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RWQCB-CVR  
FRESNO, CALIF.

April 23, 2015

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

Tim Lovley  
Macpherson Oil Company  
PO Box 5368  
Bakersfield, CA 93388

Re: Midway-Sunset Hoyt Lease Ponds (3) Water Code Directive Pursuant To Section 13267 certified letter (7014 3490 0001 7023 0551) received by Macpherson Oil Company on April 7, 2015

Mr. Holcomb,

Enclosed are the items requested in the April 1, 2015 certified letter (7014 3490 0001 7023 0551) received by Macpherson Oil Company on April 7, 2015. Please note that some of these items were provided to the Central Valley Water Board in Macpherson Oil Company's submittal of a Report Of Waste Discharge (ROWD) for these ponds in October 2014. A copy of the ROWD is included along with an additional water sample report.

- A. Identification of any discharges of oil field produced waters to land, including but not limited to ponds, since April of 2014 that are not listed in Attachment A;  
*Response: From April 1, 2014 through March 2015 134,520 Barrels of water was discharged to the ponds at MDSS/ Hoyt in ponds 1 – 3.*
- B. Collect representative samples of wastewater within each of the ponds. Samples must be analyzed in accordance with the water quality analysis and reporting requirements contained in Attachment B of this Order;  
*Response:*  
*As indicated in the referenced letter "If more than one pond is connected in series then only the upstream pond must be sampled" additionally if samples results are within the last 12 months prior to the date of the letter that data can be submitted for the appropriate order requirements. All samples were taken from pond #1 within the prior 12 months from the referenced letter date.*  
*In October of 2014 Macpherson Oil Company submitted a ROWD for the MDSS/ Hoyt lease. Water sample results dated August 8, 2014 were included in that submittal. A copy of that submittal is attached to this document.*  
*Additionally Macpherson Oil Company collected samples during a Central Valley Water Board site inspection on November 5, 2014. These sample results dated November 20, 2014 are also attached for your review.*

- C. All available information for each of the surface impoundment(s), including:
- a. Dimensions (L, W, D) –  
Response: *Pond #1(Active) – 57’X101’X10’*  
*Pond #2(Active) – 95’X108’X10’*  
*Pond #3(Active) – 97’X123’X10’*  
*Pond #4(Inactive) – 195’X123’X10’*
  - b. Latitude and Longitude –  
Response: *Pond #1(Active) – 35.05688/-119.37991 (NAD 83)*  
*Pond #2(Active) – 35.05683/-119.37883 (NAD 83)*  
*Pond #3(Active) – 35.05682/-119.37838 (NAD 83)*  
*Pond #4(Inactive) – 35.05650/-119.37668 (NAD 83)*
  - c. Assessor’s Parcel Numbers of the lease – Response: *239-30-07*
  - d. Duration of discharge (in months),  
Response: *The ROWD filed with the Central Valley Water Board in October 2014 indicates produced water has been discharged to ponds since 1936. This equates to approximately 83 years or 996 months.*
  - e. Volume of wastewater discharged per year,  
Response: *The attached ROWD filed with the Central Valley Water Board in October 2014 indicates that approximately 84,000 to 16,800,000 gallons per year were disposed of during the facilities lifetime.*
- D. A location map that includes the following:
- a. All surface impoundment(s) at the Facility –  
Response: *Please see attached ROWD filed with the Central Valley Water Board in October 2014 as Exhibits IV-5-5C*
  - b. Include the boundary lines for all leases at the Facility–  
Response: *Please see attached ROWD filed with the Central Valley Water Board in October 2014 as Exhibits III-1*
  - c. Legend with the name of the surface impoundment(s) –  
Response: *Please see attached ROWD filed with the Central Valley Water Board in October 2014 as Exhibits IV-5*

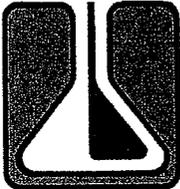
Please contact me directly at (661) 368-3909 Office, (661) 201-8320 Cell, or by email at [Tim\\_Lovley@MacphersonOil.com](mailto:Tim_Lovley@MacphersonOil.com) if you have any questions or require additional information.

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Regards,



Tim Lovley  
Manager HSE  
Macpherson Oil Company



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue  
Bakersfield, California 93308

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

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November 20, 2014

Tim Lovley  
Macpherson Oil Company  
PO Box 5368  
Bakersfield, CA 93388

TEL: (661) 368-3909  
FAX: (661) 393-8065

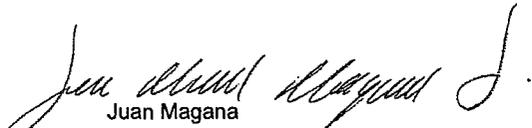
Project ID:  
RE: 1411063

Dear Tim Lovley:

Zalco Laboratories, Inc. received 1 samples on 11/6/2014 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,

  
Juan Magana  
Project Manager  
CC:

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.



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Mac Pherson Oil Company  
PO Box 5368  
Bakersfield  
CA  
93388

Laboratory ID: 1411063-01  
Date Received: 11/5/2014  
Date Reported: 11/20/2014

Attention:

Client Sample ID: Hoyt Perk Pond # 1

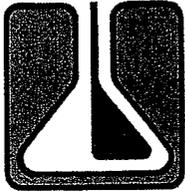
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**CATION / ANION BALANCE**

<b>Cations</b>	<b>mg/L</b>	<b>meq/L</b>	<b>Anions</b>	<b>mg/L</b>	<b>meq/L</b>
Calcium	110.00	5.49	Bicarbonate:	1900.00	31.14
Iron:	1.50	0.08	Carbonate	0.00	0.00
Magnesium:	75.00	6.17	Chloride	7000.00	203.05
Potassium	180.00	4.60	Nitrate	0	0
Sodium	6900.00	300.04	Hydroxide:	0.00	0.00
			Sulfate:	0.00	0.00
			Silica	160.00	4.21
<hr/>			<hr/>		
Cation Sum		316.38 meq/L	Anion Sum		238.39 meq/L

Balance (Anion / Cation % Difference): 14.06 %

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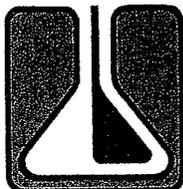
Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1411063 Reported: 11/20/2014 Received: 11/06/2014 08:30
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Lab Sample ID: 1411063-01 Client Sample ID: Hoyt Perk Pond #1	Collected By: Jeremiah Johnson Date Collected: 11/5/2014 3:30:00PM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Alkalinity</b>								
Total Alkalinity	1900	10	mg/L		SM 2320B	11/6/14	11/6/14	SAM
Bicarbonate (HCO3)	1900	10	mg/L		SM 2320B	11/6/14	11/6/14	SAM
Carbonate (CO3)	<10	10	mg/L		SM 2320B	11/6/14	11/6/14	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	11/6/14	11/6/14	SAM
<b>Anions</b>								
Bromide	66	1.0	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
Chloride	7000	500	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
Fluoride	<1.0	1.0	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
Nitrate as NO3	<20	20	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
Nitrite	<10	10	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
Sulfate as SO4	<5.0	5.0	mg/L		EPA 300.0	11/6/14	11/6/14	MSS
<b>CAM, Toxicity (17 Metals)</b>								
			<i>TTL Limits</i>					
Antimony	<1.0	1.0	500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Arsenic	<0.10	0.10	500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Barium	3.7	0.50	10000	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Beryllium	<0.050	0.050	75	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Cadmium	<0.050	0.050	100	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Chromium	<0.25	0.25	2500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Cobalt	<0.50	0.50	8000	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Copper	<0.25	0.25	2500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Lead	<0.25	0.25	1000	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	11/6/14	11/6/14	SS
Molybdenum	<0.50	0.50	3500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Nickel	<0.25	0.25	2000	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Selenium	<0.25	0.25	100	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Silver	<0.10	0.10	500	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Thallium	<2.5	2.5	700	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Vanadium	<0.50	0.50	2400	mg/L	SW846 6010B	11/6/14	11/6/14	SS
Zinc	<0.25	0.25	5000	mg/L	Method 15	11/6/14	11/6/14	SS
<b>General Chemistry</b>								
			<i>MCL Limits</i>					
Total Dissolved Solids	14000	10		mg/L	SM 2540C	11/6/14	11/6/14	MSS

NSS: Non Sufficient Sample H: Exceeds Analysis Hold Time TTL: Total Threshold Limit Concentration STL: Soluble Threshold Limit Concentration TCLP: Toxicity Characteristic Leaching Procedure MCL: Maximum Contaminant Level \*: See Case Narrative  
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Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1411063 Reported: 11/20/2014 Received: 11/06/2014 08:30
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Lab Sample ID: 1411063-01 Client Sample ID: Hoyt Perk Pond #1	Collected By: Jeremiah Johnson Date Collected: 11/5/2014 3:30:00PM
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Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Metals</b>								
Boron	82	0.50	mg/L		EPA 200.7	11/6/14	11/20/14	SS
Lithium	3.0	0.50	mg/L		EPA 200.7	11/6/14	11/20/14	SS
Strontium	7.3	0.50	mg/L		EPA 200.7	11/6/14	11/20/14	SS
Iron	1.5	0.50	mg/L		EPA 200.7	11/6/14	11/20/14	SS
Manganese	0.22	0.15	mg/L		EPA 200.7	11/6/14	11/20/14	SS
<b>Petroleum Hydrocarbons</b>								
Diesel Range Hydrocarbons	4.49	0.05	mg/L		SW846 8015B	11/12/14	11/13/14	BIG
Gasoline Range Hydrocarbons	<0.05	0.05	mg/L		SW846 8015B	11/11/14	11/11/14	HLP
Motor Oil Range Hydrocarbons	8.71	0.15	mg/L		SW846 8015B	11/12/14	11/13/14	BIG

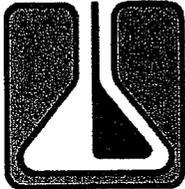
Surrogates	% Recovery	Recovery Limits	Flag
a,a,a-Trifluorotoluene	82.3	69-125	11/11/14 15:29

### Semivolatile Organic Compounds

Penlachloronitrobenzene (PCNB)	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Acenaphthene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Indeno(1,2,3-cd)pyrene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Acenaphthylene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Naphthalene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Acetophenone	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Aldrin	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Aniline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Acenaphthylene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Anthracene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Aramite	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzo (a) anthracene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzo (a) pyrene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzo (b) fluoranthene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Acenaphthene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzo (g,h,i) perylene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzo (k) fluoranthene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzoic acid	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzyl alcohol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM

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Bakersfield, California 93308

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FAX (661) 395-3069

Table with 3 columns: Client Information (Macpherson Oil Company, PO Box 5368, Bakersfield, CA 93388), Project Information (Project: Master-4Q2013, Project #: , Attention: Tim Lovley), and Work Order Information (Work Order No.: 1411063, Reported: 11/20/2014, Received: 11/06/2014 08:30)

Table with 2 columns: Sample Information (Lab Sample ID: 1411063-01, Client Sample ID: Hoyt Perk Pond #1) and Collection Information (Collected By: Jeremiah Johnson, Date Collected: 11/5/2014 3:30:00PM)

Main data table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, and Init. It lists various Semivolatile Organic Compounds such as Bis(2-chloroethoxy)methane, Fluorene, and many others, all with results <75.0 and PQL 75.0.

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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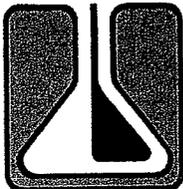
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Main data table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, Init. Section: Semivolatile Organic Compounds. Lists various compounds like Fluoranthene, Fluorene, gamma-BHC, etc., with results <75.0 and PQL 75.0.

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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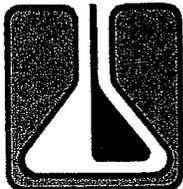
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Lab Sample ID: 1411063-01 Client Sample ID: Hoyt Perk Pond #1	Collected By: Jeremiah Johnson Date Collected: 11/5/2014 3:30:00PM
--	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Semivolatile Organic Compounds</b>								
Pentachlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Pentachlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Phenacetin	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Phenanthrene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Phenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Pyrene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Pyridine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Safrole	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Thionazin	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,2,4,5-Tetrachlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,2,4-Trichlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,2-Dichlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,3-Dichlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,3-Dinitrobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,4-Dichlorobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1-Naphthylamine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,3,4,6-Tetrachlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4,5-Trichlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4,6-Trichlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4-Dichlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4-Dimethylphenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4-Dinitrophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,4-Dinitrotoluene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,6-Dichlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,6-Dinitrotoluene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Acetylaminofluorene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Chloronaphthalene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Chlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Methylnaphthalene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Methylphenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Naphthylamine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Nitroaniline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Nitrophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2-Picoline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
3,3'-Dichlorobenzidine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	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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# ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue  
Bakersfield, California 93308

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

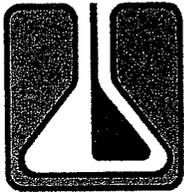
Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1411063 Reported: 11/20/2014 Received: 11/06/2014 08:30
--	---	---

Lab Sample ID: 1411063-01 Client Sample ID: Hoyt Perk Pond #1	Collected By: Jeremiah Johnson Date Collected: 11/5/2014 3:30:00PM
--	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Semivolatile Organic Compounds</b>								
3,3'-Dimethylbenzidine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
3-Methylcholanthrene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
3-Nitroaniline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4,6-Dinitro-2-methylphenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Aminobiphenyl	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Bromophenyl phenyl ether	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Chloro-3-methylphenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Chloroaniline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Chlorophenyl phenyl ether	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Nitroaniline	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Nitrophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
5-Nitro-o-toluidine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
7,12-Dimethylbenz(a)anthracene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
a,a-Dimethylphenethylamine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
4-Nitroquinoline-1-oxide	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
O,O,O-Triethylphosphorothioate	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
p,p-DDD	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
p,p-DDT	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
p,p-DDE	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1-Chloronaphthalene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,4-Dinitrobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,2-Dinitrobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
2,3,5,6-Tetrachlorophenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,4-Naphthoquinone	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1-Methylnaphthalene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Benzidine	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
3 & 4-Methylphenol	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Sulfotep	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Parathion	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
1,3,5-Trinitrobenzene	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Dimethoate	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Pronamide	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Disulfoton	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Methyl parathion	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	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.

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Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1411063 Reported: 11/20/2014 Received: 11/06/2014 08:30
--	---	---

Lab Sample ID: 1411063-01 Client Sample ID: Hoyt Perk Pond #1	Collected By: Jeremiah Johnson Date Collected: 11/5/2014 3:30:00PM
--	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
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### Semivolatile Organic Compounds

Famphur	<75.0	75.0	ug/L		SW846 8270C	11/10/14	11/10/14	JMM
Surrogates		% Recovery	Recovery Limits	Flag				

Nitrobenzene-d5		73.0	0-95				11/10/14 15:30	
2-Fluorobiphenyl		76.6	0-92				11/10/14 15:30	
Terphenyl-d14		53.2	0-100				11/10/14 15:30	
2-Fluorophenol		40.3	0-67				11/10/14 15:30	
Phenol-d6		46.0	0-57				11/10/14 15:30	
Nitrobenzene-d5		73.0	0-95				11/10/14 15:30	
2-Fluorobiphenyl		76.6	0-92				11/10/14 15:30	
2,4,6-Tribromophenol		91.6	0-143				11/10/14 15:30	
Terphenyl-d14		53.2	0-100				11/10/14 15:30	

### Volatile Organic Compounds

m,p-Xylene	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Benzene	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Xylenes, total	0.00			ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Methyl tert-Butyl Ether	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Ethylbenzene	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Toluene	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
o-Xylene	<5.00	5.00		ug/L	SW846 8260B	11/6/14	11/6/14	HLP
Surrogates		% Recovery	Recovery Limits	Flag				

1,2-Dichloroethane-d4		85.8*	89-165	S-GC			11/6/14 15:31	
Toluene-d8		99.6	65-124				11/6/14 15:31	
4-Bromofluorobenzene		94.5	94-114				11/6/14 15:31	

### Volatile Organic Contaminants (VOCs)

Methane	0.0651	0.000240		ppm	RSK-175	11/11/14	11/11/14	MO
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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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**ENVIRONMENTAL AGRICULTURAL**  
Analytical Chemists

November 21, 2014

Lab ID : SP 1412989-001

Customer ID : 2-249

**Zalco Laboratories, Inc.**  
4309 Armour Avenue  
Bakersfield, CA 93308-4573

Sampled On : November 5, 2014-15:30

Sampled By : Not Available

Received On : November 7, 2014-11:10

Matrix : Water

Description : 1411063

Project : 1411063

**Sample Result - Radio**

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Radio Chemistry<sup>P:1</sup></b>								
Gross Alpha	33.2 ± 16.5	20.1	pCi/L	15/5	900.0	11/12/14-07:30 2P1413359	900.0	11/13/14-14:00 2A1417636
Gross Beta	20.1 ± 12.6	16.0	pCi/L	50	900.0	11/12/14-07:30 2P1413359	900.0	11/13/14-14:00 2A1417636

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (P) Plastic Preservatives: N/A \* PQL adjusted for dilution.

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.

MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).

AV = Assigned Value(Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following

If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:

Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L

Uranium is less than or equal to 20 pCi/L

Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.



CALIFORNIA ENVIRONMENTAL  
PROTECTION AGENCYState of California  
Regional Water Quality Control Board

## APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



## I. FACILITY INFORMATION

## A. Facility:

<b>Name:</b> Macpherson Oil Company Midway-Sunset, Hoyt Lease			
<b>Address:</b> 24118 Round Mountain Road NW 1/4 of Section 7, T11N, R23W, SDB&M			
<b>City:</b> Bakersfield	<b>County:</b> Kern	<b>State:</b> CA	<b>Zip Code:</b> 93308
<b>Contact Person:</b> Tim Lovley		<b>Telephone Number:</b> 661-393-3204	

## B. Facility Owner:

<b>Name:</b> NPA CO: Macpherson Oil Company			<b>Owner Type (Check One)</b>	
<b>Address:</b> 24118 Round Mountain Road			1. <input type="checkbox"/> Individual	2. <input type="checkbox"/> Corporation
<b>City:</b> Bakersfield	<b>State:</b> CA	<b>Zip Code:</b> 93308	3. <input type="checkbox"/> Governmental Agency	4. <input checked="" type="checkbox"/> Partnership Agency
<b>Contact Person:</b> Tim Lovley		<b>Telephone Number:</b> 661-393-3204	5. <input type="checkbox"/> Other: _____	
			<b>Federal Tax ID:</b> 95-2860707	

## C. Facility Operator (The agency or business, not the person):

<b>Name:</b> Macpherson Oil Company Midway-Sunset, Hoyt Lease			<b>Operator Type (Check One)</b>	
<b>Address:</b> 24118 Round Mountain Road NW 1/4 of Section 7, T11N, R23W, SDB&M			1. <input type="checkbox"/> Individual	2. <input type="checkbox"/> Corporation
<b>City:</b> Bakersfield	<b>State:</b> CA	<b>Zip Code:</b> 93308	3. <input type="checkbox"/> Governmental Agency	4. <input type="checkbox"/> Partnership Agency
<b>Contact Person:</b> Tim Lovley		<b>Telephone Number:</b> 661-393-3204	5. <input type="checkbox"/> Other: _____	

## D. Owner of the Land:

<b>Name:</b> Department of Interior Bureau of Land Management			<b>Owner Type (Check One)</b>	
<b>Address:</b> 3801 Pegasus Drive			1. <input type="checkbox"/> Individual	2. <input type="checkbox"/> Corporation
<b>City:</b> Bakersfield	<b>State:</b> CA	<b>Zip Code:</b> 93308	3. <input checked="" type="checkbox"/> Governmental Agency	4. <input type="checkbox"/> Partnership Agency
<b>Contact Person:</b> Gabriel Garcia		<b>Telephone Number:</b> 661-391-6000	5. <input type="checkbox"/> Other: _____	

## E. Address Where Legal Notice May Be Served:

<b>Address:</b> 24118 Round Mountain Road		
<b>City:</b> Bakersfield	<b>State:</b> CA	<b>Zip Code:</b> 93308
<b>Contact Person:</b> Tim Lovley		<b>Telephone Number:</b> 661-393-3204

## F. Billing Address:

<b>Address:</b> 24118 Round Mountain Road		
<b>City:</b> Bakersfield	<b>State:</b> CA	<b>Zip Code:</b> 93308
<b>Contact Person:</b> Tim Lovley		<b>Telephone Number:</b> 661-393-3204

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



State of California  
Regional Water Quality Control Board

**APPLICATION/REPORT OF WASTE DISCHARGE  
GENERAL INFORMATION FORM FOR  
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT**



**II. TYPE OF DISCHARGE**

Check Type of Discharge(s) Described in this Application (A or B):

A. WASTE DISCHARGE TO LAND

B. WASTE DISCHARGE TO SURFACE WATER

Check all that apply:

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Domestic/Municipal Wastewater Treatment and Disposal              | <input type="checkbox"/> Animal Waste Solids           | <input type="checkbox"/> Animal or Aquacultural Wastewater  |
| <input type="checkbox"/> Cooling Water   | <input type="checkbox"/> Land Treatment Unit           | <input type="checkbox"/> Biosolids/Residual                 |
| <input type="checkbox"/> Mining  | <input type="checkbox"/> Dredge Material Disposal      | <input type="checkbox"/> Hazardous Waste (see instructions) |
| <input type="checkbox"/> Waste Pile  | <input type="checkbox"/> Surface Impoundment           | <input type="checkbox"/> Landfill (see instructions)        |
| <input type="checkbox"/> Wastewater Reclamation  | <input type="checkbox"/> Industrial Process Wastewater | <input type="checkbox"/> Storm Water                        |
| <input checked="" type="checkbox"/> Other, please describe: <u>Oilfield Produced Water</u> |  |   |

**III. LOCATION OF THE FACILITY**

Describe the physical location of the facility.

<p><b>1. Assessor's Parcel Number(s)</b> Facility: 239-300-07 Discharge Point:</p>	<p><b>2. Latitude</b> Facility: 35.0562 Discharge Point:</p>	<p><b>3. Longitude</b> Facility: -119.379 Discharge Point:</p>
--	--	--

**IV. REASON FOR FILING**

<input type="checkbox"/> New Discharge or Facility	<input type="checkbox"/> Changes in Ownership/Operator (see instructions)
<input type="checkbox"/> Change in Design or Operation	<input type="checkbox"/> Waste Discharge Requirements Update or NPDES Permit Reissuance
<input type="checkbox"/> Change in Quantity/Type of Discharge	<input checked="" type="checkbox"/> Other: <u>Notice of Violation</u>

**V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

Name of Lead Agency: Central Valley Regional Water Quality Control Board

Has a public agency determined that the proposed project is exempt from CEQA?  Yes  No

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.  
Basis for Exemption/Agency: \_\_\_\_\_

Has a "Notice of Determination" been filed under CEQA?  Yes  No

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

<input type="checkbox"/> EIR	<input type="checkbox"/> Negative Declaration
------------------------------	---

Expected CEQA Completion Date: \_\_\_\_\_

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



State of California  
Regional Water Quality Control Board

**APPLICATION/REPORT OF WASTE DISCHARGE  
GENERAL INFORMATION FORM FOR  
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT**



**VI. OTHER REQUIRED INFORMATION**

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

**VII. OTHER**

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:  
See Report of Waste Discharge (Attached)

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

**VIII. CERTIFICATION**

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: J. Lovley

Title: HSE MGR.

