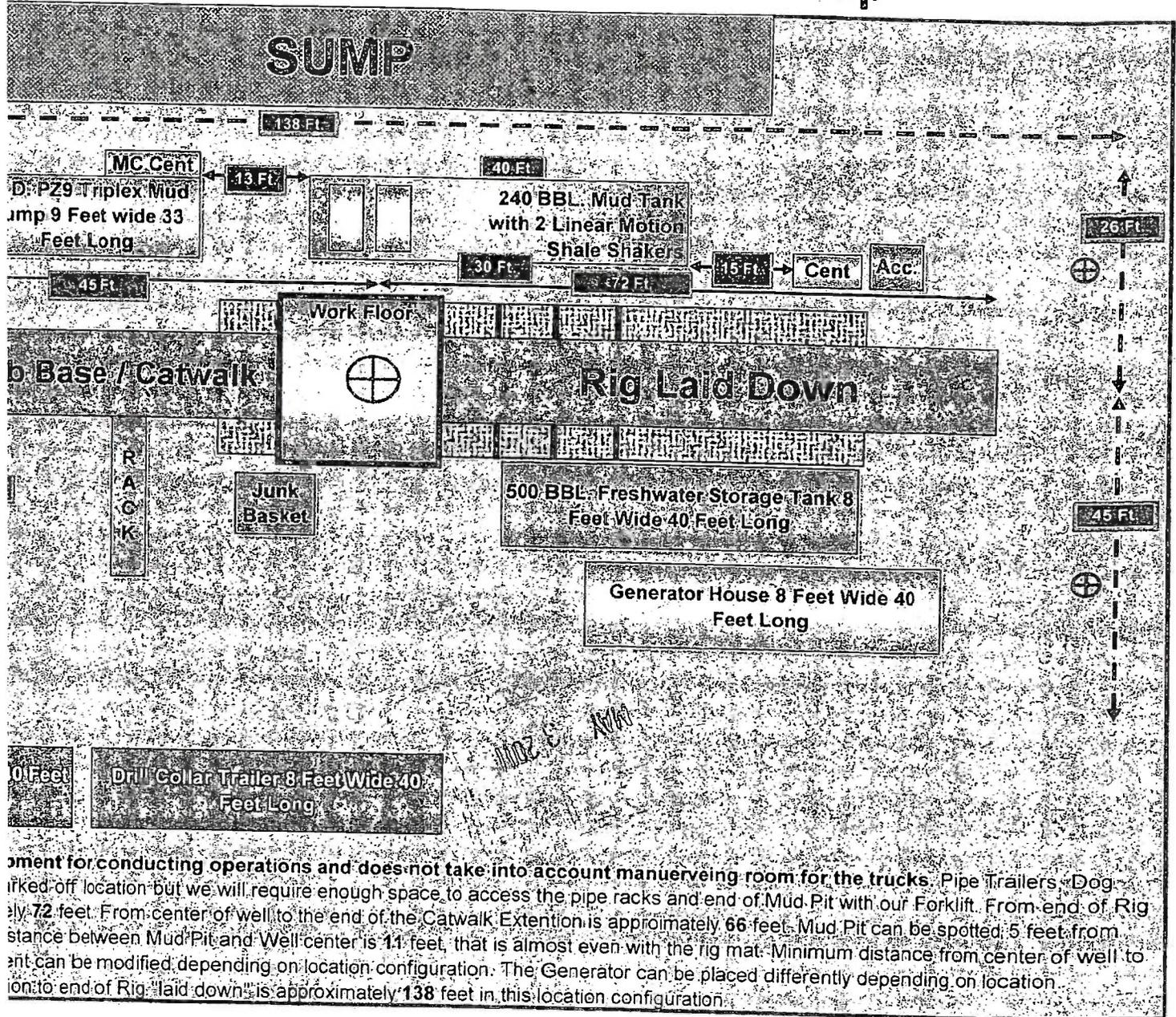
8. **Ancillary facilities:** None required.
9. **Well site layout:** See PLAT#4 (Proposed site Plan) & #5 (well survey) and PLAT #6 (Type Rig). The proposed well site pad is to be an extension of the existing road and pad at our Ring 18 #19 well.
10. **Surface reclamation plan:** Following the completion of the well, the reserve pit drill cuttings (solids) will be dry blended and back filled using original top soil. The base material will be removed and the surface graded to its present condition and topography upon well abandonment.
11. **Surface owner:** Macpherson Oil Company
12. **Other information:** We plan to install a power pole on the same pad to deliver electricity to the well. We also plan to install a flow line per plat #3.
13. **Operator Representative:** Ron Palmer
PO Box 5368
Bakersfield, CA 93388
(661) 393-3204 Ext 105, (661) 201-2881 cell phone
E mail address: ron_palmer@macphersonoil.com

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed herein will be performed by Macpherson Oil Company and its contractors and sub-contractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for filing of a statement.

Signed: Ron Palmer Date: 11.9.10

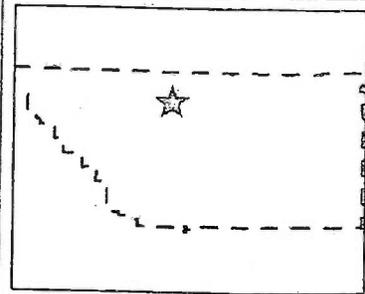
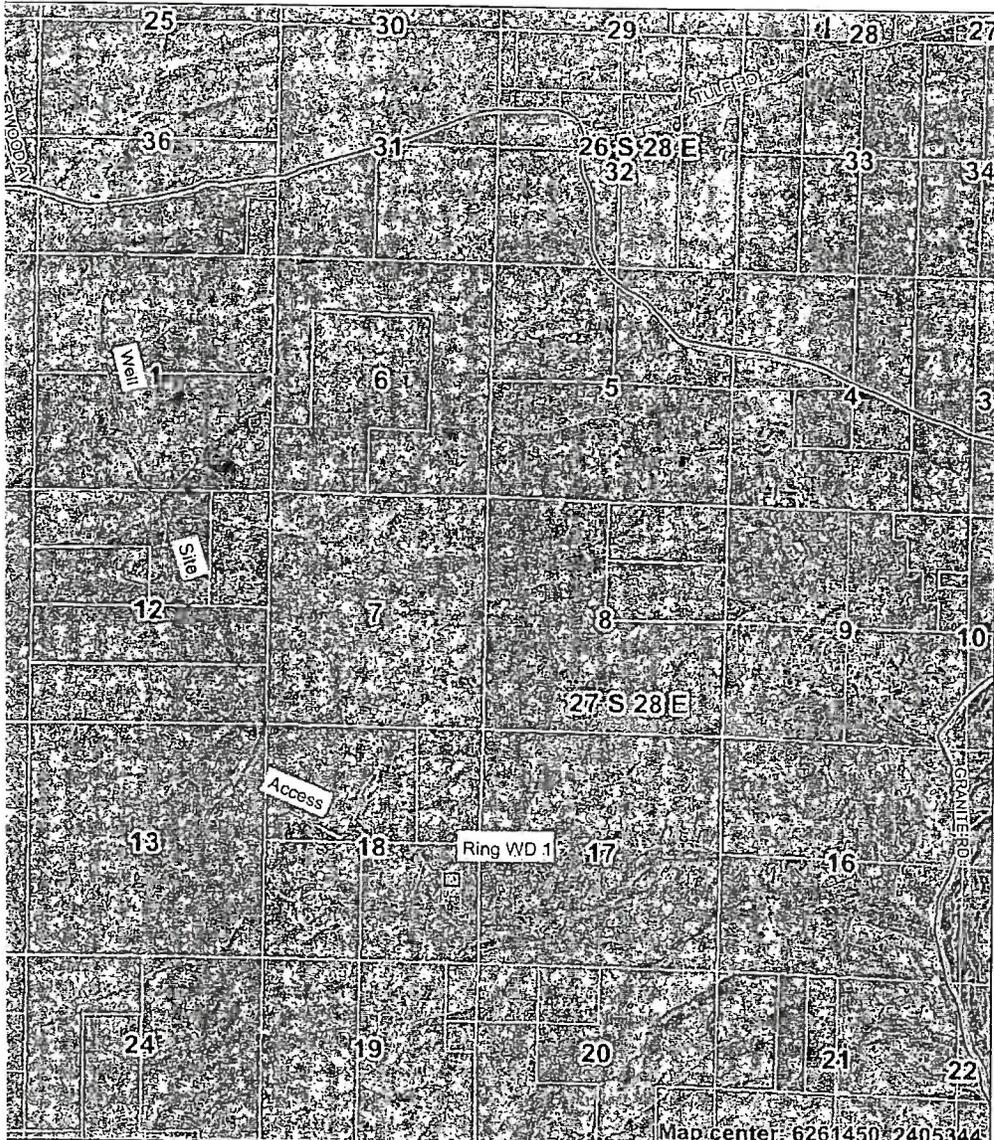


Energy Services Small Location Setup



ment for conducting operations and does not take into account maneuvering room for the trucks. Pipe Trailers, Dog-irked-off location but we will require enough space to access the pipe racks and end of Mud Pit with our Forklift. From end of Rig ly 72 feet. From center of well to the end of the Catwalk Extension is approximately 66 feet. Mud Pit can be spotted 5 feet from stance between Mud Pit and Well center is 11 feet, that is almost even with the rig mat. Minimum distance from center of well to ant can be modified depending on location configuration. The Generator can be placed differently depending on location. on to end of Rig Laid Down is approximately 138 feet in this location configuration.

on 18 Well Ring 18 WD 1 Site Access



Legend

Roads

- Arterial
- Collector
- Highway
- Local
- Ramp
- Unpaved

County of Kern

Assessment Parcels

Townships

Sections

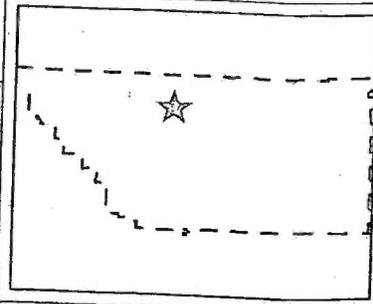
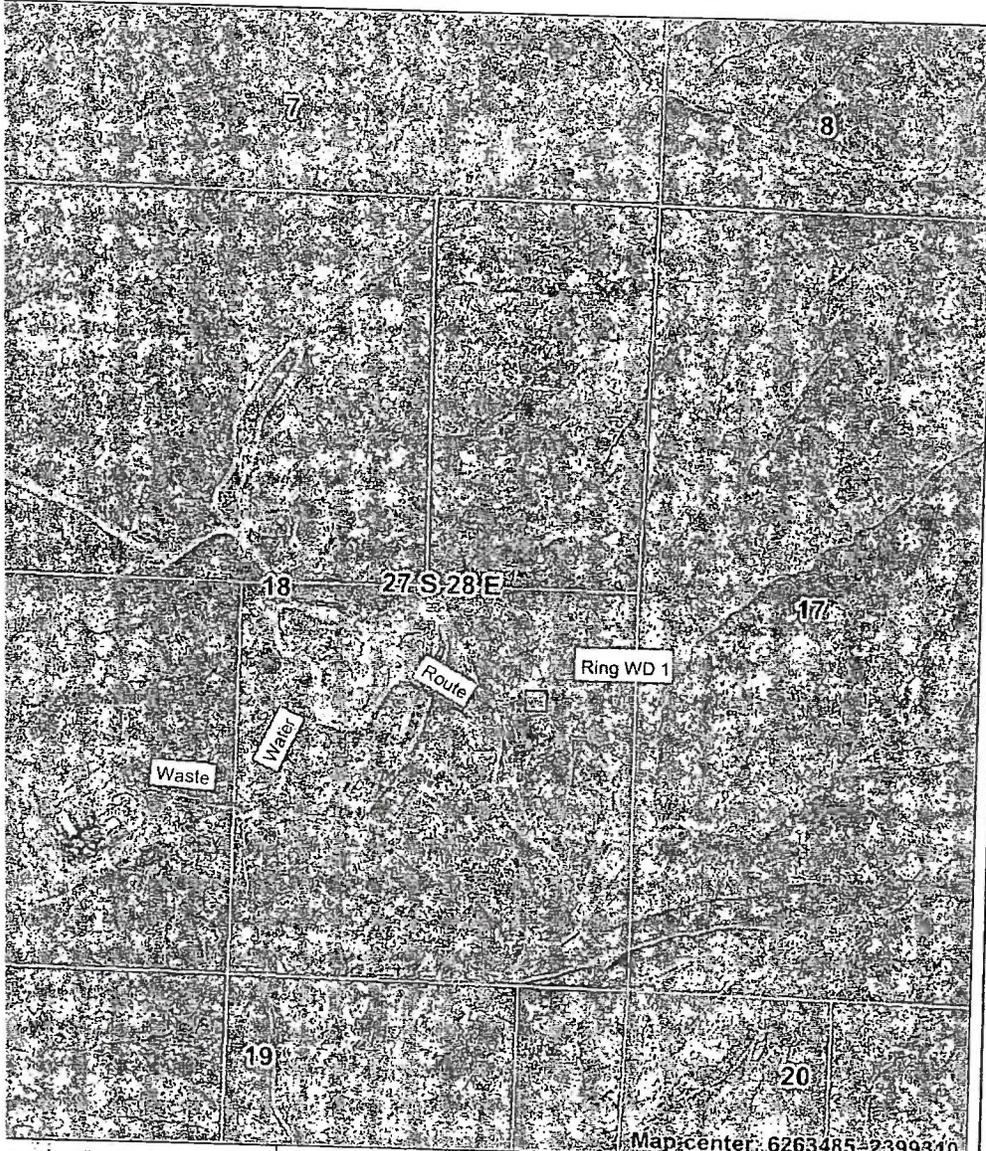
Aerial Photo 2008

Scale: 1:48,231

net mapping site and is for general
y or may not be accurate, current, or
IR NAVIGATION.

Notes: Macpherson Oil Company Section 18 Well Ring 18 WD 1 Site Access, Section
18, T. 27 S., R. 28 E., MDM, Kern County, Ca.

18 WD 1 Waste Water Supply Routing



Legend

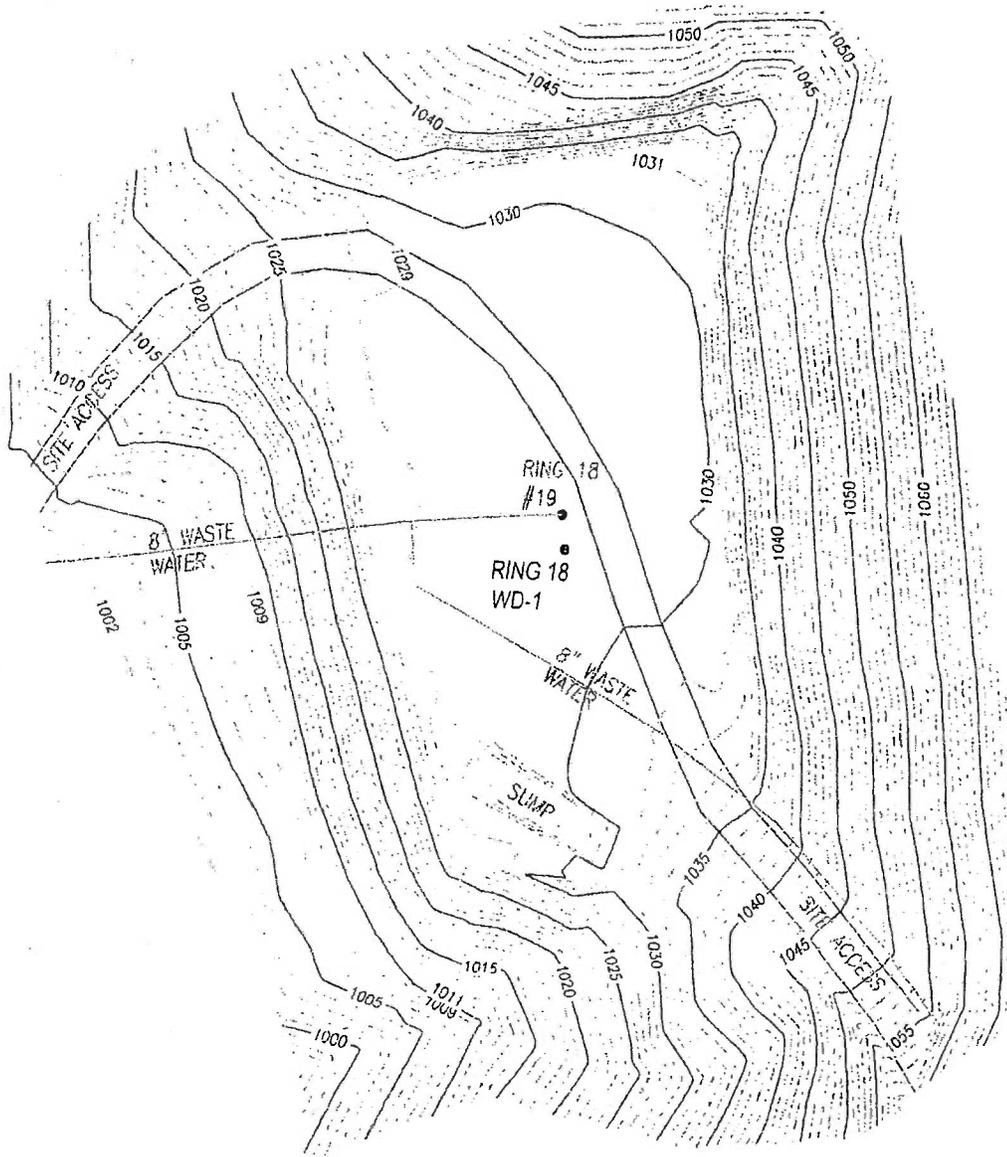
Map:center: 6263485, 2399310

Scale: 1:14,401

mapping site and is for general
may not be accurate, current, or
NAVIGATION.

Notes: Macpherson Oil Company Section 18 Well Ring 18 WD 1 Waste Water Supply
Route, Section 18, T. 27 S., R. 28 E., MDM, Kern County, Ca.

EXISTING CONDITIONS FOR THE
 MACPHERSON OIL CO.
 SECTION 18 WELL RING 18 WD 1

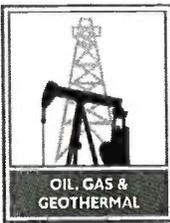


SCALE 1" = 50'
 MAY 3 2011
 DEPARTMENT OF OIL & GAS
 EMBERSHIP

Soles Surveying
 civil engineering land surveying
 442 Orcas St., Morro Bay, Ca 93442
 805 771-8915 661 805-3763 Cell
 solsurv@charter.net

EXISTING CONDITIONS FOR THE MACPHERSON OIL CO.
 SECTION 18 WELL RING 18 WD 1
 SECTION 18, T. 27 S., R. 28 E., M.D.M.
 KERN COUNTY, CALIFORNIA

© MacPherson Oil Co. 2009. All Rights Reserved. Section 18, T. 27 S., R. 28 E., M.D.M., Kern County, California. Date: 05/03/2011 2:11:55 PM



DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
4800 Stockdale Hwy., Suite 100 Bakersfield, CA 93309-0279
Phone:(661) 322-4031 Fax:(661) 861-0279

No. T414-1641

REPORT ON OPERATIONS

WATER DISPOSAL PROJECT
VEDDER
BLM

Mr. Scott Macpherson
Macpherson Operating Company, L.P. (M0955)
2716 Ocean Park Blvd. #3080
Santa Monica, CA 90405

Bakersfield, California
August 06, 2014

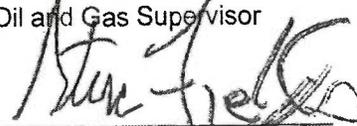
Your operations at well **"Ring 18" 21**, A.P.I. No. **029-87404**, Sec. **18**, T. **27S**, R. **28E**, MD B. & M., **Mount Poso** field, in **Kern** County, were witnessed on **6/6/2014**, by **Mary Holland-Ford**, a representative of the supervisor.

The operations were performed for the purpose of **determining casing integrity**.

DECISION:

APPROVED

Steven Bohlen
State Oil and Gas Supervisor

By 

MF/mf
cc: BLM
OG109

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF PROPERTY AND WELL TRANSFER

Field or county Mount Poso		District 04	
Former owner Macpherson Oil Company		Operator code M0950	Date 01/10/2013
Name and location of well(s) See attached list.			
Description of the land upon which the well(s) is (are) located Sec. 18, 19&20-27S/28E / Retain Spot Locs: None.			
Date of transfer, sale, assignment, conveyance, or exchange 11/01/2010	New owner Macpherson Operating Co. L.P.	Operator code (M0955)	Type of organization Limited Partnership
	Address 2716 Ocean Park Blvd. Ste. 3080 Santa Monica, CA 90405		Telephone No. 949-242-3636
Reported by Macpherson Oil Company (M0950)			
Confirmed by Macpherson Operating Co. L.P. (M0955)			
New operator new status (status abbreviation) PA	Request designation of agent		
Old operator new status (status abbreviation) PA	Remarks The DOGGR requirements for this transfer have been met. However, your right to enter and operate the wells/property is not complete until you receive final approval of transfer from the Bureau of Land Management.		
OPERATOR STATUS ABBREVIATIONS	Deputy Supervisor Burton R. Ellison		Signature <i>Burton R. Ellison</i> 1-10-13
	FORM AND RECORD CHECK LIST		
PA - Producing Active	Form or record	Initials	Date
NPA - No Potential, Active	Form OGD121		Map and book
PI - Potential Inactive	Form OGD140		Notice to be cancelled
NPI - No Potential, Inactive	New well cards		Bond status
Ab - Abandoned or No More Wells	Well records		EDP files
	Electric logs		Computer Files
	Production reports		

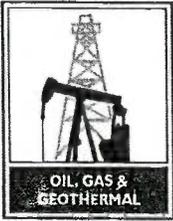
API	Lease	Well#	Active	Field Name	BLM	S	T	R	B&M	UIC	Project	die	Years
029-14060	Glide-19	3	Y	Mount Poso	Y	19	27	S	28	E	MD	Y	15

AP#	Lease	Well#	Active	FieldName	BLM	S	T	R	B&M	UICProject	Idle	Yearside
029-83694	Ring 18	101	Y	Mount Poso	Y	18	27S	28E	.	48818032		
029-89562	Ring 18	103	Y	Mount Poso	Y	18	27S	28E	MD		Y	15
029-14051	Ring 18	12	Y	Mount Poso	Y	18	27S	28E	MD			
029-14054	Ring 18	15	Y	Mount Poso	Y	18	27S	28E	MD			
029-66534	Ring 18	16	Y	Mount Poso	Y	18	27S	28E	MD			
029-66857	Ring 18	18	Y	Mount Poso	Y	18	27S	28E	MD		Y	15
029-67011	Ring 18	19	N	Mount Poso	Y	18	27S	28E	MD			
029-87403	Ring 18	20	Y	Mount Poso	Y	18	27S	28E	MD			
029-87404	Ring 18	21	Y	Mount Poso	Y	18	27S	28E	MD	48818026		
029-89560	Ring 18	22	Y	Mount Poso	Y	18	27S	28E	MD			
030-00784	Ring 18	25	Y	Mount Poso	Y	18	27S	28E	MD			
029-14048	Ring 18	9	Y	Mount Poso	Y	18	27S	28E	MD	48818026		
029-14039	Ring 18	1	N	Mount Poso	Y	18	27S	28E	MD			

API	Lease	Well#	Active	FieldName	BLM	S	T	R	B&M	UICProject	Idle	Years	Idle
029-14072	Ring 20	10	Y	Mqunt Poso	Y	20	27S	28E	MD		Y		15
029-14073	Ring 20	11	Y	Mount Poso	Y	20	27S	28E	MD		Y		10
029-14076	Ring 20	14	Y	Mount Poso	Y	20	27S	28E	MD				
029-14078	Ring 20	16	Y	Mount Poso	Y	20	27S	28E	MD	48818026			
029-66995	Ring 20	17	Y	Mount Poso	Y	20	27S	28E	MD		Y		15
029-14064	Ring 20	3	Y	Mount Poso	Y	20	27S	28E	MD	48818029			
029-66994	Ring 20	3A	Y	Mount Poso	Y	20	27S	28E	MD		Y		5
029-14071	Ring 20	9	Y	Mount Poso	Y	20	27S	28E	MD				

API	LeaseName	Well#	Active	FieldName	BLM	S	T	R	B&M	UICProject	IdleWell	Year
029-14082	Vedder USL	4	Y	Mount Poso	Y	20	27S	28E	MD			
029-14079	Vedder USL	1	Y	Mount Poso	Y	20	27S	28E	MD			
029-14080	Vedder USL	2	Y	Mount Poso	Y	20	27S	28E	MD			

AP	Lease	Well#	Active	FieldName	BLM	S	T	R	B&M	UIC	Project	Idle	Years
029-85331	Union 18	5	Y	Mount Poso	Y	18	27S	28E	MD				
030-02050	Union 18	WS 2	Y	Mount Poso	Y	18	27S	28E	MD				
029-89773	Union 18	WS 1	Y	Mount Poso	Y	18	27S	28E	MD				
029-85330	Union 18	4	Y	Mount Poso	Y	18	27S	28E	MD				



DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES

No. T409-0185

REPORT ON OPERATIONS

MECHANICAL INTEGRITY TEST (MIT)

WATER DISPOSAL PROJECT
VEDDER
BLM

Mr. Scott Mundy
Macpherson Oil Co. (M0950)
P.O. Box 5368
Bakersfield, CA 93388

Bakersfield, California
February 12, 2009

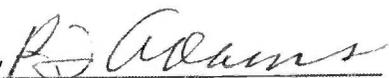
Your operations at well "Ring 18" 21, A.P.I. No. 029-87404, Sec. 18, T. 27S, R. 28E, MD B. & M., Mount Poso field, in Kern County, were witnessed on 7/22/2008. W. F. (Bill) Penderel, a representative of the supervisor, was present from 1100 to 1500. Also present was Gary Adams, contractor rep.

The operations were performed for the purpose of demonstrating that the injection fluid is confined to strata below 2380'.

DECISION:

THE INJECTION SURVEY IS APPROVED SINCE IT INDICATES THAT ALL OF THE INJECTION FLUID IS CONFINED TO THE FORMATIONS BELOW 2380' AT THIS TIME.

Hal Bopp
State Oil and Gas Supervisor

By 
Randy Adams
Deputy Supervisor

WFP/kk pm
cc: BLM

OG109

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES

No. T 0185

REPORT ON OPERATIONS

Macpherson
Bakersfield, California

Your operations at well "Ring 10" 21, API No. 029-87404,
Sec. 18, T. 27S, R. 28E, MD B. & M. Mt. Paso Field, in Kern County, were
witnessed on 7/22/2008 by Mr. W.F. Penderel, a representative of the supervisor
from 1100 to 1500. There were also present Mr. Gary Adams, Contractor's
representative.

Present condition of the well: 16" LD 80'; 9 5/8" Cem 2380'; 7" Cem 2330';
7" LD 2339'-2426', part 2397'-2423'. TD 2476'.
Plugged w/cem 2476'-2445'.

The operations were performed for the purpose of "F" 2380

DECISION: "S" 2380

Hal Bopp
State Oil and Gas Supervisor

By _____
Randy Adams
Deputy Supervisor

Intention / Type	Drill/ <i>OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>	<i>work OG</i>
P-Report No.	P490-6695	P491-3332	P492-3396	P400-0946 **					
Proposed Pool	<i>10 member</i>	10	10	10					
Completed Pool	<input checked="" type="checkbox"/>	10	10	10					
Status / Date	<i>CG/ 3-25-91</i>	<i>OG/ 6-26-91</i>	<i>8/27/92</i>	<i>WD/ 5-16-08</i>					
	Rec'd	Hold	Rec'd	Hold	Rec'd	Hold	Rec'd	Hold	
History	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Summary	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
Signature	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Core									
SWS	<input checked="" type="checkbox"/>								
Logs: E-Log	<input checked="" type="checkbox"/>								
FDC/CNL/GR									
CBL									
<i>WSD</i>	<input checked="" type="checkbox"/>								
<i>RA Survey</i>							<i>7/22/00</i>	<input checked="" type="checkbox"/>	
Direct. Survey	<input checked="" type="checkbox"/>								
T-Report							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Environ. Inspect.									
Location	<input checked="" type="checkbox"/>								
Elevation	<input checked="" type="checkbox"/>								
Map No. Date Entered Initials	<i>440</i> <i>1-10-95</i> <i>JK</i>	<i>N/C</i>	<i>N/C</i>						
Drill Card	<input checked="" type="checkbox"/>								
Init. Prod. (Date)	<i>3-25-91</i>	<i>6-26-91</i>					<i>5-19-08</i>		
6 mos. Prod. (Date)	<i>AK RT 7-9-93</i>								
Hold For Records (Date & Initials)	<i>4-23-91 RR</i>	<i>7/21/91*</i>	<i>9/11/92*</i>				<i>6-25-08</i>		
Records Approved (Date & Initials)	<i>RT 7-9-93</i>	<i>RT 7-9-93</i>	<i>RT 7-9-93</i>				<i>WJ 2/5/2007</i>		
Bond Eligible For Release (Date)									
E.D.P. Clerk							<i>6/19/13</i>		
Confid. Clerk							<i>1/21/14</i>		
Form 121									
Bond No.									
Date	<i>BE</i>	<i>BE</i>							
Form 150 (Release)									
Form 159 (Final Letter)									
Remarks:	<p><i>* OK to approve rework when initial drill is approved for 6 mo.</i></p> <p><i>8-13-92/RB: after acid wash the 7" line was accidentally pulled, will run liner w/ new LCA to some depth, rule notice coming in</i></p> <p><i>includes sup dated 5/27/00 (P400-3427)</i></p>								
Storage:									
Final Letter Approval:									

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

WELL SUMMARY REPORT

API NO. 029-87404

Operator Macpherson Oil Company		Well Ring 18 #21				
Field Round Mountain		County Kern	Sec. 18	T. 27S	R. 28E	B.&M. MD B&M
Location (Give surface location from property or section corner, street center line) 3967' S & 1723' W from NE corner of Section 18, T27S, R28E, MD B&M					Elevation of ground above sea level 984'	
California Coordinates (if known):						
Was the well directionally drilled? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, show coordinates at total depth.						