Signature: [Signature]

Date: 10.23.14

**FOR OFFICE USE ONLY**

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:
-------------------------	-----------------------	----------------------	----------



**WZI** INC.

**Macpherson Oil Company  
Hoyt Lease Percolation Ponds  
Report of Waste Discharge (ROWD)**

*October 2014*

*Submitted to:*

Macpherson Oil Company  
24118 Round Mountain Road  
Bakersfield, CA 93308

*Prepared by:*

WZI Inc.  
1717 28th Street  
Bakersfield, CA 93301

**Macpherson Oil Company  
Hoyt Lease Percolation Ponds  
Report of Waste Discharge**

This report was prepared by the staff of WZI Inc. under the supervision of the geologist whose signature appears hereunder.



Laura M. Bazeley, PG, C.H.G.

A handwritten signature in black ink that reads "Laura M. Bazeley". The signature is written in a cursive style and is positioned below the typed name.

Date: October 23, 2014

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## Exhibits

- Exhibit II-1 Regional Location Map (with oil field boundary)
- Exhibit II-2 Site Map
- Exhibit II-3 APN Map
- Exhibit III-1 Percolation Pond Location Map
- Exhibit IV-1 Zoning Map
- Exhibit IV-2 Land Use Map
- Exhibit IV-3 Vicinity Map
- Exhibit IV-4 Detailed Site Map
- Exhibit IV-5 Surface Impoundment Detail
- Exhibit IV-6 Production Facility Schematic
- Exhibit V-1 Produced Water Analytical Summary
- Exhibit VIII-1 Isoheytal Map
- Exhibit VIII-2 Evapotranspiration Map
- Exhibit VIII-3 Windrose Diagram
- Exhibit IX-1 Map of Typical Surface Waters
- Exhibit IX-2 Topographic Map
- Exhibit X-1 Groundwater Elevation Map
- Exhibit X-2 Monitoring Well Analytical Summary
- Exhibit XII-1 Regional Geologic Map
- Exhibit XII-2 Site Geologic Map
- Exhibit XII-3 Regional Structure Map
- Exhibit XII-4 Regional Cross Section
- Exhibit XII-5 North-South Cross Section A-A'
- Exhibit XII-6 East-West Cross Section B-B'
- Exhibit XIII-1 List of Analytes

## Appendices

- Appendix I SPCC Plan
- Appendix II Analytical Reports, Impoundment Water
- Appendix III Site Closure Plan

## **I Executive Summary**

Macpherson Oil Company operates an oil and gas lease in the Midway Sunset Oil Field located in the southwest end of the San Joaquin Valley in Kern County. The lease is owned by the Federal government, administered by the Bureau of Land Management. Similar to surrounding oil and gas leases, produced water from the oil and gas operations has been disposed of in surface percolation ponds. Four ponds are present on the site, although only three are in use at the present time.

This area is used primarily for oil field operations. The City of Maricopa is located approximately 1 mile to the west of the Hoyt lease on Highway 166. Groundwater for municipal and industrial supply in this area is imported from West Kern Water District (WKWD). The WKWD water is supplied by groundwater wells and imported water from the State Water Project (SWP). The WKWD water groundwater supply is obtained from eight groundwater wells located approximately 17 miles north east of Taft in the in the Tupman area.

The project site and the surrounding properties presented in this report are located on Quaternary Alluvium. Structurally the sites are located to the south of the Thirty-five Anticline within the Midway Sunset Oil Field. There are no groundwater supply wells located within this area. The nearest water supply wells are located approximately 6 miles to the east of the Macpherson facility in Sections 6 and 8, T11N, R22W, S.B.B.&M.

Central Valley Regional Water Quality Control Board (CVRWQCB) staff inspected the lease on March 3, 2014 in response to a complaint concerning the alleged disposal of produced wastewater to land. Three unlined surface impoundments at the facility are in use for the percolation and evaporation of oil field produced water. Produced water disposal operations at the facility are not regulated by Waste Discharge Requirements 9WDRs. A notice of violation was issued on April 8, 2014 which required the submission of a Report of Waste Discharge.

## **II Introduction**

The Hoyt Lease is located in the Midway Sunset Oil Field in the southwest end of the San Joaquin Valley in Kern County. The area of interest is located along Highway 166, one and one-half miles to the east of the City of Maricopa in the northwest corner of Section 7, Township 11 North, Range 23 West, San Bernardino Base & Meridian, (**Regional Location Map, Exhibit II-1 and Site Map, Exhibit II-2**). The lease is operated by Macpherson Oil Company and is owned by the Federal Government administered by the Bureau of Land Management. The property consists of approximately 65.58 acres and is identified by Kern County assessor's parcel number 239-300-07 (**APN Map, Exhibit II-3**). The lease (LA 033358) was originally issued in 1920 by the U. S. Department of Interior General Land Office. Produced water has been discharged to sumps since 1936.

Presently there are 7 active wells, 6 idle wells and 8 plugged and abandoned wells. There are four unlined percolation sumps, three of which are presently being used for percolation and evaporation. Produced crude oil and water are stored in tanks. The crude oil is separated and stored on site prior to shipment via truck. The separated produced water is stored in a tank and then discharged via piping to the percolation sumps.

This Report of Waste Discharge has been prepared in response to the notice of violation issued on April 8, 2014 which required the submission of a Report of Waste Discharge.

### **III Background**

Disposal of oil field produced water in the Midway Sunset oil field has been primarily via percolation and evaporation sumps and has been on-going since the development of the oil field in the early 1900's. A summary of the history of percolation on the Hoyt lease and surrounding leases located within one mile of the Hoyt lease is presented below. The location of the percolation sumps are shown on **Exhibit III-1**. In addition to the oil field sumps, the City of Maricopa discharges sewage wastewater to percolation ponds located to the north of the Macpherson facility.

#### **Hoyt Lease**

The Hoyt lease has been in operation since approximately 1936. There are four percolation/evaporation sumps, three of which are in use at the present time. The oil and water are separated in tanks, and the produced water is piped to the percolation sumps. Historically, the amount of water produced ranged from approximately 20,000 to 400,000 barrels per year (84,000 to 16,800,000 gallons per year). The present discharge is approximately 128,000 barrels per year (5,376,000 gallons per year).<sup>1</sup>

#### **Valley Water Management, Maricopa West Facility**

The Valley Water Management impoundments have been in operation since at least 1959 for the percolation and evaporation of oil field produced water under WDR 59-73. This facility is located approximately 1,800 feet to the north of the Macpherson facility in Section 6, T11 N, R 23 W, S.B.B.&M. Historically, the facility consisted of two oil/water separation tanks, 16 disposal sumps, and five injection wells.<sup>2</sup> At the present time there are 10 percolation/evaporation sumps and 3 cleaning ponds. Wastewater is transported to this facility via pipeline. As of 2011, approximately 13,000 barrels per day (1,999,290,000 gallons per year) of produced oil field wastewater is discharged into the

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<sup>1</sup> Division of Oil, Gas, and Geothermal Resources Online Data (<http://opi.consrv.ca.gov/opi/opi.dll> accessed September 24, 2014).

<sup>2</sup> 1997 Field Inspection Report, Valley Waste Disposal Company, Midway Sunset Maricopa West by RWQCB, August 1997

percolation sumps<sup>3</sup>. Historic discharge volumes have approached 30,000 barrels per day (1,260,000 gallons per day) of produced water.<sup>4</sup> A sample of wastewater collected from the downstream sump in 2013 contained a TDS concentration of 17,000 mg/l, a chloride concentration of 9,200 mg/l and a boron concentration of 97 mg/l.

#### D&P, Snook & Wells Lease

Drilling & Production Company operates four percolation sumps under WDR 59-030 on the Snook & Wells for percolation and evaporation of oil field produced wastewater. These facilities are located in the northeast quarter of Section 12, T11N, R24W, S.B.B.&M., approximately 2.5 miles to the northwest of the Macpherson facilities. A sample of wastewater collected from Sump 1 in 2013 contained a TDS concentration of 10,000 mg/l, a chloride concentration of 4,500 mg/l and a boron concentration of 51 mg/l.<sup>5</sup> The volume of produced water discharged to the sumps ranges from 100,000 barrels to 150,000 barrels per year (4,200,000 to 6,300,000 gallons/year)

#### Sill Properties, O'Brien & Sill Lease

This facility is located approximately 4,000 feet to the northeast of the Macpherson percolation sumps in the southeast quarter of Section 6, T11N, R23W, S.B.B.&M. The facility consists of two unlined percolation ponds which are operated under WDR 59-028. The sumps are used for percolation and evaporation of oil field produced wastewater. Approximately 100,000 barrels (4,600,000 million gallons) per year are discharged to the sumps. The wastewater contains an electrical conductivity of 30,000 microseimens/cm, a TDS concentration of 18,000 mg/l, a chloride concentration of 9,000 mg/l, and a boron concentration of 77 mg/l (2008 wastewater analytical results).<sup>6</sup>

#### Maricopa Wastewater Disposal Facilities

These facilities are located approximately 1,500 feet to the northwest of the Macpherson percolation sumps. In 2000 the City of Maricopa received waste discharge requirements (Order No. 5-00-153) for two disposal ponds which had been in operations for at least 15 years and operated under WDR No. 76-252. The average flow is 45,600 gpd. According to the findings in the WDR, the electrical conductivity of the groundwater ranges from 4,000 to 6,000 umhos/cm. The area groundwater does not currently supply a public water system, nor is it reasonably expected to do so in the future.

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2011 Field Inspection Report, Valley Waste Disposal Company, Midway Sunset Maricopa West by RWQCB, April 15, 2011

<sup>4</sup> Geomega, 2005, Phase III Hydrogeologic Characterization Report, Valley Waste Disposal Company, Maricopa Flats Area, p.1-1

<sup>5</sup> 2013 Field Inspection Report, Drilling and Production Company, Snook and Wells Lease by RWQCB, June 26, 2013

<sup>6</sup> 2014 Field Inspection Report, Sill Properties, O'Brien Sill Lease, by RWQCB, April 8, 2014

**IV Facility Description**

The site is located within the southern end of the Midway Sunset oil field, approximately 1.5 miles to the east of the City of Maricopa, on the south side of Highway 166. The property consists of approximately 65.58 acres as identified on Kern County APN Map 239-300-07 (**Exhibit II-3**). Access to the site is via Highway 166 which bounds the site on the north side.

The site and the surrounding land is zoned A-1, Exclusive Agriculture (**Exhibit IV-1**). The site land use designation is 1.1, Non-jurisdictional Land and the surrounding land use designation is 8.4 Mineral Petroleum, some with a flood hazard overlay (2.5) (**Exhibit IV-2**). With the exception of the City of Maricopa located to the west, the surrounding land use is related to petroleum development. The nearest residential development is the City of Maricopa, located approximately 1.5 miles to the west of the site (**Vicinity Map, Exhibit IV-3**). The nearest water wells are located approximately 6 miles to the east of the site.

The approximately 65.58 acre Hoyt lease there are seven active wells, 6 idle wells and 8 plugged and abandoned wells (**Detailed Site Map, Exhibit IV-4**). The production facilities consist of 8 above ground tanks used for the separation of oil and water, and storage of crude oil. The location of the production facility is shown on the Site Map (**Exhibit IV-4**). The four surface impoundments are shown on the Surface Impoundment Detail Map and enlargements (**Exhibits IV-5, IV-5A, IV-5B, IV-5C**).

Impoundment	Dimensions	Depth	Holding Capacity (gallons)
Sump 1	57' x 101'	10'	344,522
Sump 2	95' x 108'	10'	614,001
Sump 3	97' x 123'	10'	714,000
Sump 4	195' x 123'	10'	1,435,362

The total holding capacity with four impoundments in service is 3,107,885 gallons assuming 2 feet of freeboard. The present discharge is approximately 128,000 barrels per year (5,376,000 gallons per year).<sup>7</sup>

The site slopes gently to the east-northeast, ranging in elevation from 754 feet in the southwest corner of the lease to 676 feet in the northeast corner of the lease (**Detailed Site Map, Exhibit IV-4**). Earthen berms and diversionary structures surround the production facility (**Production Facility Schematic, Exhibit IV-6 and Appendix I, SPCC Plan**). A 10-inch pipeline connects the produced water tank to Sump 1, the westernmost impoundment. The three sumps to the east are each connected in series by a similar 10-inch pipeline.

<sup>7</sup> Division of Oil, Gas, and Geothermal Resources Online Data (<http://opi.consrv.ca.gov/opi/opi.dll> accessed September 24, 2014).

## V Wastewater Characteristics

The produced oil and water piped to a tank (Freewater Knockout Tank) and gravity separated. The separated oil is stored in either the northern or the southern shipping tanks. The produced water is stored in the Kill Water Tank prior to discharge to the impoundments. The tanks are shown in the **Production Facility Schematic, Exhibit IV-6**. The average daily flow of produced water to the impoundments is 325 barrels (13,650 gallons). Water samples were collected from the first impoundment and analyzed for general mineral and hydrocarbon constituents. The results are summarized in **Exhibit V-1**, laboratory reports are contained in **Appendix II**. The total dissolved solids concentration is 11,000 mg/l, the chloride concentration is 7,000 mg/l and the boron concentration is 93 mg/l. The concentration of these constituents is similar to the concentrations detected in the surrounding percolation/evaporation sumps.

### i Solids Handling-

Solids are generated from tank clean outs and spills. The material is tested for metals and benzene and disposed of at a disposal facility or used onsite as road base mixed with sand. Tanks were cleaned out once in approximately 2008, when the tanks were replaced. The tanks have not been cleaned out since that time.

Trash is removed by an authorized solid waste company.

### ii Chemical Usage-

Demulsifier is injected into the well header. Current usage is approximately 68 gallons per year but in the future as more wells are brought online, it may be as high as 200 gallons per year.

Demulsifiers contain Light aromatic naphtha; 1,2,4-Trimethylbenzene ; 1,3,5-Trimethylbenzene; 1,2,3-Trimethylbenzene; and Xylene

Oxygen scavenger is injected into wells being steamed. Currently no chemical is being used but in the future the use may be as high as 200 gallons per year. Oxygen scavengers contain ammonium bisulfite or a mixture of sulfites depending upon the product used.

## VI Climatology

The San Joaquin Valley lies in the central region of the State of California; it is bounded to the east by the Sierra Nevada Mountain Range, bounded to the west by the Coastal Mountain Range and to the South by the Tehachapi Mountains, see **Exhibit II-1, Regional Location Map**. The proposed project site is located in the southwest portion of the valley.

The climate of the southern San Joaquin Valley is classified as a Dry-Summer Subtropical type, and is characterized by hot summers, mild winters, and small amounts of precipitation. The major climatic controls in the Basin are the surrounding mountains and the Pacific High pressure system over the ocean. The Great Basin High pressure system to the east also affects the valley, primarily during winter months. These influences result in distinct seasonal weather characteristics.

The Pacific High is a semi-permanent, subtropical, high-pressure system located off the Pacific Coast. The Pacific High tends to migrate seasonally. During the summer, it moves northward and dominates the regional climate. This high produces persistent temperature inversions and a predominantly northwest airflow. Clear skies, high temperature, low humidity, and relatively good air circulation characterize this season. The Pacific High blocks migrating extra-tropical storms, therefore very little precipitation occurs in the summer months. Occasionally, tropical air moves into the area and thunderstorms may occur over the adjacent mountains.

As the Pacific High shifts southward during the fall, its dominance is diminished in the San Joaquin Valley. During this transition period, the storm belt and zone of strong westerlies also shifts southward, into California. Three weather regimes generally prevail during winter: (1) storm periods which are usually characterized by cloudiness, precipitation, and shifting, gusty winds; (2) clear weather associated with either a buildup of pressure through the interior of California following these storms or the influence of a well-developed Great Basin High pressure system; and (3) persistent fog or stratus clouds and temperature inversions associated with a weak influence of the Great Basin High trapping a layer of cool, moist air in the San Joaquin Valley. Thus sky, temperature, and humidity conditions are much more variable during winter. Air movement is also variable, with stagnant conditions occurring more frequently than during summer.

Radiative cooling at night, especially during clear conditions, results in a distinct down slope drainage flow. Thus, the mountains provide a distinct diurnal wind pattern of generally northerly winds during the day and a westerly drainage flow at night.

Diurnal wind regimes markedly affect the horizontal transport of air in the project area. During the summer, northeast winds dominate the daytime regime. These winds, generated by the Pacific High offshore, are enhanced by the San Joaquin Valley orientation and by the thermal low that develops in the central valley during this season. In response to this thermal low, air moves inland through passes in the coastal ranges, principally the Carquinez Strait near San Francisco, and flows to the south in the San Joaquin Valley as an up-valley northwesterly wind. This general northwest flow in the San Joaquin Valley is expressed locally as a more northeasterly wind under the influence of local terrain.

Dominant nighttime wind directions during summer are markedly different from those of the daytime. Winds with a northerly component have a low frequency of occurrence at night. The high frequency of west to southwest winds at night is due primarily to down slope drainage flow.

During the winter months, northerly to northeasterly winds remain dominant in the daytime. However, winds are more variable than during summer, due in part to: (1) the southward migration of the Pacific High and resultant storm passages; (2) the absence of a strong thermal trough; and (3) the varied influence of the Great Basin High. As in summer, winds during winter nights are predominantly from the west to southwest and are associated with drainage flow. Wind speeds are generally higher in summer than in winter in the project area. Calm conditions occur most often in winter but are relatively infrequent during either season.

The mountains to the east, south and west essentially block the region from transport of very cold air from the mid-continent in winter, and the relatively cool, marine air from the Pacific Ocean during summer. Transport of marine air through the Carquinez Strait during summer has a moderating effect on northern portions of the San Joaquin Valley, but this effect is not great in

the southern portion of the valley. In this area, temperature regimes are influenced primarily by topography, the higher elevations generally experiencing cooler temperatures.

About 90 percent of the precipitation in the San Joaquin Valley occurs from November through April, generally in association with storms that move eastward from the Pacific Ocean during this period. Precipitation is low because the mountains to the west and south produce a rain shadow effect by intercepting prefrontal, moisture-laden west and south winds. The southern San Joaquin Valley receives precipitation primarily from cold, unstable, northwesterly flow that usually follows a frontal passage. Table 3.4-1 presents climate data representative of the project area.

**Table VIII-1**  
 Representative Temperature, Relative Humidity  
 and Precipitation Data from Bakersfield, California

Month	Average Daily Temperature (°F)		Relative Humidity (%)		Average Rainfall (inches)
	Minimum	Maximum	Morning	Afternoon	
January	39.3	56.3	84	62	1.18
February	43	63.5	80	51	1.21
March	46.2	68.3	74	42	1.41
April	49.6	75.7	67	33	0.45
May	56.8	83.8	57	26	0.24
June	63.7	91.6	51	23	0.12
July	69.2	96.9	48	21	0
August	68.4	95.4	54	24	0.08
September	63.9	89.4	58	29	0.15
October	54.9	79.5	63	34	0.3
November	44.2	65.3	76	50	0.59
December	38.2	56.1	84	62	0.76
Annual	53.1	76.8	66	38	6.49

**i Isohyetal Map**

Isohyets are lines which join points of equal precipitation on a map. The Kern County Hydrology Manual details precipitation data for the area in which the Macpherson Hoyt lease site is located, on an isohyetal map (**Exhibit VIII-1**). A 100-year, 24-hour event map shows precipitation in the area of the site to be between 2 ½ and 3 inches. Precipitation amounts are higher to the south of the site. Within a 10-mile radius of the site, precipitation ranges from 2 inches north of the site to 8 inches south of the site.

**ii Evapotranspiration**

Evapotranspiration (ET) is the combination of transpiration (precipitation loss to the atmosphere through plant surfaces) and evaporation. In agricultural operations, accurate estimates of evapotranspiration are often needed for irrigation schedules, system design, and other matters relating to water.

Temperatures, humidity, wind speeds, soil parameters and plant factors all affect ET. While ET can be accurately measured using lysimeters and other similar equipment, estimating ET (utilizing analytical and empirical equations) is far more common because measurement methods are often expensive and time consuming.

Formulating an equation for ET is difficult as there are so many factors to include. It is complicated to formulate an equation that can produce estimates of ET under so many different sets of conditions; therefore, the idea of reference crop evapotranspiration (ET<sub>o</sub>) was developed by researchers. Reference ET is the ET rate of a reference crop expressed in inches or millimeters.

The California Irrigation Management Information System (CIMIS), governed by the State of California Department of Water Resources, has created a Reference ET map for California (**Exhibit VIII-2**) dividing the state up into different zones. The Macpherson Hoyt lease site falls into Zone 15 which is described as: Northern & Southern San Joaquin Valley, slightly lower winter ET<sub>o</sub> due to fog and slightly higher summer ET<sub>o</sub> than zones 12 (east side Sacramento-San Joaquin Valley) and 14 (Mid-Central Valley, Southern Sierra Nevada, Tehachapi & High Desert Mountains). Zone 15 Average Evapotranspiration, by month, is shown on **Table VIII-2**.

**Table VIII-2**  
**Monthly Average Reference Evapotranspiration**

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
15	1.24	2.24	3.72	5.70	7.44	8.10	8.68	7.75	5.70	4.03	2.10	1.24	57.9

*Values given are in inches/month*

*Source: DWR, California Irrigation Management Information System (CIMIS) Reference Evapotranspiration Map, 1999.*

**iii Wind Rose**

The appropriate windrose is included as **Exhibit VIII-3**.

## VII Surface Water

The Hoyt lease is situated between Bitter Creek and Bitterwater Creek as shown on the **Map of Typical Surface Waters, Exhibit IX-1**. The water quality of these streams ranges from approximately 5,500 mg/l to 8,800 mg/l TDS with sulfate being the primary anion (Wood and Dale, 1964). The groundwater in this area is present in the alluvial fans of the streams that drain the surrounding San Emigdio Mountains to the south and the Temblor Range to the west.

As shown on the **Topographic Map, Exhibit IX-2**, the topographic surface at the site and in the general vicinity slopes to the east-northeast. There are no drainages that cross the site. There are no springs on the site or in the vicinity of the site. The 100-year flood zone is present approximately ¼ mile to the south of the Hoyt lease boundary. Another 100-year flood zone is located approximately ½ mile to the north of the Hoyt lease. Neither of these zones cross the Hoyt lease.

## VIII Groundwater Characteristics

Information regarding groundwater quality in the vicinity of the site was obtained from monitoring reports prepared and submitted to the RWQCB for the Valley Water Management Company Maricopa West Facility located directly to the north of the Hoyt Lease. Monitoring wells were installed between 1999 and 2004 to the east of the Maricopa West Facility to document the groundwater quality in the vicinity of the facility. A **Groundwater Elevation Map, Exhibit X-1**, prepared using this data (Schlumberger Water Services, 2014) shows a water mound associated with the Maricopa West surface impoundments with a general gradient to the east. The gradient near the impoundments was determined to be 0.06 ft/ft decreasing to 0.014 ft/ft to the east.<sup>8</sup>

Based on aquifer testing performed by Geomega in 1999<sup>9</sup>, the hydraulic conductivity is estimated to be  $5 \times 10^{-4}$  feet/minute downgradient of the impoundments. Farther to the southeast in the vicinity of monitoring wells MAR-2 and MAR-3, the hydraulic conductivity is estimated to be  $3.7 \times 10^{-5}$  feet/minute.<sup>10</sup> Assuming an effective porosity of 25%, the average groundwater velocity was calculated to be 1.1 ft/yr.<sup>11</sup>

The historic analytical data from the monitoring well groundwater samples have been summarized in the **Monitoring Well Analytical Summary, Exhibit X-2**. This data was obtained from the Quarterly and Semi-Annual Monitoring Well reports submitted to the RWQCB on behalf of Valley Water Management starting in 1999. The TDS concentration varies from 18,000 mg/l in MAR-1, the monitoring well located directly downgradient from the

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<sup>8</sup> Schlumberger Water Services, 2014, p. 3.

<sup>9</sup> Geomega, 2005, p.3-4

<sup>10</sup> Ibid

<sup>11</sup> Geomega, 2005, p.3-5

impoundments to 5,900 mg/l in MAR-2, the monitoring well located furthest downgradient of the impoundments, approximately 8,000 feet to the east. The monitoring well locations are shown on the **Groundwater Elevation Map, Exhibit X-1**. The water quality detected in the downgradient wells is similar to the stream water quality adjacent to the impoundments as discussed in the previous section.

The nearest water supply wells are located in Section 31, T12N, R22W and Sections 6 and 8, T11N, R22W which are approximately 6 miles to the east of the Hoyt lease.<sup>12</sup> Groundwater for municipal and industrial supply in this area is imported from West Kern Water District (WKWD). The WKWD water is supplied by groundwater wells and imported water from the State Water Project (SWP). The WKWD water groundwater supply is obtained from eight groundwater wells located approximately 17 miles north east of Taft in the in the Tupman area.

## **IX Geology/Stratigraphy**

The site is located in the southwest portion of the San Joaquin Valley within the Maricopa Flats region. The San Joaquin Valley is an alluvial plain underlain by up to 28,000 feet of marine and non-marine deposits of Quaternary and Tertiary age. The surficial deposits consist of alluvial fan, fluvial and lacustrine deposits of Quaternary age (**Regional Geologic Map, Exhibit XII-1**). The Valley is bounded on the south by the San Emigdio Mountains and on the west by the Temblor Range, where the Tertiary rocks are exposed at the surface which dip beneath the Valley. The San Andreas Fault zone, located approximately 7 miles to the southwest of the Hoyt Lease, is the nearest active fault to the site.

The site and the surrounding area are underlain by Quaternary Alluvial Fan deposits, consisting of unconsolidated sand, gravel, silt and clay (**Site Geologic Map, Exhibit XII-2**). The non-marine Tulare Formation underlies the Recent Alluvial deposits. The depositional environments represent sequential stages of basin filling within the time frame of the Pleistocene to recent geologic history. The basin edges expose a series of southeast plunging anticlines which form the structural traps associated with the Midway Sunset oil field. The basic structure of the Midway Sunset Oil Field is a regional homocline (**Regional Structure Map, Exhibit XII-3**) along the flank of the Temblor Range to the west, that is modified by several folds and converging unconformities as shown on the **Regional Geologic Cross Section, Exhibit XII-4**.

In the vicinity of the Hoyt Lease, within the southern portion of the oil field, oil production is from the Pliocene Top Oil Sand and the Miocene Hoyt Sand which is equivalent to the Monarch Sand ( **Cross Section A-A', Exhibit XII-5** and **Cross Section B-B', Exhibit XII-6**). The Tulare Formation and the Alluvium overlie the Top Oil Zone. In this area the Lower Tulare is bounded by an unconformity, overlain by a basal clay unit of the Alluvium. This basal clay unit is

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<sup>12</sup> Geomega, 2005, p.3-6, Figure 3.  
Report of Waste Discharge

approximately 250 feet thick as shown on Cross Sections A-A' and B-B' (**Exhibits XII-5 and Exhibit XII-6**). The basal clay is overlain by the Alluvium deposit consisting of gravel, sands, silt and clay. The unconfined groundwater aquifer is encountered in the lower portion of the Alluvium at a depth of approximately 200 feet. The cross sections show the relationship between the surface impoundments on the Hoyt Lease and the Valley Water Management impoundments and the depth to the unconfined aquifer. The unconfined aquifer beneath the Hoyt Lease is estimated to be less than 100 feet thick due to the presence of the basal alluvial clay.

Soil beneath the impoundments has been classified as Gujarral-Klipstein complex (Natural Resources Conservation Service, 2009). This soil type is derived from calcareous sedimentary rock consisting of sandy loam and gravelly sandy loam and is well drained.

## **X Impoundment Monitoring**

### **i Impoundment Inspection**

The impoundments will be inspected once a week and records maintained of visual observations. The freeboard will be monitored on all impoundments to the nearest tenth of a foot. A permanent marker will be placed in each pond designating the operational freeboard.

### **ii Wastewater Monitoring**

Surface water samples will be collected from the Hoyt Lease impoundments on a semi-annual basis. These samples will be analyzed for the following inorganic and organic constituents listed in **Exhibit XIII-1**.

### **iii Impoundment Sludge Monitoring**

When sludge is removed from the impoundments but prior to disposal, a composite sample will be collected and analyzed on a dry weight basis for Total Solids (%), general mineral, and boron (total and soluble) to determine the appropriate disposal site for the sludge.

## **XI Closure and Post Closure Maintenance Plan**

Site Closure plan is attached as **APPENDIX III**.

## **XII Contacts**

### **Operator Contact Information**

Name: Macpherson Oil Company

Address: 24118 Round Mountain Road, Bakersfield, CA 93308

Contact Person: Tim Lovley, HSE Manager

Phone Number: 661-393-3204

Owner Type: Partnership

### **Land Owner Contact Information**

Name: Department of Interior, Bureau of Land Management

Address: 3801 Pegasus Drive, Bakersfield, CA 93308

Contact Person: Gabriel Garcia, Field Office Manager

Phone Number: 661-391-6000

### **XIII References**

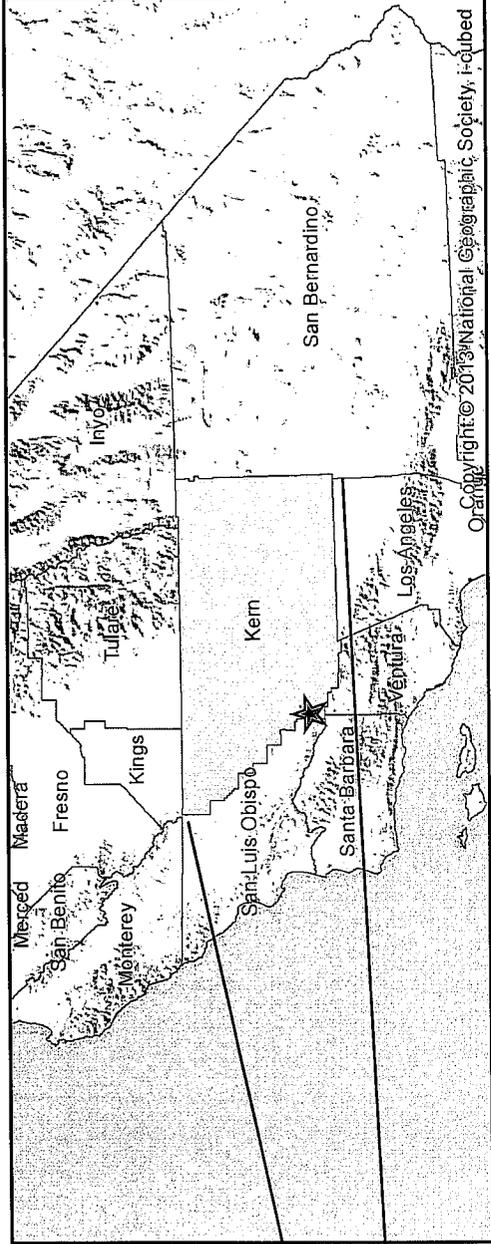
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Schlumberger Water Services; 2013 Second Semi Annual Sampling and Analysis Report (February 24, 2014); Maricopa Flats Area

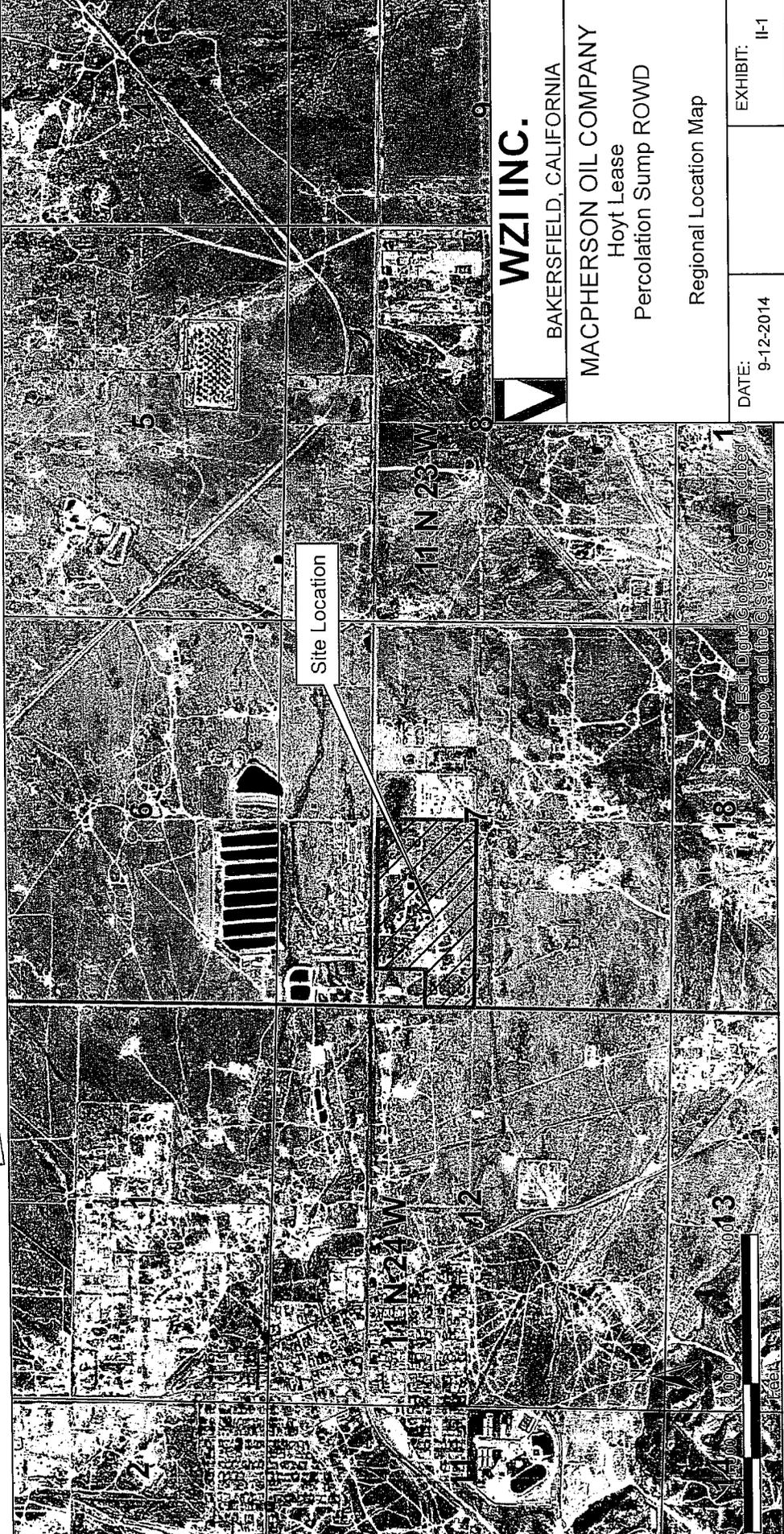
Schlumberger Water Services, 2014, Valley Water Management Company 2013 Second Semi-annual Sampling and Analysis Report, Maricopa Flats Area

Wood, P.R. and Dale, R.H., 1964, Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California; U. S. Geological Survey Water-Supply Paper 1656, 108 pgs.

# EXHIBITS



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**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

Hoyt Lease

Percolation Sump ROWD

Regional Location Map

DATE:  
9-12-2014

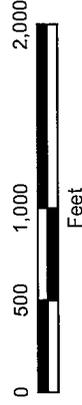
EXHIBIT:  
II-1

Source: Esri, DigitalGlobe, GeoEye, Earthstar, CNES, and the User Community

Legend



Hoyt Lease Boundary



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

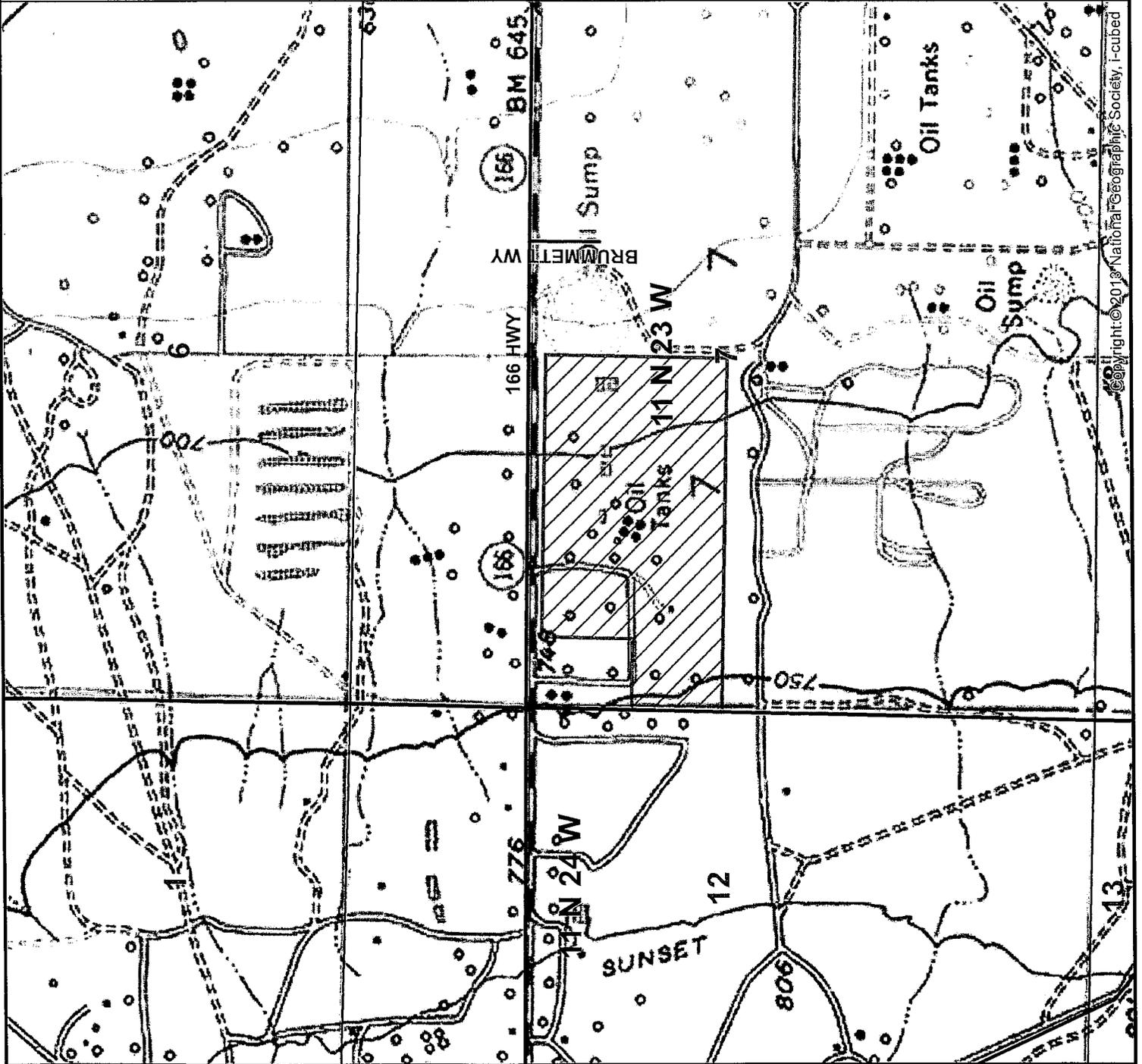
Hoyt Lease

Percolation Sump ROWD

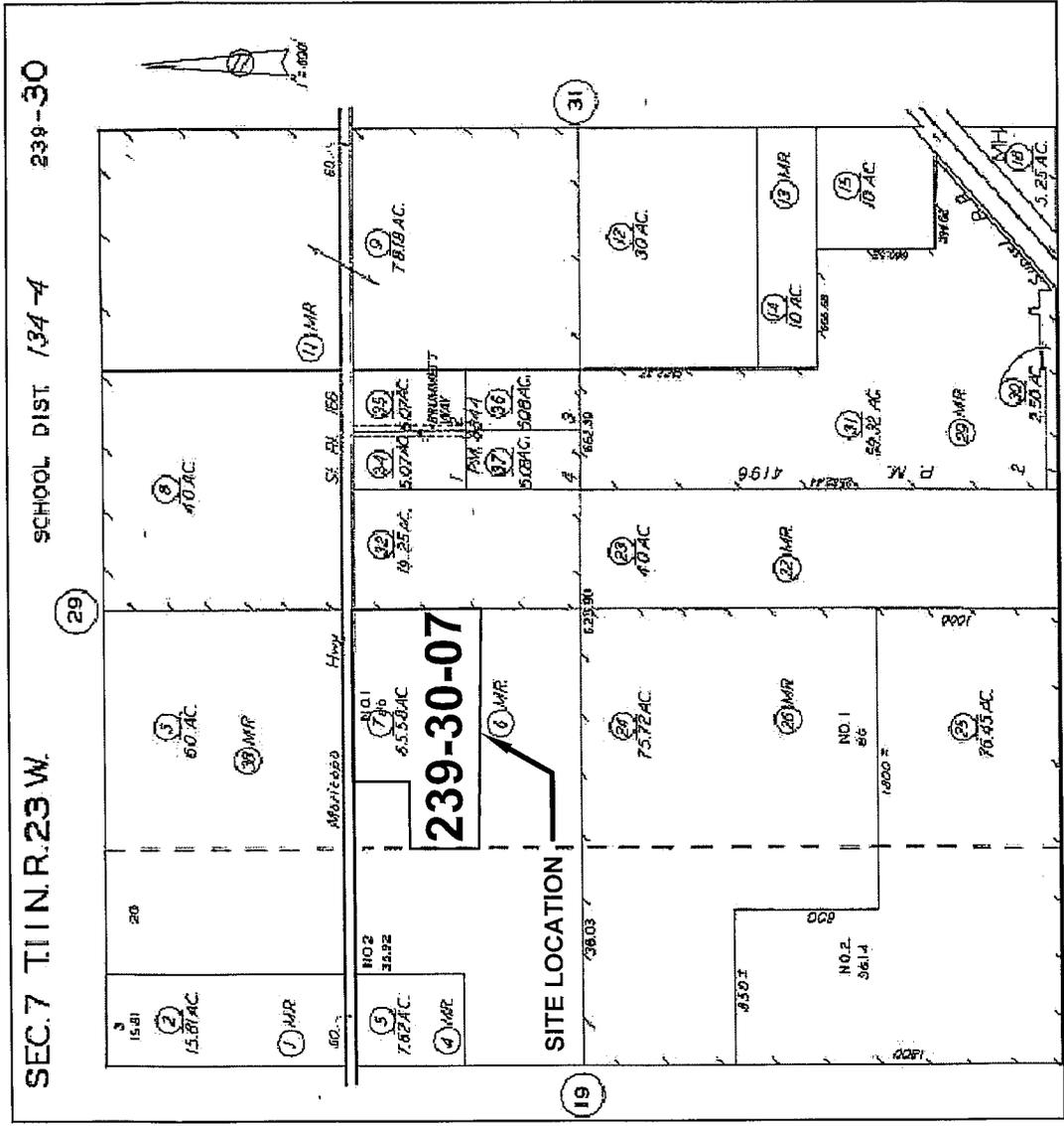
Site Map

DATE: 9-12-2014

EXHIBIT: 11-2



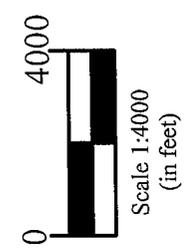
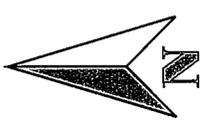
© copyright © 2013 National Geographic Society, I-cubed