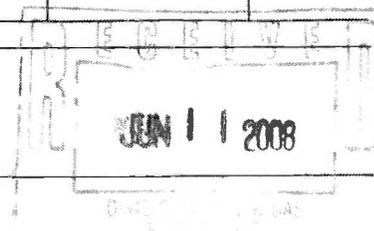
Commenced drilling (date) 5/9/08	(1st hole) 2476'	Total depth	(3rd)	Depth measurements taken from top of: <input checked="" type="checkbox"/> Derrick Floor <input type="checkbox"/> Rotary Table <input type="checkbox"/> Kelly Bushing	
		(2nd)		Which is 9 feet above ground	
Completed drilling (date) 5/18/08	Present effective depth 2426'			GEOLOGICAL MARKERS Vedder	
Commenced production/injection (date) 5/19/08	Junk			DEPTH 2398'	
Production mode: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas lift				Formation and age at total depth	
Name of production/injection zone(s) Vedder					

	Clean Oil (bbl per day)	API Gravity (clean oil)	Percent Water (including emulsion)	Gas (Mcf per day)	Tubing Pressure	Casing Pressure
Initial Production						
Production After 30 days						

CASING AND CEMENTING RECORD (Present Hole)

Size of Casing (API)	Top of Casing	Depth of Shoe	Weight of Casing	Grade and Type of Casing	New (N) or Used (U)	Size of Hole Drilled	Number of Sacks or Cubic Feet of Cement	Depth of Cementing (if through perforations)	Top(s) of Cement in Annulus
16"	Surface	80'	36#		N				
9-5/8"	Surface	2380'	36#	K-55	N	12-1/4"	1180 CuFt		surface
7"	Surface	2330'	23#	J-55	N	12-1/4"	573 CuFt		surface
7"	2339'	2426'	23#	J-55	N	17"			

PERFORATED CASING (Size, top, bottom, perforated intervals, size and spacing of perforations, and method.)
7", 23#, top @ 2339', bottom @ 2426', perforated 2397' - 2423' w/ 12G WWS



Logs/surveys run? Yes No If yes, list type(s) and depth(s).

In compliance with Sec. 3215, Division 3, of the *Public Resources Code*, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Name -Ron Palmer/		Title Production Engineer	
Address P.O. Box 5368		City/State Bakersfield, Ca.	Zip Code 93388
Telephone Number 661 393 3204	Signature <i>Ra Pal</i>		Date 6.9.08

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

HISTORY OF OIL OR GAS WELL

Operator Macpherson Oil Company Field Round Mountain County Kern
Well Ring 18 #21 Sec. 18 T. 28S R. 29E MD B.&M.
A.P.I. No. 029-87404 Name Ron Palmer Title Production Engineer
(Person submitting report) (President, Secretary, or Agent)
Date 5/23/2008
(Month, day, year)

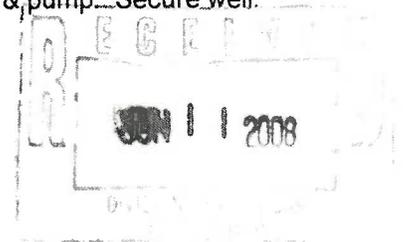
Signature Ron Palmer

Address P.O. Box 5368 Bakersfield, Ca. 93388 Telephone Number 661 393 3204

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment, with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests, and initial production data.

Convert to Water Disposal, Install ICS

Date	Description
5/9/08	MIRU. Put out guy wires. Work tools loose. Pull & LD 4-1/2" tbg. Break down tools. PU 3-1/2" tbg. & RIH. Secure well
5/10/08	Open well. Cont. to PU & RIHw/ 3-1/2" tbg. Tag fill @ 2425'. Pull tbg. up to liner top. Dump 15 CuFt sand. Pull tbg. high & wait 1/2 hr. Tag @ 2381'. Dump 10 CuFt 12/20 hot sand, pull up & wait 1/2 hr. Tag @ 2338'. POOH w/ tbg. & close in well.
5/12/08	Open well. PU & Rih w/ bailer. Tag sand @ 2334'. POOH w/ bailer. MU cmt. dump bailer. RIH & dump 1 CuFt cmt. @ 2334'. POOH & LD dump bailer. NU BOPE w/ 7" rams. Unload 7", 23#, LT&C, J-55 casing to racks. RU tong service & tools. MU 7" cementing shoe w/ 9-5/8" cup & side ports. Run shoe jt of 7", 23#, J-55, LT&C casing. Install cement insert. Cont. to RIH picking up 7", 23#, J-55, LT&C casing. Tag @ 2329'. RO tong service. RU cementers. Clear 7" casing w/ lease water. Mix & pump 190 CuFt of 50/50 poz mix cmt. followed with 383 CuFt of Class G cmt. w/ 35% SF. Displace wiper plug w/ 90 bbls lease water. Plug didn't bump, 12 bbls cmt. returns & 850 psi. Close in well. RO cementers.
5/13/08	Check well, no pressure. Casing has no movement. Welder cut off 9-5/8" wellhead & installed 7-1/16", 2000# wellhead. MU 6-1/8" bit & PU 4 4-3/4" DCs. RIH & tag @ 2270'. Drill out cmt. wiper & baffle t/ 2285'. RU power swivel & circ. Head. Drill out wiper plug. Return lines plugged w/ rubber. Stop & clean out. Secure well.
5/14/08	Open well. Cont. drlg. f/ 2285' cmt. t/ shoe @ 2330'. Drill out shoe & cmt. cap. Drill out plug back sand & circ. Clean t/ 2400'. Lost returns. Pull up hole to 300'. Secure well.
5/15/08	Open well. Cont. to POOH. LD DCs. MU bailer & tag @ 2400'. Bailed t/ 2428'. RU pump truck. Establish injection, ran 200 psi, 10 BPM for 400 bbls. RO pump truck. MU 7" casing scraper & RIH t/ 2326'. POOH & secure well.
5/16/08	Open well. RU tubing tester. MU 7" Lockset packer & RIH w/ 3/1/2" tbg. hydrotesting tbg. to 4,000 psi. Found 1 leak & replaced jt. RO tubing tester. Set packer top @ 2309' in compression. Land & NU flange. Fill casing w/ packer fluid. Pressure test packer & csg. To 400 psi. Test OK. Call out DOGGR engineer to witness SAPT. OK per W.F. Penderel. Load out tools & pump. Secure well.
5/19/2008	RDMO hoist & equipment.



Macpherson Oil Company

WBD As of : 8/31/1992

Field: Mount Poso

Drawing Date: 7/5/07

Lease Ser. #: SAC 037934

Well No: Ring 18 #21

Commenced Drilling: 1/17/91

Sec. 18, T27S, R28E, MD B&M
3967' S & 1723' W from NE corner of

Completed Drilling: 1/23/91

On Production: 3/25/91

Unit or CA #:

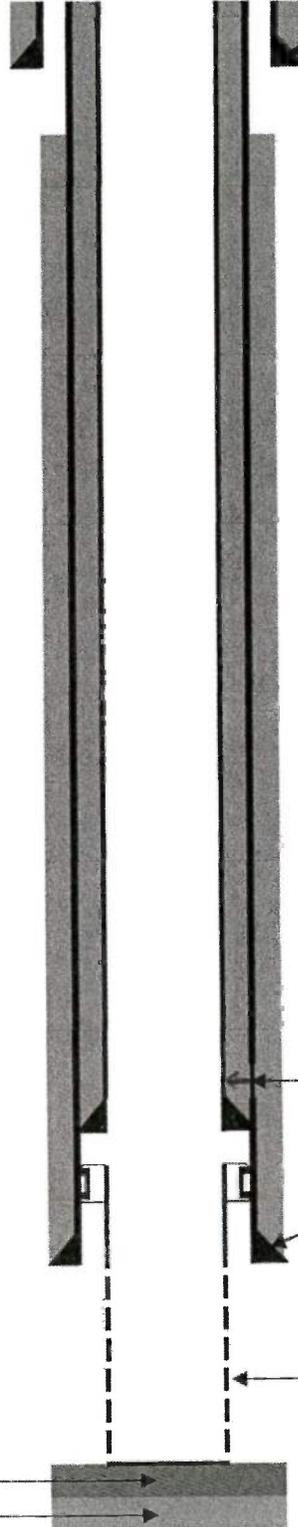
All measurements from DF

GL: 984'

DF: 993'

API #: 029-87404

Hole Size: 12-1/4" 80' - 1220'
15" 1220' - 1360'
12-1/4" 1360' - 2380'
17" 2380' - 2440'
8-3/4" 2440' - 2476'



16" Conductor Pipe @ 80'

Prod. Equip. as of

5/19/08

	Length	Depth
KB	9.00	
3-1/2" pup jt.	3.80	9.00
74 jts. 3-1/2" tbg.	2295.22	12.80
xover	1.10	2308.02
7" Lokset pkr.	?	2309.12
		#VALUE!

7", 23#, LTC, J55 inner casing string @ 2330' cemented w/ 573 CuFt cmt. TOC @ surface

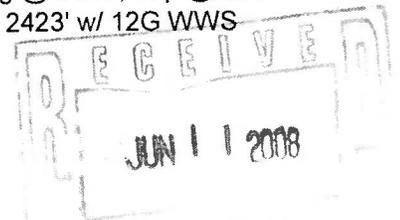
9-5/8", 36# casing @ 2380' Cemented with 1180 CuFt Cmt. TTOC @ surface

7", 23# Liner Hung @ 2426', Top @ 2339' Perforated 2397' - 2423' w/ 12G WWS

Top Vedder @ 2398'

Fill 2426'-2445'
Cement Plug 2445'-2476'

TD @ 2476'





DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES

No. P408-3427

PERMIT TO CONDUCT WELL OPERATIONS

	Old	New
FIELD CODE	<u>488</u>	<u>488</u>
AREA CODE	<u>18</u>	<u>18</u>
POOL	<u>10</u>	<u>10</u>

WATER DISPOSAL PROJECT
BLM
Vedder Zone

Mr. Scott Mundy
Macpherson Oil Co. (M0950)
P.O. Box 5368
Bakersfield, CA 93388

Bakersfield, California
June 06, 2008

Your Supplementary proposal to **REWORK AND CONVERT TO WATER DISPOSAL** well "Ring 18" 21, A.P.I. No. 029-87404, Section 18, T. 27S, R. 28E, MD B. & M., Mount Poso field, West area, Vedder pool, Kern County, dated 5/27/2008, received 5/27/2008 has been examined in conjunction with records filed in this office.

DECISION: THE PROPOSAL, COVERING WORK ALREADY COMPLETED IN ACCORDANCE WITH PRIOR AGREEMENT, IS APPROVED.

1. In all other respects, the well is to be reworked in accordance with provisions outlined in Report No. PP408-0948, dated 02/20/2008.
2. The operations and surveillance of this well shall conform to the requirements outlined in our project approval letter dated 02/26/1993.
3. No change in the proposed program shall be made without prior approval of this Division.

Blanket Bond

Hal Bopp
State Oil and Gas Supervisor

Engineer Burton R. Ellison
Direct (661) 334-3674
Office (661) 322-4031

By Randy Adams
Randy Adams
Deputy Supervisor

BE/dy

RESOURCES AGENCY OF CALIFORNIA
 DEPARTMENT OF CONSERVATION
 DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

FOR DIVISION USE ONLY		
	Forms	
Bond	OGD114	OGD121
<i>B</i>	<i>an</i>	<input checked="" type="checkbox"/>

SUPPLEMENTARY NOTICE

A notice to the Division of Oil, Gas, and Geothermal Resources, dated 5/27/08, stating the intention to

Workover well " Ring 18 #21, API No. 029-87404
(Drill, rework, abandon) (Well designation)

Sec. 18, T. 27S, R. 28E, MD B.&M., Mount Poso Field,
 Kern County, should be amended because of changed conditions.

1. The complete casing record of the well (present hole), including plugs and perforations, is as follows:

- 16" conductor @ 80'
- 9-5/8", 36# casing @ 2380' cemented w/ 1180 CuFt cmt. TTOC @ surface.
- 7", 23#, Liner hung @ 2426'. Top @ 2339'. Perforated 2397' - 2423' w/ 12G WWS.
- Fill 2426' - 2445'
- Cement plug 2445' - 2476'

S. 2008
BE 5-28-08
On 5/29/08
6-5-08

2. The total depth is 2476 feet. The effective depth is: 2426 feet.

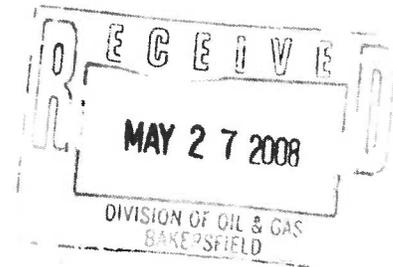
3. Present completion zone (s): Vedder. Anticipated completion zone (s): Vedder

4. Present zone pressure: 30 psi. Anticipated/existing new zone pressure: 30 psi.

We now propose: (A complete program is preferred and may be attached.)

1. Sand back & dump bail 1 CuFt cement in existing 7" liner
2. Install and cement new 7" inner casing string from surface to top of liner (~2330')
3. Clean out cement & sand to ED
4. Begin water disposal

*Note: Verbal approval to run & cement
 7" inner casing string granted on 5/8/08.
 BRE*



Note: If the well is to be redrilled, show proposed bottom-hole coordinates and estimated true vertical depth. The Division must be notified if changes to this plan become necessary.

Name of Operator Macpherson Oil Company	661 393 3204	
P.O. Box 5368	City Bakersfield	Zip Code 93308
Name of Person Filing Notice Ron Palmer	Signature <i>Ron Palmer</i>	Date 5.27.08

PERMIT TO CONDUCT WELL OPERATIONS

WATER DISPOSAL PROJECT

Vedder Zone

BLM

488
FIELD CODE
18
AREA CODE
10
NEW POOL
10
OLD POOL

5-8-08

BE/Ron Palmer w/ Macpherson

Bakersfield, California

February 20, 2008

Mr. Scott Mundy
Macpherson Oil Co.
P.O. Box 5368
Bakersfield, CA 93388

9 5/8" casing would not pressure test -
OK to locate holes & squeeze w/cement. Will then
run and cement a 7" inner casing string from 2320'
to surface. Supplementary notice to follow ASRP. *RAC*

Your proposal to rework and convert to water disposal well "Ring 18" 21, A.P.I. No. 029-87404, Section 18, T. 27S, R. 28E, MD B. & M., Mount Poso field, West area, Vedder pool, Kern County, dated 01/24/08, received 01/24/08 has been examined in conjunction with records filed in this office.

DECISION: THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Prior to commencing operations, an operator's representative shall instruct all operator's rig personnel, or drilling contractor's representative, on the potential hazards and control of wells which operate in active steam zones or areas of anomalous zone pressures.
2. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
3. The specified blowout prevention equipment, as defined by DOGGR Manual M07, is considered minimal and shall be maintained in operating condition at all times: on the 9 5/8" casing, DOGGR Class II 2M.
4. A standard annular pressure test shall be conducted prior to commencing injection, as outlined in the Notice to Operators dated January 9, 1990. One copy of the test results shall be submitted to this office and, unless otherwise notified, this office will not witness it.
5. Sufficient surveys shall be run within 90 days after the injection begins to confirm that the injection fluid is confined to the intended zone of injection.
6. **THIS DIVISION SHALL BE NOTIFIED TO:**
 - a. **WITNESS** a standard annular pressure test, prior to commencing injection. A 24 hour notification is required.
 - b. **WITNESS** within 90 days after injection is started, sufficient surveys to confirm that the injection fluid is confined to the intended zone of injection. A 24 hour notification is required.
7. The operations and surveillance of this well shall conform to the requirements outlined in our project approval letter dated 02/26/93.
8. No change in the proposed program shall be made without prior approval of this Division.

NOTES:

1. Upon completion of the proposed work, a form OG103, History of Oil & Gas Well, shall be submitted to this office, noting the effective date of conversion.
2. Issuance of this report was held in abeyance pending the completion of the "Area of Review" for "Ring 18" 21.

Blanket Bond

Hal Bopp
State Oil and Gas Supervisor

Engineer Burton Ellison
Direct (661) 334-3674
Office (661) 322-4031

By *Randy Adams*
Randy Adams
Deputy Supervisor

BE/dy *DM*

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

NOTICE OF INTENTION TO REWORK / REDRILL WELL

C.E.Q.A. INFORMATION (when redrilling or deepening only)			
Exempt <input type="checkbox"/>	Neg. Dec. <input type="checkbox"/>	E.I.R. <input type="checkbox"/>	Document not required by local jurisdiction <input type="checkbox"/>
Class _____	S.C.H. No. _____	S.C.H. No. _____	
See Reverse Side			

FOR DIVISION USE ONLY			
Bond	Forms	EDP Well File	
	OGD 11A	OGD 121	

This notice and an indemnity or cash bond must be filed, and approval given, before the rework/redrill begins. (See the reverse side for bonding information.) If operations have not commenced within one year of receipt of the notice, this notice will be considered canceled.

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework/redrill well Ring 18 #21 (Circle one) (Well designation) API No. 029-87404

Sec. 18 T. 27S R. 28E MD B.&M. Mount Poso Field

Kern County.

1-25-08
1-25-08
2-14-08
2-15-08
2-20-08

1. The complete casing record of the well (present hole), including plugs and perforations, is as follows:
See attached proposed program to convert well to Water Disposal service.

2. The total depth is: 2476' feet. The effective depth is: 2475' feet.

3. Present completion zone (s): Vedder (Name) Anticipated completion zone (s): Vedder (Name)

4. Present zone pressure: 30 psi. Anticipated/existing new zone pressure: 30 psi.

5. Last produced: Oct. 1998 (Date) 0 (Oil, B/D) 3920 (Water, B/D) 0 (Gas, Mcf/D)

(or)
Last injected: _____ (Date) _____ (Water, B/D) _____ (Gas, Mcf/D) _____ (Surface pressure, psig)

6. Is this a critical well according to the definition on the reverse side of this form? Yes No
The proposed work is as follows: (A complete program is preferred and may be attached.)

See attached proposed program to convert well to Water Disposal service.

For redrilling or deepening: _____ (Proposed bottom-hole coordinates) _____ (Estimated true vertical depth)

The division must be notified if changes to this plan become necessary.

Name of Operator Macpherson Oil Company	Telephone Number 661 393 3204	Zip Code 93308
Address P.O. Box 5368	City Bakersfield, Ca.	Date 1.24.08
Name of Person Filing Notice Ron Palmer	Signature <i>Ron Palmer</i>	

File In Duplicate

Macpherson Oil Company

Post Office Box 5368
Bakersfield, CA 93388
Phone: (661) 393-3204
Fax: (661) 393-8065

Well Remedial/Workover Program

1-24-2008

Well: Ring 18 #21 (029-87404)

Reason for Workover: Convert to Water Disposal.

Planned Work: Convert to Water Disposal into the Vedder Sand

Well Conditions/Casing: (Completed 1-23-1991)

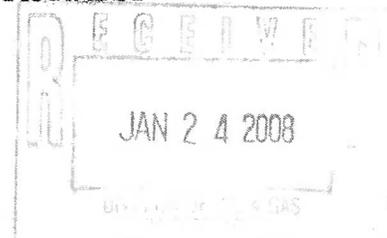
Elevation GL: 984' **DF:** 883'

9-5/8" 36# casing cemented @ 2380' with 1180 CuFt Cement. TTOC @ surface

7" 23# liner landed @ 2426', Top @ 2339'. Perforated: 2397'- 2423' w/ 12G WWS.

Total Depth: 2476'

Production Equipment: 75 Jts. 4-1/2" tubing. Reda ESP



Project/Workover Procedure:

1. MIRU workover rig. Kill well. Install BOPE.
2. Pull tubing, & ESP.
3. M/U bailer and RIH. Clean out to 2425''
4. MU A-1 Lok Set Packer on 4-1/2'' tubing. RIH & set packer @ 2300'.
5. NU new injection well head with 4-1/2'' threads.
6. Close well in. R/O workover rig.



RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

February 4, 2008
Bakersfield, CA

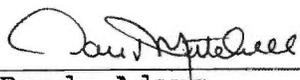
Mr. Scott Mundy
Macpherson Oil Co.
P.O. Box 5368
Bakersfield, CA 93388

This Division has received your NOTICE OF INTENTION TO REWORK & CONVERT TO WATER DISPOSAL "Ring 18" 21, (029-87404), Sec. 18, T. 27S, R. 28E, MD B. & M., Mount Poso, Kern County, dated 01/24/2008.

THIS NOTICE IS BEING HELD IN ABEYANCE PENDING THE COMPLETION OF THE "AREA OF REVIEW" FOR "RING 18" 21.

If you have any questions, you may contact Burt Ellison at (661) 334-3674.

Hal Bopp,
State Oil & Gas Supervisor

By  for
Randy Adams
Deputy Supervisor

RA/js *dm*

OG113

MACPHERSON

O I L C O M P A N Y

P.O. BOX 5368
BAKERSFIELD, CALIFORNIA 93388
TEL: 661 393-3204 FAX: 661 393-8065

2716 OCEAN PARK BOULEVARD,
SUITE 3080
SANTA MONICA, CALIFORNIA 90405
TEL: 310 452-3880 FAX: 310 452-0058

January 24, 2008

Department of Conservation
Division of Oil, Gas and Geothermal Resources
District 4
4800 Stockdale Hwy., Suite 417
Bakersfield, Calif. 93309-4031

Re: Proposed replacement of Water Disposal well
Ring 18 #19R.
Project # 48818026, Vedder Zone

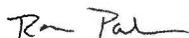
Gentlemen:

We would like to ask for approval to convert Ring 18 #21 to Water Disposal service in the Vedder Zone. We currently have a permit to dispose water in a maximum of three wells in the Vedder zone and those three wells are Ring 18 #16, Ring 18 #19R and Ring 20 #16. Ring 18 #19R was the only active well until January, 2008 when it went down with mechanical problems. Water Disposal has been resumed in Ring 18 #16. We are proposing to remove Ring 18 #19R from the permit and replace it with Ring 18 # 21.

Attempts to repair or cleanout Ring 18 #19R have not been successful and Ring 18 # 21 can be converted to Water Disposal service with a minimum effort and time. We can then utilize Ring 18 # 21 as a back up Disposal well.

The Geological and Formation Data for Ring 18 #21 are the same as originally stated in the Proposal for Project # 48818026. All fluids are the same as in the other wells in the project. We anticipate injection rates will not exceed the existing approved rate of 65,000 bbls day. Please feel free to contact Ron Palmer at 393.3204 ext.105 if you have any questions.

Sincerely,



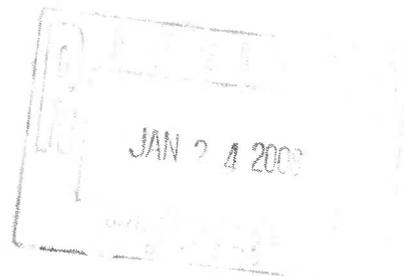
Ron Palmer
Sr. Production Engineer
Macpherson Oil Company

2-4-08

BE/D. Mitchell

OK to substitute "Ring 18" 21
for the damaged "Ring 18" 19
provided the "Area of Review"
for the Vedder is OK.

Note: See Project File for "AOR."
BRE



RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES

T493-0724

REPORT ON OPERATIONS

Bakersfield, California
August 5, 1993

Chris E. Williamson
MACPHERSON OIL COMPANY
P.O. Box 5368
Bakersfield, CA 93388

Your operations at well "Ring 18" 21, API No. 029-87404, Sec. 18, T. 278, R. 28E, MD B&M, Mount Poso field, in Kern County, were reviewed on 7/9/93 by Richard Thesken, a representative of the supervisor.

Present condition of well: See well summary

The operations were performed for the purpose of evaluating the 9 5/8" water shut-off by reviewing the production data.

DECISION:

THE 9 5/8" SHUT-OFF AT 2380' IS APPROVED.

William F. Guerard Jr.
Acting Oil & Gas Supervisor

11-08-93
Hal Bopp, Deputy Supervisor

RT/jc DCM

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

WELL SUMMARY REPORT

SUBMIT IN DUPLICATE

Operator Macpherson Oil Company, Well No. Ring 18 - #21, API No. 029-87404

Sec. 18, T. 27S, R. 28E MD B. & M., West Area - Mount Poso Field, Kern County.

Location 3967' South & 1723' West of NE Corner of Sec 18 T237S, R28E

(Give surface location from property or section corner, or street center line and/or lambert coordinates)

Elevation of ground above sea level 984' feet.

All depth measurements taken from top of KB which is 9 feet above ground.
(Derrick Floor, Rotary Table or Kelly Bushing)

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Date August 31, 1992

RECEIVED

Signed Chris Williamson

Engineer-Chris Williamson
(Engineer or Geologist)

SEP 10 1992

Title Engineer

Commenced ~~drilling~~ rework 8-11-92
Completed ~~drilling~~ rework 8-27-92
Total depth (1st hole) 2476' (2nd) _____ (3rd) _____
Present effective depth 2426'
Junk 5' "OLD" 7" Liner blank 2440'/2445'

DIVISION OF OIL & GAS
BAKERSFIELD

GEOLOGICAL MARKERS	DEPTH
Vedder Sand	2398'

Formation and age at total depth Vedder Sand Mioce

Name of producing zone Vedder Sand

Commenced producing _____ Flowing/gas lift/pumping _____
(Date) (Cross out unnecessary words)

Initial production _____
Production after 30 days _____

Clean Oil bbl. per day	Gravity Clean Oil	Per Cent Water including emulsion	Gas Mcf. per day	Tubing Pressure	Casing Press

CASING RECORD (Present Hole)

Size of Casing (A. P. I.)	Depth of Shoe	Top of Casing	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Numbers of Sacks or Cubic Feet of Cement	Depth of Cement if through perforations
16"	80'	surface	conductor					
9-5/8"	2380'	surface	36#	K-55	New	12-1/4"	1188cu ft	
7"junk	2445'	2440'	23#	Blank		14"		
7"	2426'	2339'	23#	WWS		17"		

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

Perforations .012" openings WWS 2396'/2423'

Was the well directionally drilled? Yes If yes, show coordinates at total depth from wellhead 73.73'S & 13.20'E

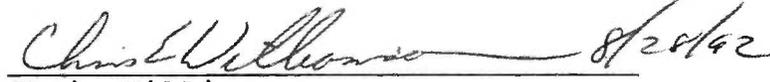
Electrical log depths _____ Other surveys _____

MACPHERSON OIL COMPANY - MPCC
MOUNT POSO FIELD - WEST AREA, Kern County
Section 18 T27S R28E
RING 18 Lease Well #21
API# 029-87404 BLM# SAC-037934

RECEIVED

SEP 10 1992

DIVISION OF OIL
BAKERSFIELD


Chris Williamson
Engineer

DAY 1 8-11-92 6:00AM to 2:30PM

Spotted rig mat and rig. Rigged up hoist and put out guy wires. ND production tree. Disconnected electrical cable. LD head joint. Rigged up spooler POOH 30 joints 4-1/2" tubing and 1960' of cable. Broke down and loaded up electric submersible pump. Made up 3-3/4" bailer RIH tag at 2419'. Bailed to 2431'. Started getting red brick stood bailer back. Secured well, PM.

DAY 2 8-12-92 6:00AM to 6:00PM

Opened well. RIH with bailer tagged at 2431'. POOH with bailer. Made up 7" opposing cups with 10" spacing. RIH tagged with tools at 2403' KB, 30' high. Hooked up vac truck pumped 21 bbls and stopped taking fluid. Pulled up and LD 14.30' kelly joint, tubing at 2389' would not take fluid. Pulled up 78' went back down and stacked out 29' high. POOH with tubing and cups. Suspect liner pulled up hole on cups, fell from 860' to TD. RIH with bailer tagged at 2405'. POOH with bailer had red brick in the bottom. Second run with bailer tagged at 2408'. Secured well, PM.

DAY 3 8-13-92 7:00AM to 6:00PM

Serviced rig. Made up 2 joints 2-7/8" and 8-5/8" IB, RIH on sand line tagged liner top at 2314'. POOH L/D IB and tubing. Made up spear and bumper sub RIH engaged liner pulled liner free. POOH L/D liner. RIH with tubing. Secured well, PM. Recieved verbal approval from DOG (Reed Bowles), BLM (Dave Moore), to rerun liner to same depth.

DAY 4 8-14-92 6:00AM to 8:00AM

Serviced rig. Cleaned and loaded tubing equipment. Picked up trash cleaned location. Dropped guy wires. RDMO.

THE WELL WAS SHUT DOWN FOR 4 DAYS

DAY 5 8-18-92 6:00AM to 3:00PM

Moved rig from Union 18-3. Spotted rig mat and rig. Rigged up and guyed out. Unloaded equipment, spotted pump. POOH with tubing. Welded drill in shoe on 7" liner. Picked up 81' 7" 23# wire mesh liner, made up 3 joints of 2-7/8" tubing and "J" tool. "J" into liner. RIH with liner to 2300'. Secured well, PM.

MACPHERSON OIL COMPANY - MPCC
 MOUNT POSO FIELD - WEST AREA, Kern County
 Section 18 T27S R28E
 RING 18 Lease Well #21
 API# 029-87404 BLM# SAC-037934

RECEIVED

SEP 10 1992

Chris Williamson 8/28/92

Chris Williamson
 Engineer

DIVISION OF OIL & GAS
 BAKERSFIELD

DAY 6 8-19-92 6:00AM to 5:30PM

Serviced rig. Picked up 7 joints off the ground, tag with shoe at 2400'. Rigged up swivel washed liner into 2426' un "J" from liner. POOH with tubing L/D stinger. Rigged out swivel. Made up liner setting tool. RIH tag liner top at 2339'. Screwed in setting tool. Set lead seal, released from liner. POOH L/D setting tool. Made up cement dump bailer mixed 1/2 sack of cement. RIH on sandline dumped cement on liner shoe. POOH broke down bailer. RIH with 6 joints of kill string. Rigged out pump, hauled swivel to the yard. Secured well, PM.

LINER DETAIL:	SIZE	- 7" 23#
	TOP LSA	- 2339.33'
	TOP SCREEN (PERFORATIONS)	- 2396.53'
	BASE SCREEN (PERFORATIONS)	- 2422.99'
	BOTTOM LINER	- 2426.14'

DAY 7 8-21-92 6:00AM to 8:30AM

Held 5 minute safety meeting. Pinch points. Serviced rig. RIH with 75 joints of tubing, L/D 7 joints, landed tubing. Loaded out tubing equipment. Dropped guylines. RDMO.

NO WORK WAS DONE TO THE WELL FOR 6 DAYS

DAY 8 8-27-92 6:00AM to 3:30PM

Held 5 minute safety meeting (safety glasses). Serviced the rig. Road rig from Ring 20-3 to 18-21. Spotted rig mat, rigged up rig. ND well head. POOH with kill string. Dropped red brick in the hole. Picked up and made up Reda electric submersible pump. Hung sheave, rigged up spooler. Tallied, banded and hooked up electrical cable. Checked rotation, fluid to surface in 5 minutes. Loaded equipment. RDMO.

PERMIT TO CONDUCT WELL OPERATION

488
FIELD CODE
18
AREA CODE
10
NEW POOL
10
OLD POOL

Bakersfield, California
September 17, 1992

Chris E. Williamson
MACPHERSON OIL COMPANY
P. O. Box 5368
Bakersfield, CA 93388

Your proposal to rework well "Ring 18" 21, A.P.I. No. 029-87404, Section 18, T. 27S, R. 28E, M.D. B. & M., Mount Poso field, West area, Vedder pool, Kern County, dated —, received 9/10/92 has been examined in conjunction with records filed in this office.

DECISION: THE PROPOSAL, COVERING WORK ALREADY COMPLETED IN ACCORDANCE WITH PRIOR AGREEMENT, IS APPROVED.

NOTE:

The Division will monitor the monthly production of this well for a period of 6 months, and if anomalous water production is indicated, remedial action will be ordered.