**WZI** INC.  
 BAKERSFIELD, CALIFORNIA

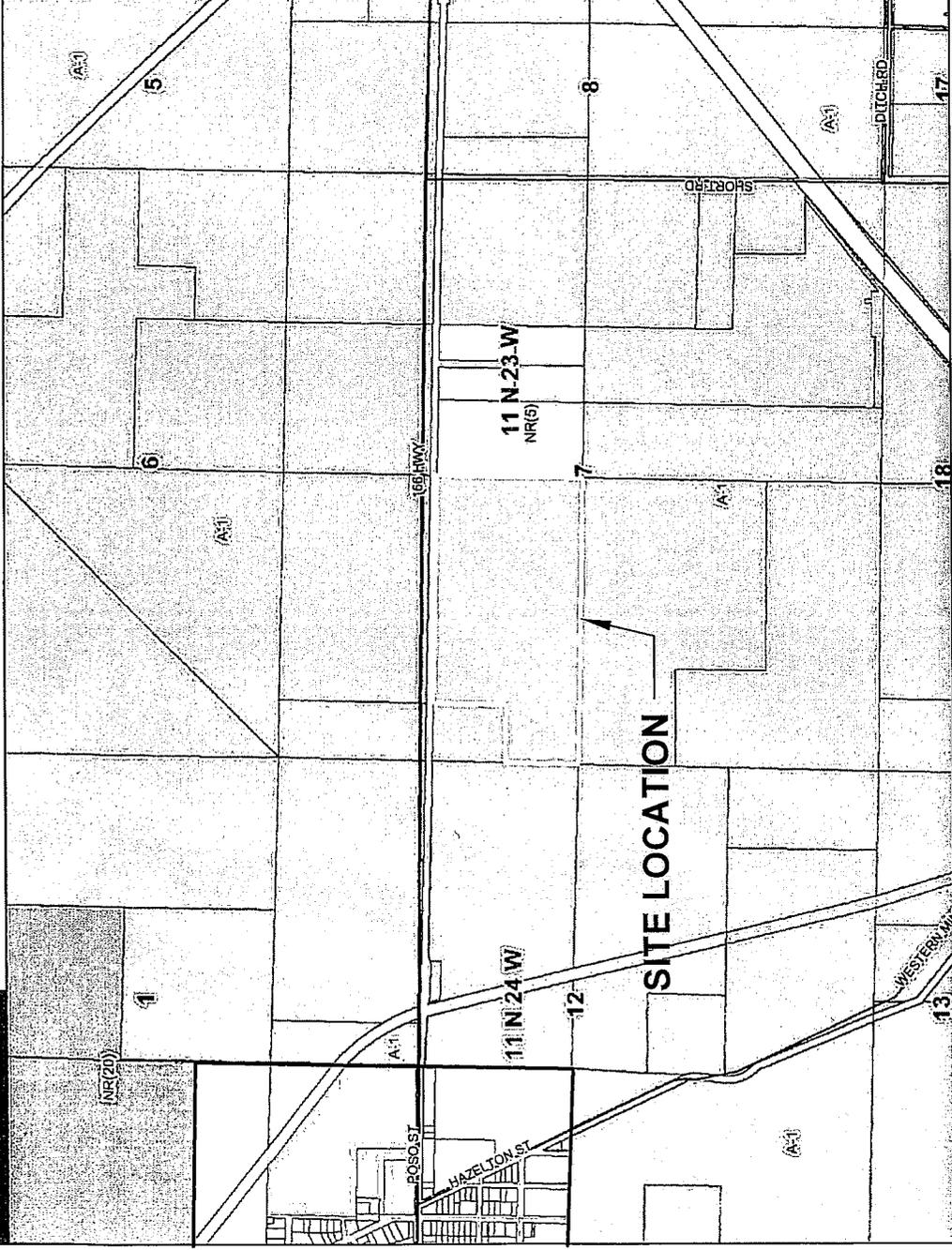
Macpherson Oil Company  
 Hoyt Lease  
 Percolation Sump ROWD  
 Assessor's Parcel Map

DATE: 9/14 | Macpherson - 127 | EXHIBIT: II-3





# ZONING MAP

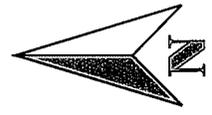
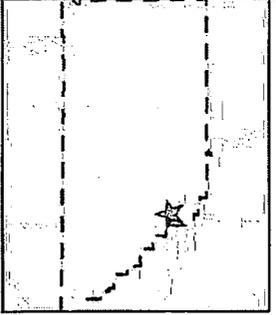


**Legend**

**Roads**  
 Arterial  
 Collector  
 Highway  
 Local  
 Ramp  
 Unpaved

County of Kern  
 Assessment Parcels  
 Townships  
 Sections

COUNTY\_ZONING  
 A-1 Exclusive Ag District  
 NR (5) Natural Resources 5 acres  
 NR (20) Natural Resources 20 acres  
 City Limits



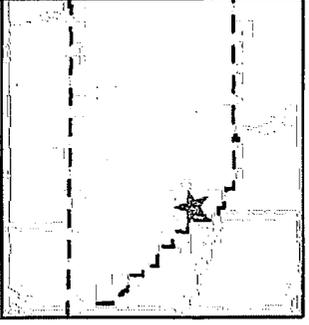
Scale 1:4000  
(in feet)



**WZI** INC.  
BAKERSFIELD, CALIFORNIA

Macpherson Oil Company  
Hoyt Lease  
Percolation Sump ROWD  
Zoning Map

# LAND USE MAP



**Legend**

kc\_alucp

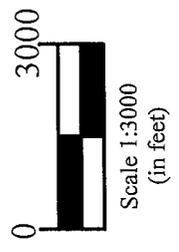
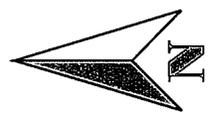
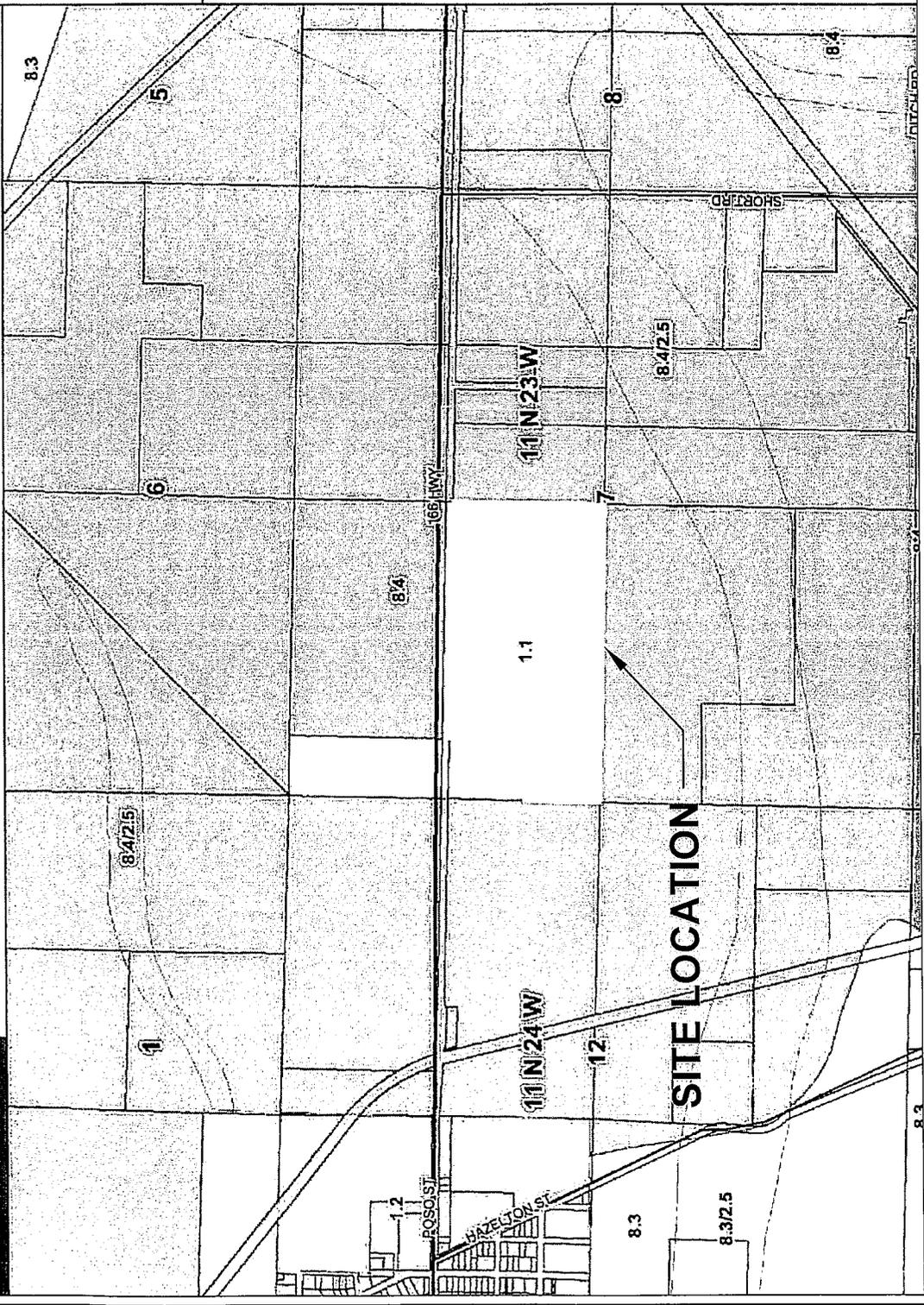
- 1.1 Non-jurisdictional Land
- 1.2 Incorporated Cities
- 2.5 Flood Hazard
- 8.3 Extensive Ag. Land
- 8.4 Mineral Petroleum

**Roads**

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

County of Kern

Assessment Parcels



**WZI INC.**  
BAKERSFIELD, CALIFORNIA

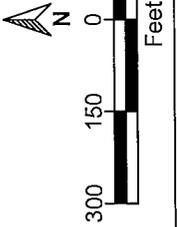
**Macpherson Oil Company**  
Hoyt Lease  
Percolation Sump ROWD  
Land Use Map





**LEGEND**

- 818.00 X \_\_\_\_\_
- BOUNDARY - - - - -
- CONTOURS - MAJOR - - - - -
- CONTOURS - MINOR - - - - -
- EDGE OF DIRT ROAD - - - - -
- TOP OF SLOPE - - - - -
- TOE OF SLOPE - - - - -
- BARB WIRE FENCE - - - - -
- PIPELINE (SIZE AS NOTED) \_\_\_\_\_
  
- ACTIVE WELLS ●
- IDLE WELLS ○
- PLUGGED AND ABANDONED WELLS ⊕



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

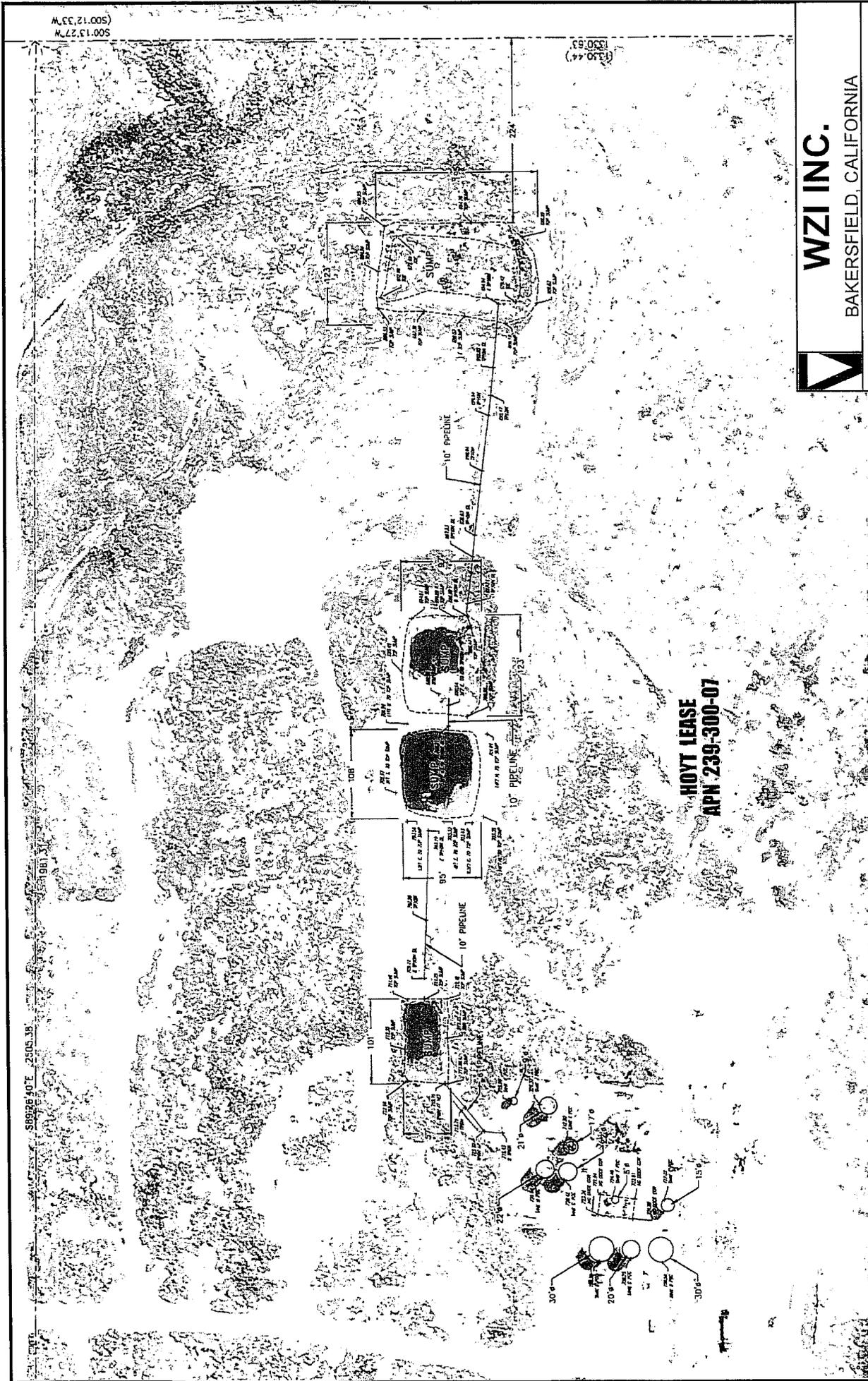
Hoyt Lease

Percolation Sump ROWD

Detailed Site Map

DATE: 9-12-2014

EXHIBIT: IV-4



**HOYT LEASE  
APN 239-300-07**

**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

Hoyt Lease

Percolation Sump ROWD

Surface Impoundment  
Detail Map



**NTS**

DATE: 9-12-2014

EXHIBIT: IV-5

MCC, 21.005)  
M, 22, 27, 27)

(130.44)  
130.53)

89978 40'E 2505.38'

1081.3'

10'

10'

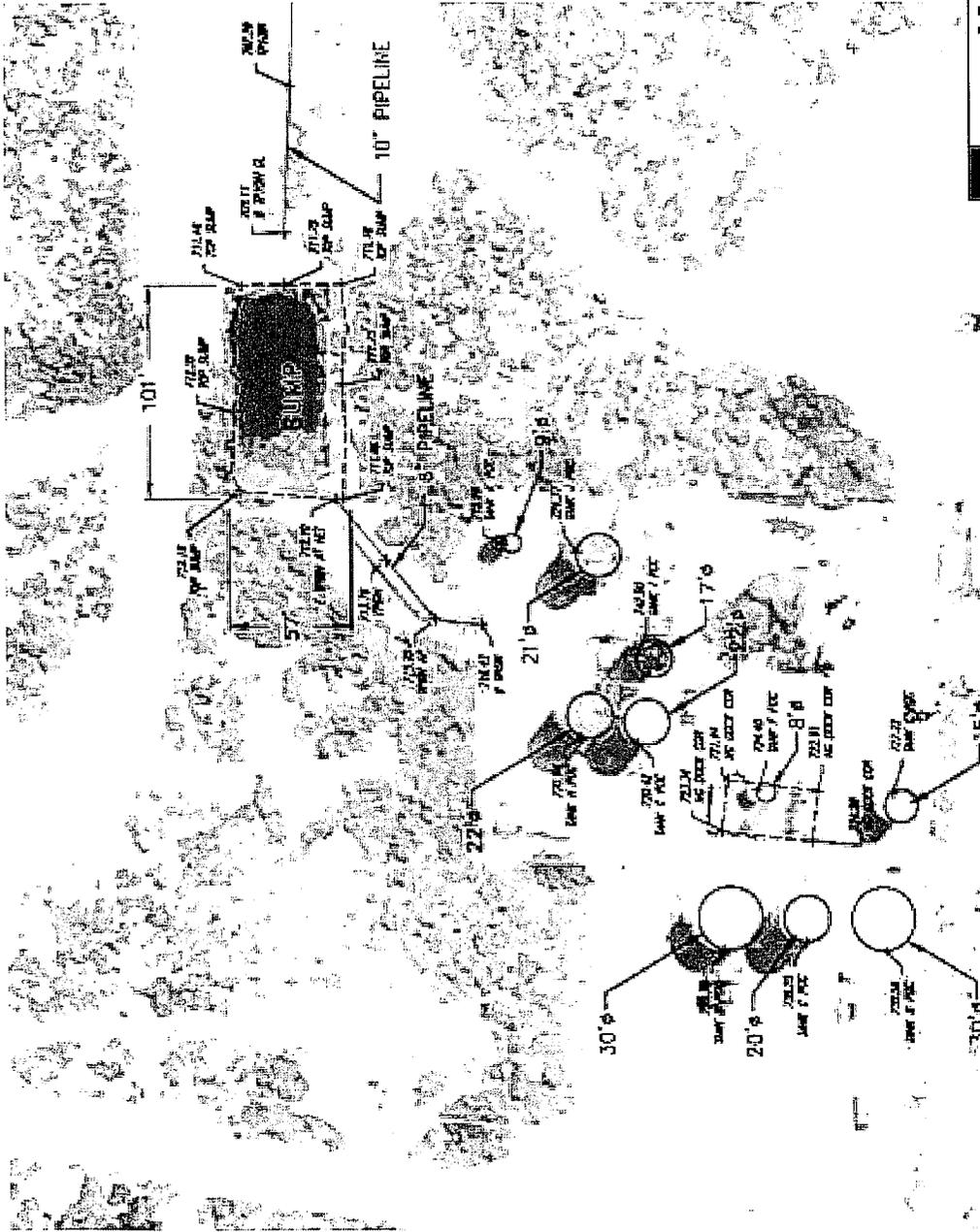
10'

30'

20'

15'

30'



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

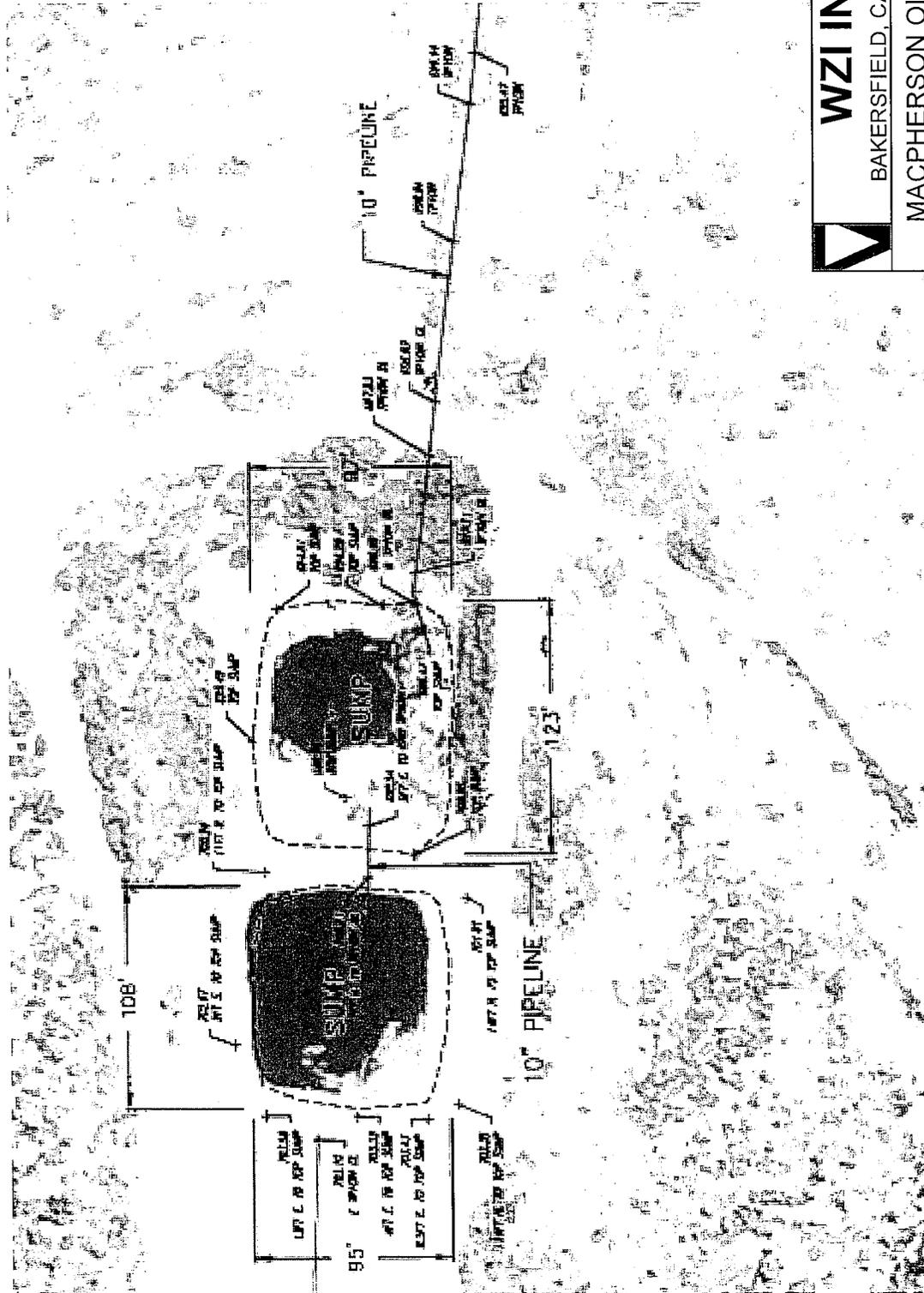
Hoyt Lease

Percolation Sump ROWD

Surface Impoundment  
Detail Map

DATE: 9-12-2014

EXHIBIT: IV-5A



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

Hoyt Lease

Percolation Sump ROWD

Surface Impoundment  
Detail Map

DATE: 9-12-2014

EXHIBIT: IV-5B



NTS

**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

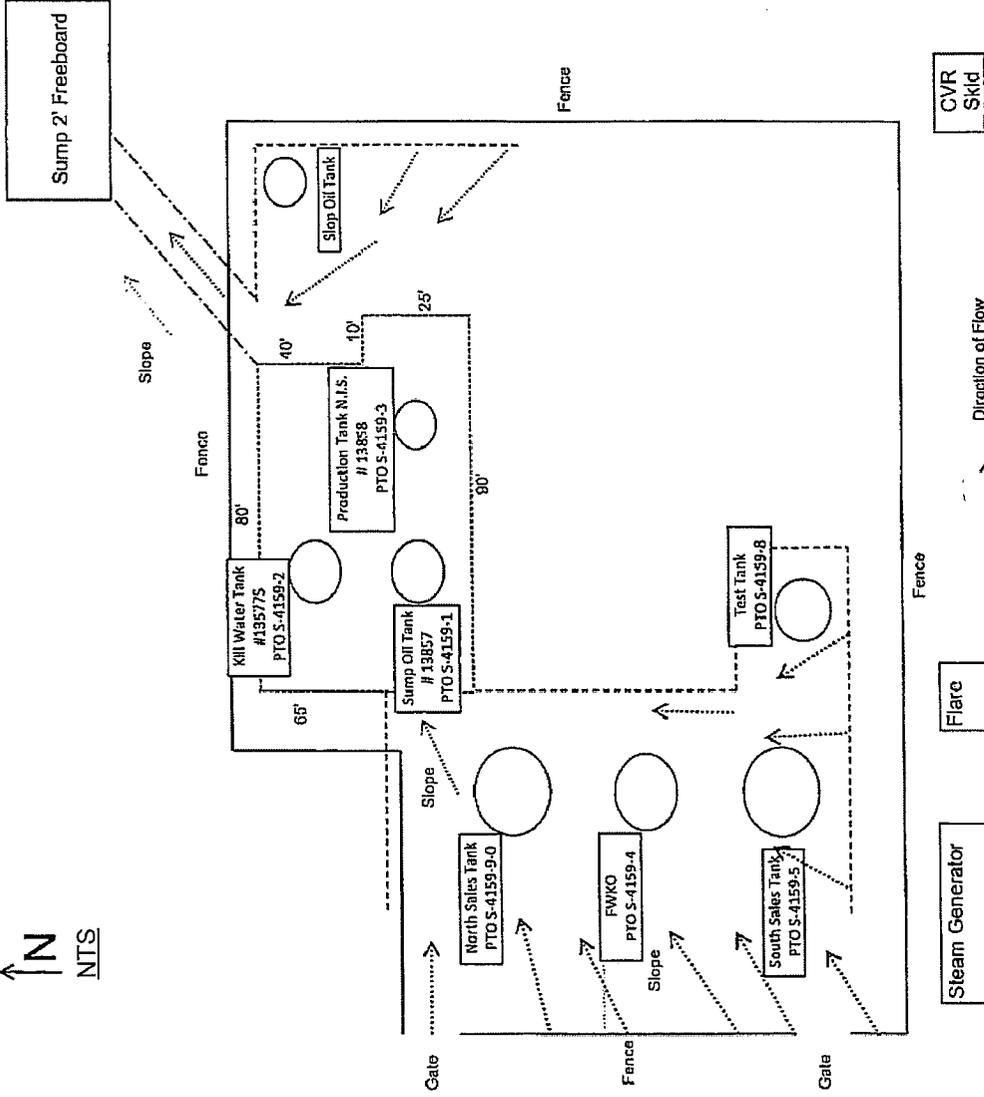
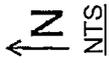
Hoyt Lease