Blanket Bond

W.F. Guerard
Acting State Oil & Gas Supervisor

Engineer Mike Glinzak
Phone (805) 322-4031

RA

Hal Bopp
Hal Bopp, Deputy Supervisor

MG/db

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.
Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.
OG111

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

9/11/92 mto
9/15/92 ew

Notice of Intention to Rework Well

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

RECEIVED

SEP 10 1992

DIVISION OF OIL & GAS
BAKERSFIELD

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD 114	OGD 121
Bl	92-38	✓
	tw	

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework well Ring 18 #21, API No. 029-87404
(Well designation)
Sec. 18, T. 27S, R. 28E MD B. & M., Mt. Poso-West Area Field, Kern County.

The present condition of the well is as follows:

- Total depth 2476'
Effective Depth - 2426'
- Complete casing record, including plugs and perforations (present hole)
Plug - 2445'/2476'
16" Conductor 80' cemented to surface
9-5/8" 36# K-55 surface/2380' cemented w/1180 cu.ft.
7" 23# WWS 2349'/2437' ,perforated .012" openings WWS 2396'/2423'
- Present producing zone name Vedder sand; Zone in which well is to be recompleted Vedder sand
- Present zone pressure 200 psi; New zone pressure 200 psi
- Last produced July 1992 6 121 0
(Date) (Oil, B/D) (Water, B/D) (Gas, Mcf/D)
(or)
Last injected _____
(Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure, psig)
- Is this a critical well according to the definition on the reverse side of this form? (Yes) (No)

The proposed work is as follows:

Liner came up hole
Propose to rerun the liner
Verbal approval for proposal from Reed Bowles

Note: If well is to be redrilled, show proposed new bottom-hole coordinates and true vertical depth.

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 5368
(Street)
Bakersfield, CA. 93388
(City) (State) (Zip)
Telephone Number (805) 393-3204

Macpherson Oil Company
(Name of Operator)
By Chris Williamson
(Name - Printed)
Chris Williamson
(Name - Signature) (Date)

Type of Organization Corporation
(Corporation, Partnership, Individual, etc.)

DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

WELL SUMMARY REPORT

SUBMIT IN DUPLICATE

Operator MACPHERSON OIL COMPANY, Well No. RING 18 #21, API No. 029-87404

Sec. 18, T. 27S, R. 28E, M.D.B. & M., West Area - Mount Poso Field, Kern County.

Location 3967' South and 1723' West of NE corner of sec 18, T27S, R28E.
(Give surface location from property or section corner, or street center line and/or Lambert coordinates)

Elevation of ground above sea level 984 feet.

All depth measurements taken from top of KB which is 9 feet above ground.
(Derrick Floor, Rotary Table or Kelly Bushing)

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Date 7-3-91

Signed Chris Williamson

engineer-Chris Williamson
(Engineer or Geologist)

Title Engineer

	GEOLOGICAL MARKERS	DEPTH
Commenced ^{rework} drilling <u>6-12-91</u>		
Completed ^{rework} drilling <u>6-21-91</u>	<u>Vedder Sand</u>	<u>2398'</u>
Total depth (1st hole) <u>2476'</u> (2nd) _____ (3rd) _____		
Present effective depth <u>2437'</u>		
Junk <u>5' "old" 7" liner blank, 2440'/2445'</u>		

Formation and age at total depth Vedder Sand - Miocene

Commenced producing 6-21-91 (Date) Flowing/gas lift/pumping (Cross out unnecessary words) Name of producing zone Vedder Sand

Initial production
Production after 30 days

Clean Oil bbl. per day	Gravity Clean Oil	Per Cent Water including emulsion	Gas McF. per day	Tubing Pressure	Casing Pressure
trace		100		200 psi	200 psi

CASING RECORD (Present Hole)

Size of Casing (A. P. I.)	Depth of Shoe	Top of Casing	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Numbers of Sacks or Cubic Feet of Cement	Depth of Cement if through perforations
16"	80'	surface	conductor					
9 5/8"	2380'	surface	36#	K-55	New	12 1/4"	1180 cu. ft.	
7" (junk)	2445'	2440'	23#	blank		14"		
7"	2437'	2349'	23#	WWS	New	17"		

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

7" 23# 0.012" openings WWS 2407' / 2433'

Was the well directionally drilled? yes If yes, show coordinates at total depth from wellhead - 73.73' S & 13.20' E

Electrical log depths _____ Other surveys _____

HISTORY OF OIL or GAS WELL

MACPHERSON OIL COMPANY

Mount Poso Field - West Area, Kern County

Ring 18 Lease, Well #21

Section 18, T27S, R29E, MDBM

API# 029-87404

Chris Williamson
7/3/91

Chris Williamson
Engineer

DAY 1 6-12-91

Moved in mats. Rigged up hoist and put out guy wires. Removed horses head and pulled out of hole with rods. MD production tee 4". Pulled out of hole with tubing. Made feeler run with 3 1/8" bailer; no fill. Closed well in and secured rig til 1 a.m. Crew returned to OWS yard.

DAY 2 6-13-91

Traveled to location, and opened well. Made up R & O, fishing tools, bumper sub, and 7" #23 spear. RIH on 4 1/2" tubing. Caught liner. Attempted to work free up to 140,000 lbs., no movement. Released spear and pulled out of hole. Picked up 4-4 1/2" drill collars, 6" jars and accelerator, and RIH. Caught liner and jarred on liner for 4 hrs. at 130,000 lbs. Pulled up hole 20', released liner, and started POOH. Closed well in and secured rig til 1 a.m. Crew returned to OWS yard.

DAY 3 6-14-91

Traveled to location. Opened well and continued to POOH. Layed down jars to replace broken spear. Called out replacement, made up spear and ran in hole with jars, drill collars, acc. and 4 1/2" tubing. Caught liner and pulled out of hole, (dragging). Broke down; layed down liner and fishing tools. Installed BOPE. Closed well in til 1 a.m. Crew traveled to OWS yard.

DAY 4 6-15-91

Traveled to location. Opened well. Made up working floor. Made up 8 5/8" bit on 4 3/4" drill collars. Picked up 2 7/8" drill pipe and RIH to 2000'. Pumped 400 barrels lease water. Well didn't fill. Closed well in and secured rig and well for the weekend. Crew returned to OWS yard.

DAY 5 6-17-91

Traveled to location and opened well. Rigged up foam air, foam unit, head and bouy line to sump. Continued to RIH with bit, 4 3/4" drill collars, and 2 7/8" drill pipe. Stopped at 2355' and foam around. Continued to RIH with bit tag at 2400' and continued to foam ahead to 2415' tight to 2445'. Pulled up, unable to work past 2430'. Picked up H & H power swivel and rotated ahead to 2445'. Was hard to make from 2430' to 2445'. Layed down power swivel and removed foam head and POOH, leaving

HISTORY OF OIL WELL (page 2)

MACPHERSON OIL COMPANY
Mount Poso Field - West Area, Kern County
Ring 18 Lease, Well #21
Section 18, T27S, R29E, MDBM
API# 029-87404


Chris Williamson
Engineer

DAY 5 6-17-91 (continued)

kill string in hole. **Note:** Well blew sand and foam out of casing when foam head was removed. Killed with lease water line.

DAY 6 6-18-91

Traveled to location. Bled off well and opened it. POOH with drill collars and bit. Made up Tri-State 17" underreamer. RIH to 2360'. Made up foam head and line. P/U power swivel and changed well over to foam, no foam returns. Opened hole to 17" from casing shoe, 2380' to 2440' (returns after 5 1/2 hrs from start of foaming). Unable to get past 2440'. Foamed for 1/2 hr, no returns. Pumped 200 barrels lease water down well and layed down power swivel. Pulled underreamer inside casing and worked arms closed. Rigged out foam air hoses and foam head. Continued to pull out of hole. Stood back drill collars and layed down underreamer. Ran kill string, closed well in, and secured well. Crew returned to OWS yard.

DAY 7 6-19-91

Traveled to location. Opened well and bled off. Pulled kill string. Made up 7" wash down shoe on liner and welded. P/U 7" liner, made up wash down sub, and RIH liner on drill pipe. Latched running tool and RIH with liner on 2 7/8" drill pipe. Tag fill at 2320'. Washed liner in with OWS pump to 2437'. Released liner and POOH with drill pipe. Made up LSA, setting tool, and ran in hole with 4 - 4 3/4" DC and 2 7/8" drill pipe. Set lead seal and released. POOH, laying down drill pipe. Closed well in and secured rig til 1 a.m. Crew returned to OWS yard. New 7" liner detail: 2349'/2437', LSA @2349'; 0.012" openings WWS 2407'/2433'. 5' of old 7" blank liner from 2440'/2445'.

DAY 8 6-20-91

Traveled to location. Opened well and continued to POOH. Layed down drill pipe and 4 3/4" drill collars. Made up bailer and RIH. Tagged bridge at 2350', bailed out and went to 2435' TD. Put red brick in well and let fall. Ran and tagged bricks at 2433'. RIH with 4" x 3 3/4" x 20" pump barrel land donut. ND BOPE. Attempted to make up plunger pin on plunger, thread bad. Closed well. Crew returned to yard and had plunger repaired.

HISTORY OF OIL WELL (page 3)

MACPHERSON OIL COMPANY

Mount Poso Field - West Area, Kern County

Ring 18 Lease, Well #21

Section 18, T27S, R29E, MDBM

API# 029-87404

Chris Williamson
7-3-91

Chris Williamson
Engineer

DAY 9 6-21-91

Traveled to location. Opened well, made up plunger and made up production T. RIH with rods and plunger. Spaced out pump and installed horses head. Hung well on and removed guy wires. Rigged out hoist and returned well to production. Moved hoist to Ring 18 #4.

Begin Production 6-21-91

24 hour PRODUCTION test 6-26-91 results:
trace OIL & 2500 bbls WATER.

MACPHERSON OIL COMPANY, MPCC RING 18 LEASE, WELL # 21

SECTION 18, T 27 S, R 28 E; API # 029-87404

WELL DRILLED 1991; DIAGRAM PREPARED JAN '91 (RT) Revised 6/91

ELEV. KB 993±; GL 984±,

CONDUCTOR: 16" 80'

HOLE SIZE 12 1/4" 2380', 17" 2440'
14" 2445', 8 3/4" 2476'

SURFACE CASING 4 5/8 36# 2380'

CASING _____

PERFS IN CSG. _____

LINER 7" 23# 2349'/2437' (Junk 2440'/2445')

LINER SLOTS WWS 0.012" 2407'/2433'

CEMENT BEHIND PIPE:
9 5/8" VOLUME 1180 ft³, DATE 1991

CEMENT TOP SURFACE

VOLUME _____, DATE _____

CEMENT TOP _____

LINER ADAPTER: LSA @ 2349'

CEMENT PLUG(S) 2445'-2476'

GRAVEL PACK 42 ft³ 50/40 2439' (Jan 1991)

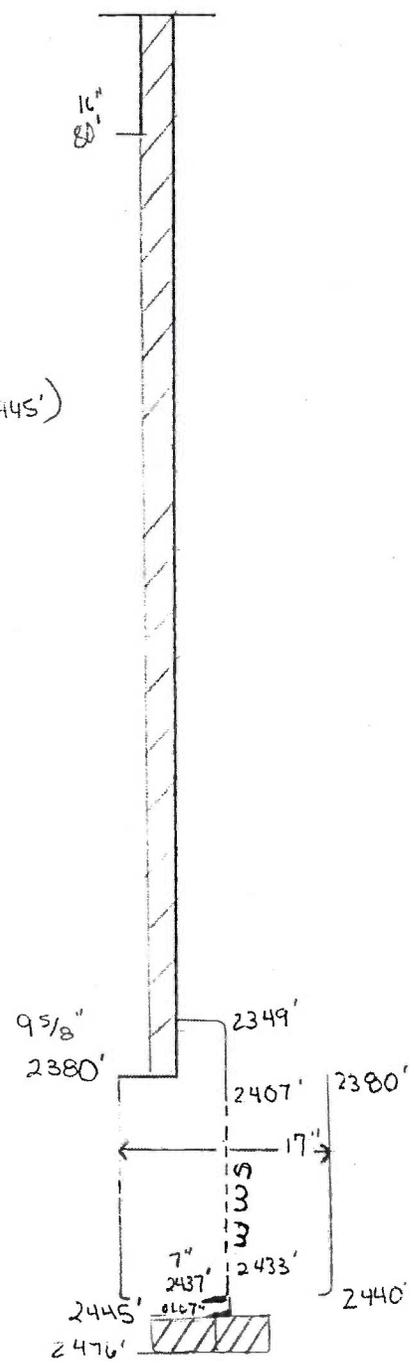
CEMENT SQUEEZED _____

CASING HOLES _____

CEMENT SQUEEZED _____

BASE FRESH WATER--- _____

TOP VEEDER SANDS 2398'



PERMIT TO CONDUCT WELL OPERATIONS

488
(field code)
18
(area code)
10
(new pool code)
10
(old pool code)

Chris E. Williamson
MACPHERSON OIL COMPANY
P. O. Box 5368
Bakersfield, CA 93388

Bakersfield, California
May 28, 1991

Your _____ proposal to rework well "Ring 18" 21
A.P.I. No. 029-87404, Section 18, T. 27S, R. 28E, MD B. & M.,
Mount Poso field, West area, Vedder pool,
Kern County, dated 5/17/91, received 5/20/91 has been examined in conjunction with records
filed in this office.

DECISION: THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
2. The 9 5/8" casing shall be equipped with either a minimum 6" steam diverter system or with a BOPE capable of a complete shut-in of the steam zone.
3. Prior to commencing operations, an operator's representative shall instruct all operator's rig personnel, or drilling contractor's representative, on the potential hazards and control of wells which operate in active steam zones.
4. No change in the proposed program shall be made without prior approval of this Division.

Blanket Bond

Engineer Mike Glinzak
Phone (805) 322-4031
MG/db

M. G. MEFFERD, State Oil and Gas Supervisor

By Hal Bopp
Hal Bopp, Deputy Supervisor

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.
Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

Notice of Intention to Rework Well

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

RECEIVED
MAY 20 1991
DIVISION OF OIL & GAS
BAKERSFIELD
5/20/91
5/24/91
5/27/91

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD114	OGD121
BE	9/22	RD

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework well RING 18 #21, API No. 029-87404
(Well designation)
Sec. 18, T. 27S, R. 28E, M.D.B. & M., MT. POSO - West Area Field, Kern County.

The present condition of the well is as follows:

- Total depth 2476'
effective depth 2445'
- Complete casing record, including plugs and perforations (present hole)
plug 2445'/2476'
16" Conductor 80', cemented to surface
9 5/8" 36# K-55 surface/2380' cemented w/1180 cu.ft.
7" 23# VWS 2359'/2445', perforated .012" openings VWS 2404'/2439'
- Present producing zone name Vedder Sand; Zone in which well is to be recompleted Vedder Sand
- Present zone pressure 200 psi; New zone pressure 200 psi
- Last produced 4-14-91 trace 2353 --
(Date) (Oil, B/D) (Water, B/D) (Gas, Mcf/D)
(or)
Last injected _____
(Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure, psig)
- Is this a critical well according to the definition on the reverse side of this form? (Yes) (No)

The proposed work is as follows:
Please see attached proposal.

Note: If well is to be redrilled, show proposed new bottom-hole coordinates and true vertical depth.
It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 5368 MACPHERSON OIL COMPANY
(Street) (Name of Operator)
Bakersfield, CA 93388
(City) (State) (Zip)
By Chris Williamson
(Name - Printed)
Chris Williamson 5-17-91
(Name - Signature) (Date)
Type of Organization corporation
(Corporation Partnership Individual etc.)

MACPHERSON OIL COMPANY
WEST MOUNT POSO FIELD
M P C C
RING 18 LEASE WELL #21

OBJECTIVE: Pull and inspect liner. clean out gravel pack.

ELEVATION: 993' KB; 984' GL

CASING: 9 5/8" 36#, K-55, cemented at 2380' with 1180 cu. ft., run in 1991.

LINER: 7" OD, 23#, 2359'/2445', WWS from 2404'/2439'.

PERFORATIONS: WW Screen, Johnson superweld, .012" opening.

GRAVEL PACK: Behind 7" liner, 42 cu. ft. 20-40.

NOTES: Pump sanded stuck after pounding on steel seal adapter. Well has severe sand inflow with fluid, probable liner tear.

PROGRAM:

- 1) Rig up doubles, pull rods and tubing, install BOPE, set up mud pump.
- 2) Tag fill or TD at 2445'.
- 3) Pick up spear assembly for 7" Liner. New well, attempt pull without jar and accelerator. If liner will not come, add jars, and accelerators to string. Pull and lay down liner.
USE CARE WHEN LAYING DOWN SCREEN TO ALLOW INSPECTION TO DETERMINE PROBLEM.
- 4) Run to bottom with 15" underreamer and clean out fill from 2404' to 2445'. Circulate with lease water. Returns to pass through shale shaker to remove sand.
- 5) Pick up replacement liner from Sec 20 yard. Run liner to TD. Set steel seal adapter.
- 6) Put well on production with tubing as before.

MACPHERSON OIL COMPANY, MPCC RING 18 LEASE, WELL # 21

SECTION 18, T 27 S, R 28 E; API # 029-87404

WELL DRILLED 1991; DIAGRAM PREPARED JAN '91 (RT)

ELEV. KB 993±; GL 964±,

CONDUCTOR: 16" 80'

HOLE SIZE 12 7/8" 2380'; 14" 2404'-2445';
9 5/8" 2380'-2404'-2445'-2476'

SURFACE CASING 4 5/8 36# 2380'

CASING _____

PERFS IN CSG. _____

LINER 7" 23# 2359'-24115'

LINER SLOTS WWS 012" 2404'-2439'

CEMENT BEHIND PIPE:
9 5/8" VOLUME 1180 ft³, DATE 1991

CEMENT TOP SURFACE

GRAVEL PACK
VOLUME 42 ft³, DATE 1991

~~GRAVEL BTM~~
~~CEMENT TOP~~ 20/40 @ 2439'

~~CEMENT PLUG(S)~~ @ 2359'

CEMENT PLUG(S) 2445'-2476'

CASING HOLES _____

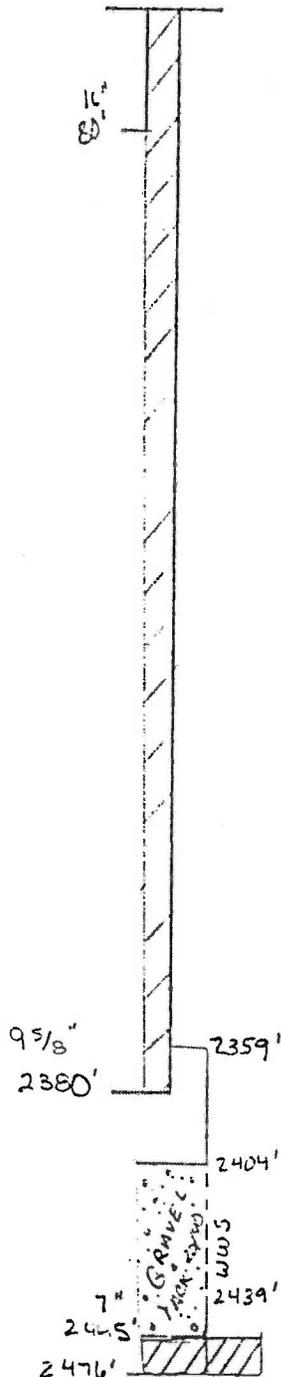
CEMENT SQUEEZED _____

CASING HOLES _____

CEMENT SQUEEZED _____

BASE FRESH WATER-- _____

TOP VESICULAR SANDS 2398'



RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

RECEIVED
APR 18 1991
API No. 029-87404
DIVISION OF OIL & GAS
BAKERSFIELD

WELL SUMMARY REPORT
SUBMIT IN DUPLICATE

Operator MACPHERSON OIL COMPANY, Well No. Ring 18-21
Sec. 18, T. 27S, R. 28E, MD B. & M., Mt. Poso - West Area Field, Kern County.
Location 3967' South and 1723' West of NE corner of sec 18, T27S, R28E.
(Give surface location from property or section corner, or street center line and/or lambert coordinates)

Elevation of ground above sea level 984 feet.

All depth measurements taken from top of KB which is 9 feet above ground.
(Derrick Floor, Rotary Table or Kelly Bushing)

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Date 4-16-91

Signed Chris E. Williamson

Engineer Chris Williamson
(Engineer or Geologist)

Title Engineer

	GEOLOGICAL MARKERS	DEPTH
Commenced drilling <u>1-17-91</u>		
Completed drilling <u>1-23-91</u>	<u>Vedder Sands</u>	<u>2398'</u>
Total depth (1st hole) <u>2476'</u> (2nd) _____ (3rd) _____		
Present effective depth <u>2445'</u>		
Junk <u>cement plug 2445' / 2476'</u>		

Formation and age at total depth Vedder Sands - Miocene
Vedder Sands

Commenced producing 3-25-91 ~~blowing gas lift~~ / pumping
(Date) (Cross out unnecessary words)

Name of producing zone _____

Initial production
Production after 30 days

	Clean Oil bbl. per day	Gravity Clean Oil	Per Cent Water including emulsion	Gas Mcf. per day	Tubing Pressure	Casing Press
4-12-91	1		99.9		200 psi	200 psi

CASING RECORD (Present Hole)

Size of Casing (A. P. I.)	Depth of Shoe	Top of Casing	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Numbers of Sacks or Cubic Feet of Cement	Depth of Cement if through perforations
16"	80'	surface	conductor					
9 5/8"	2380'	surface	36#	K-55	New	12 1/4"	1180 cu ft	
7"	2445'	2359'	23#	WWS 2404' / 2439'	New	8 3/4 & 14"	--	

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

7" 23#, 0.012" openings WWS 2404' / 2439'.

Was the well directionally drilled? yes If yes, show coordinates at total depth from well-head 73.73' S & 13.20'E
Electrical log depths 80' to 2475' Other surveys sub-surface directional survey

HISTORY of OIL or GAS WELL

MACPHERSON OIL COMPANY

Mt. Poso Field - West Area, Kern County

RING 18 Lease, Well #21

Section 18, T27S, R28E, MDBM

API# 029-87404

Chris Williamson 4/16/91

CHRIS E. WILLIAMSON

ENGINEER

date: 4-16-91

DAY 1 1-17-91

Rig on location. N/U BOP & devertor. N/U 12 1/4" BHA & spud hole. Drill 12 1/4" hole to 966'. 0 degree vertical direction at 966'.

DAY 2 1-18-91

Drill, circ & survey at 1243'; 1/4 degree S60E. TFNB. Bit #1RR, 12 1/4", type REED, 1154' total, depth out 1243'. New bit #2RT, drill to 1577'. Loss partial returns 1560' to 1577', add sawdust - OK.

DAY 3 1-19-91

Drill hole to 1850', survey; 1/2 degree at 1850', S50E. TFNB. Bit #2RT, 12 1/4", type SMITH, 607' total, depth out 1850'. New bit #3New in hole and drill to 2143'. Survey at 2103' = 8 1/2 degrees, S10E. TFNB. Bit #3New, 12 1/4", type HTRI, 293' total, depth out 2143'. RIH with new bit #3RR and ream hole from 1850' to 2143'. Drill to 2165'.

DAY 4 1-20-91

Drill 12 1/4" hole 2165' to 2380'. Survey at 2380' = 7 3/4 degrees, S8E. Circ for trip, TFNB. Bit #3RR, 12 1/4", type HTRI, 215' total, depth out 2380'. RIH with Bit #4RT & drill 8 3/4" hole from 2380' to 2435'. ROP slowed, TFNB. Bit #4RT, 8 3/4", type HP11, 55' total, depth out 2435'. RIH with new Bit #5RT and drill 2435' to 2476' TD. Surveyed closure at TD = 79.6' at S9E. Circ, wipe hole to 12 1/4". POOH. Bit #5RT, 8 3/4", type RDGH, 41' total, depth out 2476'. R/U loggers & ran DIL-SP 80' to 2475'. Begin SWC run.

DAY 5 1-21-91

Finish shooting 24 SWC's, recovered 22. R/D loggers. RIH with 7"X13" UNDERREAMER and underream 12 1/4" hole to 14" from 1220' to 1360' (air sand interval). POOH. RIH with bit #6RR and clean out fill to 2476'. Circ clean. POOH and TIH with open ended DP to TD (2476'). Set cement plug from 2476' to 2436' with 17 cu ft G + 40% SiO2 + 1% CaCl2. Pull 5 stds & circ clean. POOH. Bit #6RR, 8 3/4", type FDGH, clean out fill for cement plug. RIH to 2380' with 12 1/4" Bit #7RR, CCM for casing. POOH. RIH with 56 jts (2384') of 9 5/8", 36#, K-55 STC casing to 2380'. Circ for cmt job.

HISTORY of OIL WELL -- page 2

MACPHERSON OIL COMPANY

Mt. Poso Field - West Area, Kern County

RING 18 Lease, Well #21

Section 18, T27S, R28E, MDBM

API# 029-87404

Chris E. Williamson 4/16/91

CHRIS E. WILLIAMSON

ENGINEER

date: 4-16-91

DAY 6 1-22-91

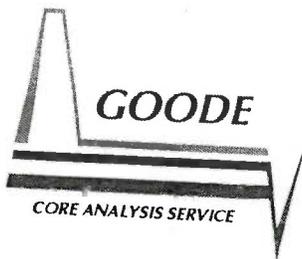
Cemented 9 5/8" csg with 1000 cu ft lead + 180 cu ft tail. Good circ partial returns increased to full last 1/2 of displacement, ~10 BBLs cmt to surface. CIP at 0800 1-21-91. WOC. N/D BOP, cut 9 5/8" csg & install 9 5/8" 50W X 11" 3M head. Tst same to 1000#. N/U BOP & function tst same. P/U 8 3/4" bit RIH to insert at 2348'. Clean out cmt to shoe. RIH & tag cmt plug at 2430'. Dress off firm cmt to 2445'. Circ clean & POOH. RIH with 7"X14" UNDERREAMER to shoe, at 2404' cut shoulder & opened hole to 14" from 2404' to 2445'. Circ clean. Attempt to pull out but unable to close underreamer arms. Stuck at 2403'.

DAY 7 1-23-91

Unable to free UR struck at 2403'. Made blind backoff to remove kelly. POOH & check pin. RIH, spaced out & screw in to fish. R/U DIALOG & B/O above bottom drill collars at 2366' (14' into csg). POOH. RIH with jars & bumper sub, engage fish, jar down to free. Freed. Chain out & l/d underreamer & fishing tools. RIH to 2445' with 8 3/4" bit. Circ clean, dump & clean pits, mix KCL & HEC pill, spot same & POOH. RIH with 7" liner and gravel packing tools. Liner information: 7" 23# liner from 2359' to 2445' including 12 gauge WWS from 2404' to 2439', SSA at 2359'. Gravel packed liner with 45 cu ft 20/40 gravel to P.O. rev out 3 cu ft, 42 cu ft in place (118% of theor). Good pack. POOH. RIH & set SSA at 2359'. L/D DP & DCs. Cleaned pits, N/D BOP & release rig at 1000 hrs, 1-23-91.

Begin production 3-25-91

24 hour PRODUCTION test 4-12-91 results: 1 bbl OIL, 1788 bbls WATER.



1400 Easton Drive, Suite 111 • Bakersfield, CA 93309 • (805) 322-5540

Mr. Chris Williamson
MacPherson Oil Company
Post Office Box 5368
Oildale, CA 93388

RECEIVED

January 24, 1991

APR 18 1991

DIVISION OF OIL & GAS
BAKERSFIELD

Subject: Core Analysis Data
Well "Ring 18" 21
Mount Poso Field
Kern County, CA
File No. 91030

Dear Mr. Williamson;

Percussion type sidewall core samples from the subject well were submitted to our laboratory for permeability, porosity and fluid saturation determinations. The results of these measurements are presented in the accompanying report.

The samples were cleaned of mud prior to analyzing by the Summation of Fluid Method. Bulk volumes were measured by mercury displacement at ambient conditions. Void volumes were measured by mercury injection. Fluid volumes were measured by a retort process. In this process, samples are eventually heated to 1200 degrees Fahrenheit. Permeability values were determined by empirical methods. Two samples were also analyzed by Dean Stark/Boyle's Law method. The samples were prepared by encasing in lead sleeves with 100 mesh end screens to hold the sample intact. The sleeves were sealed to the sample by applying a pressure of 300 psig. Saturations were determined by Dean Stark Methods with toluene as the distilling solvent. Following distillation, the samples were extracted of remaining hydrocarbon with toluene by centrifuge. Prior to measurement of porosity and permeability to air, the samples were dried at 235 degrees Fahrenheit. Porosity was determined by Boyle's Law method using helium as the gaseous medium. A confining pressure of 300 psig was used during pore volume and permeability measurements. The analysis procedures are noted on the data page.

We are pleased to have performed this service and trust we will be called upon again in the future.

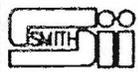
Very Truly Yours,

GOODE CORE ANALYSIS SERVICE

A handwritten signature in cursive script, appearing to read "Bryan A. Bell".

Bryan A. Bell

Distribution: 4 Copies Addressee



SMITH INTERNATIONAL, INC.

RECEIVED

APR 18 1991

**DIVISION OF OIL & GAS
BAKERSFIELD**

**REPORT
of
SUB-SURFACE DIRECTIONAL
SURVEY**

**MACPHERSON OIL COMPANY
WELL: RING 18-21
FIELD: MT. POSO, WEST AREA
KERN COUNTY**

RECEIVED

MAR 13 1991

Smith International, Inc.

MACPHERSON OIL COMPANY
 WELL: RING 18-21
 FIELD: MT. POSO, WEST AREA
 KERN COUNTY
 21 JAN 1991

File Name: MCR1821S

RECORD OF SURVEY
 Calculated by DATADRIL's CADDS System

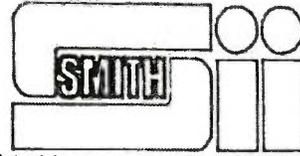
Average Angle Method
 All Angles are Decimal
 Vertical Section Plane: S 0.00 E

MEASURED DEPTH (FT)	INCL ANGLE (DEG)	D R I F T DIRECTION (DEG)	COURSE LENGTH (FT)	TOTAL VERTICAL DEPTH	T O T A L RECTANGULAR COORDINATES (FT)	VERTICAL SECTION (FT)	C L O S U R E DISTANCE (FT)	DIRECTION (DEG)	DOGLEG SEVERITY (DEG/100')
0.00	0.00	N 0.00 E	0.00	0.00	0.00 N 0.00 E	0.00	0.00	N 0.00 E	0.00
340.00	.50	S 35.00 W	340.00	340.00	1.22 S .85 W	1.22	1.48	S 35.00 W	.15
658.00	.50	S 40.00 W	318.00	657.98	3.42 S 2.54 W	3.42	4.26	S 36.63 W	.01
966.00	0.00	N 0.00 E	308.00	965.98	4.45 S 3.40 W	4.45	5.60	S 37.44 W	.16
1243.00	.25	S 60.00 E	277.00	1242.98	4.75 S 2.88 W	4.75	5.55	S 31.24 W	.09
1850.00	.50	S 50.00 E	607.00	1849.97	7.03 S .37 E	7.03	7.04	S 3.04 E	.04
1886.00	2.00	S 50.00 E	36.00	1885.96	7.53 S .98 E	7.53	7.59	S 7.38 E	4.17
1948.00	3.50	S 35.00 E	62.00	1947.89	9.73 S 2.98 E	9.73	10.17	S 17.06 E	2.66
1979.00	4.00	S 27.00 E	31.00	1978.82	11.46 S 4.03 E	11.46	12.15	S 19.37 E	2.33
2040.00	6.25	S 19.00 E	61.00	2039.58	16.48 S 6.16 E	16.48	17.59	S 20.49 E	3.86
2103.00	8.50	S 10.00 E	63.00	2102.06	24.31 S 8.18 E	24.31	25.65	S 18.60 E	4.00
2192.00	9.00	S 2.00 E	89.00	2190.02	37.77 S 9.60 E	37.77	38.97	S 14.26 E	1.48
2380.00	7.75	S 8.00 E	188.00	2376.02	65.05 S 11.98 E	65.05	66.15	S 10.44 E	.81
2478.00	7.75	S 8.00 E	98.00	2473.12	78.14 S 13.82 E	78.14	79.35	S 10.03 E	0.00

BOTTOM HOLE CLOSURE: 79.35 Feet at S 10.03 Degrees E

MACPHERSON OIL COMPANY
WELL: RING 18-21
FIELD: MT. POSO, WEST AREA
KERN COUNTY

21 Jan 1991 @ 12:49

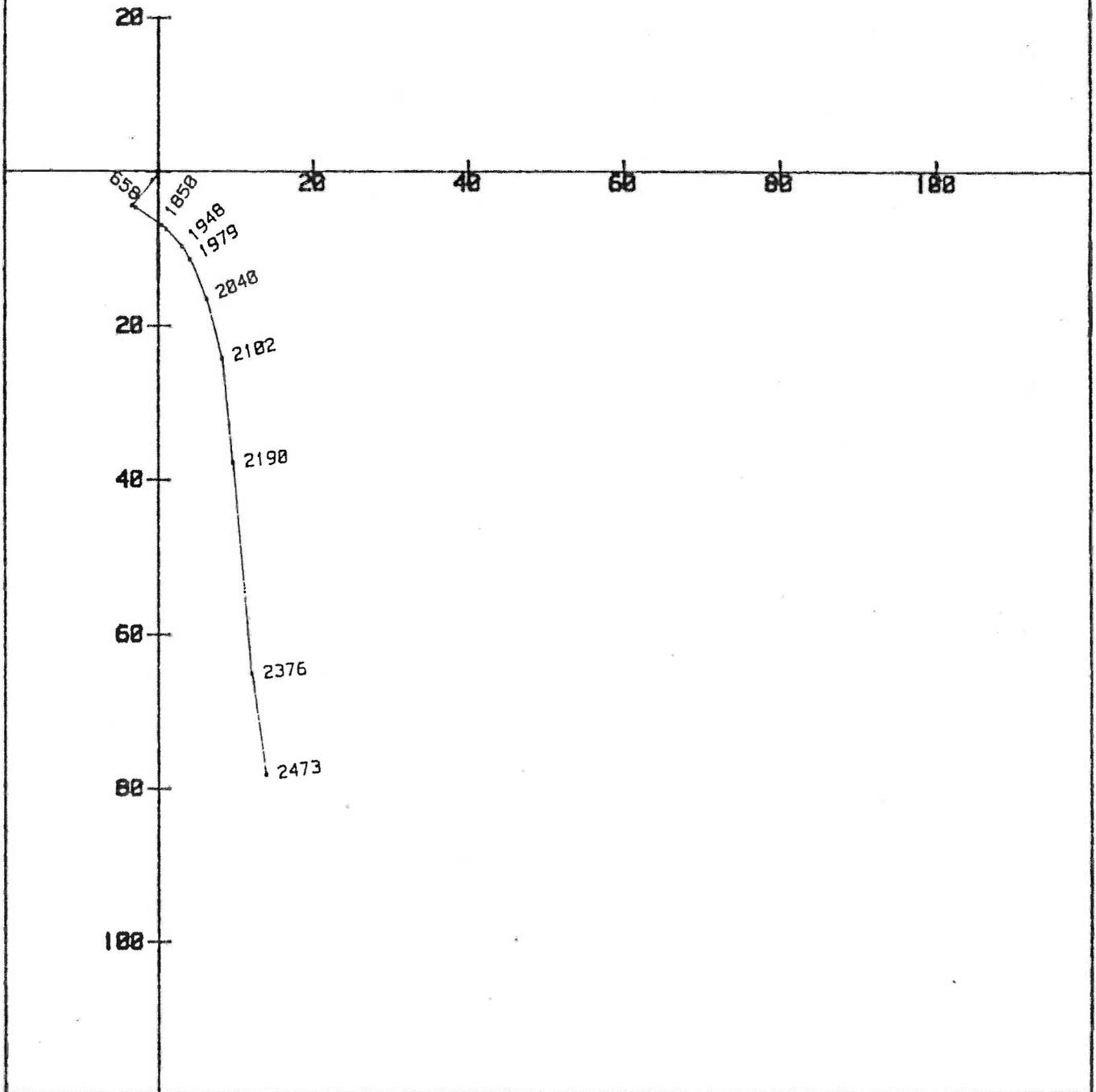


HORIZONTAL PLOT



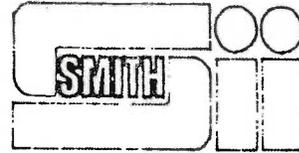
SCALE: 20 FEET/INCH

BHL: 79 FEET
e S 10.03 E
TVD: 2473 FEET
MD: 2478 FEET



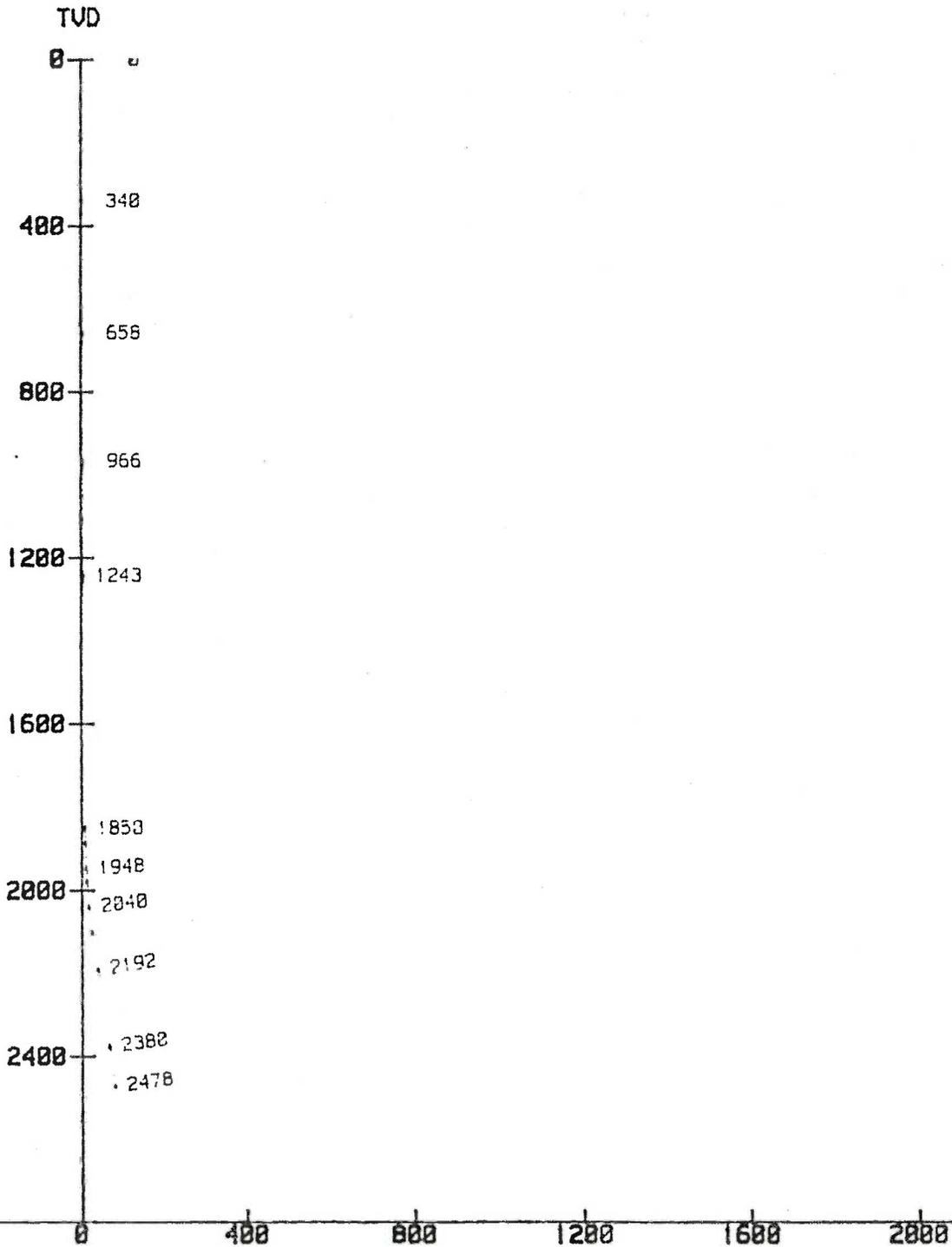
MACPHERSON OIL COMPANY
WELL: RING 18-21
FIELD: MT. POSO, WEST AREA
KERN COUNTY

21 Jan 1991 @ 12:52



SCALE: 400 FEET/INCH

VERTICAL PLOT

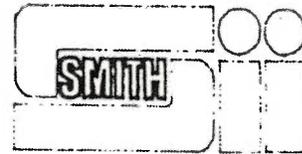


VERTICAL SECTION
SECTION PLANE: S 0.00 E

BHL: 79 FEET
@ S 10.03 E
TVD: 2473 FEET
MD: 2478 FEET

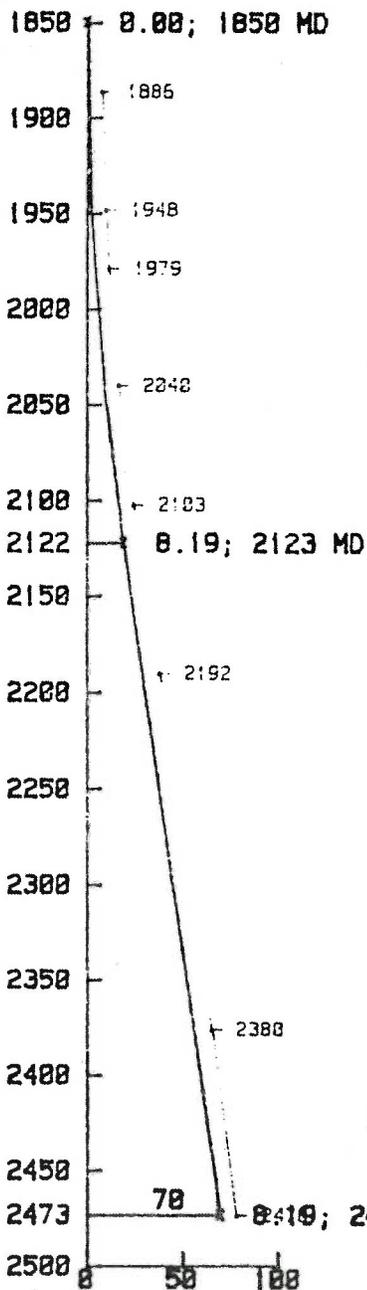
21 Jan 1991 @ 11:21

MACPHERSON OIL COMPANY
WELL: RING 18-21
FIELD: MT. POSO - WEST AREA
KERN COUNTY



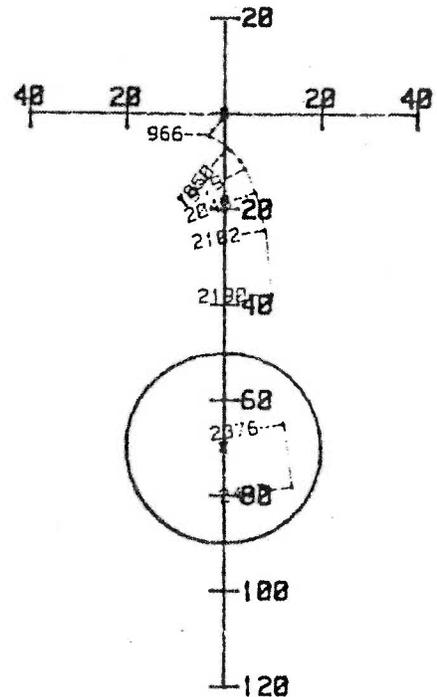
VERTICAL PLANE
SCALE: 50 FEET/DIVISION

HORIZONTAL PLANE
SCALE: 20 FEET/DIVISION



PRESENT LOCATION:
TUD: 2473.12 FT
MD: 2478.00 FT
US: 78.14 FT

VERTICAL SECTION PLANE: S 0.00 E



PERMIT TO CONDUCT WELL OPERATIONS

488
(field code)
18
(area code)
10
(new pool code)

(old pool code)

Donald R. MacPherson, Jr.
MACPHERSON OIL COMPANY
P.O. Box 5368
Bakersfield, CA 93388

Bakersfield, California
September 28, 1990

Your _____ proposal to drill _____ well "Ring 18" 21
A.P.I. No. 029- 87404, Section 18, T. 27S, R. 28E, MD B. & M.,
Mount Poso field, West area, Vedder pool,
Kern County, dated 9/13/90, received 9/14/90 has been examined in conjunction with records
filed in this office.

DECISION: THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Drilling fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
2. Sufficient cement shall be pumped back of the 16" & 9 5/8" casing to fill to the surface.
3. The well shall be equipped with a minimum 6" steam diverter system on the 16" casing.
4. The specified blowout prevention equipment, as defined by DOG Manual M07, is considered minimal and shall be maintained in operating condition at all times
 - a. on the 9 5/8" casing, DOG Class II, 2M and hole fluid monitoring equipment A.
5. No change in the proposed program shall be made without prior approval of this Division.

NOTES:

1. All drilling fluid shall be disposed of according to Regional Water Quality Control Board regulations.
2. The Division will monitor the monthly production of this well for a period of 6 months, and if anomalous water production is indicated, remedial action will be ordered.

*1/ Doug Elert plan to drill pilot hole to T.D., log well,
& lower shoulder to set 9 5/8" casing & G.P. liner
no notice needed.*

Engineer Joyce Jaszarowski

M. G. MEFFERD, State Oil and Gas Supervisor

Phone (805) 322-4031

By R. Adams
Deputy Supervisor

JTJ/ra

for Hal Bopp

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

DIVISION OF OIL AND GAS

Notice of Intention to Drill New Well

RECEIVED
9/14/90
SEP 14 1990
9/24/90 CW
9/29/90 JS

C.E.Q.A. INFORMATION			
EXEMPT CLASS <input type="checkbox"/>	NEG. DEC. S.C.H. NO. <input type="checkbox"/>	E.I.R. S.C.H. NO. <input type="checkbox"/>	DOCUMENT NOT REQUIRED BY LOCAL JURISDICTION <input checked="" type="checkbox"/>
See Reverse Side			

FOR DIVISION USE ONLY					
MAP	MAP BOOK	CARDS	BOND	FORMS	
				114	121
440	1-198	CW	EL	90-39 CW	CW

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to commence drilling well 1" RING 18" 21, well type oil, API No. 029-87404 (Assigned by Division)
Sec. 18, T. 27S, R. 28E, M. D. B. & M., ~~MT.~~ WEST Field, KERN County.

Legal description of mineral-right lease, consisting of 340 acres, is as follows: (Attach map or plat to scale)
Entire southeast quarter and parts of the northwest, northeast and southwest quarters of Section 18-T27S/R28E.

Do mineral and surface leases coincide? Yes No . If answer is no, attach legal description of both surface and mineral leases, and map or plat to scale.

Location of well 3967 feet south along section/property line and 1723 feet west at right angles to said line from the northeast corner of section/property 18 or (Direction) (Cross out one) (Cross out one)

Is this a critical well according to the definition on the reverse side of this form? Yes No

If well is to be directionally drilled, show proposed coordinates (from surface location) and TVD at total depth: _____ feet (Direction) and _____ feet (Direction)

Estimated true vertical depth 2473' Elevation of ground above sea level 984 feet.

All depth measurements taken from top of Kelly Bushing that is 9 feet above ground. (Derrick Floor, Rotary Table, or Kelly Bushing)

PROPOSED CASING PROGRAM

SIZE OF CASING INCHES API	WEIGHT	GRADE AND TYPE	TOP	BOTTOM	CEMENTING DEPTHS	CALCULATED FILL BEHIND CASING (Linear Feet)
16"	48#	H-40	Surf.	50'	50'	50'
9-5/8"	36#	K-55	Surf.	2398'	2398'	2398'
7"	23#	K-55	2368'	2473'	(WRS hung liner)	

(A complete drilling program is preferred and may be submitted in lieu of the above program.)

Intended zone(s) of completion Vedder, +600 psi Estimated total depth 2473 (Name, depth, and expected pressure) 2403'

It is understood that if changes in this plan become necessary we are to notify you immediately.

Name of Operator <u>MACPHERSON OIL COMPANY</u>	Type of Organization (Corporation, Partnership, Individual, etc.) <u>CORPORATION</u>
Address <u>P. O. Box 5368</u>	City <u>BAKERSFIELD</u>
Telephone Number <u>393-3204</u>	Name of Person Filing Notice <u>Paul K. Duncan</u>
Signature <u>P.K. Duncan</u>	Date <u>9-13-90</u>

305)

This notice and indemnity or cash bond shall be filed, and approval given, before drilling begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

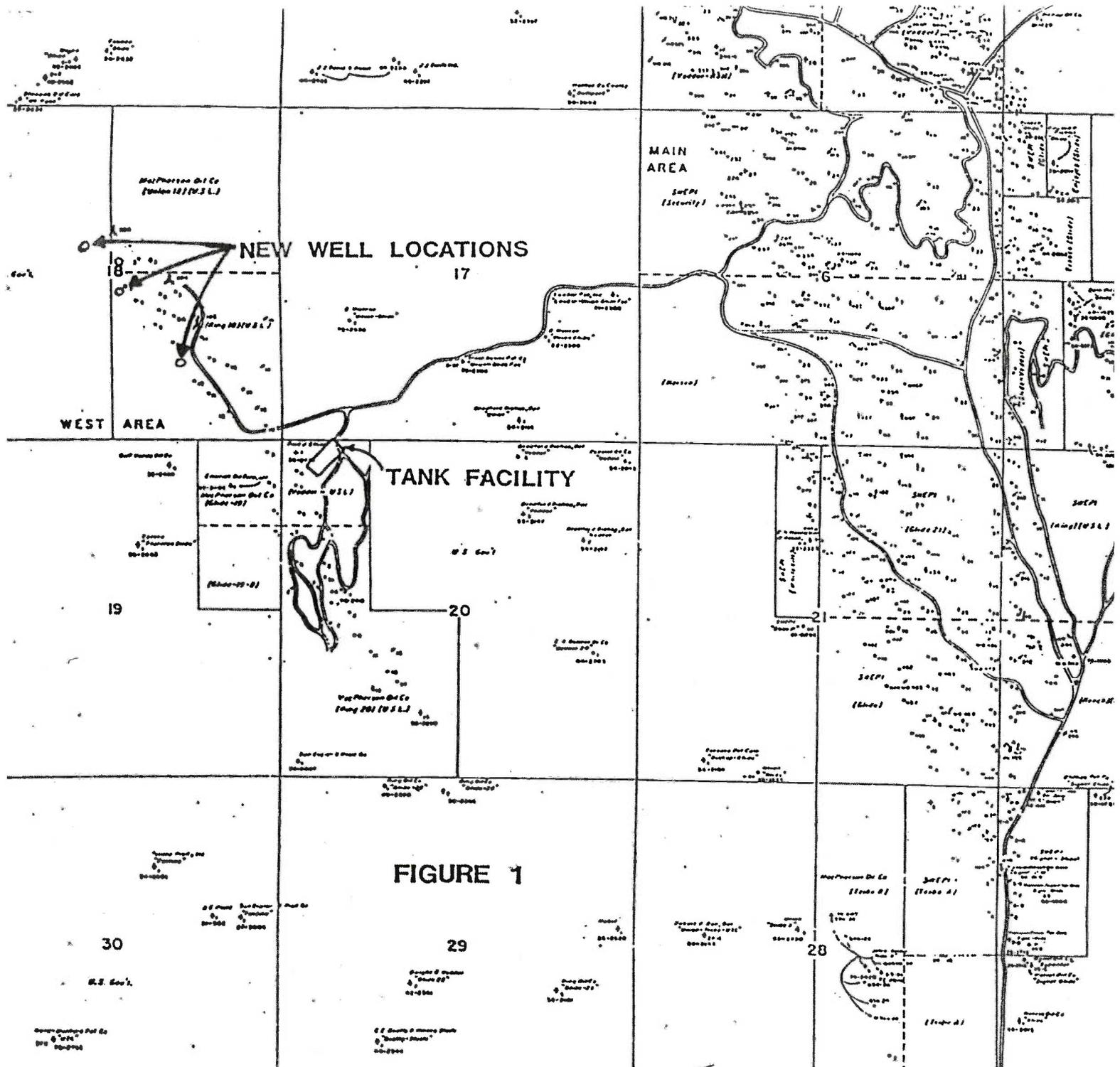


EXHIBIT 4

EXHIBIT 4

A

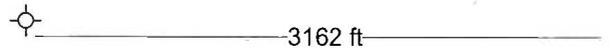
Southwest

1954
Trico Industries, Inc.
"USL #1"
API# 02916177
KB: 916'

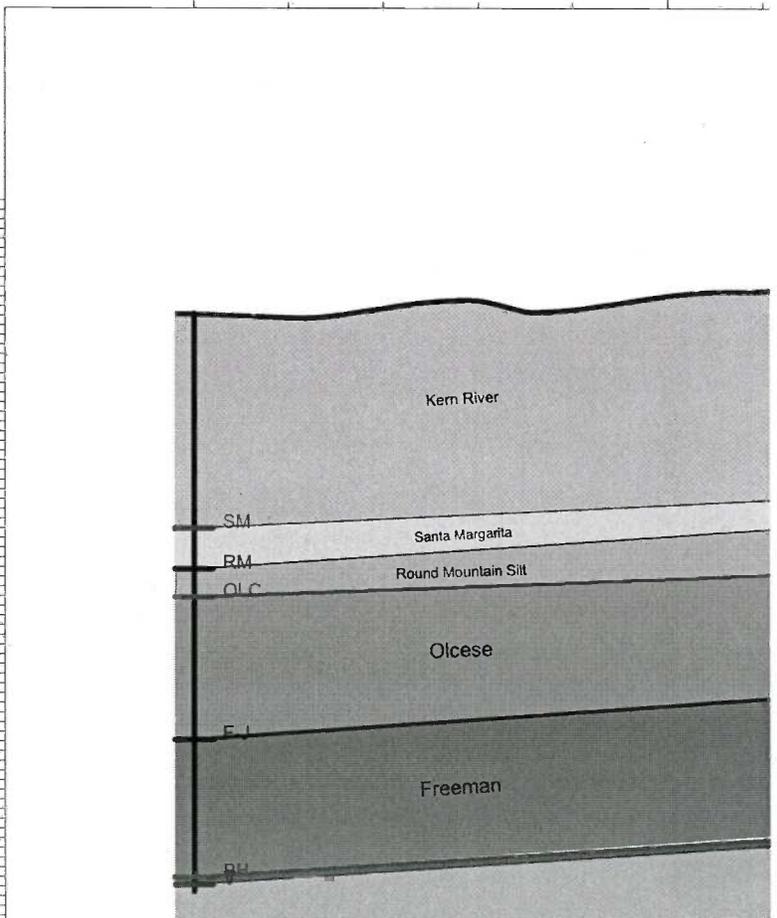
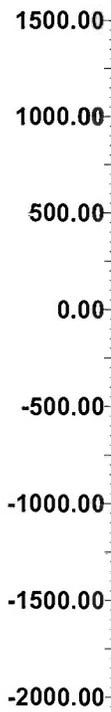
Trico Inc
"US
API#
KB

Section 24
T27S R27E

Sec
T27



Offset: 0



B

Northwest

1955
Trico Industries, Inc.
"Glide #1-6"
API# 02916488
KB: 998'

Section 1
T27S R27E

1955
Tesoro Petroleum Corporation
"Intex-H.H Magee Operator Fee #1"
API# 02914932
KB: 1007'

Section 1
T27S R27E

P

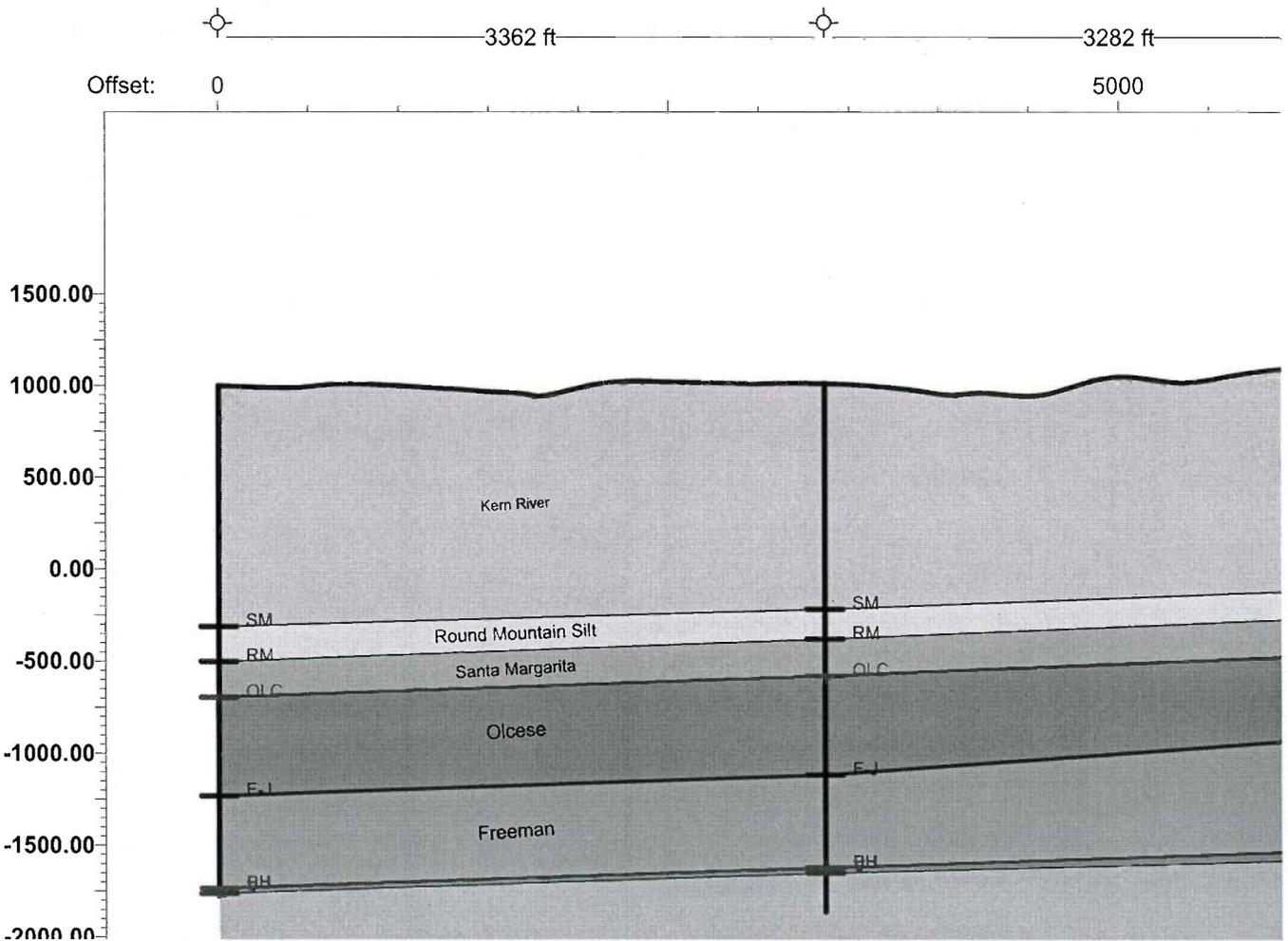


EXHIBIT 5

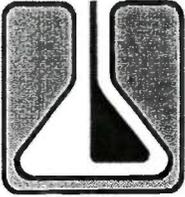
EXHIBIT 5

1.1 Mount Poso West Area History of Formation Injection

The West Area of Mount Poso Oil field was discovered in 1943. The current exempted area has been utilized for steam injection and disposal purposes. Re-injection of produced water was permitted in the subject fault block in 1982 for the benefit of production to reduce the reservoir pressure in the West Area in preparation for an enhanced recovery project. Since the approval approximately 63,477,974 barrels have been re-injected. There has been no noticeable increase in the pressure on the fault block to date. A review of the records indicates that there has been no injection of Class II water sourced from outside of the West Area of the Mount Poso oil field.

EXHIBIT 6

EXHIBIT 6



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

June 12, 2015

Justin Lawson
Mac Pherson Oil Company
PO Box 5368
Bakersfield, CA 93388

TEL: (661) 393-3204
FAX: (661) 393-8065

Project ID:
RE: 1505280

Dear Justin Lawson:

Zalco Laboratories, Inc. received 5 samples on 5/21/2015 for the analyses presented in the following report.

We appreciate your business and look forward to serving you in the future. Please feel free to call our office if you have any questions regarding these test results.

Sincerely,

A handwritten signature in black ink, appearing to read "Juan Magana", is written over a horizontal line.

Juan Magana
Project Manager
CC:

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C. Microbiological analysis requires samples to be at least 4-10°C when received at the laboratory. For additional information regarding the limitations of the method(s) referred to, please call us at 661-395-0539.



ZALCO LABORATORIES, INC.
Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

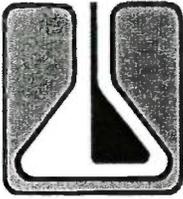
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
---	--	---

Lab Sample ID: 1505280-01 Client Sample ID: Ring 18 WD-1	Collected By: Chris Martinez Date Collected: 5/21/2015 9:10:00AM
---	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Alkalinity								
Total Alkalinity	460	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Bicarbonate (HCO3)	460	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
CAM, Toxicity (17 Metals)								
			<i>TTL Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Barium	<0.10	0.10	10000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Copper	0.094	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	5/26/15	5/26/15	SS
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Silver	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Zinc	0.051	0.050	5000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
General Chemistry								
			<i>MCL Limits</i>					
Fluoride	<0.10	0.10	2	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Nitrate as NO3	<2.00	2.00	45	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Electrical Conductivity	3.2	0.010		mmhos/cm	SM 2510B	5/22/15	5/22/15	SAM
Bromide	2.5	0.10		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Chloride	780	100		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
pH	8.14			pH Units	EPA 150.1	5/21/15	5/21/15	SAM
Sulfate as SO4	48	25		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Total Dissolved Solids	1800	10		mg/L	SM 2540C	5/29/15	5/29/15	SAM
Hardness								

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C. Microbiological analysis requires samples to be at least 4-10°C when received at the laboratory. For additional information regarding the limitations of the method(s) referred to, please call us at 661-395-0539.