Percolation Sump ROWD

Surface Impoundment  
Detail Map

DATE:  
9-12-2014

EXHIBIT:  
IV-5C



----- Diversionary Berm  
----- Containment  
----- Channel



**WZI INC.**  
BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**  
Hoyt Lease  
Percolation Sump ROWD  
Production Facility  
Schematic

DATE: 9-12-2014

EXHIBIT: IV-6

Hoyt Lease Produced Water Analytical Summary

Sample Date	Analytical Date	General Minerals	Method	Units	Concentration
8/1/2014	8/1/2014	Specific Conductance	SM2510B	umhos/cm	23000
7/2/2014	7/2/2014	Total Dissolved Solids (TDS)	SM2540C	mg/l	11000
7/2/2014	7/2/2014	Bicarbonate	SM2320B	mg/l	1800
7/2/2014	7/10/2014	Boron	EPA 200.7	mg/l	93
8/1/2014	8/4/2014	Calcium	EPA 200.7	mg/l	170
8/1/2014	8/1/2014	Carbonate	SM2320B	mg/l	<10
8/1/2014	8/1/2014	Chloride	EPA 200.7	mg/l	7000
8/1/2014	8/4/2014	Copper	EPA 200.7	mg/l	<250
8/1/2014	8/4/2014	Iron	EPA 200.7	mg/l	<500
8/1/2014	8/4/2014	Magnesium	EPA 200.7	mg/l	79
8/1/2014	8/4/2014	Manganese	EPA 200.7	mg/l	340
8/1/2014	8/4/2014	Potassium	EPA 200.7	mg/l	220
8/1/2014	8/4/2014	Silver	EPA 200.7	mg/l	<50
8/1/2014	8/4/2014	Sodium	EPA 200.7	mg/l	5000
8/1/2014	8/1/2014	Sulfate as SO4	EPA 300.0	mg/l	190
8/1/2014	8/4/2014	Zinc	EPA 200.7	mg/l	<250
		<b>Petroleum Hydrocarbons</b>			
7/2/2014	7/2/2014	Total Petroleum Hydrocarbons as Gasoline (TPHg)	US EPA Modified 8015 fuel finger print	ug/l	310
7/2/2014	7/15/2014	Total Petroleum Hydrocarbons as Diesel (TPHD)	US EPA Modified 8015 fuel finger print	ug/l	6730
7/2/2014	7/15/2014	Total Petroleum Hydrocarbons as Motor Oil (TPHmo)	US EPA Modified 8015 fuel finger print	ug/l	8610
7/2/2014	7/3/2014	Benzene	US EPA Method 8260	ug/l	<5.0
7/2/2014	7/3/2014	Toluene	US EPA Method 8260	ug/l	101
7/2/2014	7/3/2014	Ethylbenzene	US EPA Method 8260	ug/l	9.12
7/2/2014	7/3/2014	Xylene	US EPA Method 8260	ug/l	38.1



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

Hoyt Lease

Percolation Sump ROWD

Produced Water

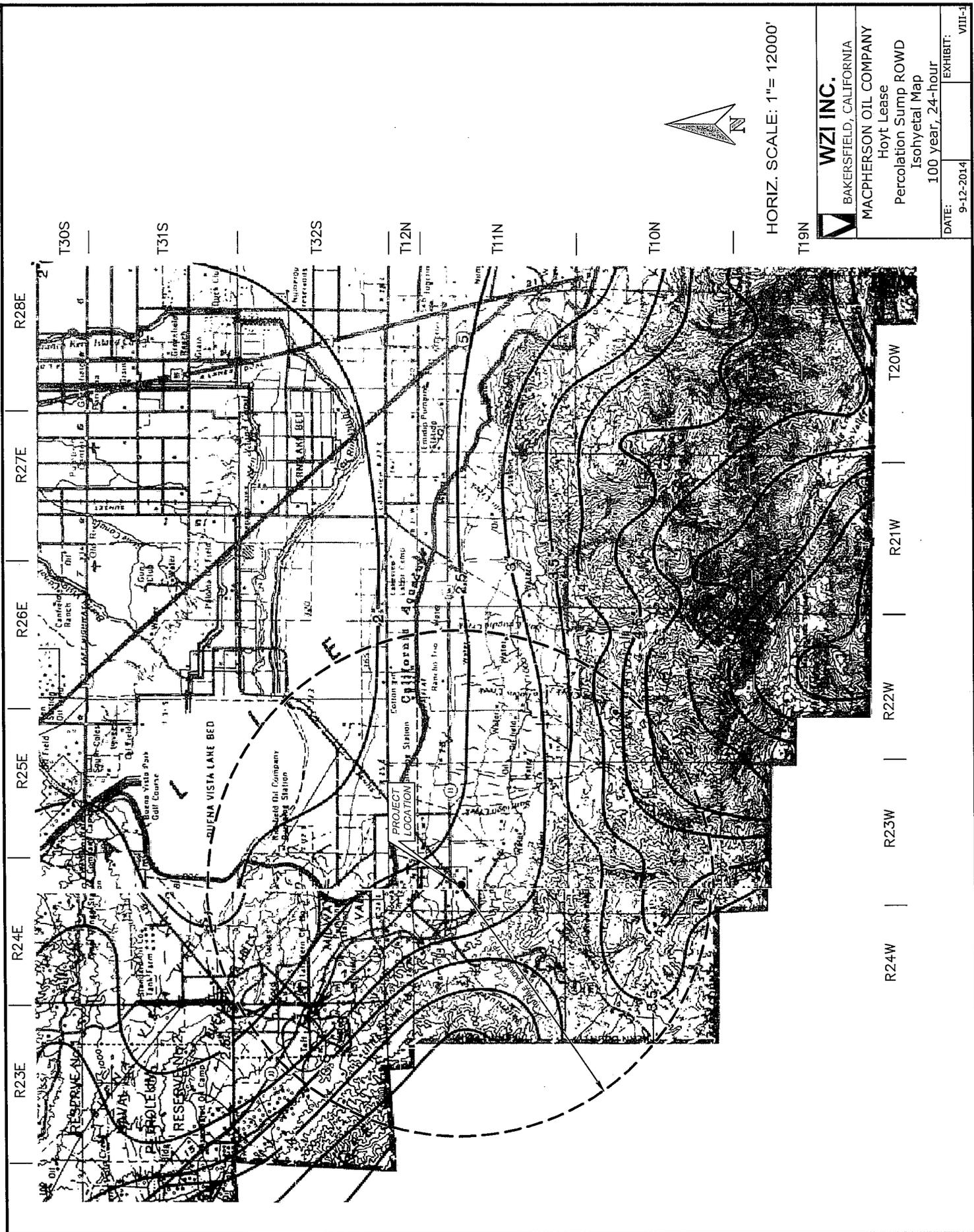
Analytical Summary

DATE:

9-12-2014

EXHIBIT:

V-1



HORIZ. SCALE: 1"= 12000'

T19N

 <b>WZI INC.</b> BAKERSFIELD, CALIFORNIA	<b>MACPHERSON OIL COMPANY</b> Hoyt Lease
	Percolation Sump ROWD Isohyetal Map 100 year, 24-hour
	DATE: 9-12-2014
	EXHIBIT: VIII-1

R24W | R23W | R22W | R21W | R20W

R23E | R24E | R25E | R26E | R27E | R28E

T30S

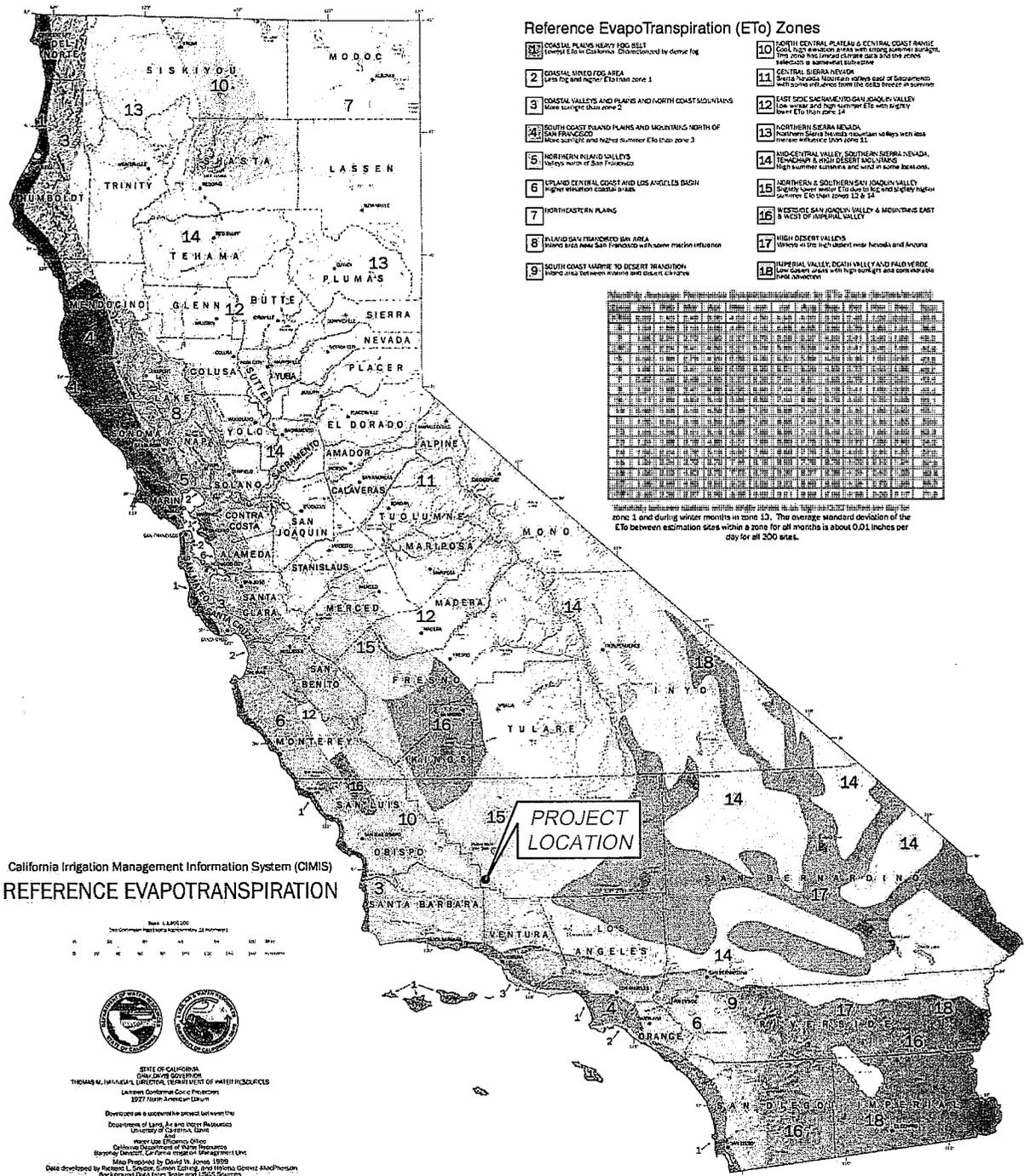
T31S

T32S

T12N

T11N

T10N



**Reference EvapoTranspiration (ETo) Zones**

- 1 COASTAL PLAINS HEAVY FOG BELT (Lowest ETo in California. Characterized by dense fog)
- 2 COASTAL MILD FOG AREA (Less fog and higher ETo than zone 1)
- 3 COASTAL VALLEYS AND PLAINS AND NORTH COAST MOUNTAINS (More sunnier than zone 2)
- 4 SOUTH COAST ISLAND PLAINS AND MOUNTAINS NORTH OF SAN FRANCISCO (More sunnier and higher summer ETo than zone 3)
- 5 NORTHERN ISLAND VALLEYS (Wetly north of San Francisco)
- 6 ISLAND CENTRAL COAST AND LOS ANGELES BASIN (Higher elevation coastal areas)
- 7 NORTHEASTERN PLAINS
- 8 ISLAND SAN FRANCISCO BAY AREA (Windy area near San Francisco with summer marine influence)
- 9 SOUTH COAST MARINE TO DESERT TRANSITION (Windy area between maritime and desert climates)
- 10 NORTH CENTRAL PLATEAU & CENTRAL COAST RANGE (Cool high elevation areas with strong summer sunlight. This zone has limited climate data for the years indicated in subsequent table)
- 11 CENTRAL SIERRA NEVADA (Sierra Nevada Mountains north east of Sacramento with sparse influence from the Sierra Nevada in summer)
- 12 EAST SIERRA SACRAMENTO SAN JOAQUIN VALLEY (Low winter and high summer ETo with highly variable influence from the Sierra Nevada)
- 13 NORTHERN SIERRA NEVADA (Northern Sierra Nevada mountain slopes with less influence from the Sierra Nevada)
- 14 MID-CENTRAL VALLEY SOUTHERN SIERRA NEVADA, TENNESSEE & HIGH DESERT AND MOUNTAINS (High summer sunlight and wind in some locations)
- 15 NORTHERN & SOUTHERN SAN JOAQUIN VALLEY (Slightly lower winter ETo due to fog and slightly higher summer ETo than zones 12 & 14)
- 16 WESTSIDE SAN JOAQUIN VALLEY & MOUNTAINS EAST & WEST OF IMPERIAL VALLEY
- 17 HIGH DESERT VALLEYS (Windy at the high elevations near Nevada and Arizona)
- 18 IMPERIAL VALLEY, DEATH VALLEY AND FELD VERDE (Low winter areas with high sunlight and considerable wind influence)

Monthly Reference Evapotranspiration (ETo) in Inches (mm) for the 18 Reference Evapotranspiration Zones

Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Jan	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Feb	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Mar	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Apr	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
May	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Jun	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Jul	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Aug	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Sep	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Oct	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Nov	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Dec	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Annual	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80

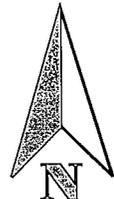
California Irrigation Management Information System (CIMIS)  
REFERENCE EVAPOTRANSPIRATION



STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES  
THOMAS W. HANRAHAN, DIRECTOR, OFFICE OF WATER RESOURCES  
LARRY W. CONNOR, CHIEF OF PROJECTS  
1977 NORTH AMERICA DRIVE

Developed as a cooperative project between the  
Department of Land, Air and Water Resources  
University of California, Davis  
Water Use Efficiency Office  
California Department of Water Resources  
Bartley D. Smith, California Irrigation Management Unit  
Data Provided by David M. Jones, 1999  
Data developed by Richard L. Snyder, Simon Lichter, and William Gomez and Pearson  
Background Data from Soiler and USGS Sources

**PROJECT LOCATION**



SCALE 1"=18,250

**WZI INC.**  
BAKERSFIELD, CALIFORNIA

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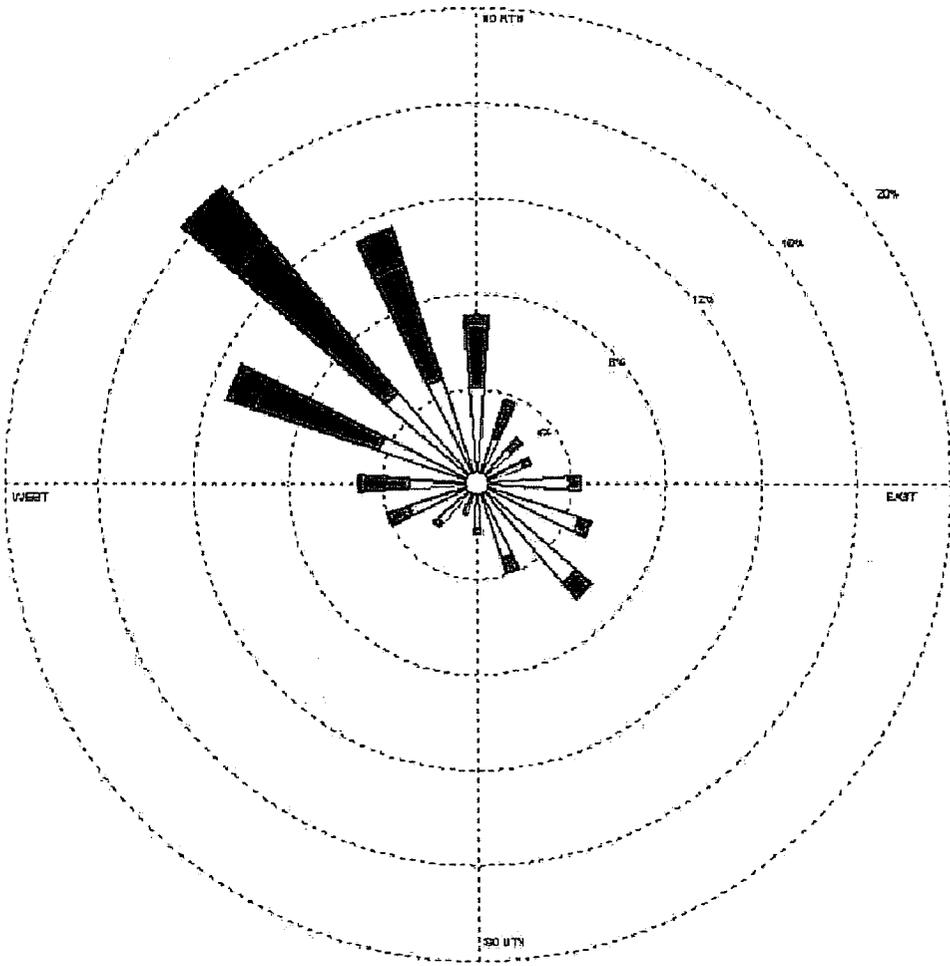
MACPHERSON OIL COMPANY  
Hoyt Lease  
Percolation Sump ROWD

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Evapotranspiration Map

DATE: 9-12-2014	EXHIBIT: VIII-2
--------------------	--------------------

WIND ROSE PLOT  
 Station #23155 - Bakersfield, CA



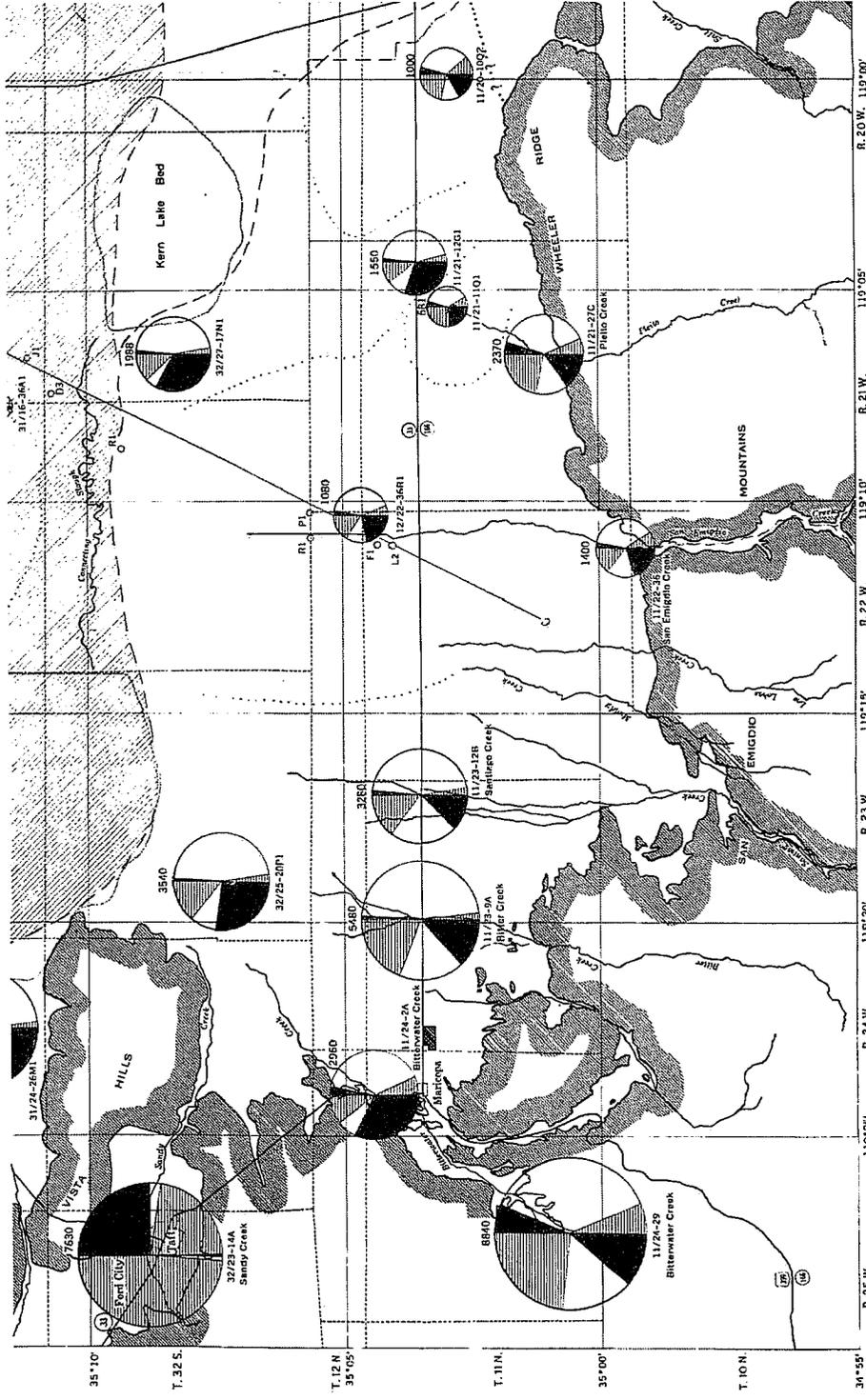
<b>Wind Speed (m/s)</b> 	<b>MO S E L E R</b> Sara West	<b>D A T E</b> 8/19/2002	<b>C O M P A N Y N A M E</b> USDA-ARS
	<b>D I S P L A Y</b> Wind Speed	<b>U N I T</b> m/s	<b>C O M M E N T S</b>
	<b>A V G. W I N D S P E E D</b> 3.24 m/s	<b>C A L C U L A T I O N P E R I O D</b> 10,22%	
	<b>O R I E N T A T I O N</b> Direction (blowing from)	<b>P L O T Y E A R - D A T E T I M E</b> 1961 Sep 1 - Sep 30 Midnight - 11 PM	

**WZI INC.**  
 BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY  
 Hoyt Lease  
 Percolation Sump ROWD

Windrose Diagram

<b>DATE:</b> 9-12-2014	<b>EXHIBIT:</b> VIII-3
---------------------------	---------------------------



**EXPLANATION**

- Na + K, Cl + NO<sub>3</sub> + F
- Mg
- SO<sub>4</sub>
- HCO<sub>3</sub> + CO<sub>3</sub>
- Well No
- 31/16-36A1
- Scale of RAD II
- East-side waters
- Transition waters
- West-side waters
- Axial waters
- Waters of the older rocks

**Legend**

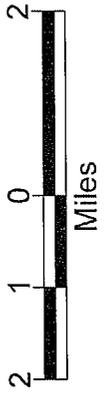
- Site Location- Hoyt Lease
- Creek



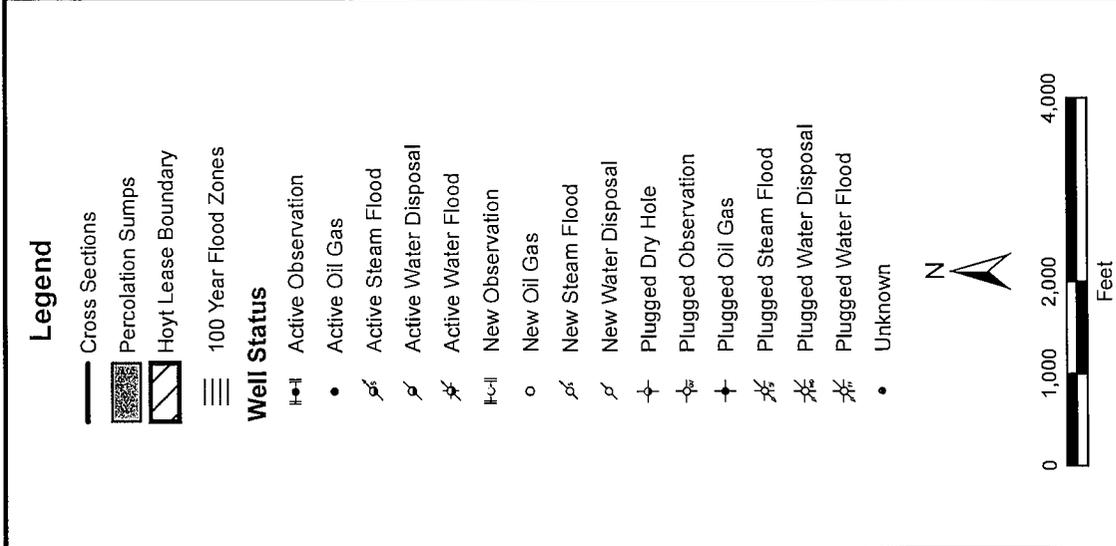
**BAKERSFIELD, CALIFORNIA**  
**MACPHERSON OIL COMPANY**  
 Hoyt Lease  
 Percolation Sump ROWD

Map of Typical Surface Waters

DATE: 9-12-2014  
 EXHIBIT: IX-1

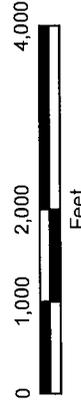


Ref: Wood and Dale, 1964



**Legend**

- Cross Sections
- ▨ Percolation Sumps
- ▧ Hoyt Lease Boundary
- ≡ 100 Year Flood Zones
- Well Status**
- ⊕ Active Observation
- Active Oil Gas
- ⊕ Active Steam Flood
- ⊕ Active Water Disposal
- ⊕ Active Water Flood
- ⊕ New Observation
- New Oil Gas
- ⊕ New Steam Flood
- ⊕ New Water Disposal
- ⊕ Plugged Dry Hole
- ⊕ Plugged Observation
- ⊕ Plugged Oil Gas
- ⊕ Plugged Steam Flood
- ⊕ Plugged Water Disposal
- ⊕ Plugged Water Flood
- Unknown



**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

Hoyt Lease

Percolation Sump ROWD

Topographic Map

DATE: 9-12-2014

EXHIBIT: IX-2

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**Legend**

- ⊕ VW Monitoring Wells
- Groundwater Elevations
- ▬ Cross Sections
- ▨ Percolation Sumps
- ▧ Hoyt Lease Boundary
- Well Status**
- ⊕ Active Observation
- Active Oil Gas
- ⊕ Active Steam Flood
- ⊕ Active Water Disposal
- ⊕ Active Water Flood
- ⊕ New Observation
- New Oil Gas
- ⊕ New Steam Flood
- ⊕ New Water Disposal
- ⊕ Plugged Dry Hole
- ⊕ Plugged Oil Gas
- ⊕ Plugged Steam Flood
- ⊕ Plugged Water Disposal
- ⊕ Plugged Water Flood
- Unknown



**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

Hoyt Lease

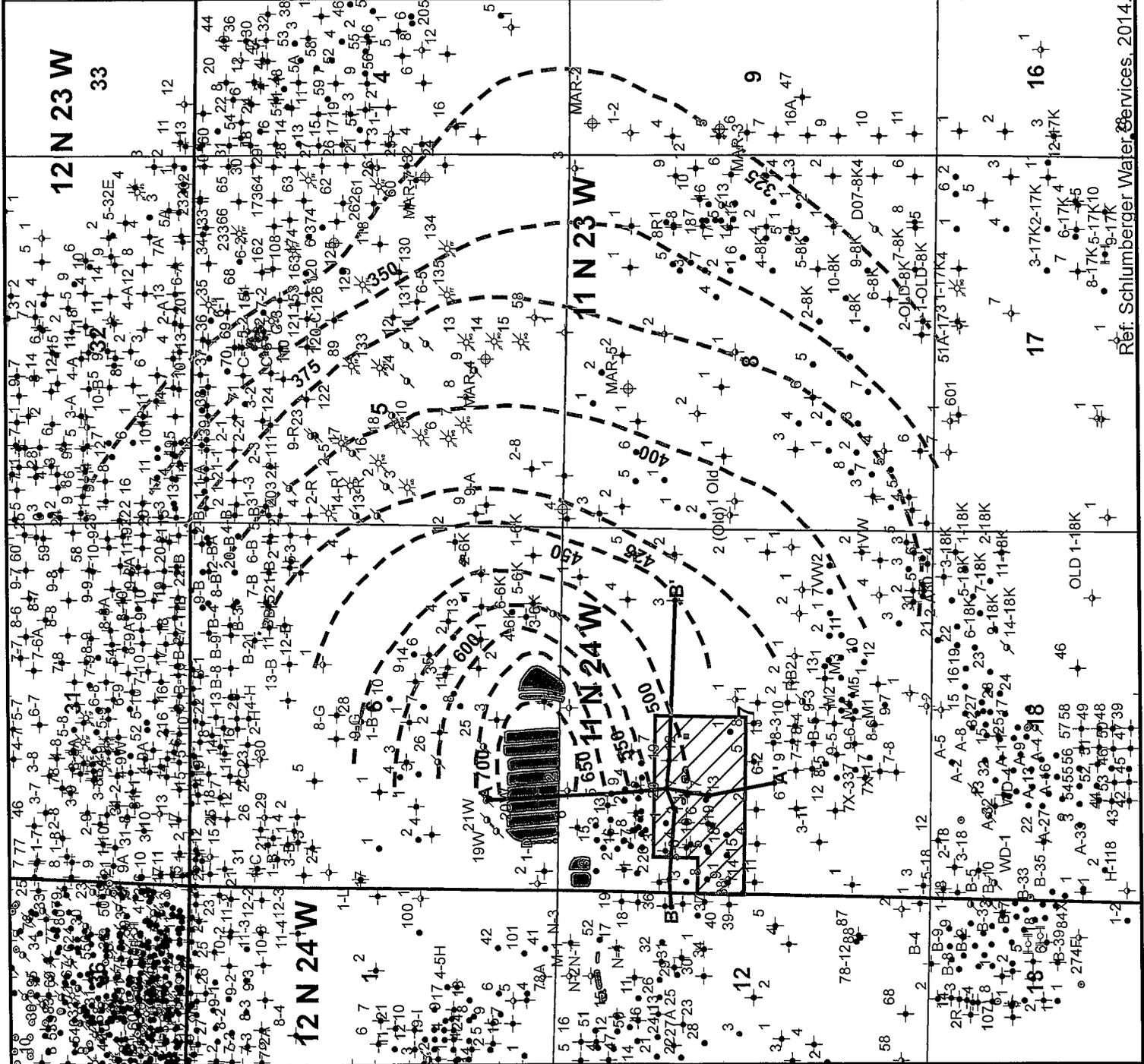
Percolation Sump ROWD

Groundwater Elevation Map

February 2014

DATE: 9-12-2014

EXHIBIT: X-1



Ref: Schlumberger Water Services, 2014.

Hoyt Lease Sump Water Analyses

Inorganic Analyses															
Monitoring Well	Sample Date	Alkalinity mg/L	Bicarbonate mg/L	Boron mg/L	Calcium mg/L	Carbonate mg/L	Chloride mg/L	Hydroxide mg/L	Magnesium mg/L	Nitrate mg/L	Potassium mg/L	Sulfate mg/L	Sodium mg/L	Conductivity @ 25c umhos/cm	TDS mg/L
		310.1	23208	60108	60108	23208	300.0	9080	60108	300.0	60108	300.0	60108		160.1
MAR 1	4/15/1999	NA	90	13	556	0.00001	4400	0.8	475	101	7.8	1700	1010	8160	8250
	6/15/1999	NA	66	14	1640	2.5	4460	0.8	387	87	93	1930	1700	15600	10600
	12/15/2000	NA	91	NA	1600	1.5	6250	0.81	1100	130	24	2130	2300	21500	14000
	2/21/2002	NA	220	32	1400	3.0	6410	1.7	970	100	25	2190	2100	17100	13600
	9/22/2004	NA	250	35	1400	1.5	6480	0.81	940	110	22	2480	2200	20500	14100
	9/1/2008	260	NA	40	1300	NA	6800	NA	940	110	23	2800	2300	NA	NA
	12/1/2008	36	NA	36	1300	NA	6300	NA	870	100	23	2500	2200	NA	17000
	3/1/2009	250	NA	39	1300	NA	6400	NA	360	100	26	2600	2600	NA	17000
	3/23/2009	250	NA	0.5	1	NA	NA	NA	0.2	NA	5	NA	5	NA	NA
	6/1/2009	260	NA	39	1400	NA	7000	NA	100	ND	27	2500	2800	NA	18000
	9/1/2009	270	NA	45	1300	NA	7200	NA	940	110	28	2500	2500	NA	19000
	12/1/2009	270	NA	41	1300	NA	6700	NA	910	100	26	2500	2500	NA	18000
	12/28/2010	300	NA	42	1400	NA	6300	NA	980	120	26	2400	2500	NA	16000
	6/27/2011	310	NA	42	1400	NA	5700	NA	920	160	27	2600	2400	NA	16000
	12/20/2011	300	NA	63	1800	NA	6300	NA	1400	100	37	2400	2600	NA	15000
	11/19/2013	390	NA	45	1300	NA	5900	NA	910	130	27	2500	2700	NA	18000
MAR 2	4/15/1999	NA	160	2.1	86	2.6	46	0.8	69	1.4	11	1920	789	4050	3010
	12/15/2000	NA	86	NA	680	1.5	82	0.81	130	1	18	3280	950	6100	5160
	2/21/2002	NA	140	4.3	570	3.0	97	1.7	140	0.28	12	3570	960	5100	5420
	9/22/2004	NA	90	5.2	550	3.0	120	1.7	94	0.5	11	3510	990	5940	5320
	9/1/2008	160	NA	6.7	470	NA	110	NA	180	ND	10	4000	920	NA	NA
	12/1/2008	120	NA	6.6	470	NA	97	NA	190	ND	12	3900	920	NA	5300
	3/1/2009	84	NA	7.1	460	NA	1220	NA	160	3.4	12	3600	900	NA	5500
	3/23/2009	84	NA	0.05	0.1	NA	NA	NA	0.02	NA	0.5	NA	0.5	NA	NA
	6/1/2009	96	NA	NA	480	NA	110	NA	170	1.5	11	3600	1080	NA	5600
	9/1/2009	100	NA	6.8	480	NA	110	NA	160	1.6	15	3600	850	NA	5500
	12/1/2009	100	NA	6.4	450	NA	130	NA	150	2.1	13	3700	950	NA	5600
	12/28/2010	130	NA	6.3	460	NA	98	NA	190	2.8	12	3500	1000	NA	5700
	6/27/2011	140	NA	7.4	590	NA	90	NA	210	4.3	13	3700	990	NA	5500
	12/20/2011	150	NA	7.5	490	NA	110	NA	240	3.4	11	3600	930	NA	5300
	11/19/2013	190	NA	7.5	520	NA	110	NA	250	3.8	11	3800	1000	NA	5900
MAR 3	4/15/1999	NA	70	1.9	331	2.6	313	0.8	88	6.7	96	NA	979	6220	4940
	12/15/2000	NA	2.9	NA	680	22	270	0.81	20	13	63	NA	1100	6730	5270
	2/21/2002	NA	42	2.1	670	11	240	1.7	37	18	40	NA	1000	5200	5450

**WZI INC.**

BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY

Hoyt Lease

Percolation Sump ROWD

Inorganic Analysis

DATE:

9-12-2014

EXHIBIT:

X-2A

Hoyt Lease Sump Water Analyses

Inorganic Analyses															
Monitoring Well	Sample Date	Alkalinity mg/L	Bicarbonate mg/L	Boron mg/L	Calcium mg/L	Carbonate mg/L	Chloride mg/L	Hydroxide mg/L	Magnesium mg/L	Nitrate mg/L	Potassium mg/L	Sulfate mg/L	Sodium mg/L	Elec Conductivity @ 25c umhos/cm	TDS mg/L
Units		310.1	23208	60108	60108	23208	300.0	9080	60108	300.0	60108	300.0	60108		160.1
Laboratory Method		NA	93	4	580	1.5	210	0.81	130	25	2.4	NA	1000	6180	5550
	9/22/2004	NA	NA	5.5	460	NA	170	NA	220	28	18	3900	890	NA	NA
	9/1/2008	140	NA	5.6	470	NA	160	NA	220	26	21	3900	970	NA	6000
	12/1/2008	130	NA	5.7	440	NA	160	NA	220	26	19	3800	890	NA	6000
	3/1/2009	140	NA	0.05	0.1	NA	NA	NA	0.02	NA	0.5	NA	0.5	NA	NA
	3/23/2009	140	NA	5.6	510	NA	150	NA	250	28	20	3900	1100	NA	6300
	6/1/2009	150	NA	5.4	460	NA	170	NA	230	27	23	3700	1200	NA	6100
	9/1/2009	150	NA	5.6	440	NA	160	NA	220	29	23	4000	970	NA	6300
	12/1/2009	150	NA	6.4	520	NA	140	NA	280	24	22	3800	1000	NA	6200
	12/28/2010	160	NA	6.7	580	NA	160	NA	310	27	22	3900	1000	NA	6200
	6/27/2011	160	NA	6.5	480	NA	150	NA	300	25	19	3800	990	NA	6000
	12/20/2011	210	NA	7.3	560	NA	160	NA	320	28	19	4000	1200	NA	6400
MAR 4	11/19/2013	200	NA	5.5	720	3.0	603	1.7	200	97	15	2540	770	5400	5350
	2/21/2002	NA	160	6.3	710	1.5	906	0.81	220	230	13	2440	850	7100	6230
	9/22/2004	NA	140	6.4	680	NA	870	NA	210	240	14	2500	860	NA	NA
	12/1/2008	100	NA	6.4	650	NA	770	NA	210	2330	14	2400	780	NA	6000
	12/1/2008	96	NA	6.4	650	NA	770	NA	210	2330	14	2400	780	NA	6000
	3/1/2009	100	NA	6.7	690	NA	820	NA	220	230	15	2400	930	NA	6200
	3/23/2009	100	NA	0.1	0.2	NA	NA	NA	0.04	NA	1	NA	1	NA	NA
	6/1/2009	92	NA	6.3	700	NA	870	NA	230	240	14	2400	890	NA	6200
	9/1/2009	110	NA	6.3	660	NA	840	NA	210	230	18	2300	800	NA	6200
	12/1/2009	96	NA	8.3	660	NA	820	NA	200	230	15	2500	870	NA	6500
	12/28/2010	92	NA	6.7	730	NA	780	NA	230	210	16	2100	870	NA	6100
	6/17/2011	100	NA	6.9	810	NA	740	NA	230	220	16	2300	880	NA	6000
	12/20/2011	100	NA	6.4	630	NA	730	NA	220	210	13	2200	860	NA	5800
	11/19/2013	110	NA	7.1	740	NA	860	NA	240	230	15	2300	930	NA	6200
MAR 5	2/21/2002	NA	NA	4.9	5080	3	500	1.7	170	NA	NA	NA	NA	NA	NA
	9/22/2004	NA	NA	7	5950	1.5	833	0.81	200	NA	12	2790	960	NA	NA
	9/1/2008	NA	NA	6.7	520	NA	820	NA	190	95	12	3000	900	NA	NA
	12/1/2008	110	NA	6.7	570	NA	720	NA	200	89	13	2800	890	NA	5800
	3/1/2009	110	NA	6.7	650	NA	70	NA	230	90	15	2800	1100	NA	6000
	3/23/2009	110	NA	0.1	0.2	NA	NA	NA	0.06	NA	1	NA	1	NA	NA
	6/1/2009	110	NA	6.8	630	NA	730	NA	220	93	14	2500	1100	NA	6000
	9/1/2009	100	NA	7.1	720	NA	790	NA	210	87	18	2700	1100	NA	5800



BAKERSFIELD, CALIFORNIA  
 MACPHERSON OIL COMPANY  
 Hoyt Lease  
 Percolation Sump ROWD

Inorganic Analysis

DATE: 9-12-2014 EXHIBIT: X-2B

Hoyt Lease Sump Water Analyses

Inorganic Analyses															
Monitoring Well	Sample Date	Alkalinity mg/L	Bicarbonate mg/L	Boron mg/L	Calcium mg/L	Carbonate mg/L	Chloride mg/L	Hydroxide mg/L	Magnesium mg/L	Nitrate mg/L	Potassium mg/L	Sulfate mg/L	Sodium mg/L	Elec Conductivity @ 25c umhos/cm	TDS mg/L
		310.1	2320B	6010B	6010B	2320B	300.0	9080	6010B	300.0	6010B	300.0	6010B		160.1
Laboratory Method		110	NA	6.6	540	NA	770	NA	130	89	15	2800	940	NA	6000
	12/1/2009	100	NA	7.3	630	NA	740	NA	220	84	15	2600	990	NA	5900
	12/28/2010	100	NA	6.4	650	NA	690	NA	210	83	14	2700	920	NA	4700
	6/27/2011	120	NA	7.4	580	NA	680	NA	210	82	13	2600	920	NA	5900
	12/20/2011	120	NA	7.7	660	NA	820	NA	220	84	14	2800	1100	NA	5300
	11/19/2013	NA	100	2.6	49	46	356	1.7	10	7.6	7.6	442	420	2180	1400
MAR 6	9/22/2004	400	NA	8.1	140	NA	910	NA	60	0.25	12	750	880	NA	NA
	9/1/2008	400	NA	7.8	140	NA	870	NA	60	ND	12	910	850	NA	3100
	12/1/2008	420	NA	7.9	140	NA	950	NA	58	1.2	11	940	820	NA	3300
	3/1/2009	420	NA	0.05	0.1	NA	NA	NA	0.02	NA	0.5	NA	0.5	NA	NA
	3/23/2009	420	NA	7.8	150	NA	820	NA	65	110	12	2500	980	NA	3200
	6/1/2009	410	NA	7.8	140	NA	910	NA	60	ND	14	900	840	NA	3100
	9/1/2009	440	NA	7.9	140	NA	860	NA	55	ND	13	900	890	NA	3200
	12/1/2009	380	NA	8.7	160	NA	840	NA	66	ND	11	850	930	NA	3300
	12/28/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/27/2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/20/2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/19/2013	220	NA	4.9	98	NA	900	NA	43	< 1.1	5.7	920	490	NA	1800
MAR 7	9/1/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/1/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/1/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/23/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/1/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/1/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/1/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/28/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/27/2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/20/2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/19/2013	110	NA	7.1	740	NA	790	NA	240	230	14	2300	910	NA	DRY

A=not analyzed  
D=non detect



BAKERSFIELD, CALIFORNIA  
 MACPHERSON OIL COMPANY  
 Hoyt Lease  
 Percolation Sump ROWD  
 Inorganic Analysis  
 DATE: 9-12-2014 EXHIBIT: X-2C



**Legend**

- Cross Sections
- ▨ Percolation Sumps
- ▨ Hoyt Lease Boundary

**Well Status**

- Active Oil Gas
- ⊗ Active Water Disposal
- ⊕ Plugged Dry Hole
- ⊕ Plugged Oil Gas
- ⊗ Plugged Water Disposal