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

Table with 3 columns: Client Information (Mac Pherson Oil Company), Project Information (RWQCB Oilfield Ponds - 2Q2015), and Work Order Information (1505280).

Table with 2 columns: Lab Sample Information (Lab Sample ID: 1505280-01) and Collection Information (Collected By: Chris Martinez).

Main analytical results table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, and Init. Includes sections for Hardness, Metals, Metals - As Received, and Petroleum Hydrocarbons.

Table for Surrogates with columns: Surrogates, % Recovery, Recovery Limits, and Flag. Includes entry for a,a,a-Trifluorotoluene.

Semivolatile Organic Compounds

Table for Semivolatile Organic Compounds with columns: Analyte, Results, PQL, Units, Method, Date Prepared, Date Analyzed, and Init. Lists compounds like Indeno(1,2,3-cd)pyrene, Naphthalene, etc.

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C.



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
---	--	---

Lab Sample ID: 1505280-01 Client Sample ID: Ring 18 WD-1	Collected By: Chris Martinez Date Collected: 5/21/2015 9:10:00AM
---	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Semivolatile Organic Compounds								
Fluoranthene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Pyrene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) anthracene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Chrysene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (b) fluoranthene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (k) fluoranthene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) pyrene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Dibenz (a,h) anthracene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (g,h,i) perylene	<10.0	10.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Surrogates		% Recovery	Recovery Limits	Flag				

Nitrobenzene-d5		53.0	0-95				5/29/15 11:02	
2-Fluorobiphenyl		45.3	0-92				5/29/15 11:02	
Terphenyl-d14		51.8	0-100				5/29/15 11:02	

Subcontracted Analyses

Gross Alpha	<15.0	15.0		pCi/L	SM 7110C	6/5/15	6/8/15	MCS
Radium-226	<3.00	3.00		pCi/L	E903.1	5/28/15	6/1/15	MCS
Radium-228	<2.00	2.00		pCi/L	EPA Ra-05	6/6/15	6/10/15	MCS
Uranium (ug/L)	<20.0	20.0		pCi/L	E908	6/9/15	6/9/15	MCS

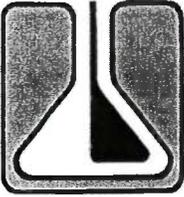
Volatile Organic Compounds

m,p-Xylene	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Benzene	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Xylenes, total	0.00			ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Methyl tert-Butyl Ether	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Ethylbenzene	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Toluene	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
o-Xylene	<5.00	5.00		ug/L	SW846 8260B	5/26/15	5/26/15	HLP
Surrogates		% Recovery	Recovery Limits	Flag				

1,2-Dichloroethane-d4		113	89-165				5/26/15 14:13	
Toluene-d8		109	65-124				5/26/15 14:13	
4-Bromofluorobenzene		114	94-114				5/26/15 14:13	

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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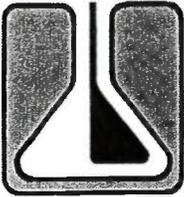
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-01 Client Sample ID: Ring 18 WD-1	Collected By: Chris Martinez Date Collected: 5/21/2015 9:10:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Volatile Organic Contaminants (VOCs)								
Methane	1.13	0.000240	ppm		RSK-175	5/27/15	5/27/15	MO

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-02	Collected By: Chris Martinez
Client Sample ID: Ring 20 Well # 9 API 02914071	Date Collected: 5/21/2015 9:40:00AM

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Alkalinity								
Total Alkalinity	400	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Bicarbonate (HCO3)	400	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
CAM, Toxicity (17 Metals)								
			<i>TTLC Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Barium	<0.10	0.10	10000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Copper	0.075	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	5/26/15	5/26/15	SS
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Silver	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Zinc	0.083	0.050	5000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
General Chemistry								
			<i>MCL Limits</i>					
Fluoride	<0.10	0.10	2	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Nitrate as NO3	<2.00	2.00	45	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Electrical Conductivity	2.4	0.010		mmhos/cm	SM 2510B	5/22/15	5/22/15	SAM
Bromide	2.3	0.10		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Chloride	510	50		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
pH	8.17			pH Units	EPA 150.1	5/21/15	5/21/15	SAM
Sulfate as SO4	6.6	0.50		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Total Dissolved Solids	1400	10		mg/L	SM 2540C	5/29/15	5/29/15	SAM
Hardness								

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Table with 3 columns: Client Information (Mac Pherson Oil Company), Project Information (RWQCB Oilfield Ponds - 2Q2015), and Work Order Information (1505280).

Table with 2 columns: Lab Sample Information (1505280-02) and Client/Collection Information (Ring 20 Well # 9 API 02914071).

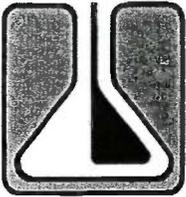
Main analytical results table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, and Init. Includes sections for Hardness, Metals, Metals - As Received, and Petroleum Hydrocarbons.

Table for Surrogates with columns: Surrogates, % Recovery, Recovery Limits, and Flag. Includes entry for a,a,a-Trifluorotoluene.

Table for Semivolatile Organic Compounds with columns: Analyte, Results, PQL, Units, Method, Date Prepared, Date Analyzed, and Init. Lists compounds like Indeno(1,2,3-cd)pyrene, Naphthalene, etc.

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative

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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-02 Client Sample ID: Ring 20 Well # 9 API 02914071	Collected By: Chris Martinez Date Collected: 5/21/2015 9:40:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Semivolatile Organic Compounds								
Fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Pyrene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) anthracene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Chrysene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (b) fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (k) fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) pyrene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Dibenz (a,h) anthracene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (g,h,i) perylene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Surrogates		% Recovery	Recovery Limits	Flag				

Nitrobenzene-d5	20.1	0-95				5/29/15	11:02	
2-Fluorobiphenyl	9.85	0-92				5/29/15	11:02	
Terphenyl-d14	6.55	0-100				5/29/15	11:02	

Subcontracted Analyses

Gross Alpha	<15.0	15.0	pCi/L		SM 7110C	6/5/15	6/8/15	MCS
Radium-226	<3.00	3.00	pCi/L		E903.1	5/28/15	6/1/15	MCS
Radium-228	<2.00	2.00	pCi/L		EPA Ra-05	6/6/15	6/10/15	MCS
Uranium (ug/L)	<20.0	20.0	pCi/L		E908	6/9/15	6/9/15	MCS

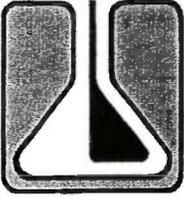
Volatile Organic Compounds

m,p-Xylene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Benzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Xylenes, total	0.00		ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Methyl tert-Butyl Ether	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Ethylbenzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Toluene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
o-Xylene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Surrogates		% Recovery	Recovery Limits	Flag				

1,2-Dichloroethane-d4	101	89-165				5/26/15	14:13	
Toluene-d8	98.5	65-124				5/26/15	14:13	
4-Bromofluorobenzene	110	94-114				5/26/15	14:13	

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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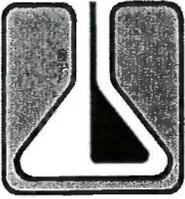
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-02 Client Sample ID: Ring 20 Well # 9 API 02914071	Collected By: Chris Martinez Date Collected: 5/21/2015 9:40:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Volatile Organic Contaminants (VOCs)								
Methane	19.9	0.000240	ppm		RSK-175	5/27/15	5/27/15	MO

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-03 Client Sample ID: Ring 18 Well # 15 API 0291054	Collected By: Chris Martinez Date Collected: 5/21/2015 10:10:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Alkalinity								
Total Alkalinity	430	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Bicarbonate (HCO3)	430	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
CAM, Toxicity (17 Metals)								
			<i>TTL Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Barium	0.14	0.10	10000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Copper	0.083	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	5/26/15	5/26/15	SS
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Silver	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Zinc	0.058	0.050	5000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
General Chemistry								
			<i>MCL Limits</i>					
Fluoride	<5.0	5.0	2	mg/L	EPA 300.0	5/28/15	5/28/15	MSS
Nitrate as NO3	<2.00	2.00	45	mg/L	EPA 300.0	5/28/15	5/28/15	MSS
Electrical Conductivity	4.3	0.010		mmhos/cm	SM 2510B	5/22/15	5/22/15	SAM
Bromide	4.6	0.10		mg/L	EPA 300.0	5/28/15	5/28/15	MSS
Chloride	1100	100		mg/L	EPA 300.0	5/28/15	5/28/15	MSS
pH	8.05			pH Units	EPA 150.1	5/21/15	5/21/15	SAM
Sulfate as SO4	130	25		mg/L	EPA 300.0	5/28/15	5/28/15	MSS
Total Dissolved Solids	2400	10		mg/L	SM 2540C	5/29/15	5/29/15	SAM
Hardness								

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Table with 3 columns: Client Information (Mac Pherson Oil Company), Project Information (RWQCB Oilfield Ponds - 2Q2015), and Work Order Information (1505280).

Table with 2 columns: Lab/Client Sample IDs (1505280-03, Ring 18 Well # 15 API 0291054) and Collection Information (Chris Martinez, 5/21/2015 10:10:00AM).

Main analytical results table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, and Init. Includes sections for Hardness, Metals, Metals - As Received, and Petroleum Hydrocarbons.

Table for Surrogates with columns: Surrogates, % Recovery, Recovery Limits, and Flag. Includes entry for a,a,a-Trifluorotoluene.

Semivolatile Organic Compounds

Table for Semivolatile Organic Compounds with columns: Analyte, Results, PQL, Units, Method, Date Prepared, Date Analyzed, and Init. Lists compounds like Indeno(1,2,3-cd)pyrene, Naphthalene, etc.

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative

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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-03 Client Sample ID: Ring 18 Well # 15 API 0291054	Collected By: Chris Martinez Date Collected: 5/21/2015 10:10:00AM
--	--

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Semivolatile Organic Compounds								
Fluoranthene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Pyrene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) anthracene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Chrysene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (b) fluoranthene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (k) fluoranthene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) pyrene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Dibenz (a,h) anthracene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (g,h,i) perylene	<500	500	ug/L		SW846 8270C	5/28/15	5/29/15	JMM

Surrogates	% Recovery	Recovery Limits	Flag	
Nitrobenzene-d5	34.0	0-95		5/29/15 11:02
2-Fluorobiphenyl	19.5	0-92		5/29/15 11:02
Terphenyl-d14	36.0	0-100		5/29/15 11:02

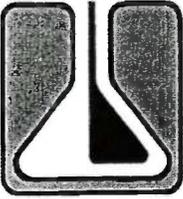
Subcontracted Analyses								
Gross Alpha	<15.0	15.0	pCi/L		SM 7110C	6/5/15	6/8/15	MCS
Radium-226	<3.00	3.00	pCi/L		E903.1	5/28/15	6/1/15	MCS
Radium-228	<2.00	2.00	pCi/L		EPA Ra-05	6/6/15	6/10/15	MCS
Uranium (ug/L)	<20.0	20.0	pCi/L		E908	6/9/15	6/9/15	MCS

Volatile Organic Compounds								
m,p-Xylene	6.73	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Benzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Xylenes, total	6.73		ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Methyl tert-Butyl Ether	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Ethylbenzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Toluene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
o-Xylene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP

Surrogates	% Recovery	Recovery Limits	Flag	
1,2-Dichloroethane-d4	116	89-165		5/26/15 14:13
Toluene-d8	90.9	65-124		5/26/15 14:13
4-Bromofluorobenzene	96.2	94-114		5/26/15 14:13

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level * See Case Narrative
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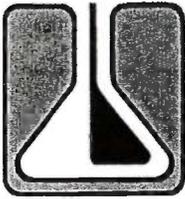
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-03 Client Sample ID: Ring 18 Well # 15 API 0291054	Collected By: Chris Martinez Date Collected: 5/21/2015 10:10:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Volatile Organic Contaminants (VOCs)								
Methane	6.49	0.000240	ppm		RSK-175	5/27/15	5/27/15	MO

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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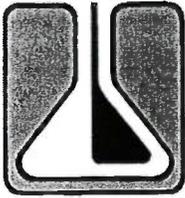
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-04	Collected By: Chris Martinez
Client Sample ID: Union 18 WS-2	Date Collected: 5/21/2015 10:40:00AM

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Alkalinity								
Total Alkalinity	550	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Bicarbonate (HCO3)	550	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
CAM, Toxicity (17 Metals)								
			<i>TTL Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Barium	0.15	0.10	10000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Copper	0.078	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	5/26/15	5/26/15	SS
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Silver	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Zinc	0.094	0.050	5000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
General Chemistry								
			<i>MCL Limits</i>					
Fluoride	<0.10	0.10	2	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Nitrate as NO3	<2.00	2.00	45	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Electrical Conductivity	4.5	0.010		mmhos/cm	SM 2510B	5/22/15	5/22/15	SAM
Bromide	5.6	0.10		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Chloride	1100	100		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
pH	7.82			pH Units	EPA 150.1	5/21/15	5/21/15	SAM
Sulfate as SO4	160	25		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Total Dissolved Solids	2500	10		mg/L	SM 2540C	5/29/15	5/29/15	SAM
Hardness								

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-04 Client Sample ID: Union 18 WS-2	Collected By: Chris Martinez Date Collected: 5/21/2015 10:40:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Hardness								
Hardness (as CaCO3)	210	2.0	mg/L		SM 2340B	5/22/15	5/22/15	SS
Metals								
Lithium	0.34	0.10	mg/L		EPA 200.7	5/22/15	5/29/15	SS
Metals - As Received								
Magnesium	6.5	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Potassium	13	0.50	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Sodium	800	70	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Calcium	74	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Iron	<0.10	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Boron	4.2	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Barium	0.10	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Copper	<0.050	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Silica (SiO2)	50	4.0	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Strontium	0.90	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Manganese	0.043	0.030	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Petroleum Hydrocarbons								
Diesel Range Hydrocarbons	0.63	0.05	mg/L		SW846 8015B	5/27/15	5/29/15	BIG
Gasoline Range Hydrocarbons	<0.050	0.050	mg/L		SW846 8015B	5/28/15	5/28/15	HLP
Motor Oil Range Hydrocarbons	0.65	0.15	mg/L		SW846 8015B	5/27/15	5/29/15	BIG

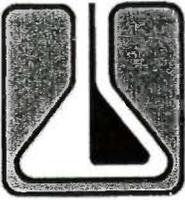
Surrogates	% Recovery	Recovery Limits	Flag
a,a,a-Trifluorotoluene	101	69-125	5/28/15 15:52

Semivolatile Organic Compounds

Analyte	Results	PQL	Units	Method	Date Prepared	Date Analyzed	Init.
Indeno(1,2,3-cd)pyrene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Naphthalene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Acenaphthylene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Acenaphthene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Fluorene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Phenanthrene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Anthracene	<10.0	10.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Table with 3 columns: Client Information (Mac Pherson Oil Company), Project Information (RWQCB Oilfield Ponds - 2Q2015), and Work Order Information (1505280).

Table with 2 columns: Lab Sample Information (1505280-04) and Client Information (Union 18 WS-2).

Main analytical results table for Semivolatile Organic Compounds with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, and Init.

Table for Surrogates with columns: Surrogates, % Recovery, Recovery Limits, and Flag.

Subcontracted Analyses

Table for Subcontracted Analyses with columns: Analyte, Results, PQL, Units, Method, Date Prepared, Date Analyzed, and Init.

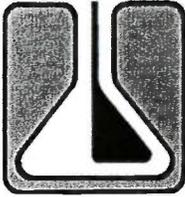
Volatile Organic Compounds

Main analytical results table for Volatile Organic Compounds with columns: Analyte, Results, PQL, Units, Method, Date Prepared, Date Analyzed, and Init.

Table for Surrogates with columns: Surrogates, % Recovery, Recovery Limits, and Flag.

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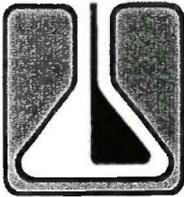
Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-04 Client Sample ID: Union 18 WS-2	Collected By: Chris Martinez Date Collected: 5/21/2015 10:40:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Volatile Organic Contaminants (VOCs)								
Methane	16.0	0.000240	ppm		RSK-175	5/27/15	5/27/15	MO

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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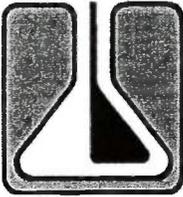
Lab Sample ID: 1505280-05 Client Sample ID: Union 18 Well # 5 API 02985331	Collected By: Chris Martinez Date Collected: 5/21/2015 11:20:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Alkalinity								
Total Alkalinity	370	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Bicarbonate (HCO3)	370	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	5/21/15	5/21/15	SAM
CAM, Toxicity (17 Metals)								
			<i>TTLC Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Barium	<0.10	0.10	10000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Copper	0.058	0.050	2500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	5/26/15	5/27/15	SS
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Silver	<0.020	0.020	500	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	5/22/15	5/26/15	SS
Zinc	<0.050	0.050	5000	mg/L	SW846 6010B	5/22/15	5/26/15	SS
General Chemistry								
			<i>MCL Limits</i>					
Fluoride	2.7	2.5	2	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Nitrate as NO3	<2.00	2.00	45	mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Electrical Conductivity	2.4	0.010		mmhos/cm	SM 2510B	5/22/15	5/22/15	SAM
Bromide	2.4	0.10		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Chloride	540	50		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
pH	8.21			pH Units	EPA 150.1	5/21/15	5/21/15	SAM
Sulfate as SO4	<0.50	0.50		mg/L	EPA 300.0	5/22/15	5/22/15	MSS
Total Dissolved Solids	1300	10		mg/L	SM 2540C	5/29/15	5/29/15	SAM

Hardness

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
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Lab Sample ID: 1505280-05 Client Sample ID: Union 18 Well # 5 API 02985331	Collected By: Chris Martinez Date Collected: 5/21/2015 11:20:00AM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Hardness								
Hardness (as CaCO3)	79	2.0	mg/L		SM 2340B	5/22/15	5/22/15	SS
Metals								
Lithium	0.16	0.10	mg/L		EPA 200.7	5/22/15	5/29/15	SS
Metals - As Received								
Magnesium	1.6	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Potassium	6.5	0.50	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Sodium	600	7.0	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Calcium	29	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Iron	<0.10	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Boron	2.2	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Barium	<0.10	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Copper	<0.050	0.050	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Silica (SiO2)	65	4.0	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Strontium	0.17	0.10	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Manganese	0.12	0.030	mg/L		EPA 200.7	5/22/15	5/22/15	SS
Petroleum Hydrocarbons								
Diesel Range Hydrocarbons	261	10.0	mg/L		SW846 8015B	5/27/15	5/29/15	BIG
Gasoline Range Hydrocarbons	<0.050	0.050	mg/L		SW846 8015B	5/28/15	5/28/15	HLP
Motor Oil Range Hydrocarbons	339	30.0	mg/L		SW846 8015B	5/27/15	5/29/15	BIG

Surrogates	% Recovery	Recovery Limits	Flag
a,a,a-Trifluorotoluene	90.5	69-125	5/28/15 15:52

Semivolatile Organic Compounds

Analyte	Results	PQL	Units	Method	Date Prepared	Date Analyzed	Init.
Indeno(1,2,3-cd)pyrene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Naphthalene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Acenaphthylene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Acenaphthene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Fluorene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Phenanthrene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM
Anthracene	<50.0	50.0	ug/L	SW846 8270C	5/28/15	5/29/15	JMM

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C. Microbiological analysis requires samples to be at least 4-10°C when received at the laboratory. For additional information regarding the limitations of the method(s) referred to, please call us at 661-395-0539.



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
---	--	---

Lab Sample ID: 1505280-05	Collected By: Chris Martinez
Client Sample ID: Union 18 Well # 5 API 02985331	Date Collected: 5/21/2015 11:20:00AM

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Semivolatile Organic Compounds								
Fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Pyrene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) anthracene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Chrysene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (b) fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (k) fluoranthene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (a) pyrene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Dibenz (a,h) anthracene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM
Benzo (g,h,i) perylene	<50.0	50.0	ug/L		SW846 8270C	5/28/15	5/29/15	JMM

Surrogates	% Recovery	Recovery Limits	Flag
Nitrobenzene-d5	36.4	0-95	5/29/15 11:02
2-Fluorobiphenyl	36.6	0-92	5/29/15 11:02
Terphenyl-d14	49.3	0-100	5/29/15 11:02

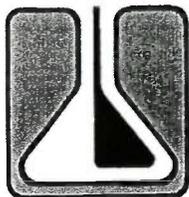
Subcontracted Analyses								
Gross Alpha	<15.0	15.0	pCi/L		SM 7110C	6/5/15	6/8/15	MCS
Radium-226	<3.00	3.00	pCi/L		E903.1	5/28/15	6/11/15	MCS
Radium-228	<2.00	2.00	pCi/L		EPA Ra-05	6/6/15	6/10/15	MCS
Uranium (ug/L)	<20.0	20.0	pCi/L		E908	6/9/15	6/9/15	MCS

Volatile Organic Compounds								
m,p-Xylene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Benzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Xylenes, total	0.00		ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Methyl tert-Butyl Ether	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Ethylbenzene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
Toluene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP
o-Xylene	<5.00	5.00	ug/L		SW846 8260B	5/26/15	5/26/15	HLP

Surrogates	% Recovery	Recovery Limits	Flag
1,2-Dichloroethane-d4	104	89-165	5/26/15 14:13
Toluene-d8	93.6	65-124	5/26/15 14:13
4-Bromofluorobenzene	117*	94-114	S-GC 5/26/15 14:13

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C. Microbiological analysis requires samples to be at least 4-10°C when received at the laboratory. For additional information regarding the limitations of the method(s) referred to, please call us at 661-395-0539.



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Mac Pherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: RWQCB Oilfield Ponds - 2Q2015 Project #: Attention: Justin Lawson	Work Order No.: 1505280 Reported: 06/12/2015 Received: 05/21/2015 13:05
---	--	---

Lab Sample ID: 1505280-05 Client Sample ID: Union 18 Well # 5 API 02985331	Collected By: Chris Martinez Date Collected: 5/21/2015 11:20:00AM
---	--

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
Volatile Organic Contaminants (VOCs)								
Methane	14.7	0.000240	ppm		RSK-175	5/27/15	5/27/15	MO

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTLC: Total Threshold Limit Concentration STLC: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level *: See Case Narrative
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Note: Samples analyzed for regulatory purposes should be put on ice immediately after sampling and received by the laboratory at temperatures between 0-6°C. Microbiological analysis requires samples to be at least 4-10°C when received at the laboratory. For additional information regarding the limitations of the method(s) referred to, please call us at 661-395-0539.

EXHIBIT 7

EXHIBIT 7

MOC
MACPHERSON OIL
C O M P A N Y

August 4, 2014

To: Clay Rodgers
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

From: Scott Macpherson
Macpherson Operating Co.
2716 Ocean Park Boulevard Suite 3080
Santa Monica, CA 90405

Re: Macpherson Operating Company Change Of Contact Person

Mr. Rodgers,
To ensure timely communications between the Water Quality Control Board and Macpherson Operating Company (MOC) I hereby authorize Tim Lovley, HSE Manager for Macpherson Oil Company to act on all matters relating to the Water Quality Control Board and in the capacity as the Approved Signatory for Macpherson Operating Company to the Water Quality Control Board. Please direct all communications to Tim Lovley at 24118 Round Mountain Rd Bakersfield, CA 93308. In addition, Mr. Lovley can be contacted at 661/ 368-3969 or Tim.Lovley@MacphersonOil.com. This authorization is valid until further written notice starting on August 4, 2014.

Sincerely,



Scott Macpherson
Macpherson Operating Co. L.P.

Cc: Tim Lovley – Macpherson Oil Company
File

EXHIBIT 8

EXHIBIT 8

VEIR Corp

Environmental Management Services

UIG WELL SAMPLING WORK PLAN

RESPONSE TO THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD ORDER
PURSUANT TO CALIFORNIA WATER CODE SECTION 13267
PERTAINING TO TWO PRODUCED WATER INJECTION WELLS IN THE
WEST MOUNT POSO FIELD, KERN, COUNTY, CALIFORNIA

JUNE 5, 2015

Client: Macpherson Oil Company
Post Office Box 5368
Bakersfield, California 93388

Client Contact: Mr. Tim Lovley, CSP, CFPS, CUSA
Manager of Health, Safety and Environmental
(661) 368-3909

Agency: California Regional Water Quality Control Board
Central Valley Region
1685 E Street
Fresno, California 93706

Agency Contact: Mr. Clay L. Rodgers
(559) 445-5116

Consultant: *VEIR Corp*
3410 Fruitvale Avenue, Suite A
Bakersfield, California, 93308

Project Manager: Mr. Mark R. Magargee, PG, CHg
(661) 631-8347


Mark R. Magargee, PG, CHg
Consulting Hydrogeologist
VEIR Corp



3410 Fruitvale Avenue, Suite A, Bakersfield, California 93308
(661) 631-8347 ∞ Fax (661) 631-8007
Contractor License Number 920738-FAZ
www.veir.net

I, Tim Lovley, an authorized representative of Macpherson Oil Company, certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Tim Lovley
HSE Manager

Date

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SECTION II - TABLES

1. UIC Well Location and Completion Data

SECTION III - ATTACHMENTS

1. Central Valley Water Board Correspondence
2. MOC Correspondence
3. Public Version of the Aquifer Exemption Study and supporting documents (on Thumb Drive)

INTRODUCTION

VEIR Corp is pleased to present this Underground Injection Control (UIC) Well Sampling Work Plan in response to the California Regional Water Quality Board – Central Valley Region Water Quality Control Board (Central Valley Water Board) Order pursuant to California Water Code Section 13267, dated May 15, 2015, pertaining to two (2) produced water injection wells, which are operated by Macpherson Operating Company (MOC) in the West Mount Poso Field in Kern County, California (see Attachment 1 for the Central Valley Water Board Correspondence). The Order requested this work plan by June 3, 2015. Please note that MOC received this Order on June 3, 2015 at its new offices in Santa Monica. The Order was sent to MOC's old Santa Monica address (MOC moved from this address approximately 8 months ago). MOC notified the Water Board of the change in address and responsible person by letter dated August 4, 2014 (see Attachment 2 for the MOC Correspondence).

VEIR Corp is pleased to present the following work plan describing the procedures to present information on the representative samples of the fluids being injected into the Vedder formation, a hydrocarbon bearing formation, by the 2 UIC wells and provide information on the Vedder formation water quality. Please note that these 2 UIC wells are included in an Aquifer Exemption Study completed by WZI, Inc. and submitted to the California Department of Oil, Gas, and Geothermal Resources (DOGGR) on June 1, 2015. This study provides information on multiple formations, but is focused on the Vedder Formation within the West Mount Poso Field where the 2 UIC wells indicated in the Order are located. This study was developed within the last month and includes historic and current data on water quality in the formation. The public version of this exemption study is part of this work plan is included as part of the response to the Order issued by the Central Valley Water Board (see Attachment 3 for the Public Version of the Aquifer Exemption Study and supporting documents on a Thumb Drive).

Macpherson Operating Company is the operator of the 2 UIC wells identified as American Petroleum Institute (API) numbers 02987404 (Ring 18-21) and 03042925 (Ring 18WD-1). The DOGGR has informed the Central Valley Water Board that the UIC wells subject to the Order have been injecting fluids produced by oil or gas extraction activities into an aquifer that may not have been properly designated as an exempt aquifer under the federal Safe Drinking Water Act (42 U.S.C. § 300f et seq.). The Central Valley Water Board states that the aquifer may be suitable for drinking water supply and other beneficial uses. Of note is the Vedder formation within the Mount Poso field is a hydrocarbon producing formation and that API Well 02987404 is within the existing exempted area and was an oil producing well from October 1990 until December of 2008.

The Order requested that by June 3, 2015 MOC submit a work plan that adequately describes the procedures to collect a representative groundwater sample from the injection zone(s) for each injection well subject to the Order. If a representative sample cannot feasibly be collected from one or more of

the injection zones for any of the injection wells subject to the Order within the required timeframe (e.g., due to constraints posed by the design of the injection well), MOC is to submit a technical report demonstrating that collection of a representative sample from those injection zones is not feasible within the required timeframe, and proposing an alternative sampling procedure and expeditious time schedule for obtaining a representative sample of groundwater from those injection zones. Alternative sampling procedures and time schedules are subject to approval by the Assistant Executive Officer of the Central Valley Water Board.

The Order further requested that by 3 August 2015, MOC is required to submit a technical report that contains all of the following information:

- a. The analyses of each of the groundwater samples from the injection zone(s) for each injection well subject to the Order, in accordance with the water quality analysis and reporting requirements contained in Attachment A to the Order.
- b. If fluids have been injected into any of the injection wells subject to the Order, an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment A to the Order.
- c. All available historical chemical analyses of the fluids injected into each injection well subject to the Order.
- d. All previously obtained analytical data for groundwater samples collected from any injection zones within one (1) mile of each of the injection wells subject to the Order.
- e. A list and location map of all water supply wells within one mile of each injection well subject to the Order.
- f. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction; borehole geophysical logs; and all analytical results for any water sample(s) collected from each water supply well. MOC is required to notify Central Valley Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.

- g. For each injection well subject to the Order, the following information for items A-0 shall be submitted in a spreadsheet, labeled with the capital letters indicated. The information for items P-R shall be submitted as attachments:
- A. The name of the owner and/or operator of the injection well;
 - B. API number for the injection well;
 - C. Injection well name and number;
 - D. Name of the field in which the injection well is located;
 - E. County in the which the injection well is located;
 - F. Latitude and Longitude (decimal degrees) of well head location;
 - G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;
 - H. Injection well total depth (feet);
 - I. Top injection depth (feet);
 - J. Formation/Zone name at top injection depth;
 - K. Bottom injection depth (feet);
 - L. Formation/Zone name at bottom injection depth;
 - M. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);
 - N. Total injection volume in barrels by calendar year (to present day);
 - O. Attach well construction diagram including all perforations, annular material, and seals;
 - P. Attach a description of all sources of fluid injected;
 - Q. Attach all data maintained in compliance with California Code of Regulations (CCR), title 14, section 1724.10, subdivision (h).
 - R. Attach documentation associated with each mechanical integrity test undertaken to comply with CCR, title 14, section 1724.10, subdivision (U).

In addition, the Technical Report shall include:

- Site plan with the location(s) of the wells sampled;
- Description of field sampling procedures;
- Copies of analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods;
- Waste management and disposal procedures;
- Table(s) of analytical results organized by well number (including API number); and
- A list and location map of all the water supply wells located within a one mile radius of the injection well(s).