**GEOLOGY**

LEGEND



SUBSURFACE STRATIGRAPHY  
Qa - Alluvial fan and flood valley deposit



**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

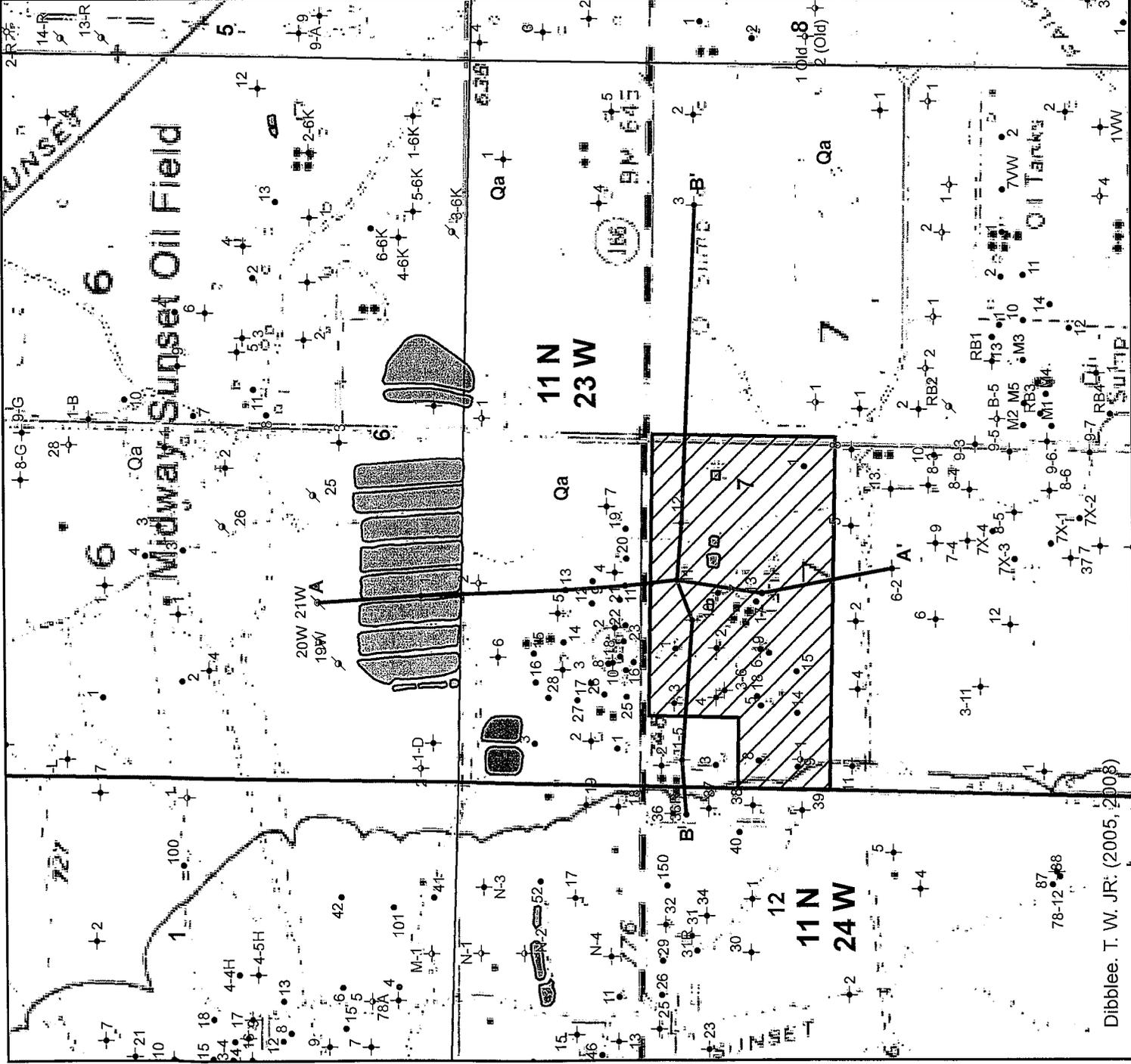
Hoyt Lease

Percolation Sump ROWD

Site Geologic Map

DATE: 9-12-2014

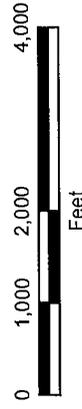
EXHIBIT: XII-2



Dibblee, T. W. JR. (2005, 2008)

# Legend

- Cross Section K-K'
- ▨ Percolation Sumps
- ▤ Hoyt Lease Boundary



**WZI INC.**

BAKERSFIELD, CALIFORNIA

**MACPHERSON OIL COMPANY**

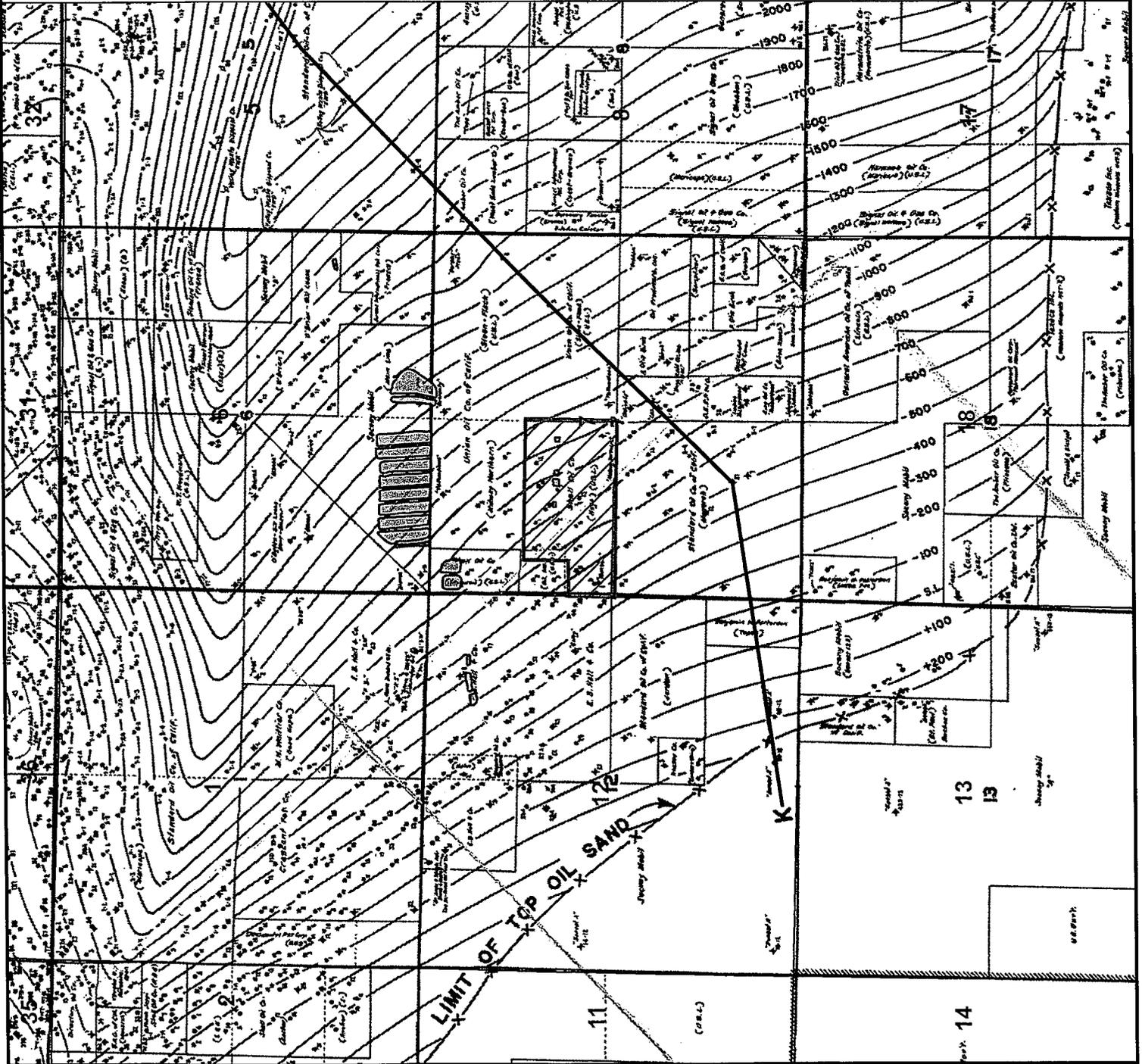
Hoyt Lease

Percolation Sump ROWD

Regional Structure Map

DATE: 9-12-2014

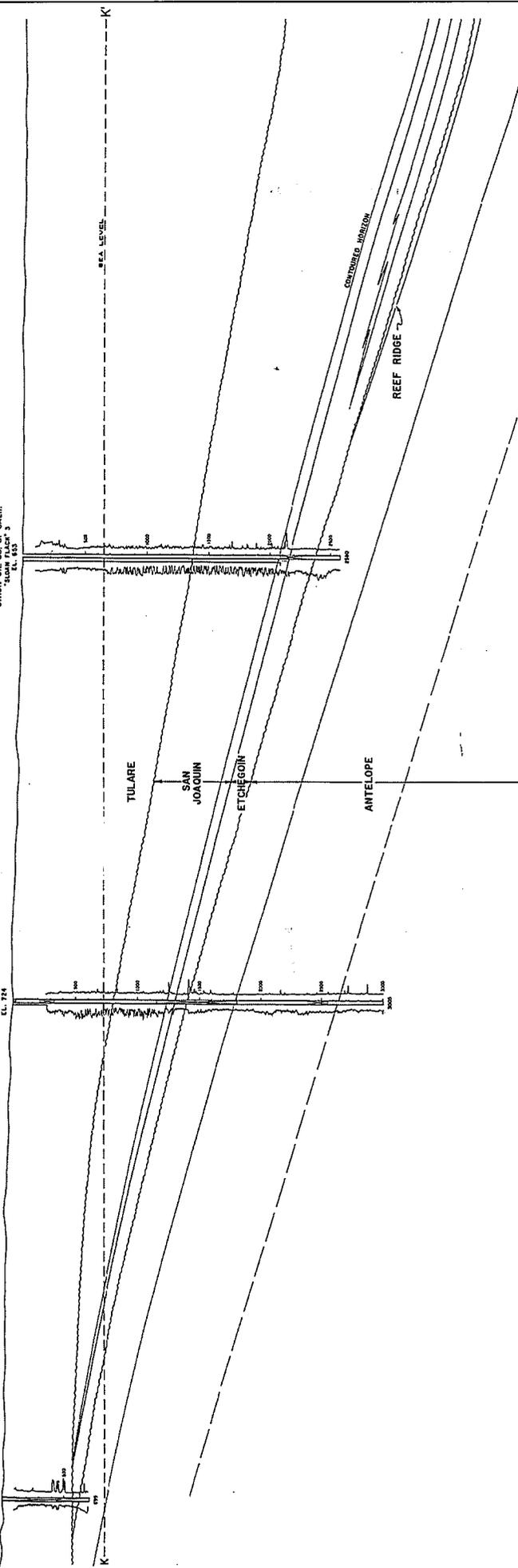
EXHIBIT: XII-3



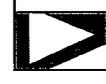
SOCONY MOBIL OIL CO., INC.  
SHEET # 28-12  
11-71

STANDARD OIL CO. OF CALIF  
SHEET # 28-12  
11-71

UNION OIL CO. OF CALIF  
SHEET # 28-12  
11-71



CROSS SECTION K-K'  
 MIDWAY-SUNSET OIL FIELD  
 KERN AND SAN LUIS OBISPO COUNTIES, CALIFORNIA  
 SCALE  
 0 500 1000 1500 2000  
 FEET  
 JANUARY 1954  
 FOR LITHOLOGY SEE PLATE II



**WZI INC.**  
 BAKERSFIELD, CALIFORNIA

MACPHERSON OIL COMPANY  
 Hoyt Lease  
 Percolation Sump ROWD  
 Regional Cross Section  
 K-K'

DATE: 9-12-2014

EXHIBIT: XII-4





List of Analytes

<b>Field Parameters</b>		
Tempature	*C	
Specific Conductance	umhos/cm	SM2510B
PH	pH Units	
Turbidity	ntus	
<b>Inorganic Analytes</b>		
	<b>Method</b>	<b>Units</b>
Specific Conductance	120.1	umhos/cm
Total Dissolved Solids (TDS)	160.1	mg/l
Alkalinity	310.1	mg/l
Boron	EPA 300.0	mg/l
Calcium	EPA 6010B	mg/l
Chloride	EPA 300.0	mg/l
Magnesium	EPA 6010B	mg/l
Nitrate	EPA 300.0	mb
Potassium	EPA 6010B	mg/l
Sodium	EPA 6010B	mg/l
Sulfate as SO4	EPA 300.0	mg/l
<b>Organic Analytes</b>		
Total Petroleum Hydrocarbons as Gasoline (TPHg)	US EPA Modified 8015 fuel finger print	ug/l
Total Petroleum Hydrocarbons as Diesel (TPHd)	US EPA Modified 8015 fuel finger print	ug/l
Benzene	US EPA Method 8260	ug/l
Toluene	US EPA Method 8260	ug/l
Ethylbenzene	US EPA Method 8260	ug/l
Xylene	US EPA Method 8260	ug/l

# APPENDIX I

# Spill Prevention Control and Countermeasure Plan

# SPCC

**Macpherson Oil Company**  
2716 Ocean Park Blvd.; Suite 3080  
Santa Monica, California 90405

## Hoyt Facility



Insight Environmental Consultants, Inc.  
5500 Ming Avenue, Suite 360  
Bakersfield, CA 93309

July 2011

## LOG OF PLAN REVIEW AND AMENDMENTS

### NON TECHNICAL AMENDMENTS

- Non-technical amendments are not certified by a Professional Engineer.
- Examples of changes include, but are not limited to, phone numbers, name changes, or any non-technical text change(s).

### TECHNICAL AMENDMENTS

- Technical amendments are certified by a Professional Engineer (§112.5(c)).
- Examples of changes include, but are not limited to, commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacements, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes of product or service; or addition/deletion of standard operation or maintenance procedures related to discharge prevention measures. It is the responsibility of the facility to determine, and confirm with the regulatory authority as necessary, what constitutes a technical amendment. The preamble of the rule states that an amendment is required only "when there is a change that materially affects the facility's potential to discharge oil" (67 FR 47091).
- An amendment made under this section will be prepared within six (6) months of the change and implemented as soon as possible but not later than six (6) months following preparation of the amendment.
- Technical Amendments affecting various pages within the plan can be P.E. certified on those pages, certifying those amendments only, and will be documented on the log form below.

### MANAGEMENT REVIEW

- Management will review this SPCC Plan at least each five (5) years and document the review on the form below (§112.5(b)).

Review/ Amend Date	Signature* (Specify)	Amend Plan (will/will not)	Description of Review Amendment	Affected Page(s)	P.E. Certification (Y/N)

\* Typically signed by Manager, Professional Engineer or plan reviewer.\* SPCC Plan amended and certified by a Registered Professional Engineer per 40 CFR 112.3(d)

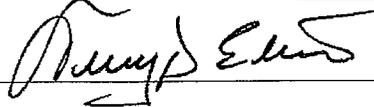
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## MANAGEMENT APPROVAL

Macpherson Operating Company, LP is committed to the prevention of discharges of oil to navigable waters and the environment, and maintains the highest standards for spill prevention control and countermeasures through regular review, updating, and implementation of this Spill Prevention Control and Countermeasure Plan for the Macpherson Operating Company facilities.

Authorized Facility Representative: Terry Ellis

Signature:  Date: 8-3-11

## SPILL PREVENTION CONTROL AND COUNTERMEASURE PROFESSIONAL ENGINEER CERTIFICATION

I, Douglas W. McCormick, a Professional Engineer registered in the state of California, hereby certify that I am familiar with the oil spill prevention and control measures in place at Macpherson Operating Company facilities and being familiar with the provisions of 40 CFR, Part 112.7, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

This is an engineering report based on my inquiry of the person or persons who managed the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Reviewing the structural integrity of the berms was outside the scope of work. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Engineer: Douglas W. McCormick

seal:

Signature: 

Company: Insight Environmental Consultants

Registration Number: M24460

State: California

Date: 7/29/11





**FACILITY OWNER AND OPERATOR:**

A. Facility Owner, Address, Telephone:

**Macpherson Oil Company**

2716 Ocean Park Blvd, Suite 3080  
Santa Monica, CA 90405  
(310) 452-3880

B. Facility Operator, Address and Telephone, FAX and E-mail:

**Macpherson Oil Company**

24118 Round Mountain Road  
P. O. Box 5638  
Bakersfield, CA 93388-5368  
Phone: (661) 393-3204  
Fax: (661) 393-8065  
E-mail: terry\_ellis@macphersonoil.com

**FACILITY CONTACT(s):**

<u>Name:</u>	<u>Title:</u>	<u>Telephone:</u>
<u>Primary</u> <del>Terry Ellis</del> TIM Lovley	HSE Manager	(661) 393-3204 Ext 108
<u>Secondary</u> Jody Butler	Operations Superintendent	(661) 393-3204 Ext 103

## GENERAL REQUIREMENTS FOR ALL OIL STORAGE FACILITIES [112.7]

### A. FACILITY CONFORMANCE [112.7(a)(1)]:

Macpherson Oil Company (Macpherson) has conformed to all of the applicable requirements listed in 40CFR, Part 112 by compiling this plan.

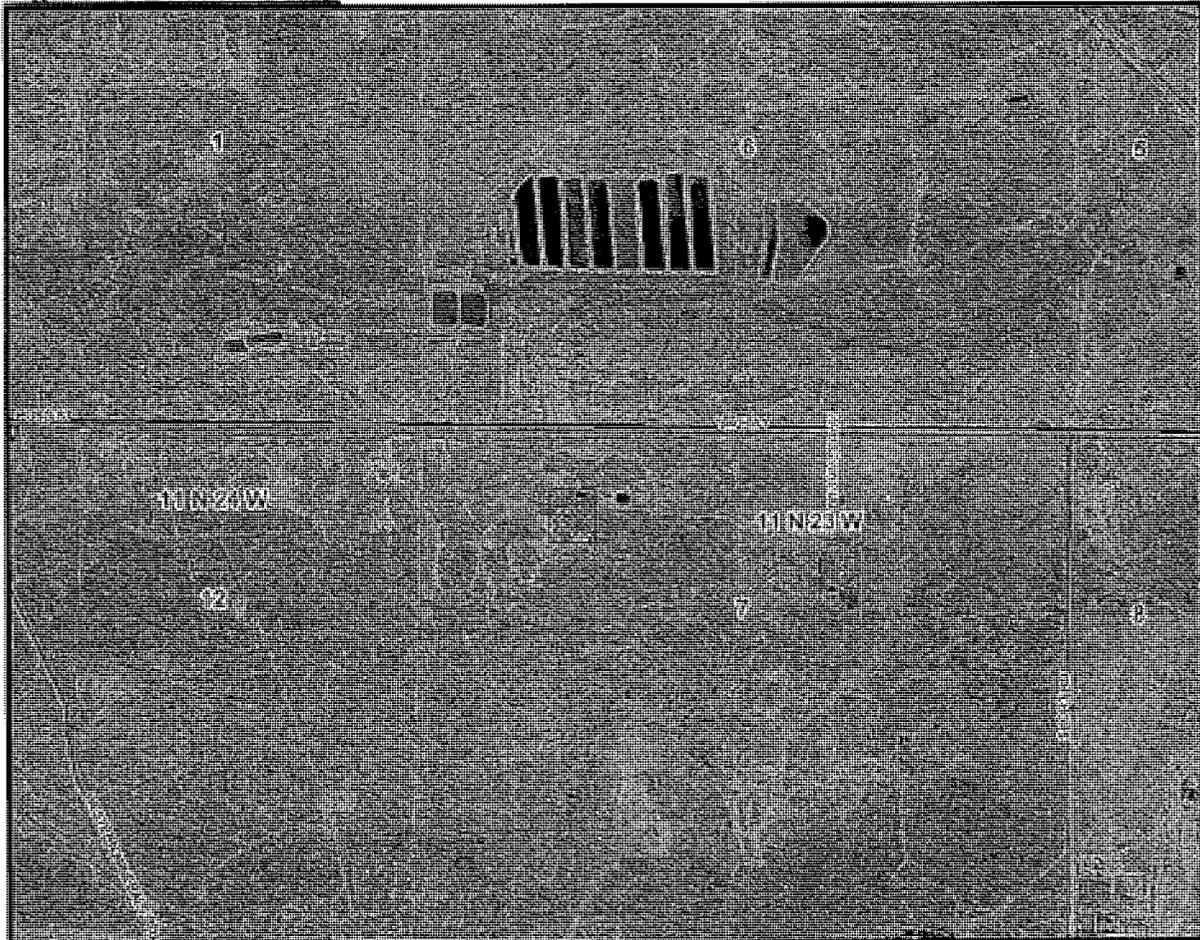
### B. DEVIATION FROM PLAN REQUIREMENTS [112.7(a)(2)]:

The facility plan does not deviate from any of the applicable requirements listed in 40CFR, Part 112.

### C. FACILITY DESCRIPTION/LOCATION [112.7(a)(3)]:

Macpherson operates a crude oil dehydration operation located in the Midway Sunset Oil Field. A location map is provided as Figure 1.

**Figure 1: Location Map**



### Hoyt Facility Section Township and Range

NE ¼ Section 7  
Township 11 North  
Range 23 West

**D. FACILITY OPERATIONS [112.7(a)(3)]:**

Macpherson operates a crude oil dehydration operation in the Midway Sunset oil field. Crude petroleum from the production area is dehydrated, and/or stored for shipment at the facility. Macpherson operators perform routine equipment checks and adjustments. Construction and clean-up services are contracted.

The Macpherson facility typically operates 24 hours per day, 7 days a week. The Hoyt Facility is usually un-manned. However, operators visit the facility 7 days a week.

**E. TANKS AND SUMPS [112.7(a)(3)]:**

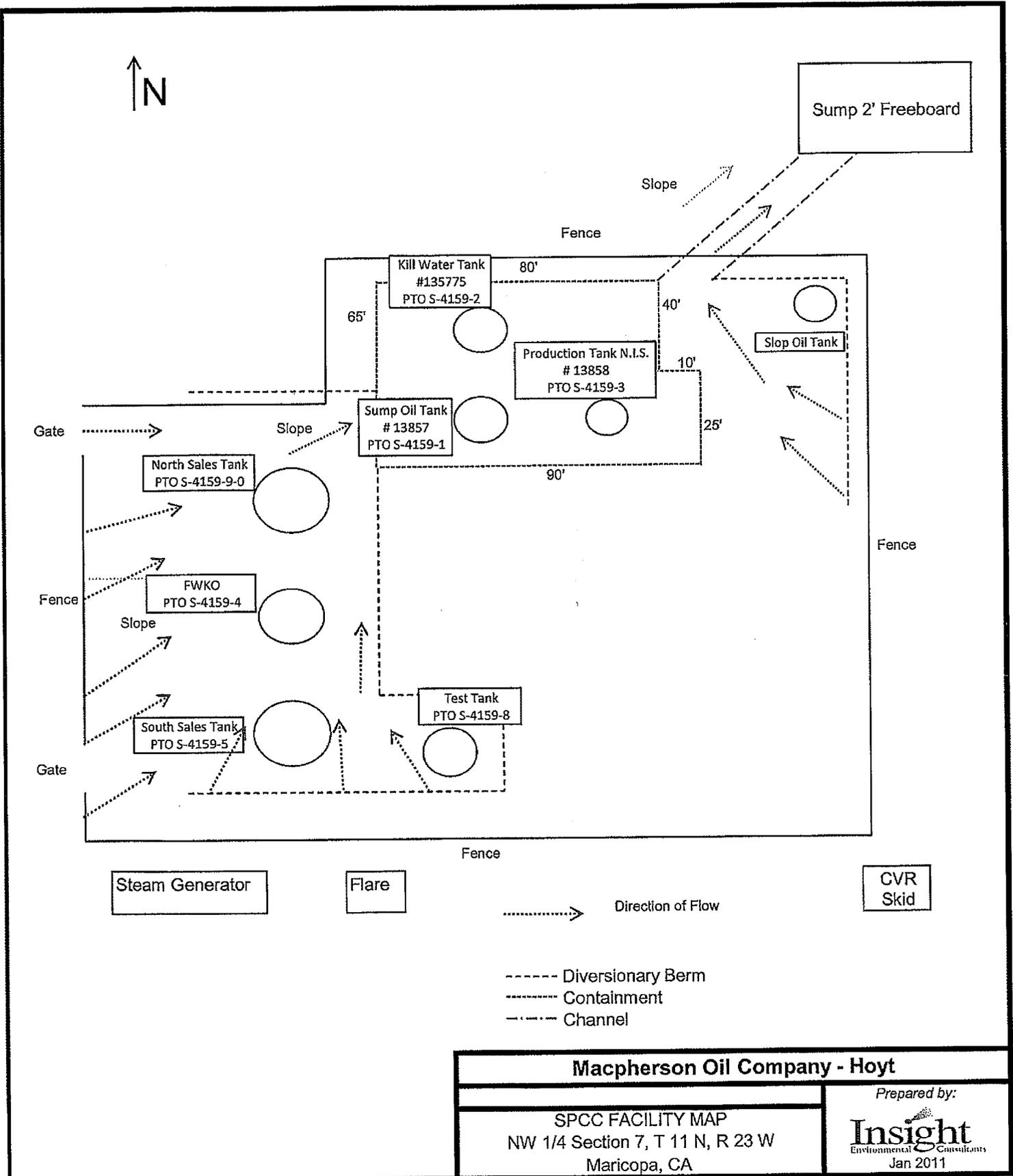
There are eight stationary, aboveground petroleum storage tanks at the Hoyt Facility. The size and contents of the tanks are provided in the following table.