All required work plans and technical information are required to be submitted in an electronic format compatible with the State's GeoTracker system following the requirements of California CCR, title 23, section 3893 (available at http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf). All GeoTracker uploads should consist of a GeoReport, GeoMap(s), and an EDF of laboratory data, if applicable. A unique case identifier (Global ID) has been assigned for each injection well subject to the Order and was listed in Attachment B of the Order (see Attachment 1).

On June 1, 2015, MOC submitted an Aquifer Exemption Study for the West Mount Poso Oil Field to the DOGGR in response to the DOGGR letter, dated March 15, 2015. The study results support the expansion of the existing aquifer exemption area for the Vedder formation underlying the West Mount Poso Oil Field Administrative Boundary for the purpose of reinjection of West Mount Poso produced water. All of the injection wells that are injecting in the expanded production zones have been permitted by DOGGR. In addition future enhanced recovery projects in the expanded productive areas are anticipated. The study contains the information necessary to expand the original aquifer exemptions to include areas outside of the original hydrocarbon producing areas identified in the 1973 Productive Field Boundaries (see Attachment 3).

Based on the study results delineated in the report, the Vedder formation cannot now and will not in the future serve as a source of drinking water because it is situated at a depth which, in combination with the location of the nearest accessible community receiving water service and the associated cost to treat and convey the water, makes the recovery of water for drinking water purposes economically impractical. Furthermore, based on history and new production and drilling techniques the Vedder has been and is a hydrocarbon producing formation.

SAMPLING WORK PLAN

Table 1 of this work plan includes location and completion data for the 2 UIC wells listed in the order. The 2 UIC wells are all constructed in the Vedder formation. Over 101,904,471 bbls of formation fluids have been re-injected in these wells. Therefore, the formations fluids that can be sampled from the 2 UIC wells will be identical to the produced water re-injected. Sampling the 2 individual UIC wells would require isolating current production, cost in excess of \$40,000, and result in lost production, to provide samples that will be identical to the fluids being reinjected and results that are currently described in the attached Aquifer Exemption study (Attachment 3). This is in addition to the \$150,000 dollars MOC has spent for the aquifer exemption study (provided to DOGGR and the public version is provided to the Central Valley Water Board as part of this workplan) of the West Mount Poso field (see Attachment 3). Therefore, *VEIR Corp* proposes to provide the Central Valley Water Board the attached Aquifer Exemption study and the radionuclide test results expected in the next 30 days for the wells sampled as part of the Aquifer Exemption study.

The samples were collected at the wells and injection sampling point for WD-1. The samples were collected in appropriate containers, which were placed in a cold ice chest and transported to the laboratory under chain of custody procedures. The water samples collected from the six disposal tanks were analyzed by Zalco laboratory certified by the Environmental Laboratory Accreditation Program; using applicable EPA approved analytical methods as those requested by the Central Valley Water Board in the Order. The radionuclide testing results are expected within the next 30 days. The analytical suite and methods were as follows:

Total Dissolved Solids using SM 2540C

Metals Listed in California Code of Regulations, Title 22, Section 66260.24, subdivision (a)(2)(A);

TTLIC EPA 6010B/7470A (STLC as necessary)

Benzene, toluene, ethyl benzene, and xylenes (BTEX) using EPA 8021

Total Petroleum Hydrocarbons, crude oil range using EPA 8015M

Polynuclear aromatic hydrocarbons (including acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorine, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) using EPA 8270M SIM

Radionuclides listed under California Code of Regulations, Title 22, Table 64442. Crude Oil Gross Beta EPA 900, Gross Alpha EPA 900.0, Gamma (photon) emitters EPA 901.1M, Radium 226 and 228 Combined 900.00, Uranium EPA 6020, Tritium 901.01

Methane; CH₄ RSK 175

Major and minor cations (including sodium, potassium, magnesium, and calcium) using EPA 6010B

Major and minor anions (including nitrate, chloride, sulfate, alkalinity, and bromide) using EPA 300.0, Alkalinity, Titrimetric (pH 4.5) using SM 2320B

Trace elements (including lithium, strontium, boron, iron, and manganese) using EPA 6010B

VEIR Corp proposes utilizing the attached Aquifer Exemption data and the radionuclide test results in response to the Order. *VEIR Corp* will provide the sample results into a spreadsheet after receiving the results of the radionuclide test to the Central Valley Water Board with a copy sent to the Division by July 1, 2015. If the July 1, 2015 deadline specified in the Order cannot be met, the Central Valley Water Board will be notified and the anticipated date will be provided to the Central Valley Water Board. MOC will ensure consistent updates are provided to the Central Valley Water Board until the results are provided. The technical report will include a site plan with the location of the wells sampled, description of the sampling procedures, table(s) of analytical results organized by well and well numbers including API number, copies of the analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods, and the waste management and disposal procedures. All other information required by the Order is included in MOC's Aquifer Exemption Study provided to DOGGR which is included as part of the response to the Order (see Attachment 3).

SECTION II.

TABLES

TABLE 1.
 UIC WELL LOCATION AND COMPLETION DATA
 MACPHERSON OIL COMPANY WEST POSO FIELD
 KERN COUNTY, CALIFORNIA

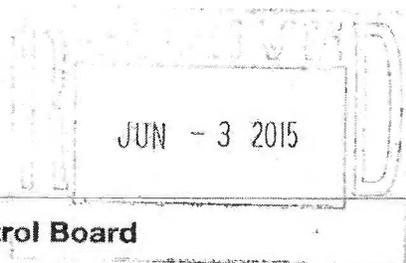
API	UIC Project #	WellName	Field	Formation	Latitude	Longitude	Section	Township	Range	Production Total	Disposal Total	Top/Bottom Perf.	Dehy / Tank Number
02987404	48818026	RING 18 #21	Mt. Poso	Vedder	35.57733	-118.999994	18	27S	28E	2685	5,363,690	2,339'-2,397'	West Poso
03042925	48818026	RING 18 WD-1	Mt. Poso	Vedder	35.57904	-118.996573	18	27S	28E		4,826,781	2,383'-2,797'	West Poso

SECTION III.

ATTACHMENTS

ATTACHMENT 1.

CENTRAL VALLEY WATER BOARD CORRESPONDENCE



EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

15 May 2015

**CERTIFIED MAIL
7014 3490 0001 7023 3057**

Scott Macpherson, Agent
Macpherson Operating Company, L.P.
2716 Ocean Park Boulevard, #3080
Santa Monica, CA 90405

ORDER PURSUANT TO CALIFORNIA WATER CODE SECTION 13267. You are legally obligated to respond to this Order. Read this Order carefully.

Macpherson Operating Company, L.P. is the operator of injection wells identified as American Petroleum Institute (API) numbers 02987404, and 03042925 (hereinafter "injection wells subject to this Order"). The California Division of Oil, Gas, and Geothermal Resources (Division) has informed the Central Valley Regional Water Quality Control Board (Central Valley Water Board) that the injection wells subject to this Order have been injecting fluids produced by oil or gas extraction activities into an aquifer that may not have been properly designated as an exempt aquifer under the federal Safe Drinking Water Act (42 U.S.C. § 300f et seq.). The aquifer may be suitable for drinking water supply and other beneficial uses.

As described further below, for each injection well subject to this Order, Macpherson Operating Company, L.P. is required to submit technical reports containing information about (1) the injection well, (2) the fluid that has been injected, (3) the quality of the groundwater within the zone(s) where fluids have been injected, and (4) nearby water supply wells. The issuance of this Order has been coordinated with the Division.

The Central Valley Water Board's authority to require technical reports derives from section 13267 of the California Water Code, which specifies, in part, that:

(a) A regional board...in connection with any action relating to any plan or requirement authorized by this division, may investigate the quality of any waters of the state within its region.

(b)(1) In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region...that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

KARL E. LONGLEY SCD, P.E., CHAIR | PAMELA C. CREEDON P.E., BCEE, EXECUTIVE OFFICER

1685 E Street, Fresno, CA 93706 | www.waterboards.ca.gov/centralvalley

The Central Valley Water Board is concerned about the potential threat to human health and potential impacts to water quality posed by the discharge of waste associated with the injection of fluids into aquifers that may be suitable for drinking water supply and other beneficial uses. The technical information and reports required by this Order are necessary to assess the potential threat to human health and potential impacts to water quality. The need to understand the potential threat to human health and potential impacts to water quality justifies the need for the information and reports required by this Order. Based on the nature and possible consequences of the discharges of waste, the burden of providing the required information, including reporting costs, bears a reasonable relationship to the need for the report, and the benefits to be obtained. Macpherson Operating Company, L.P. is required to submit this information and reports because it is the operator of the injection wells subject to this Order. If Macpherson Operating Company, L.P. and its predecessors in interest have never injected fluids into the injection wells subject to this Order, please advise Central Valley Water Board staff of this in writing as soon as possible.

Under the authority of California Water Code section 13267, the Central Valley Water Board hereby orders Macpherson Operating Company, L.P. to:

23. **By 3 June 2015** submit a work plan that adequately describes the procedures to collect a representative groundwater sample from the injection zone(s) for each injection well subject to this Order. If a representative sample cannot feasibly be collected from one or more of the injection zones for any of the injection wells subject to this Order within the required timeframe (e.g., due to constraints posed by the design of the injection well), submit a technical report demonstrating that collection of a representative sample from those injection zones is not feasible within the required timeframe, and proposing an alternative sampling procedure and expeditious time schedule for obtaining a representative sample of groundwater from those injection zones. Alternative sampling procedures and time schedules are subject to approval by the Assistant Executive Officer of the Central Valley Water Board.
24. **By 3 August 2015**, submit a technical report that contains all of the following information:
 - a. The analyses of each of the groundwater samples from the injection zone(s) for each injection well subject to this Order, in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - b. If fluids have been injected into any of the injection wells subject to this Order, an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.
 - c. All available historical chemical analyses of the fluids injected into each injection well subject to this Order.
 - d. All previously obtained analytical data for groundwater samples collected from any injection zones within one (1) mile of each of the injection wells subject to this Order.
 - e. A list and location map of all water supply wells within one mile of each injection well subject to this Order.
 - f. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction; borehole geophysical logs; and all analytical results for any water sample(s) collected from each

water supply well. Notify Central Valley Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.

- g. For each injection well subject to this Order, the following information for items A-O shall be submitted in a spreadsheet, labeled with the capital letters indicated. The information for items P-R shall be submitted as attachments:
- A. The name of the owner and/or operator of the injection well;
 - B. API number for the injection well;
 - C. Injection well name and number
 - D. Name of the field in which the injection well is located;
 - E. County in the which the injection well is located;
 - F. Latitude and Longitude (decimal degrees) of well head location;
 - G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;
 - H. Injection well total depth (feet);
 - I. Top injection depth (feet);
 - J. Formation/Zone name at top injection depth;
 - K. Bottom injection depth (feet);
 - L. Formation/Zone name at bottom injection depth;
 - M. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);
 - N. Total injection volume in barrels by calendar year (to present day);
 - O. Attach well construction diagram including all perforations, annular material, and seals;
 - P. Attach a description of all sources of fluid injected;
 - Q. Attach all data maintained in compliance with California Code of Regulations, title 14, section 1724.10, subdivision (h).
 - R. Attach documentation associated with each mechanical integrity test undertaken to comply with California Code of Regulations, title 14, section 1724.10, subdivision (j).

All required work plans and technical information must be submitted in an electronic format compatible with the State's GeoTracker system following the requirements of California Code of Regulations, title 23, section 3893 (available at http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf). A unique case identifier (Global ID) is assigned for each well subject to this Order contained in Attachment B.

Based on the information submitted in the work plan and/or technical report, additional information or action may be required.

Additionally, please submit a hard copy to the attention of:

Ron Holcomb
Central Valley Water Board
1685 E Street
Fresno, CA 93706

All information is to be copied to the Division, to the attention of:

Steven R. Bohlen, State Oil and Gas Supervisor
Department of Conservation, DOGGR
801 K Street
Sacramento, CA 95814-3500

Submissions pursuant to this Order need to include the following statement signed by an authorized representative of Macpherson Operating Company, L.P.:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The failure to furnish the required report, or the submission of a substantially incomplete report or false information, is a misdemeanor, and may result in additional enforcement actions, including issuance of an Administrative Civil Liability Complaint pursuant to California Water Code section 13268. Liability may be imposed pursuant to California Water Code section 13268 in an amount not to exceed one thousand dollars (\$1,000) for each day in which the violation occurs.

Any person aggrieved by this Order of the Central Valley Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320. The State Water Board must receive the petition by 5:00 p.m., within 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations, and instructions applicable to filing petitions, are at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml, or will be provided upon request.

Be advised that sections 13260 and 13264 of the California Water Code require any person who proposes to discharge waste that could affect waters of the state to submit a Report of Waste Discharge for any new discharge or change in the character, volume, or location of an existing discharge. Fluids produced by oil or gas extraction activities that can no longer be disposed of in the injection wells subject to this Order cannot be discharged to land or waters of the state prior to the issuance of Waste Discharge Requirements, and cannot be discharged to waters of the United States prior to the issuance of an National Pollutant Discharge Elimination System (NPDES) Permit. Failure to comply with these requirements may constitute a misdemeanor under Water Code section 13265 or a felony under Water Code section 13387, and may also subject Macpherson Operating Company, L.P. to judicial or administrative civil liabilities.

Scott Macpherson
Macpherson Operating Company, L.P.

- 5 -

15 May 2015

Any questions regarding this matter should be directed to me at (559) 445-5116 or at Clay.Rodgers@waterboards.ca.gov.



Clay L. Rodgers
Assistant Executive Officer

Enclosure:

Attachment A - Water Quality Sampling, Analysis and Reporting

Attachment B - GeoTracker Upload Instructions and Assigned Global Identification Number(s)

ATTACHMENT A
Water Quality Sampling, Analysis, and Reporting

Water Quality Sampling

All groundwater sampling is to be performed by a qualified person. A qualified person is any person with the knowledge and training in proper sampling methods, chain of custody, and quality assurance/quality control protocols. Any person conducting groundwater sampling, other than personnel from a certified laboratory, shall consult with the certified laboratory to ensure that the sampler understands and follows the proper sampling collection procedures and protocols. All procedures to sample groundwater supply wells shall be consistent with US EPA Science and Ecosystem Support Division Operating Procedure for Groundwater Sampling (March 2013) (available at <http://www.epa.gov/region4/sesd/fbgstp/Groundwater-Sampling.pdf>).

Water Quality Analysis

Groundwater samples collected from wells and injection zones shall be analyzed by a laboratory certified by the Environmental Laboratory Accreditation Program, using current applicable EPA-approved analytical methods. The methods of analysis and the detection limits used shall be appropriate for the expected concentrations. The analytical method having the lowest method detection limit (MDL) shall be selected from among those methods that would provide valid results in light of any matrix effects or interferences. Analyze samples for the following:

- A. Total dissolved solids
- B. Metals listed in California Code of Regulations, title 22, section 66261.24, subdivision (a)(2)(A)
- C. Benzene, toluene, ethylbenzene, and xylenes
- D. Total petroleum hydrocarbons for crude oil
- E. Polynuclear aromatic hydrocarbons (including acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene)
- F. Radionuclides listed under California Code of Regulations, title 22, Table 64442, which includes Gross Alpha particle activity (excluding radon and uranium), Uranium, Radium-226, and Radium-228.
- G. Methane
- H. Major and minor cations (including sodium, potassium, magnesium, and calcium)
- I. Major and minor anions (including nitrate, chloride, sulfate, alkalinity, and bromide)
- J. Trace elements (including lithium, strontium, boron, iron, and manganese)

Water Quality Reporting

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system.

Technical Report that includes

- Site plan with the location(s) of the wells sampled
- Description of field sampling procedures
- Copies of analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods.
- Waste management and disposal procedures
- Table(s) of analytical results organized by well number (including API number).
- A list and location map of all the water supply wells located within a one mile radius of the injection well(s)

All GeoTracker uploads should consist of a GeoReport, GeoMap(s), and an EDF of laboratory data, if applicable.

ATTACHMENT B
GeoTracker Upload Instructions and Assigned Global Identification Number(s)

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system. To begin the process:

- Log in or create a password
- Claim your site(s) (i.e. global ID)
- Add field point name(s)
- Upload the following:
 - Work plan/Technical report and associated data (GeoReport)
 - *laboratory report (EDF)
 - *Site Maps (GeoMAP)

For more information, please contact the GeoTracker Help Desk at Geotracker@waterboards.ca.gov or (866) 480-1028.

Injection Well	Assigned Global ID number
02987404	T10000006904
03042925	T10000006905

*GeoTracker submittal may not be required for all document types.

ATTACHMENT 2.

MOC CORRESPONDENCE

MOC
MACPHERSON OIL
C O M P A N Y

August 4, 2014

To: Clay Rodgers
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

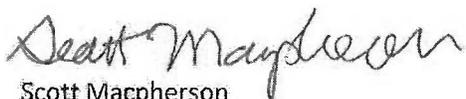
From: Scott Macpherson
Macpherson Operating Co.
2716 Ocean Park Boulevard Suite 3080
Santa Monica, CA 90405

Re: Macpherson Operating Company Change Of Contact Person

Mr. Rodgers,

To ensure timely communications between the Water Quality Control Board and Macpherson Operating Company (MOC) I hereby authorize Tim Lovley, HSE Manager for Macpherson Oil Company to act on all matters relating to the Water Quality Control Board and in the capacity as the Approved Signatory for Macpherson Operating Company to the Water Quality Control Board. Please direct all communications to Tim Lovley at 24118 Round Mountain Rd Bakersfield, CA 93308. In addition, Mr. Lovley can be contacted at 661/ 368-3969 or Tim.Lovley@MacphersonOil.com This authorization is valid until further written notice starting on August 4, 2014.

Sincerely,



Scott Macpherson
Macpherson Operating Co. L.P.

Cc: Tim Lovley – Macpherson Oil Company
File

ATTACHMENT 3.

**PUBLIC VERSION OF THE AQUIFER EXEMPTION STUDY AND SUPPORTING DOCUMENTS
(On Thumb Drive)**

EXHIBIT 9

EXHIBIT 9



WZI INC.

**Aquifer Exemption Study
West Area of Mount Poso Oilfield
Treatability Analysis-Vedder Zone
Kern County, California**

June 2015

Submitted to:

Macpherson Oil Company
100 Wilshire Boulevard
Suite 800
Santa Monica, California 90402

Prepared by:

WZI Inc.
1717 28th Street
Bakersfield, California 93301

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Appendix I	Produced Water Analytical Data
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1 Feasibility Analysis for EPA Groundwater Class III Status

1.1 Summary

Table 1-1 shows the summary results of the feasibility analysis for the Vedder Zone in the Eastern Fault Block of the West Area of the Mount Poso Oil Field. The center of the West Area of the Mount Poso Oil Field is approximately 13 miles by right-of-way from the nearest accessible community (Oildale). The feasibility analysis assumes that the water can be produced from the Vedder Zone at the mean formation depths.

The summary table breaks out the levelized capital by wells, facilities and pipelines. Operational costs are presented as a “roll-up” of pumping and maintenance costs. No costs associated with the acquisition of water rights are included as there is no historic basis for the value. The water rights in the Mount Poso Oil Field are largely held by oil companies and water purveyors would have to secure the water rights at “all in costs” which today are speculative; lastly, the analyses values, excluding the costs of these privately held water rights, are already higher than EPA thresholds.

The formation water and its associated historic injectate (returned to the producing formations) is shown by both chemical analyses and the reviewed process in Section 6 to be essentially unaltered or adulterated by additions of chemicals other than salts used for softening a small amount of water for steam injection.

In general:

- In the context of the percentage of per Household Income: The case having the lowest cost to a household is the facility design using the economy of scale applied to the production of water to serve the California State Average Households Served by a Service Purveyor. Based on this design the Per-Household Income Burden was over twenty times greater (10.5%) than the EPA threshold of 0.4% of the County-wide Household Annual Income (\$63,385). At the more localized level the nearest accessible community’s (Oildale) Per-Household Income Burden is even higher (14.5%) than the County-wide value due to Oildale’s lower per-household annual income (\$45,732).
- In the context of the incremental cost per household: The case having the lowest cost to a household is the facility design using the economy of scale applied to the production of water to serve the California State Average Households Served by a Service Purveyor. Based on this design the Per-Household Income Burden is 14.7 times greater than the incremental test value of \$450/HH-yr realized per household.¹
- In the context of the incremental cost to the Annual Household Water bill: The case having the lowest cost to a household is the facility design using the economy of scale applied to the production of water to serve the California State Average Households Served by a Service

¹ Basis EPA value of \$300, corrected to 2015 dollars and rounded up to \$450.
Vedder Treatability Study
West Area of Mount Poso Oilfield

Purveyor. Based on this design the Per-Household Income Burden represents at least a eight-fold increase in the current Annual Household Water Bill (\$746/HH-yr).

- In general the largest costs in all cases are those operational costs associated with the lifting costs for the water from the Vedder formation (2,300 to 3,800 feet) the pumping costs to Oildale Mutual Water Company and the waste management and offsite disposal in lieu of current practice of reinjecting the produced water and softening waste water into the formations currently used in Class II injection programs.

1.2 Average Household Case

Presently, the California State Water Quality Control Board has mandated reductions in per capita water consumption.² While prior water management plans showed historic per capita water use to be 300 gallons per day, see discussion below. This analysis assumes the reductions to meet this requirement will result in per capita consumption of 150 gallons per day. The California Average Household Case (1,799 households) requires 6,355,288.75 bbl/yr (731,293 gallons per day) for household use only taken from from 2 well in the subject portion of the Vedder Zone in the Eastern Fault Block of West Area of the Mount Poso Oil Field to serve the typical households in and around the greater Bakersfield area in Kern County. This design demand is twice the Maximum Yield Potential based on historic injection rates. Thus representing a more conservative case since it allows greater benefit from Economy-of-Scale.

The wells in this design case are drilled to the average depth of the Vedder interval in the subject area (2,575 feet). This design case would serve 26% of the households in the Oildale Mutual Water Company service territory.³ This facility was sized to take advantage of the economy of scale using the EPA, "Estimating Water Treatment Costs: Volume 22, Cost Curves Applicable to 2,500 gpd to 1 mgd Treatment Plants". (EPA, 1978)

1.3 Maximum Yield Case

No Maximum Yield Case was considered since the size of the Vedder Zone in the Eastern Fault Block of the West Area of the Mount Poso Oil Field is small. The yield potential from the 200 acres confined to the Vedder Zone in the Eastern Block of the West Area Mount Poso yield potential based on injection (3 million barrels per year) is substantially lower than the 6,500,000 barrels per year required to meet the demand defined by the CSAHH case. (DOGGR, 2010)

² On April 1, 2015, Governor Brown issued the fourth in a series of Executive Orders on actions necessary to address California's severe drought conditions, which directed the State Water Board to implement mandatory water reductions in urban areas to reduce potable urban water usage by 25 percent statewide. On May 5, 2015, the State Water Board adopted an emergency conservation regulation in accordance with the Governor's directive. The provisions of the emergency regulation went into effect on May 15, 2015. Oildale Mutual has a conservation goal of 36% relative to water consumption in 2013.

³ Oildale Mutual Water Company, Oildale's Population is reported to have been 32,374 persons, 2009 with a growth rate of 1.27%. Oildale Mutual Serves 6,797 households.

Table1-1: Economic Feasibility Summary

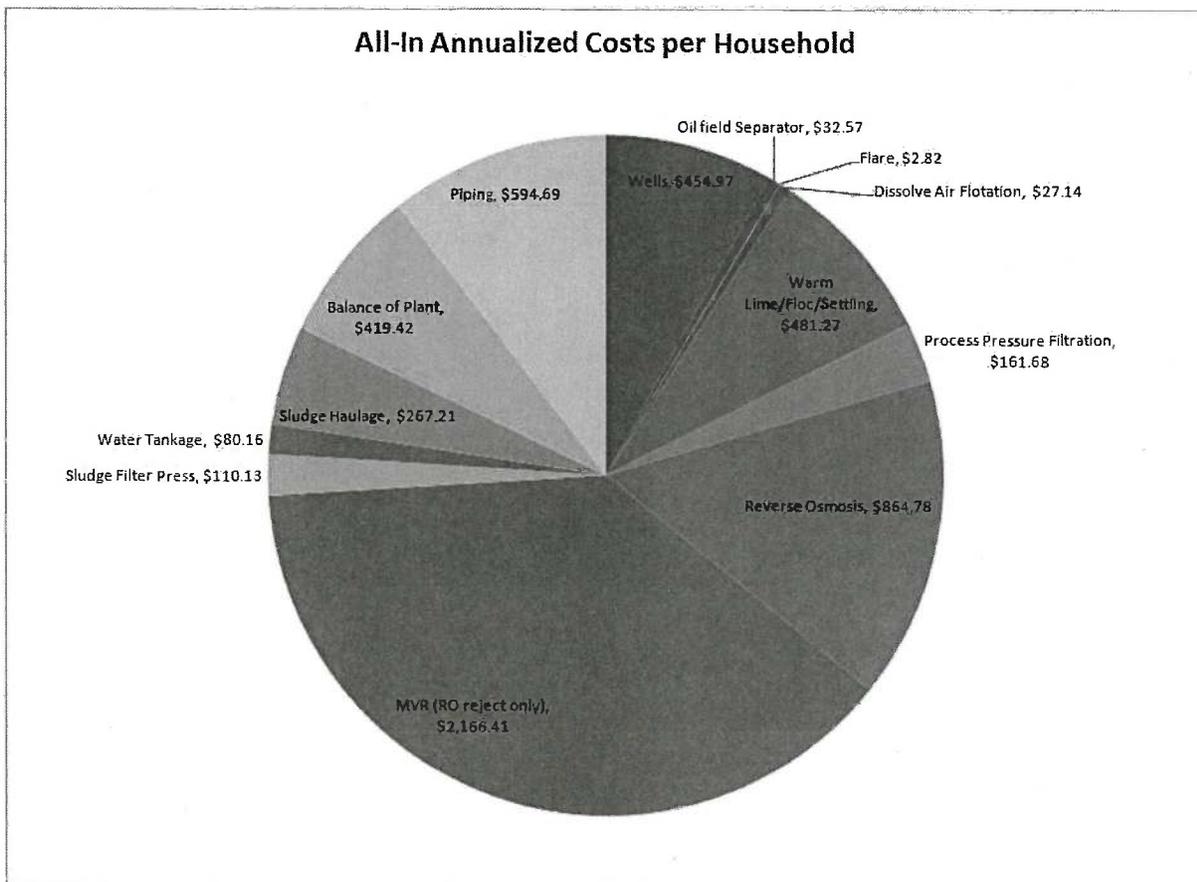
	Per Household Rate Burden (Annualized \$/HH)					Income Burden		Increment Sensitivity	
	Wells	Facilities	Piping	Operational	Total	Kern	Oildale	Threshold Increase	Current Water Rate
	Economic Base					\$63,385	\$45,732	450.00	\$746
	2575 feet Average								
holds	\$455	\$1,056	\$390	\$4,816	\$6,716	10.6%	14.7%	14.92	9.00

June2015

1.4 Sensitivity

The pie chart below shows the relative costs of each water treatment component. The largest individual cost increment is the Mechanical Vapor Recovery system used to convert the Reverse Osmosis reject water to moist salts, followed by the Reverse Osmosis unit used to lower the TDS. Each of the individual components exceed the thresholds.

Piping Costs are the next major cost and its incremental cost exceeds the incremental rate burden of \$450 and alone approaches the current amount of the existing rate, thus nearly doubling the cost of the water alone, without the added costs associated with easements and stream bed crossings.



Well drilling cost sensitivity does exist to the extent that the wells drilled in the historic oil field will require a higher degree of precaution than is normally associated with traditional water well drilling to shallower depth aquifers where normal water well drilling practices and equipment are adequate. Wells that are drilled in historic oil producing fields to take water from historic production zones are expected to have similar well control criteria as those wells drilled for oil and gas production which contains as much as 98% water. Well drilling costs were derived using Department of Energy Data for per foot drilling costs and were checked with local drilling companies.

Conveyance was assumed to be above ground piping on sleepers, the area terrain is comprised of foothills and is rugous with many stream beds requiring permitted crossings, thus not readily allowing reasonable routes for open canal conveyance. Piping diameters were set based on common velocity criteria to optimize for pressure drop and first cost. Pipe size increments were fixed at specified common sizes. Piping estimations using industry cost data base and comparing results with other historic pipeline estimation methods were checked with local Engineering, Procurement and Construction. (Means, 2015)

The model facility was based on a set of average water composition and sized to accommodate the greatest economy of scale (using the California Average Households Served by a Water Service Purveyor). The treatment facility targets reducing TDS, Boron and Radon to Drinking Water Standards. Any effort to deliver water to Agricultural uses may require a final Boron-Specific Ion Exchange system with regenerant chemical management and disposal costs.

Operating Costs are the largest portion of the burden. The major cost components of the operating expenses of the system described below are:

- lifting water from several thousand feet;
- pumping treated water 13 miles over rugous terrain;
- mechanical Vapor Recovery energy; and
- waste hauling in place of injection wells. ⁴

Hardness variation may affect the operating costs for the Softener/Clarifier, TDS may affect the reject water loads to the Mechanical Vapor Recompression Unit and Boron concentration may affect any possible addition of a Boron-Specific Ion Exchange Unit (not Included in the Facility Cost). None of these cost variations are critical to the analysis as far as creating a treatment design that is more economical or could provide cost savings.

⁴ There are no potential injection zones in proximity to the Round Mountain Field that are above 10,000 mg/l TDS as the Walker sits on the granitic basement rocks.

Lastly, the balance of plant costs are those associated with minor equipment that would be added to a more detailed process design, i.e., Ancillary components not in the scope of the major equipment, Heat Exchangers, Safety and Comfort Facilities, Redundancy Equipment, Environmental Mitigation, etc. 10% of the Annualized All-In Cost was used to budget for Balance of Plant.

1.5 System Description

The basic lowest first cost system consisted of:

- Liquid(Water and Oil) /Vapor Separation to reduce free oil and natural gas,
- Dissolved Air Flotation Unit to further remove traces of free oil and grease,
- Softener/Clarifier used to soften the water, remove some Boron and further reduce the oil,
- Filtration to ensure Reverse Osmosis performance,
- Reverse Osmosis to reduce TDS and Boron,
- Mechanical Vapor Recompression to reduce the volume of Reverse Osmosis reject water and to recover water from distillate to reduce Boron concentration in facility product water,
- Filter Presses are used to remove impregnated water from softener sludge prior to shipping filter cake along with MVR salts,
- Haulage Facilities to truck wastes to CleanHarbor at Buttonwillow, Ca, and
- Various chemical additions for softening and pH control to maximize performance and operability.

All wastes from the treatment facility are hauled away. Injection wells would be considered the best fit for managing waste water (since it is the lowest cost) but regulations prohibit waste injection into or above USDW qualified aquifers that might degrade the aquifer and a water purveyor will not be able to rely on Class II Injection that is readily available to current oil field operators. The waste water from the water treatment facility will contain concentrated salts and potentially toxic concentrations of metals from the treatment facility.

This planning level treatment system to achieve Serviceable Potable Water status will not also achieve a low enough Boron level to make the water suitable for agricultural/irrigation applications.

Need for emulsion breaker technology is dependent on the quality of water as produced by the future wells from their specific intervals. Historically, the production from these formations have shown the need for emulsion breaking equipment prior to use in water flood or steam injection, this design uses common oil-field oil and gas treatment technology and public treatment works technology for the removal of common contamination levels of oil and grease from normal community wells is not priced in as part of the Separator and Lime Softener/Filtration⁵ system.

⁵ The lime system due to its temperature and pressures will reduce to Radon in the water to an acceptable limit.

Carbon Filtration is typically used to reduce Total Petroleum Hydrocarbon in water. No activated Carbon Filtration is included as it is presently assumed that the oil field treatment technology coupled with: flocculation in the Lime Softener/Filtration System, the osmotic barriers in the Reverse Osmosis unit and distillation effect in the Mechanical Vapor Recompression Unit will be sufficient to remove TPH to acceptable levels. A polishing Carbon Filtration system is estimated to add \$30/MGD, if installed.

1.6 Regulatory Guidance

This feasibility analysis is based on EPA "Guidelines for Ground Water Classification Under the EPA Ground-Water Protection Strategy", 1986. (US EPA, 1986)

1.7 Regional Setting

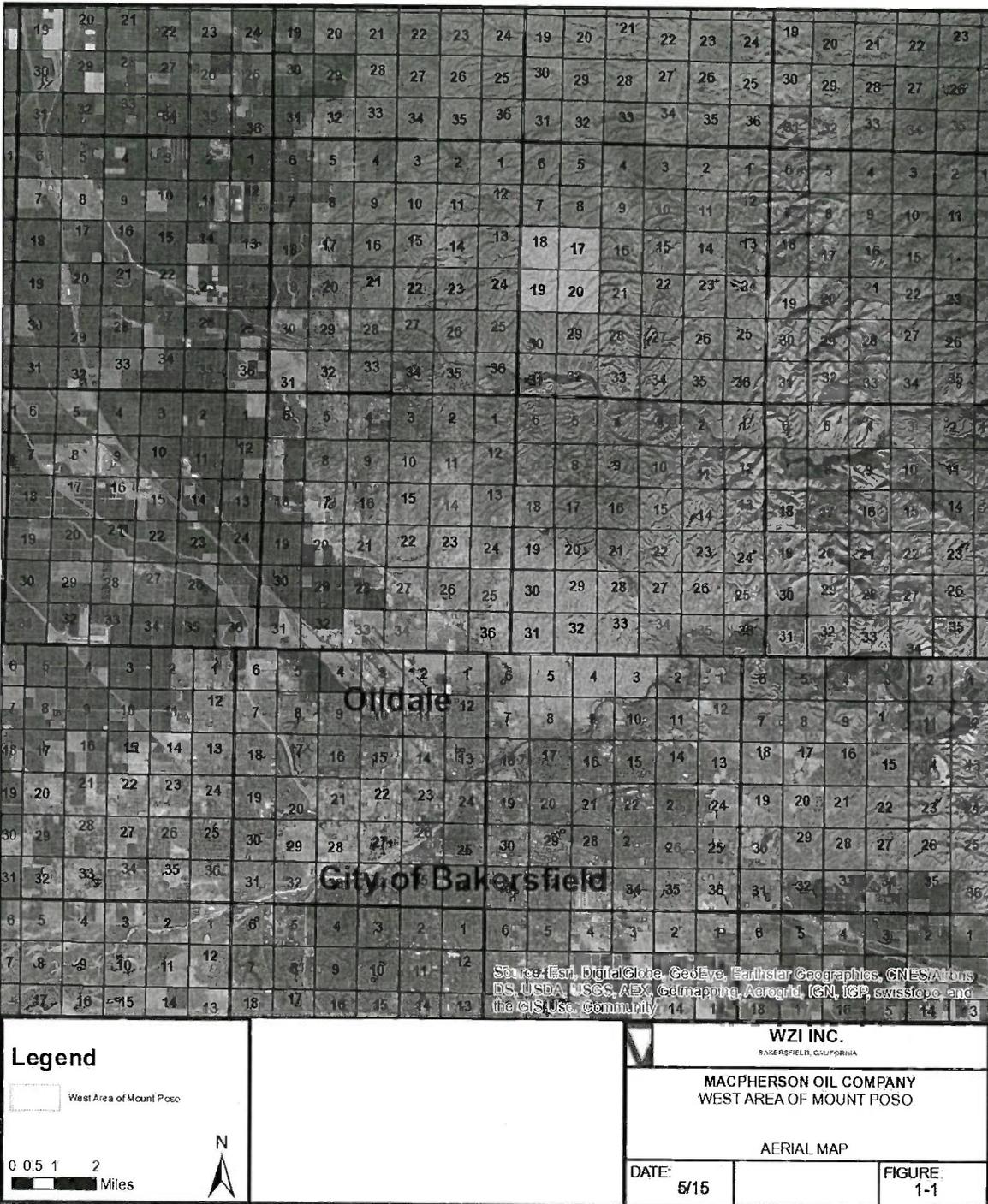
The area of the Mount Poso Administrative Boundary is approximately 28,683 acres. The Eastern Fault Block of the West Area of Mount Poso Oil Field covers approximately 200 acres.

The only paved road serving the region is Granite Road, no highway or other road serves the area. Very few residences are within 2-miles of the field. There are not communities within the Administrative Boundary of the Mount Poso Oil Field.

1.7.1 Formations and Water Composition

The treatability analysis is directed to assessing the status of the Vedder formation, within the West Area of Mount Poso Oilfield Boundary.⁶ **Figure 1-1, Aerial Map** shows the relationship of the existing and proposed oilfield operations. Oil is produced from the Vedder formation and it has been used historically as part of the production operations to manage produced water from the oil production activity in the Eastern Fault Block of the West Area. (DOGGR, Report on Proposed Operations- Ring 18 16- Vedder Zone Injection, 1982)

⁶ The definition of producing zones is given in Enclosure D to the letter from DOGGR to EPA concerning Class II Oil and Gas Underground Injection Control (dtd. Feb. 6, 2015)
Vedder Treatability Study
West Area of Mount Poso Oilfield



The data in Tables 1-2, 1-3 and 1-4 and Appendix I, show that the waters are relatively similar in nature.

Table 1-2 Current and Historic Water Analysis Statistics																
Constituent	Total Dissolved Solids (TDS)	TPH-Diesel C10 to C28	TPH-Motor Oil C20 to C35	Boron	Calcium	Magnesium	Sodium	Potassium	Carbonates	Bicarbonates	Chlorides	Sulphates	Nitrate	Fluoride	Total Iron	Copper
Average	1791.45	1156.27	1479.65	3.16	39.11	4.04	685.56	12.49	9.38	534.17	705.29	62.43		1.40	0.35	0.11
Standard Deviation	401.23	2086.15	2644.29	0.75	18.54	1.92	115.69	5.37	12.18	162.35	248.24	66.31			0.26	
High	2500.00	4860.00	6170.00	4.20	74.00	7.00	850.00	22.00	25.60	766.00	1100.00	160.00		1.40	0.72	0.11
Low	1300.00	0.63	0.65	2.20	16.00	1.40	550.00	4.90	0.00	370.00	392.60	6.60		1.40	0.14	0.11
Count	11.00	5.00	5.00	8.00	9.00	9.00	9.00	9.00	4.00	9.00	9.00	6.00		1.00	4.00	1.00
Constituent (cont'd)	Manganese	Zinc	Dissolved Silica	Colloidal Silica	Lithium	Lead	Total Hardness	Total Suspended Solids	Salinity	pH	Strontium	Barium	Sulfide	Sodium Chloride	Methane	
Average	0.07	0.07	47.25	53.00	0.27	0.06	130.80	21.60	1693.60	8.08	0.42	0.15		708.00	11.64	
Standard Deviation	0.03	0.02	18.34		0.10	0.03	43.85			0.16	0.29	0.01		442.91	7.64	
High	0.12	0.09	59.00	53.00	0.42	0.09	187.00	21.60	1693.60	8.21	0.90	0.15		1100.00	19.90	
Low	0.04	0.05	20.00	53.00	0.16	0.00	84.20	21.60	1693.60	7.82	0.12	0.14		50.00	1.13	
Count	4.00	4.00	4.00	1.00	6.00	6.00	4.00	1.00	1.00	5.00	6.00	2.00		5.00	5.00	

Table 1-3 Formation Water Data

Constituent	Total Dissolved Solids (TDS)	TPH-Diesel C10 to C28	TPH-Motor Oil C20 to C35	Boron	Arsenic	Barium	Cadmium	Calcium	Chlorides	Chromium	Copper	Fluoride	Hydroxide	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	
	0.05	45	0.1	0.02	0.1	0.01	0.05	100	0.05	0.05	0.1	10	0.1	0.05	0.1	0.05	0.03	0.05		
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
1800	23.7	33.6	2.9	nd	nd	nd	50	780	nd	nd	nd		0.72	0.094	0.24	4.5	0.063	nd		
1400	636	855	2.3	nd	nd	nd	16	510	nd	nd	nd			nd	0.075	0.17	1.4	nd	nd	
2400	4860	6170	4.2	nd	0.14	nd	53	1100	nd	nd	nd			nd	0.083	0.42	7	nd	nd	
2500	0.63	0.65	4.2	nd	0.15	nd	74	1100	nd	nd	nd			nd	0.078	0.34	6.5	0.043	nd	
1300	261	339	2.2	nd	nd	nd	29	540	nd	nd	nd			nd	0.058	0.16	1.6	0.12	nd	
1880	1156.3	1479.7	3.16		0.145		44.4	806						0.72	0.0776	0.266	4.2	0.0753		
18	1590		3.4				29	392.6			0.11			nd			2.8			
	1745		3.1		nd		38	658	nd	nd	1.4			0.36	0	0.26	4.2	0.05		
	1652				nd		18	630						0.19			4.1			
	2199		3		nd		45	637						0.14			4.3			
	1215		2.3				28.8	584					0	1			2.4			
	1500																			
	1620																			
	1743.2	0	0	3.05	0	0	0	33.667	579.4	0	0.11	1.4	0	0.23	0	0.26	4.2	0.05	0	
	mg/l			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
ary MCL					0.01	2	0.005				0.1								0.002	
ary MCL	500											2						0.05		
ary MCL					0.05	1	0.005			0.05		2							0.002	
ary MCL	500							250		1								0.05		
g Water	1000		1																	

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Table1-3 Formation Water Data

Constituent	Methane	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Strontium	Sulfide	Sulphates	Vanadium	Zinc	Colloidal Silica	Dissolved Silica	Total Hardness	Total Suspended Solids	pH	Carbonates	Bicarbonates
	0.0002	0.05	2	0.5	0.05	0.02	7	0.1		25	0.1	0.05		4	2			10	10
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
	1.13	nd	nd	11	nd	nd	850	0.39		48	nd	0.051					8.14	nd	460
	19.9	nd	nd	4.9	nd	nd	630	0.12		6.6	nd	0.083					8.17	nd	400
	6.49	nd	nd	19	nd	nd	850	0.6		130	nd	0.058					8.05	nd	430
	16	nd	nd	13	nd	nd	800	0.9		160	nd	0.094					7.82	nd	550
	14.7	nd	nd	6.5	nd	nd	600	0.17		nd	nd	nd					8.21	nd	370
	11.644			10.88			746	0.436		86.15		0.0715					8.078		442
c. 18			nd	22			595			nd				59	84.2			0	687.5
			nd	12.4			645	0.36	nd	nd		nd	53	53	112	21.6		0	766
				11			550			21				20				11.9	386
				12.6			650			9				57				25.6	758
				4.7			399.36		0	21					83.58	1109.5	9.15	24	90
															140				
															187				
	0	0	0	14.5	0	0	610	0.36	0	15	0	0	53	47.25	130.8	21.6	0	9.375	649.38
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
nary MCL			10		0.05														
dary MCL						0.1				250									
nary MCL		0.1	10		0.05														
dary MCL										250		5							
ng Water																			

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Table 1-4 Formation Average Data: Critical Chemicals

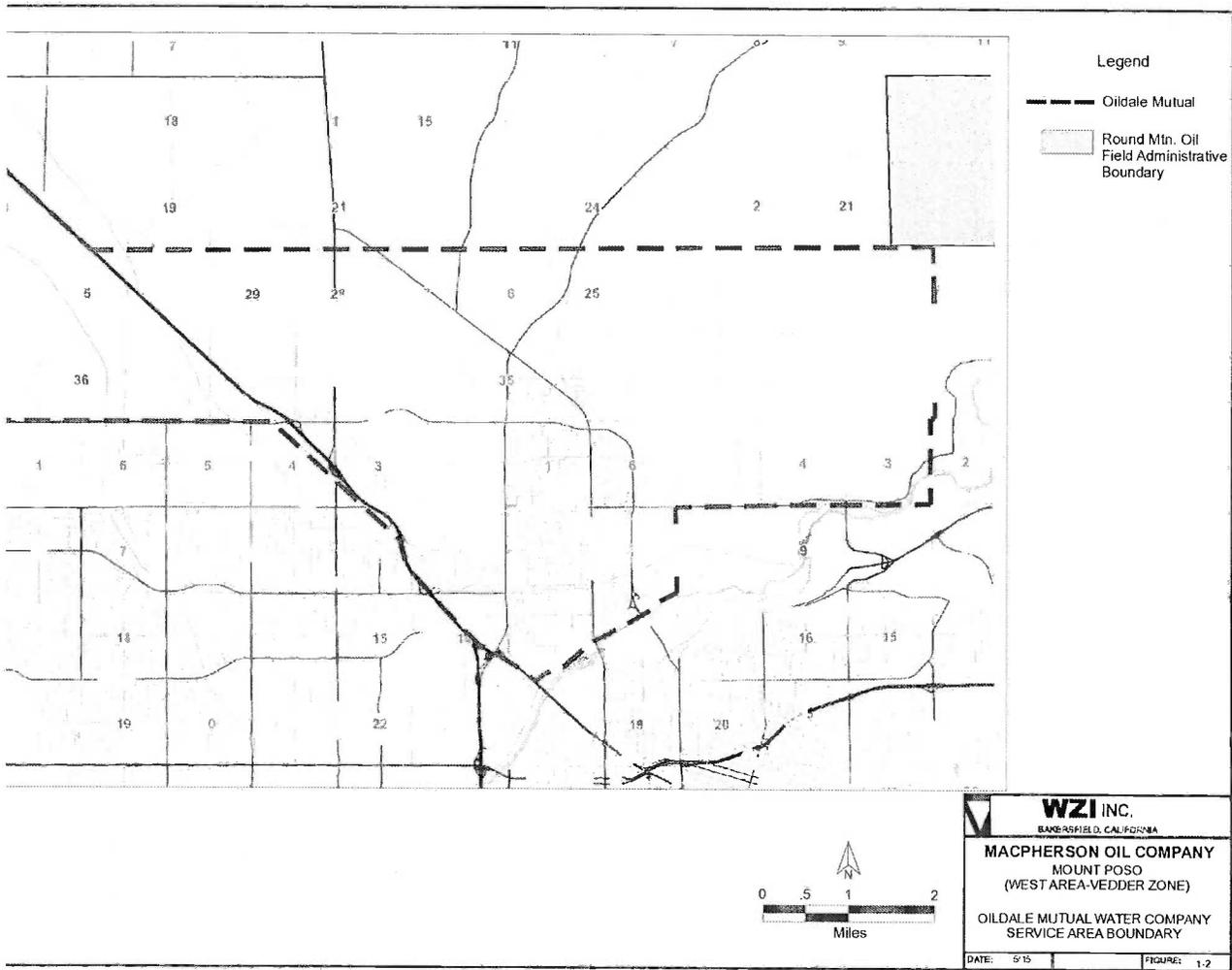
Constituent	Total Dissolved Solids (TDS)	TPH-Diesel C10 to C28	TPH-Motor Oil C20 to C35	Boron	Calcium	Magnesium	Sodium	Potassium	Bicarbonates	Chlorides	Sulphates	Total Iron	Copper
mg/l	1811.60	1156.27	1479.65	3.11	39.03	4.20	678.00	12.69	545.69	692.70	50.58	0.48	0.11
Constituent (cont'd)	Manganese	Zinc	Lithium	Lead	Total Hardness	Total Suspended Solids	Salinity	pH	Strontium	Barium	Sodium Chloride	Methane	
mg/l	0.06	0.07	0.26	0.08	126.40	21.60	1693.60	8.08	0.40	0.15	708.00	11.64	

The TDS average was 1812 mg/l, a design average produced water value for equipment selection and water quality incremental achievement towards goals was set at 1800 mg/l.

The average Boron composition was set at 3.0 mg/l.

1.7.2 Current Source of Community Water

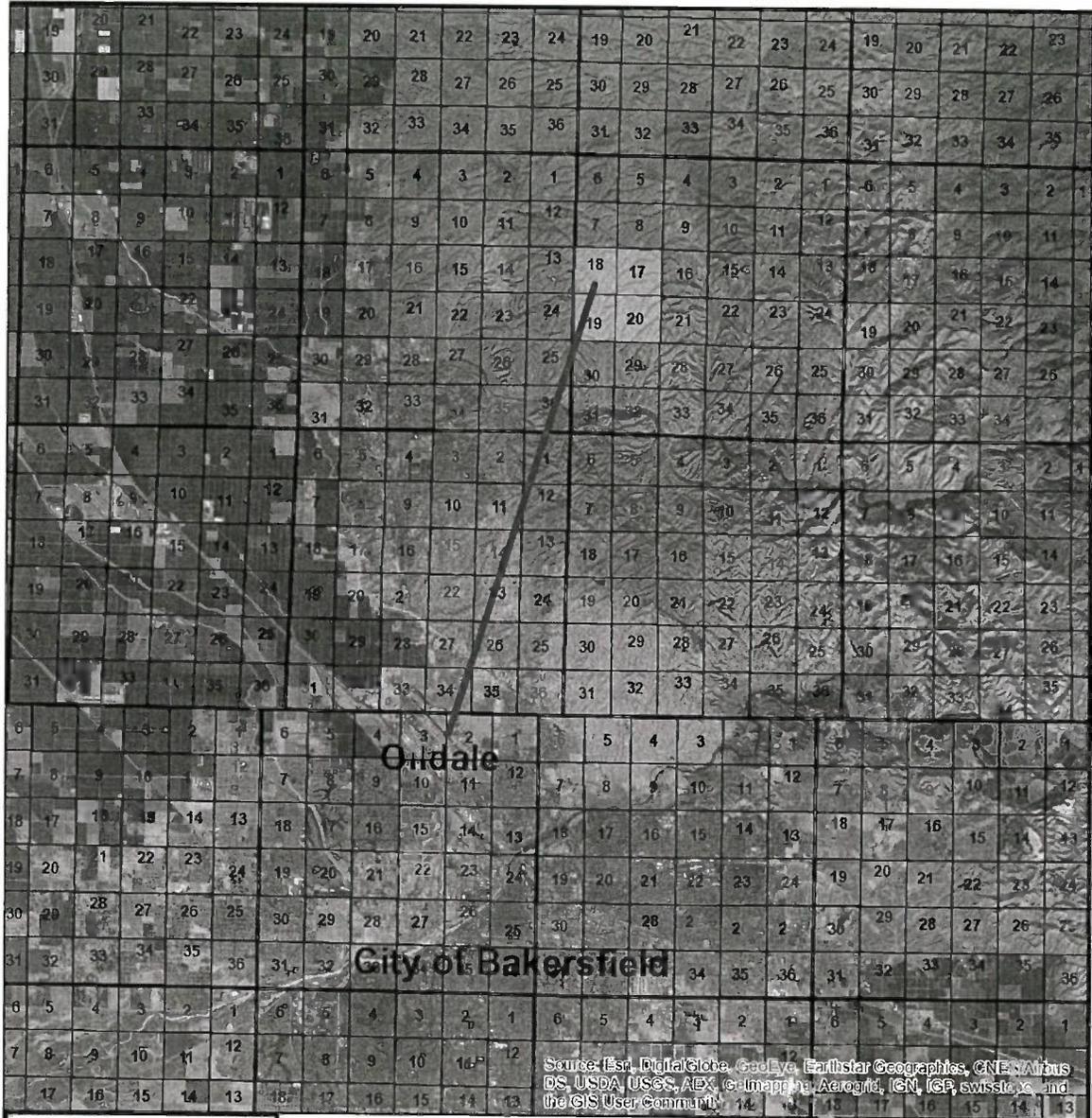
Oildale, California is the nearest community to which these waters could be provided. Oildale is served by the California Water Project Water (surface water supplies) through North of the River Municipal Water District. Retail customers of the North of the River Municipal Water District are served under contract by Oildale Mutual Water Company. Water wells are used as supplemental backup for the imported surface water supplies. Within the Oildale service area, groundwater is derived from the alluvial fans of the Kern River formation. The zone of groundwater use for Oildale Mutual Water Company with respect to the West Area of Mount Poso Oil field is shown on the I Geologic Cross Section A-A' (Figure 3-3). Retail customers of the North of the River Municipal Water District are served under contract by Oildale Mutual Water Company. **Figure 1-2** shows the Oildale Mutual Territory. Average Annual cost per retail customer is \$746/yr for metered water and \$1,038 for flat fee water, (Oildale Mutual Water Service Co.)



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Oildale is 10 miles away as-the-crow-flies from the center of the West Area. **Figure 1-3** shows the geographic relationship between the existing oilfield and the nearest communities. The intervening Oil Fields: Poso Creek, and Kern Front or Kern River are densely developed oil fields and crossings will require a large number of easements and Right of Way. The span between between Mount Poso Oil Field and Oildale is also rugged and numerous stream crossings are required to convey water. No additional costs were included to address the difficulty of obtaining easements or permits for crossing streams.



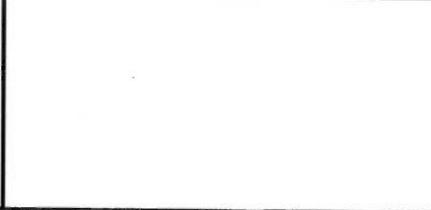
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, ICF, swisstopo, and the GIS User Community

Legend

West Area of Mount Poso

0 0.5 1 2
Miles

N



WZI INC.
BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY
WEST AREA OF MOUNT POSO

GEOLOGIC RELATIONSHIP BETWEEN EXISTING
OIL FIELD AND COMMUNITIES

DATE: 5/15

FIGURE: 1-3

Kern County, in general, has a per-household income of \$63,385. Oildale's population is 33,222, living in 13,436 households with household earnings of \$45,732 per year, (US Bureau of Labor and Statistics).

Per Capita Usage

Table 1-5 shows California Water Service Company reported a 10-year Baseline Daily Per Capita Water Use for its service territory of 320 gallons. (California Water Service Company) This local per-capita usage rate is considered representative of per-capita use for the Oildale Mutual Service Company area. Using the BLS derived Oildale per-capita per household value of 2.71 results in a per-household daily consumption of 849 gpd (310,000 gpy) for Oildale Mutual Service Company households. (US Bureau of Labor and Statistics) (California Water Service Company) The Oildale Mutual per capita consumption was reported in their Water Management Plan for 2010 to be 298 gpcd for 2009. As a result of the Executive Order B-29-15 oil dale Mutual will have to reduce their consumption by 36% of their 2013 water consumption. Assuming the Drought driven reductions since 2010 the analysis conservatively assumes that per capita water use will be 150 gpcd, thus allowing households to better absorb the incremental costs.

Per Residential Household Demand

EPA estimated that for a total community demand of 150,000 gpy (for equipment sizing) that 60,000 gpy (or 40% of the total per-capita consumption) was allocated to residential consumption for metering to bear the costs associated with the analysis.⁷ Using this same allocation for the Bakersfield and Oildale area (as well as the Executive Order conservation Goals) the total community per-household demand (including Commercial and Industrial water) is calculated as 589 gpd (metered to household) and allocated to the community to bear the cost.⁸

⁷ "150,000 gallons is used here to provide capacity for uses other than residential uses" (US EPA, 1986, pp. G-14)

⁸ "Single family residential water use represents the smallest demand per service segment in the District with approximately 310,000 gallons per service per year [849 gallons per day], yet this category uses 64.7 percent of the total demand. The multifamily residential use was 4.6 percent of the total demand with a demand per service that is greater than 1,200,000 gallons per service per year. The combined residential sector component of demand is equal to **69.3** percent of total demand." [ed][**emph**] (California Water Service Company) Design flowrates were adjusted according to these local data to arrive at the facility sizing criteria.

CITY OF BAKERSFIELD DAILY PER CAPITA WATER USE (California Water Service Company)

Water Use		Population of City of Bakersfield Domestic Water Service Area (2)	Per Capita Water Use (gallons per capita per day)		
Daily Water Use (gallons per day) (1)	Calculated Gross Water Use (gallons per day) (1)		Calculated Daily Per Capita Water	Average Per Capita Water Use	
				10-Year Continuous (3)	5-Year Continuous (4)
2001	20,773,246	64,400	323		
2002	22,270,220	67,400	330		
2003	22,262,275	70,500	316		
2004	21,746,671	74,900	290		
2005	27,314,326	79,300	344		
2006	24,464,414	83,800	292		
2007	30,020,134	88,600	339		
2008	30,089,093	93,800	321		
2009	32,464,501	99,300	327		
2010	33,285,563	106,100	314	320	
2011	31,438,801	113,600	277	315	
2012	32,773,039	120,800	271	309	
2013	37,895,612	123,100	308	308	299
2014	42,264,994	126,000	335	313	301
2015	44,264,619	128,400	345	313	307
2016	38,573,408	130,600	295	313	311
Average Per Capita Water Use =		320	gallons per capita per day. (5)		
Average Per Capita Water Use =		311	gallons per capita per day. (6)		

Company Table 5

for 2000 and 2010. The other population estimates were developed using growth estimates based on new single-family Section 2.

(3) for first base period of 10-year continuous, ending no earlier than December 31, 2004 and no later than December 31, 2010.

(4) for second base period of 5-year continuous, ending no earlier than December 31, 2007 and no later than December 31, 2010.

(5) 10-year continuous period between 1995 and 2010.

(6) 5-year continuous period between 2003 and

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1.8 Tulare Lake Basin Plan

The Tulare Lake Basin Plan discourages overdraft conditions. (CVRWQCB, 2004) The southeastern region of the Southern San Joaquin Valley Basin receives little rain and minimal recharge by surface collection or from rivers, creek and streams. Historically, the produced water associated with the West Area of the Mount Poso Oil Field has been consumed in the making of steam and re-injected in the West Area that is exempted or the Eastern Fault Block.

1.9 Chemicals of Concern

California Secondary MCLs set the most restrictive target for drinking water quality. The chemicals of concern in this context are those associated with the high TDS and Boron in particular because of its impact on agriculture.⁹ (RWQCB) **Tables 1-6 and 1-7** show approved ranges for the TDS, Chlorides and Sulfates and specific limits for 13 chemicals, respectively.

The TDS upper limit is 1000 mg/l TDS and any water from Round Mountain with TDS>1,000 must be treated to meet this limit for new service.

“(d)

...

*(3) Constituent concentrations ranging to the short term contaminant level are acceptable only for existing community water systems on a **temporary basis pending construction of treatment facilities** or development of acceptable new water sources.*

(e) New services from community water systems serving water which carries constituent concentrations between the Upper and Short Term contaminant levels shall be approved only:

(1) If adequate progress is being demonstrated toward providing water of improved mineral quality.

*(2) For other compelling reasons approved by the Department.”[**emph.**] (22 CCR, 2006)*

⁹ Radon concentrations exceed the EPA proposed primary MCL of 300 pCi/l.
Vedder Treatability Study
West Area of Mount Poso Oilfield

Table 1-6 Secondary Maximum Contaminant Levels "Consumer Acceptance Contaminant Level Ranges" (22 CCR, 2006)			
Constituent, Units	Maximum Contaminant Level Ranges		
	Recommended	Upper	Short Term
Total Dissolved Solids, mg/l	500	1,000	1,500
or			
Specific Conductance, uScm	900	1,600	2,200
Chloride, mg/l	250	500	600
Sulfate, mg/l	250	500	600

Table 1-7 Secondary Maximum Contaminant Levels "Consumer Acceptance Contaminant Levels" (22 CCR, 2006)	
	Constituents Maximum Contaminant Levels/Units
Aluminum	0.2 mg/l
Color	15 Units
Copper	1.0 mg/l
Foaming Agents (MBAS)	0.5 mg/l
Iron	0.3 mg/l
Manganese 0.05 mg/L	.05 mg/l
Methyl-tert-butyl ether (MTBE)	0.005 mg/l
Odor—Threshold	3 Units
Silver	0.1 mg/l
Thiobencarb 0.001	mg/l
Turbidity	5 Units

Zinc	5.0 mg/l
------	----------

1.9.1 TDS

Elevated total dissolved solids (TDS) concentrations are not deemed a health hazard. High total dissolved solids may affect the aesthetic quality of the water or interfere with washing clothes and corroding plumbing fixtures. For aesthetic reasons, a limit of 500 mg/l (milligrams per liter) has been established as part of the Secondary Drinking Water Standards. (EPA, 2012) An elevated TDS also carries the following concerns:

- The concentration of the dissolved ions may cause the water to be corrosive, salty or brackish taste, result in scale formation, and interfere and decrease efficiency of hot water heaters; and
- Many high TDS waters may also contain elevated levels of ions that are above the Primary or Secondary Drinking Water Standards, such as: an elevated level of chlorides, iron, manganese boron, aluminum, copper, lead, etc. (Nalco, 2009)

1.9.2 Boron

EPA has issued a Health Advisory for Boron. Based on the published Health Advisory, Boron needs to be treated to less than 1 mg/l, which is the notification requirement level in California (Regional Water Quality Control Board, n.d.) (USEPA, 2008). Additionally, Boron presents a problem for Domestic horticultural activities and agriculture. Acceptable levels for Boron are lower for agriculture than they are for Drinking Water, ranging between 0.7 to 0.750 mg/l. (Regional Water Quality Control Board, n.d.)

The EPA health advisory for Boron states the following:

“Treatment technologies do not influence the determination of whether or not a contaminant should be regulated. However, before a contaminant can be regulated with a national primary drinking water regulation (NPDWR), treatment technologies must be readily available. There is no evidence that boron and boron compounds are significantly removed by conventional treatments, such as coagulation/flocculation, sedimentation, and inert media filtration. Two treatment technologies that may be appropriate are ion exchange and reverse osmosis. Ion exchange involves the selective removal of charged inorganic species from water using an ion-specific resin. The surface of the ion exchange resin contains charged functional groups that hold ionic species by electrostatic attraction. As water passes by the resin, charged ions on the resin surface are exchanged for the contaminant species in the water. When all of the resin’s available exchange sites have been replaced with ions from the feed water, the resin is exhausted and must be regenerated or replaced. Wong (1984) evaluated eight technologies for their ability to remove boron from evaporator product water at power plants. Boron concentration in the evaporator product water averaged 11 mg/L, and ranged as high as 38 mg/L. Only three technologies successfully reduced boron levels to below 0.3 mg/L. These were a boron-specific ion exchange resin, a process of coagulation, precipitation and filtration, and a strong-base anion-exchange resin. Wong dismissed the coagulation, filtration, and filtration

process as unacceptable due to high chemical dosage requirements and high operating cost. Of the two ion exchange methods, Wong determined that the strong-base anion exchange resin would have lower regeneration costs, at least in the case of the evaporator product water, which is low in dissolved solids. Reverse osmosis (RO) is similar to other membrane processes, such as ultrafiltration and nanofiltration, in that water passes through a semi-permeable membrane. However, in the case of RO, the membrane is non-porous. RO involves the use of applied hydraulic pressure to oppose the osmotic pressure across the membrane, forcing the water from the concentrated-solution side to the dilute-solution side. The water dissolves into the membrane, diffuses across, then dissolves out into the permeate. Most inorganic and many organic contaminants are rejected by the membrane and will be retained in the concentrate. Folster et al. (1980) tested hollow-fiber (HF) RO and spiral-wound (SW) RO in two separate treatment plants in New Mexico. At the treatment plant in San Jon, with influent boron levels of 0.75 mg/L, HF RO and SW RO removed 15 percent and 3 percent of boron, respectively. At Alamogordo, however, where influent concentrations were lower (0.09 mg/L), HF RO and SW RO were ineffective; in fact, boron concentrations rose to 0.14 mg/L and 0.13 mg/L, respectively. These findings suggest that the potential for RO use in boron treatment is limited.” (USEPA, 2008)

However, treatment for Boron may be achieved (at higher operational costs) at a high pH using Lime Softening followed by Reverse Osmosis, however, the produced water must be treated to avoid premature failure of R.O. membranes, the R.O. inlet water must be filtered and pH closely managed, (Funston, 2002).¹⁰ If a Boron-Specific Ion Exchanger is used in conjunction to meet the Agricultural criteria, then the pH can be lowered throughout the system improving Softener performance, as well as extending RO maintenance cycles and membrane longevity.

1.9.3 Chlorides

High Chlorides are commonly associated with high Sodium/highTDS water. (Hem, 1992) There are no known health effects associated from chlorides. Sodium, which is often associated with chloride, may be of concern with people suffering from heart or kidney disease. Effective treatment technologies include:

- reverse osmosis;
- distillation; and
- ion exchange.

¹⁰ The study results were used in other exemption studies and it considered various options to treat produced water for industrial agricultural and drinking water uses, The design water contained approximately 6,000mg/l TDS and 20 mg/l Boron. The water was received after treatment, free of oil. The study assumed ready access to Class II wells injection of RO reject and other waste water.

1.9.4 Sulfates

Sulfates are typically associated with High TDS water. Sulfates are naturally occurring substances that are found in minerals, soil, and rocks. They are present in ambient air, groundwater, plants, and food.

Where drinking water contains high levels of sulfate or total dissolved solids, it should not be used in the preparation of powdered infant formula or nutritional supplements. An alternate low mineral water source should be used. Because laxative effects have not been observed with long-term exposures to sulfate-containing water, the data suggest that acclimatization occurs as exposures continue. (EPA, 2003)

1.9.5 Iron

Iron (in several forms) are typically associated with High TDS water. Iron is not hazardous to health, but it is considered a secondary or aesthetic contaminant. (EPA, 2012) Dissolved ferrous iron gives water a disagreeable metallic taste. When the iron combines with tea, coffee and other beverages, it produces an inky, black appearance and a harsh, unacceptable taste. Vegetables cooked in water containing excessive iron turn dark and look unappealing.

Concentrations of iron as low as 0.3 mg/L will leave reddish brown stains on fixtures, tableware and laundry that are very hard to remove. When these deposits break loose from water piping, rusty water will flow through the faucet; eventually corrosion will clog valves and equipment.

1.9.6 Manganese

Manganese may cause adverse neurological effects. The primary target of manganese toxicity is the nervous system. Manganese has very low toxicity by oral ingestion and reports of adverse effects by this route are rare. (EPA, 2003)

1.9.7 Radionuclides

Exposure to radioactivity may be harmful to chemical reactions important to living cells in the body. Low level radiation pulls electrons off atoms in the cells (ionizes them) and may prevent the cell from functioning properly. It may lead to the cell's death, to the cell's inability to repair itself, or to the cell's uncontrolled growth (cancer). For example, ionizing radiation can damage DNA, which carries the genetic information in a cell. Damage to DNA may change the cell's genetic code, resulting in the mutation of one or more genes contained in the DNA. These mutations can cause cells to malfunction or lead to cancer. These mutations may also be passed on to children. (EPA, 2015)

EPA has limits in drinking water called maximum contaminant levels (MCLs) for four groupings of radionuclides:

One MCL is a limitation on two kinds (or "isotopes") of radium: radium-226 (Ra-226), which mostly emits alpha radiation, Ra- 228, which mostly emits beta radiation. Another MCL limits radiation from a group

of 179 man-made beta and photon emitters. The third MCL is for “gross alpha” which includes all alpha emitters except uranium and radon. Fourth is a MCL for uranium isotopes U-234, U-235 and U-238, which mostly emit alpha radiation. This last MCL is actually concerned primarily about limiting the toxic effects of uranium as a heavy metal as much as its effect as a radionuclide. (EPA, 2015)

Radon found in an aquifer is due to the decay of radium in the bedrock containing the aquifer. In the case of Round Mountain Oil Field, the aquifers rest on bedrock.

Aquifers that have a more heterogeneous mixture of materials, such as sandstone or sand and gravel, typically do not have high radon concentrations or large fluctuation in radon concentrations.

The radon concentration in a well can fluctuate. Anytime a well is pumped, the water table will be lowered. The rate of recharge (water moving back into the aquifer) and the rate of pumping from a well will determine the level of the water table. As the water level changes, the water will be drawn from a different area of the aquifer. If the radon concentrations are different in these areas, the radon concentrations in the well water will change.

Presently, the State Regional Water Quality Control Board lists the EPA proposed Primary MCL of 300 pCi/L for Radon.¹¹

1.10 Analysis Procedure 1: Facility Design

1.10.1 Design Discussion

1.10.1.1 Water Wells

Water wells are expected to be drilled as far down-dip as possible in the Eastern Fault Block. This will minimize the amount of oil and gas coming up with the water. Mean Well Depths would be approximately 2,575 feet.

These wells by necessity will be drilled in a manner that reflects the potential presence of oil and gas. Well control must be established and maintained to prevent risk to the operators or the environment. Well yield is based on the average West Area injection well rate. No new electrical infrastructure cost was included in the cost of the well’s investment “Capital” as this may be valued in the electrical service tariff. No well rework or maintenance to manage potential sanding problems was included in the well operations and maintenance.

1.10.1.2 Oil Removal Equipment

For connate water (produced from an oil bearing zone) facilities require separation of the residual oil and gas from the water. This is done using a separator vessel that operates at line pressure to allow the gas to be carried to a flare (lowest cost assuming permits and Emission Reduction Credits are available). It is assumed that the gas would be “stranded” and flared. The oil can be stored and either disposed of

¹¹ “footnote 68:Draft / tentative / provisional; applies only to second value if two separate values are listed; applies to range if a range of values is listed. Footnote 185: MCL Goal is set at zero.” (SWRQCB, 2015)

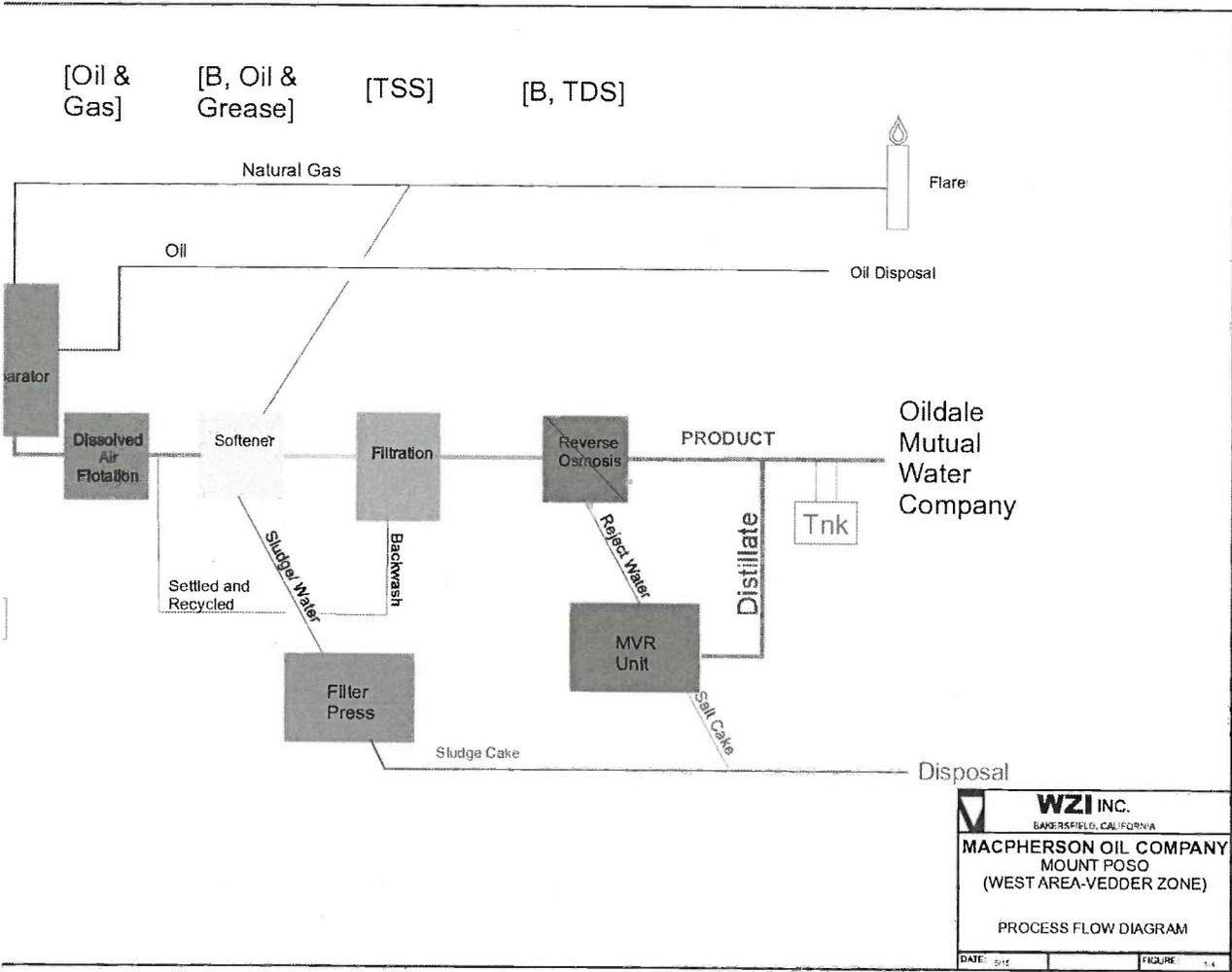
as waste or sold to marginal oil production collectors. In this planning level design the separation equipment is assumed to be needed for 10% of the water produced, if the water requires more treatment the equipment costs could be ten-times higher for any design case.

If necessary, the separated water may be further stripped of oil and other volatile components using an aeration flotation device commonly called a WEMCO after one of the larger manufacturers. Once the water has been stripped of the free oil, the water may need to be passed over additional filtration media such as nut shells or sand.

1.10.1.3 Water Treatment Equipment

Figure 1-4, Process Flow Diagram shows the selected design for the treatment to achieve Drinking Water Standards. The treatment includes provisions to remove Oil/Grease and Natural Gas, Hardness and Total Suspended Solids as well as the Total Dissolved Solids and Boron. As a secondary benefit the Radon is removed by the mechanical disturbance in the softening system. Waste management is achieved through filter press for the softener sludge and a Mechanical Vapor Recovery unit to reduce the Reverse Osmosis reject water.

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1.10.1.3.1 Lime Softening, Separation and R.O. Pretreatment

The primary cause of hardness is the presence of multivalent ions, such as calcium (Ca^{2+}) and magnesium (Mg^{2+}). These ions or minerals often directly associated with high TDS waters can cause scaling of pipes and equipment in drinking water and process water systems. In a Lime Softener, precipitation is achieved by raising the pH of water and provoking the precipitation of calcium carbonate (CaCO_3) and magnesium hydroxide $\text{Mg}(\text{OH})_2$. Precipitates are removed by means of conventional processes such as coagulation-flocculation, sedimentation, and filtration. After precipitation, the water is recarbonated to lower the pH in order to reduce scale formation, typically near pH 8.4. In addition to the removal of hardness, precipitative softening can be used for the removal of arsenic, radionuclides, dissolved organics (including disinfection byproduct precursors), color, and microbial contaminants. (Degremont, 1979) (Metcalf and Eddy, 1991) Further, the agitation cycle of the softener coupled with the separation process is expected to adequately aerate the water to allow the release of the Radon. If additional Aeration or Carbon Filtration is required to eliminate the Radon or to meet a future standard, then the costs for the equipment as well as associated operations and maintenance would have to be included.

The most important parameter controlling the removal of precipitative softening is pH. For calcium carbonate precipitation the pH is raised to approximately 10 and for magnesium hydroxide precipitation the pH is raised above 11. The removal of other substances is also dependent of pH. Arsenic removal is greatly increased at pH greater than 10.5. As pH increases, more total organic carbon (TOC) and color are removed. Removal of radionuclides also improves as pH increases. (EPA, 1998)

Lime softening is typically used for water containing low concentrations of non-carbonate hardness. Softening may be two stage wherein excess lime is added to the first stage to pH 11 for magnesium control, followed by recarbonation to near pH 10 in the second stage for calcium control where soda ash may or may not be added, followed by final recarbonation. Softening may be split wherein one stream is softened and another is conventionally treated. These waters are then blended to achieve target final hardness.

The lime impregnated water is passed through a separator (sometimes a Corrugated Plate Separator) for clarification and then filtered. This process is expected to clarify any free and emulsified oil and grease and trap it in the sludge prior to settling.

Two parameters frequently used to describe the clarification process are the overflow rate and the detention time. The overflow rate is the process loading rate and is usually expressed in gpm/sf or gpd/sf. Overflow rates for conventional sedimentation generally range from 0.3 to 1 gpm/sf (500 to 1500 gpd/sf). Overflow rates for other processes can vary significantly. There are proprietary sand-ballasted clarification systems that have been demonstrated to operate effectively at overflow rates as high as 20 gpm/sf. Typical detention times range from 1 to 2 hours.

Overall, the amount of sludge produced depends on the water's hardness. Depending on the hardness of water, the average water treatment plant produces 1,000 to 8,000 pounds of solids per million gallons of water treated. The estimated sludge volume is 2,666 pounds per million gallons.

Lime sludge is frequently recycled to the clarification process to improve precipitation, reduce chemical usage, and improve process performance. Sludge generated by softening can also be disposed by discharge to a sanitary sewer, drying lagoons, and land application. If the sludge contains high concentrations of metals or toxic substances it may be required to be disposed in a hazardous waste landfill. The nearest sanitary sewer is 10 miles away, land application is not an acceptable application due to the Boron content of the salts.

Filter Presses will be used to dewater the sludge prior to disposal. Drying lagoons (followed by hauling the dried solid waste) are an alternative but since the area is so rugged, lagoons are not considered part of this design.

1.10.1.3.2 Post Lime Softener/Clarifier Filtration

The most commonly used filter type in softening process is a dual-media filter comprised of anthracite and sand; however, mono-media (sand), multi-media (garnet, anthracite, and sand), and other media configurations - including the use of granular activated carbon - are also used in drinking water treatment. During filtration, the majority of suspended particles are removed in the top portion of the filter media. Filters are backwashed to dislodge and remove particles trapped within the filter bed, to reduce head loss, and to keep the filter media clean.

The filter loading rate is a measure of the filter production per unit area and is typically expressed in gpm/sf. Typical filter loading rates range from 2 to 4 gpm/sf; however, higher filter loading rates, 4 to 6 gpm/sf, are becoming more common at full-scale. This can be a critical parameter because it determines the water velocity through the filter bed and can impact the depth to which particles pass through the media. The filter run time describes the length of time between filter backwashes during which a filter is in production mode. As the filter run time increases and the concentration of solids in the media increases, the filtration process often performs better with regard to particulate contaminant removal until such time as "breakthrough" occurs or the pressure drop increases requiring an unacceptably high pumping pressure on the inlet side of the filters. (EPA, 1998)

1.10.1.3.3 Reverse Osmosis

Osmosis is the natural flow of a solvent, such as water, through a semi-permeable membrane (which acts as a barrier to dissolved contaminants) from a less concentrated solution to a more concentrated solution. RO systems frequently require some type of pretreatment to: (1) condition the water for optimum membrane effectiveness, and (2) modify the feed water to prevent membrane fouling and plugging, and (3) maximize the time between cleanings and prolong membrane life. The type of pretreatment required depends on the feed water quality and membrane type. The feed water must be

generally free of suspended matter. Acid and/or antiscalant addition is commonly used when scaling is the primary fouling concern.

Scaling occurs when the concentrations of dissolved contaminants in the concentrate exceed the solubility product of a particular compound. Calcium carbonate, calcium sulfate, barium sulfate, and/or silica are typically the limiting compounds. However, hydrogen sulfide, iron, manganese, organics, and microbial levels must also be carefully controlled minimize fouling. A lime scale softening system is provided to reduce the scaling potential.

The concentration of these contaminants in the concentrate stream limits system recovery, which is the ratio of the system permeate and feed water flow rates expressed as a percentage. The concentration of dissolved contaminants in the concentrate stream can increase significantly compared to the feed concentration (up to tenfold) depending on the system recovery, standard RO individual membrane elements have recoveries ranging between 80-85%. Overall system recovery (including cleaning) is estimated to be 80% using a single stage RO configuration to reduce TDS from 2,200 to less than 1000 mg/l and minimize operations and maintenance (pumping) and capital costs.

Temperature can significantly impact membrane performance. Water temperature has a significant impact on water density and viscosity, which impacts RO membrane flux - the rate of product flow through the membrane, typically expressed in gallons per day per square foot of membrane area (gfd). Higher temperatures can cause membrane degradation and compaction of RO membranes. A cooling system is included to reduce the RO inlet temperature. Post cooling pressure filtration, and pH adjustment is provided to prolong the RO life.

Residuals generated from membrane separation systems include the concentrate from the membrane processes and the spent cleaning chemicals. Concentrate disposal can be challenging as it is typically a relatively high volume, high TDS waste stream and requires discharge to a wastewater disposal facility. Chemical cleaning is required to periodically remove scale build-up and biological fouling on the membrane surface. Spent cleaning solutions are generally acidic in nature and require neutralization prior to disposal. A Mechanical Vapor Recompression System is included to remove some of the waste water from the various RO waste streams prior to disposal and to increase the yield from the treatment plant.

1.10.1.3.4 Mechanical Vapor Recompression

Mechanical vapor recompression is a highly efficient distillation process wherein a mechanically-driven blower or compressor is used to increase the pressure of the vapor that is produced from the boiler in order to improve heat transfer efficiencies. An increase in the water vapor pressure increases the condensation temperature of the steam rendering it useable for heating the original mixture (in the boiler) in a heat transfer device or heat exchanger. This results in the operation of a distillation process at a substantially lower energy demand.

The feed process solution is often preheated with hot process condensates and/or can be by concentrated solution leaving the evaporator. The present cost of thermal energy makes MVR attractive for the evaporation of any solution whose boiling point rise is moderate.

The major advantage of mechanical recompression over conventional distillation is the ability to recycle the latent heat of flashed vapors to the bottom fluids, saving 10-15 % of the total energy of distillation. Full production energy requirements are about 157 kWh/1000 gallons (6.6 kWh/bbl).

The MVR feed is comprised of Reverse Osmosis reject water. The distillate from the MVR is mixed with the Reverse Osmosis product water and becomes part of the treatment facility product stream. The MVR concentrate is passed through a filter to remove excess water combined with other high solids waste stored then hauled to the nearest disposal site. (Barnett, 2015)

1.10.1.4 Pumping

All pumps are considered to be electrically driven using approved CPUC rate tariffs. (PG&E, 2015) The annual average rate was estimated to be the current E-20 rate of 15.2 ¢/kWh flat for 20 years, assuming the water service company could meet PG&E's E-20 Secondary Service Tariff criteria and electricity rates do not increase. Any first cost related to the electrical infrastructure was not included assuming the Utility provider would make interconnection and imbed the costs in the electricity rate subject to CPUC approval using the historic infrastructure for service drops.

1.10.1.5 Offsite Disposal

The preferred disposal method is to mechanically evaporate (MVS) the waste water to its salts (\$3 to \$5 /bbl treated) (GTI/RPSEA, 2012) and truck them with along with the dewatered softener sludge to the nearest disposal facility (Clean Harbor in Buttonwillow, Ca) (\$2 to \$4/bbl hauled plus 32\$/ton); (Clean Harbors, 2015)

1.10.1.6 Pipeline

Typical pipe diameters are selected based on 3 to 10 feet per second as the design velocity, depending on pressure drop considerations. The pipeline sizing criteria velocity was 7 feet per second; to ensure low pressure drop, the next larger pipe size was selected when the velocity was at or near 7 feet per second. (Crane, 1976) Pipe was run above ground. The largest pipe is 24 inches in diameter (\$251.51/foot), assuming a maximum yield based on the 1799 Household case annual produced water. (Means, 2015) The most common pipe size was 10 inches in diameter (\$103.87/foot), which was based on serving the EPA Statewide Average Number of Households Served (1,799 households). The pipeline route would follow section and quarter section lines and would cross numerous blue-line streambeds depending on the route selection, the Kern River would not be crossed to reach Oildale Mutual Water Service.

Pipelines were costed using R.S. Means. (Means, 2015) No adder was included to reflect the local issues of routing a pipeline across biologically sensitive habitat or streambed crossings, both of which would

require consultation and/or mitigation for disturbance. The pipeline material selected is commonly available ASTM Schedule 40 steel pipe.

1.10.1.7 Facility options not included in the base design

1.10.1.7.1 Boron-Specific Ion Exchanger

Boron is mildly toxic to humans but frequently very toxic to plants, especially to citrus varieties, boron is regulated in most regions of the world. Boron takes the form of boric acid, a very weak acid (similar to silicic acid). Boron specific resins are chelating resins. The leakage rate for well designed systems is nearly zero after complete rinse to breakthrough. Thus the most cost-effective use of a Boron-Specific Unit would be as a smaller side-flow unit to then blend down the Boron concentration in the main stream.

The resins are typically weakly basic and regenerate in a two-step, co-flow manner. First, the borate is displaced with hydrochloric (HCl) or sulphuric acid (H₂SO₄), then the resin is converted back to the free base form with sodium hydroxide (NaOH). Regenerant levels are approximately stoichiometric: roughly 1 equivalent of acid per liter of resin, or about 130% of total capacity, and 0.7 eq of sodium hydroxide.

The design used in this Planning level design feasibility assumed that Softening and Reverse Osmosis would be sufficient to achieve the Drinking Water criteria and therefore no additional Ion Exchange Unit for Boron was included.

1.10.1.7.2 Offsite Wastewater Injection Wells

Waste water from the ion exchange regeneration and Reverse Osmosis rejection could be injected into Class I or Class V wells. The volume requiring injection would be approximately one-third of the water produced and treated, the other two-thirds goes to the service drops (households, commercial and industrial). The salts removed via the treatment would be concentrated in the waste water. Injection would be the cheapest means of disposal allowing the water head to drive the injection (\$0.04/bbl injected). However, because the hypothetical water purveyor is not eligible for Class II injection and there are no formations above 10,000 mg/l in the vicinity, the waste water would have to be piped to an unknown injection field that has a qualified formation with greater than 10,000 mg/l TDS (and does not overlay a USDW). The water service purveyor would have to permit all injection wells as Class I or Class V. Because injection was so speculative, no injection wells were considered.

1.10.2 Base Case Facility Costs

The Planning level Base Facility Costs are shown in Table 1-8. These costs are based on the treatment facility designed to treat the 1799 Household Produced Water (500 GPM) and is intended as a best-case test realizing that the Yield of the Eastern Fault block is limited.

Table 1-8: Base Case to Treat Eastern Fault Block Water Production	
Line Item	Capital Cost
Wells	\$ 4,423,850.00
Oil field Separator	\$ 300,000.00
Flare	\$ 8,000.00
Dissolve Air Flotation	\$ 250,000.00
Warm Lime/Floc/Settling	\$ 1,795,889.72
Process Pressure Filtration	\$ 284,824.70
Reverse Osmosis	\$ 2,131,249.12
MVR (RO reject only)	\$ 2,216,220.45
Sludge Filter Press	\$ 741,015.76
Water Tankage	\$ 738,471.00
Sludge Haulage	\$ 374,946.45
Balance of Plant	\$ 884,061.72
Piping	\$ 4,620,000.00
Total Capital	\$ 18,768,528.91

1.10.3 Base Case Operating Costs

The Base Facility Operating Costs are shown in **Table 1-9**. These costs are based on the Operational and Maintenance requirements for the Design Treatment Facility (designed to treat the water produced from the Eastern Fault Block) from a Design TDS concentration of 1800 mg/l and Design Boron concentration of 3.0 mg/l to water service criteria compliance performance levels of 500 mg/l TDS and 1.0 mg/l Boron in conformance with the Tulare Lake Basin Plan.

Table 1-9: Annual Base Case O&M	
Line Item	Annual Cost
Wells	\$ 969,806.33
Oil field Separator	
Flare	\$ 1,800.00
Dissolve Air Flotation	\$ -
Warm Lime/Floc/Settling	\$ 263,758.34
Process Pressure Filtration	\$ 120,457.59
Reverse Osmosis	\$ 583,519.20
MVR (RO reject only)	\$ 1,774,087.14
Sludge Filter Press	\$ 27,352.42
Water Tankage	\$ -
Sludge Haulage	\$ 208,665.29
Balance of Plant	\$ 297,964.00
Piping	\$ 188,836.06
Total Operating Costs	\$ 4,436,246.37

1.11 Analysis Procedure 2: Determine Size of Hypothetical User Population

To determine the economic burden one first establishes the size of the hypothetical user population. This population is based on households that are either represented by the mean population served by ground-water systems in the state where the subject analysis is being performed or based on a population that could be served by the maximum sustained yield of the aquifer in question.

The first analysis discussed in detail below is based on the state mean population served. This population is considered small enough that any of the subject zones likely has an annual yield rate capable of meeting the demand if there is no over draft constraint imposed.

The second analysis is based on the maximum yield-based population. This is intended to capture any benefits of Economy-of-Scale associated with larger water bearing zones capable of sustaining a larger facility whose cast are spread over a larger hypothetical community capable of using all of the water supplied by the maximum yield facility. Again, the Tulare Lake Basin Plan discourages over-draft, (CVRWQCB, 2004). The Kern County portion of the Eastern San Joaquin Valley has low rainfall and high evapotranspiration. Table 8-10 lists the average annual conditions at the Bakersfield Airport, which is the closest weather station to Round Mountain Oil Field, (California Water Service Company).

Table 1-10 Average Weather Conditions		
Average Temperature	Average Rainfall	Evapotranspiration
65.3°F	6.1 inches	57.9 inches

Conservatively one can determine the per zone maximum yield using the available production and injection data which presumably is focused on meeting the Maximum Efficient Rate of production. To do so one ignores either the constraint from the Tulare Lake Basin Plan’s regarding overdraft and subsidence, or accepts an assumption that the current productive capacity of the zones (as defined by water produced from current commercial oil production) is somehow recharged from Poso Creek (to the north) and Kern River (to the south). In this particular analysis no Maximum Yield Case was studied due to the small size of the subject zone of analysis.

1.11.1 State Average Households

As part of the development of the 1986 guidelines EPA determined the “Mean Population Size by Ground-Water Systems by State or Territory (Exhibit E), (US EPA, 1986, pp. G-21). The EPA provided California Mean Population Size Served by Ground-Water Systems is 1,799 households, regardless of formation being considered. The project yield requirement for the California Mean Population Size Served by Ground Water Systems (1,799 households) including the C&I water for the eastern Kern County area 387 Million gpy.¹²

1.12 Analysis Procedure 3: Establish Mean Annual HH Income (\$63,385)

Based on Bureau of Labor Statistics, the Kern County Mean Annual House Hold Income is \$63,385. (US Bureau of Labor and Statistics)

¹² This is based on the Governor’s Executive order per capita requirement of 150 gallons per day and an average household size of 2.71 persons per household. (California Water Service Company) (US Bureau of Labor and Statistics)

1.13 Analysis Procedure 4: Estimate Annualized Cost of Water Supply System

With the exception of the Mechanical Vapor Recompression Unit all equipment costs (Capital and operations and maintenance) were estimated using EPA Estimating Water Treatment Costs, Volume 2, 1979. All Costs were adjusted to 2015 dollars primarily using the Engineering News Record Construction Cost Index or by using the current energy cost applied to annual energy consumption. EPA had not MVR unit in its documentation and no search of EPA documentation revealed the existence of a costing formula for MVR. Therefore the Mechanical Vapor Recompression Unit cost was based on a budget estimate for a similar MRR. (GEA Corporation, 2008)

Table 1-11 below shows the economic values used in the analysis:

Table 1-11: Economic Base	
Capital	
Dollar	2015
Interest Rate	7%
Term	20 Years
Imputed Factor	0.1
O&M	
Diesel	\$3.00/gal
Electricity	\$15.2/kWh

Table 1-12 shows the resultant process data for the yield based planning level design facility for each of the stages. The concentrations are identical assuming the same initial design composition (2,200 mg/l TDS).

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Water Wells		Facility Inlet					Gas/Oil/Water Separation				Dissolved Air Flotation			
Depth or Wells	Fac. Feed Rate from Wells	Per Well Flow	Flow	TDS	Boron	TPH	Flow	TDS	Boron	TPH	Flow	TDS	Boron	TPH
	MGPD	GPM	MGPD	mg/l	mg/l	mg/l	MGPD	mg/l	mg/l	mg/l	MGPD	mg/l	mg/l	mg/l
2,775	1.05985	274	1.05985	1,800	3	2000	1.05985	1,800	3	2000	1.06	1800	3	50

Softener		Pressure Filtration		Reverse Osmosis			Storage Tanks to Community (Includes MVR Distillate)			Mechanical Vapor Recompression Unit			Filter Press (excess water is returned to Lime Softener)			Offsite Disposal		
TDS	Boron	Flow	TDS	Boron	Flow	TDS	Boron	Flow	TDS	Boron	Flow	TDS	Boron	Flow	TDS	Boron	Rate	Composition (Moist Sludge)
mg/l	mg/l	MGPD	mg/l	mg/l	MGPD	mg/l	mg/l	MGPD	mg/l	mg/l	MGPD	mg/l	mg/l	MGPD	mg/l	mg/l	CUF/D	%
1,800	3	1.06	1,800	1.5	1.05	1800	1.575	0.99678	480	0.86	0.20985	9,000	2.5	0.20	2361	1.50	2657.47	50%

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