<b>Tank ID</b>	<b>Volume (Bbls)</b>	<b>Volume (gal)</b>	<b>Contents</b>
Slop Oil Tank	250	10,500	Crude Oil/Produced Water
Production Tank 3 #13858	1,500	63,000	Not in Service
Sump Oil Tank #13857	1,500	63,000	Crude Oil
Kill Water Tank #135775	1,500	63,000	Crude Oil
North Sales Tank 1	2,000	84,000	Crude Oil
Free Water Knockout Tank 2	1,500	63,000	Crude Oil
South Sales Tank 3	2,000	84,000	Crude Oil
Test Tank	500	21,000	Crude Oil

**F. SPILL REPORTING AND EMERGENCY RESPONSE [112.7(a)(4)]:**

Macpherson has a Spill Contingency Plan prepared to comply with section 112.7 (d) that describes emergency response and spill reporting procedures for the Hoyt Facility.

Figure 2: Facility Map



## 1. Failure Analysis [112.7(b)]

The Hoyt Facility has aboveground petroleum storage tanks and other equipment that could contribute to a release of petroleum. Various measures have been implemented to prevent any spilled petroleum from reaching a navigable waterway. The equipment that could discharge petroleum is listed in the following table.

Source	Type of Failure	Volume (Bbl)	Rate @ 10% Bbl/hr	Direction of flow	Containment
<b>Aboveground Storage Tanks</b>					
Slop Oil Tank	rupture; leakage	250	25	Northeast	Basin & Sump
Production Tank 3 #13858	rupture; leakage	1,500	150	Northeast	Basin & Sump
Sump Oil Tank #13857	rupture; leakage	1,500	150	Northeast	Basin & Sump
Kill Water Tank #135775	rupture; leakage	1,500	150	Northeast	Basin & Sump
North Sales Tank 1	rupture; leakage	2,000	200	Northeast	Basin & Sump
Free Water Knockout Tank 2	rupture; leakage	1,500	150	Northeast	Basin & Sump
South Sales Tank 3	rupture; leakage	2,000	200	Northeast	Basin & Sump
Test Tank	rupture; leakage	500	50	Northeast	Basin & Sump

### Drainage Pathway and Distance to Navigable Waters:

The Hoyt Facility is located south of Highway 166 at a distance of less than one-quarter mile. Due to the topography of the facility location, potential for petroleum release to storm runoff exists. The direction of flow for a facility release is northeast; runoff will flow to Highway 166.

There are no public storm drains in the vicinity of the facility.

## 2. Secondary Containment [112.7(c)]

At the Hoyt Facility, the following secondary containment and diversionary structures are provided to prevent oil discharges from reaching a navigable watercourse (see **Appendix B**):

- Slop Oil Tank: An earthen dike on the north and east sides of the tank creates a diversionary path such that all liquid flow is towards the emergency sump. The capacity of the sump is sufficient to accommodate the volume of this tank as well as sufficient freeboard to allow for precipitation.
- Production Tank #123858: An earthen dike surrounding the tank setting creates a basin to serve as secondary containment and creates a diversionary path such that all liquid flow is towards the emergency sump. Capacity of the basin and sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.

- Sump Oil Tank #13857: An earthen dike surrounding the tank setting creates a basin to serve as secondary containment and creates a diversionary path such that all liquid flow is towards the emergency sump. Capacity of the basin and sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.
- Kill Water Tank #135775: An earthen dike surrounding the tank setting creates a basin to serve as secondary containment and creates a diversionary path such that all liquid flow is towards the emergency sump. Capacity of the basin and sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.
- North Sales Tank 1: Earthen diversionary structures have been provided to direct all fluid flow to the northeast corner of the facility into the secondary containment structures. The capacity of the secondary containment basin plus the sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.
- Free Water Knockout Tank 2: Earthen diversionary structures have been provided to direct all fluid flow to the northeast corner of the facility into the secondary containment structures. The capacity of the secondary containment basin plus the sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.
- South Sales Tank 3: Earthen diversionary structures have been provided to direct all fluid flow to the northeast corner of the facility into the secondary containment structures. The capacity of the secondary containment basin plus the sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.
- Test Tank: Earthen diversionary structures have been provided to direct all fluid flow to the northeast corner of the facility into the secondary containment structures. The capacity of the secondary containment basin plus the sump is sufficient to accommodate the volume of the largest tank as well as sufficient freeboard to allow for precipitation.

### 3. Contingency Planning [112.7(d)]

In the event of a spill, Macpherson has a Spill Contingency Plan (see **Appendix A**) that would be utilized for the cleanup operation.

### 4. Inspection, Test and Records [112.7(e)]

Formal facility inspections are conducted weekly. During the inspections, all tanks, containment structures, valves, pipelines, and other equipment are

inspected. All records of inspections, repairs, and modifications of the equipment are retained for at least three years at the facility's office.

## 5. Personnel Training and Discharge Prevention [112.7(f)]

### a. Personnel Instruction:

All appropriate personnel are instructed in the operation and maintenance of equipment in order to prevent oil discharges and are familiarized with the applicable pollution control laws, rules, and regulations. New employees are instructed in these subjects within six months of the first day of employment. Refresher training on the contents of the SPCC Plan occurs periodically in order to assure employee understanding and compliance. Training and briefings are carried out both on the job and in specialized meetings.

### b. Designated person accountable for spill prevention:

~~Mr. Terry Ellis~~, HSE Manager, has been designated as the person accountable for oil spill prevention at the Hoyt Facility.

### c. Spill prevention briefings:

During monthly safety meetings, spill prevention is periodically discussed. All incidents are discussed in these briefings in order to prevent them from reoccurring. Employee feedback and recommendations are encouraged in spill prevention and operations. Sign in sheets, which include the topics of discussion, are used as documentation.

## 6. Security [112.7(g)]

Access to all handling, processing and storage facilities is limited to operating personnel and contractors under the supervision of Terry Ellis or a duly appointed representative of Macpherson Oil Company.

### a. Fencing:

40 CFR Part 112.7(g) excludes production facilities such as Macpherson Operating Company from security requirements.

### b. Flow Valves Locked:

40 CFR Part 112.7(g) excludes production facilities such as Macpherson Operating Company from security requirements.

### c. Starter controls locked:

40 CFR Part 112.7(g) excludes production facilities such as Macpherson Operating Company from security requirements.

d. Pipeline loading/unloading connections securely capped:

40 CFR Part 112.7(g) excludes production facilities such as Macpherson Operating Company from security requirements.

e. Lighting adequate to detect spills:

40 CFR Part 112.7(g) excludes production facilities such as Macpherson Operating Company from security requirements.

**7. Loading Rack [112.7(h)]**

The facility does not include a loading rack; therefore, this section is not applicable.

**8. Brittle Fracture Analysis [112.7(i)]**

When a field constructed aboveground tank undergoes a repair, alteration, reconstruction, or change in service that might affect the risk of a discharge or failure due to brittle fracture or other catastrophe, or has discharged oil or failed due to brittle fracture or other catastrophe, the tank will be evaluated for risk of discharge or failure due to brittle fracture following the repair/reconstruction prior to returning the tank to service.

If the tank is found unsuitable the appropriate action will be taken.

**9. Conformance with California Specific Regulations [112.7(j)]**

Current California regulations require compliance with the Federal Regulations.

**SPECIFIC REQUIREMENTS FOR ONSHORE FACILITIES [112.8]:**

*PRODUCTION FACILITIES ARE EXCLUDED see Part 112.8*

# APPENDIX A

## Contingency Plan

# Contingency Plan

## **Introduction:**

This contingency plan was developed to address, in general, the procedures to be followed in the event of a spill. Procedures followed in a specific situation will be determined to some extent by the requirements of the applicable regulatory agencies.

Every reasonable effort will be made to prevent any oil or oily substance from reaching navigable waters. This level of protection will be provided to watercourses and dry stream beds whether or not they are considered to be "waters of the United States".

## **Containment:**

In the event of a spill, which exceeds the on-site containment capacity, the following procedures will be instituted:

- Additional containment basins, dikes, or diversionary structures will be constructed, if feasible. The extent of environmental damage caused by the construction of these devices in relation to the spill control will be a consideration;
- If insufficient equipment and personnel are available at the site, assistance will be requested from qualified contractors;
- Control of the spill can also be provided by the expeditious use of vacuum trucks and other removal methods;
- If petroleum is discharged to "waters of the United States", oil booms, sorbents, and other devices will be used to control the spread of oil;
- Other cleanup techniques will be used based on the requirements of the applicable federal and state agencies.

## **Notification Procedures:**

All federal and state safety and health regulations applicable to the cleanup of the spilled material will be complied with. A list of the appropriate people to notify in the event of a spill and their home telephone numbers are available at the site at all times. An example of an emergency notification form is attached. (Form A-1).

## **Cleanup of Spilled Material:**

Spilled petroleum will be expeditiously removed by vacuum truck or other means. The oily soil will be cleaned to the extent possible by mechanical means. All possible oil will be recovered. Oil-contaminated materials will be cleaned and/or disposed of.

The extent of cleanup and the deposition of petroleum and contaminated materials will be determined by the HSE Manager in accordance with the requirements of the applicable regulatory agencies.

In the event of a spill affecting adjacent property, BWS will attempt to promptly notify the appropriate property owner. This notification will take place prior to deploying men and/or equipment onto the affected property. After taking the appropriate measures listed above, Macpherson facility personnel are directed to notify the HSE Manager and they will be responsible for notifying the appropriate representative and will document the time and method of such communication.

# Attachment 1

## EMERGENCY NOTIFICATION PROCEDURES

### FORM A-1

\*\*\*\*\*

IN THE EVENT OF A REPORTABLE SPILL (Greater than 210 gallons outside containment; or 420 gallons within containment; or any amount to water) AND/OR FIRE, CALL:

#### Macpherson Oil Company, LP – HSE Manager:

~~Terry Ellis~~

Office: (661) 393-3204 Ext 112

Cell: (661) 201-8320

Operations Manager Reached \_\_\_\_\_

Time \_\_\_\_\_

#### CLEANUP CONTRACTORS:

Oil Spill Cleanup: NONE

Contractor Reached \_\_\_\_\_

Time \_\_\_\_\_

Hazardous Chemicals: NONE

Contractor Reached \_\_\_\_\_

Time \_\_\_\_\_

#### AGENCIES NOTIFIED

**Kern County Fire Department:  
Hazardous Materials Division:**

911

Contact Person \_\_\_\_\_

Time \_\_\_\_\_

**Local Emergency Response Agency:**

911

Contact Person \_\_\_\_\_

Time \_\_\_\_\_

**California Office of Emergency Services (OES):**

800-852-7550, or 916-845-8911

Contact Person \_\_\_\_\_

Time \_\_\_\_\_

**National Response Center:**

800-424-8802

Contact Person \_\_\_\_\_

Time \_\_\_\_\_

## **Attachment 2**

### **Commitment of Personnel, Equipment and Material**

Macpherson Oil Company commits the necessary personnel, equipment and materials to expeditiously control and remove any harmful quantity of oil discharged from our equipment.

The necessary personnel, equipment and materials will be provided directly by Macpherson Oil Company and/or from local capable contractors.

In the event of a spill, we will take all reasonable efforts to contain and clean up the spilled material as rapidly and as thoroughly as reasonably possible. Cleanup procedures will be designed to meet the requirements of the applicable regulatory agencies.

## APPENDIX B

### Secondary Containment Calculations

**Hoyt Lease: In-Facility Containment**

## Secondary Containment Calculations

## Sufficient Freeboard:

$$\begin{aligned} & \text{Maximum rainfall for a 24-hour period} \\ & \qquad \qquad \qquad 2.5 \text{ Inches} \\ & = \qquad \qquad \qquad 0.21 \text{ ft} \end{aligned}$$

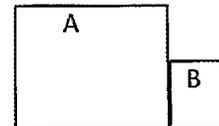
$$\text{Largest Tank Volume:} \qquad 2,000 \text{ BBL}$$

Dike Area: Rectangle = l\*w

Dike Specifications:

$$V_A = \begin{array}{l} \text{Length (l):} \quad 65.00 \text{ ft} \\ \text{Width (w):} \quad 80.00 \text{ ft} \end{array}$$

$$V_B = \begin{array}{l} \text{Length (l):} \quad 25.00 \text{ ft} \\ \text{Width (w):} \quad 10.00 \text{ ft} \end{array}$$



$$\text{Dike Area:} \qquad 5,450.00 \text{ ft}^2$$

$$\text{Dike Height:} \qquad 1.33 \text{ ft}$$

$$\text{Available Dike Height:} \qquad 1.13 \text{ ft}$$

$$\text{Total Dike Volume:} \qquad 6,131.25 \text{ ft}^3$$

Volume of Circular Tank Pad (1,500 BBL Tank Footprint) = Pi \* radius<sup>2</sup>

$$\text{Tank Diameter} \qquad 21.00 \text{ ft}$$

$$(\text{Pi}) * r^2 = \qquad 346.36 \text{ ft}^2$$

$$\text{Dike depth (h):} \qquad 1.13 \text{ ft}$$

$$\text{Volume:} \qquad 391 \text{ ft}^3$$

$$\text{Two 1,500 BBL Tanks} \qquad 783 \text{ ft}^3$$

Volume of Circular Tank Pad (1,300 BBL Tank Footprint) = Pi \* radius<sup>2</sup>

$$\text{Tank Diameter} \qquad 17.00 \text{ ft}$$

$$(\text{Pi}) * r^2 = \qquad 226.98 \text{ ft}^2$$

$$\text{Dike depth (h):} \qquad 1.13 \text{ ft}$$

Volume: 256 ft<sup>3</sup>

Available Dike Volume = Total Dike Volume - Tank Pad Volume

Available Dike Volume = 5,092 ft<sup>3</sup>  
907 bbl  
38,091 gal

Available dike volume of 907 bbl is less than the volume of the largest tank.  
Containment requires supplemented volume.

Supplemental volume of 1,364 bbl exists at the emergency sump.

Combined volume (A+ B +Sump) = 2,271 bbl

Total available Secondary Containment Volume of 2,271 barrels is greater  
than the required containment volume of 2,000 barrels.

**Hoyt Lease: Secondary Sump Containment**

## Secondary Containment Calculations

Maximum Rainfall: 0.21 ft

Dike Area: Rectangle = l\*w

Dike Specifications:

$V_1 =$  Length (l): 45.00 ft  
Width (w): 95.00 ft

Dike Area: 4,275.00 ft<sup>2</sup>

Dike Height: 2.00 ft

Available Dike Height: 1.79 ft

Total Dike Volume: 7,659 ft<sup>3</sup>

Available Dike Volume = Total Dike Volume

Available Dike Volume =  
7,659 ft<sup>3</sup>  
1,364 bbl  
57,296 gal

Available containment volume of 1,364 bbl within the sump.

# APPENDIX C

## Inspection Records

## INSPECTION PROCEDURES

### GENERAL:

All facilities are routinely inspected for accumulations of petroleum.

### ABOVE GROUND TANKS:

Periodic integrity testing is performed on above ground tanks. The methods used can include hydrostatic testing, visual inspection and/or non-destructive shell thickness testing.

Above ground tanks are frequently examined by operating personnel for signs of deterioration, condition of foundations and supports, and leaks which might cause a spill or accumulation of oil inside bermed areas.

### UNDERGROUND TANKS:

Macpherson Oil Company does not have underground tanks.

### PIPELINES:

If buried lines are exposed for any reason, they are carefully examined for deterioration. All above ground valves, flanges and piping are regularly examined by operating personnel.

A program of flow line maintenance ensures that spills are minimized. Periodic examination, corrosion protection, piping replacement, and adequate records are included in this maintenance program.

### RECORDS:

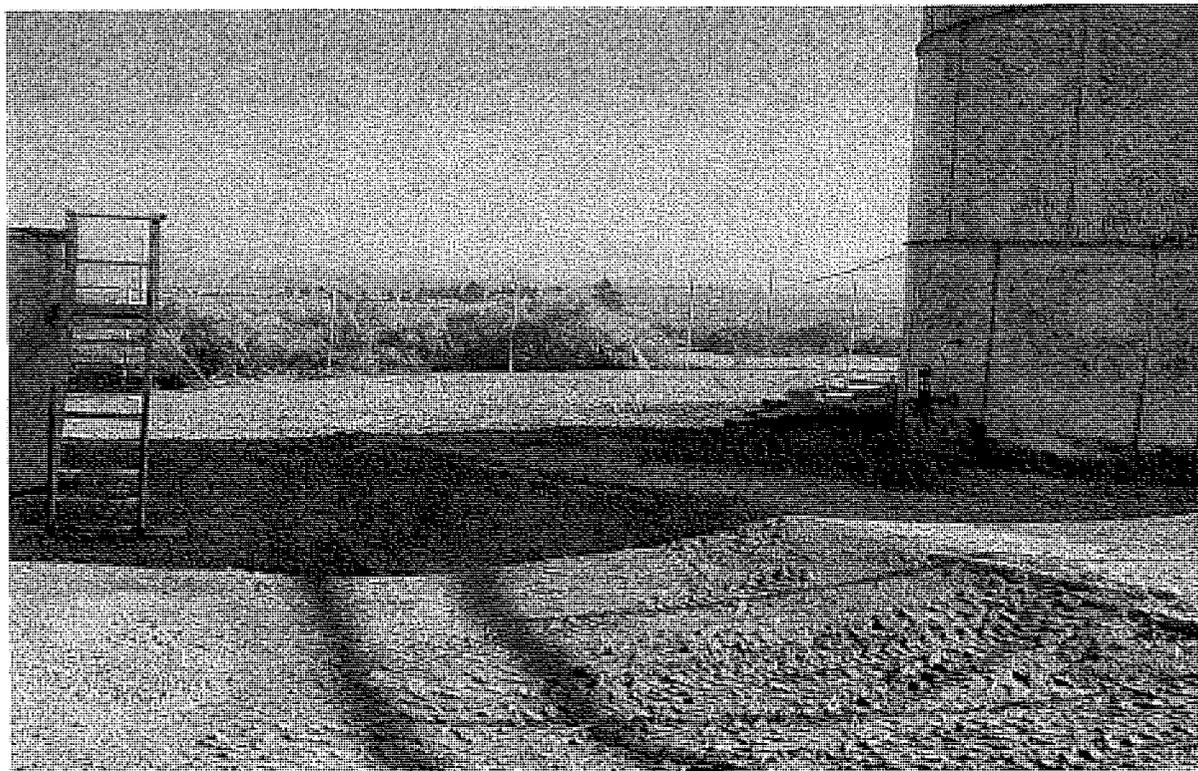
Records of inspections, signed by the appropriate supervisor or inspector are attached. If not attached, records of repairs and inspections are kept in Macpherson Oil Company's administration office.

## APPENDIX D

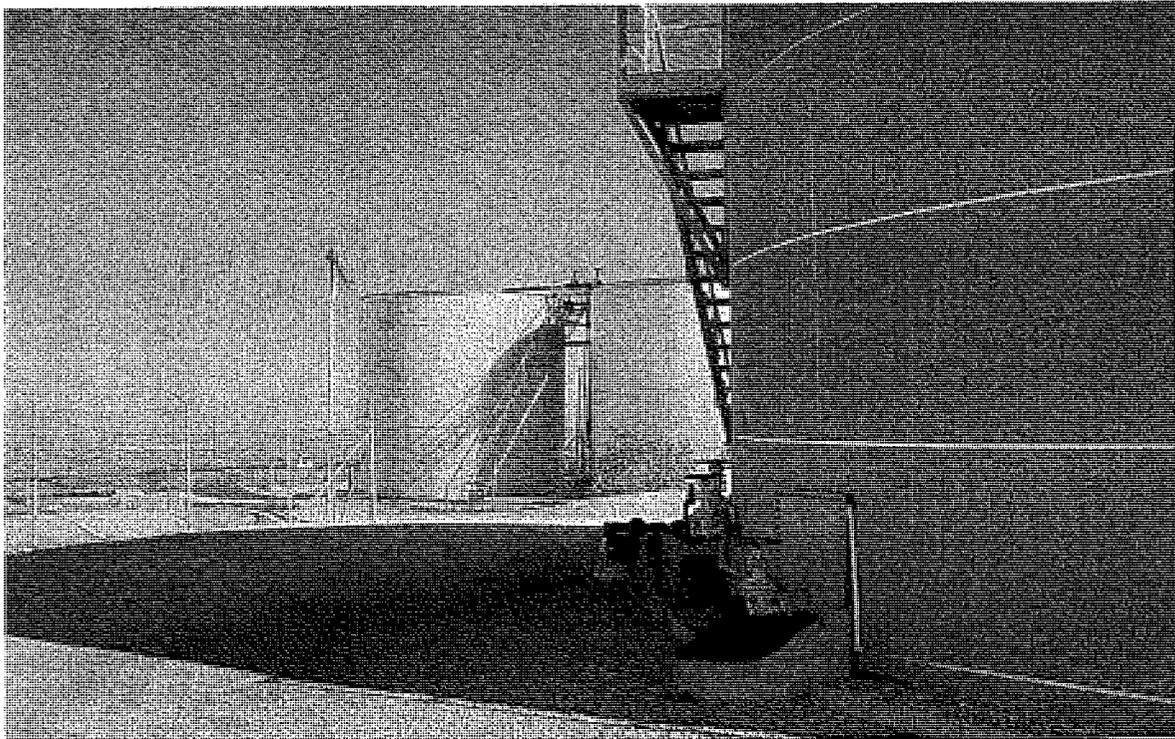
### Facility Photographs



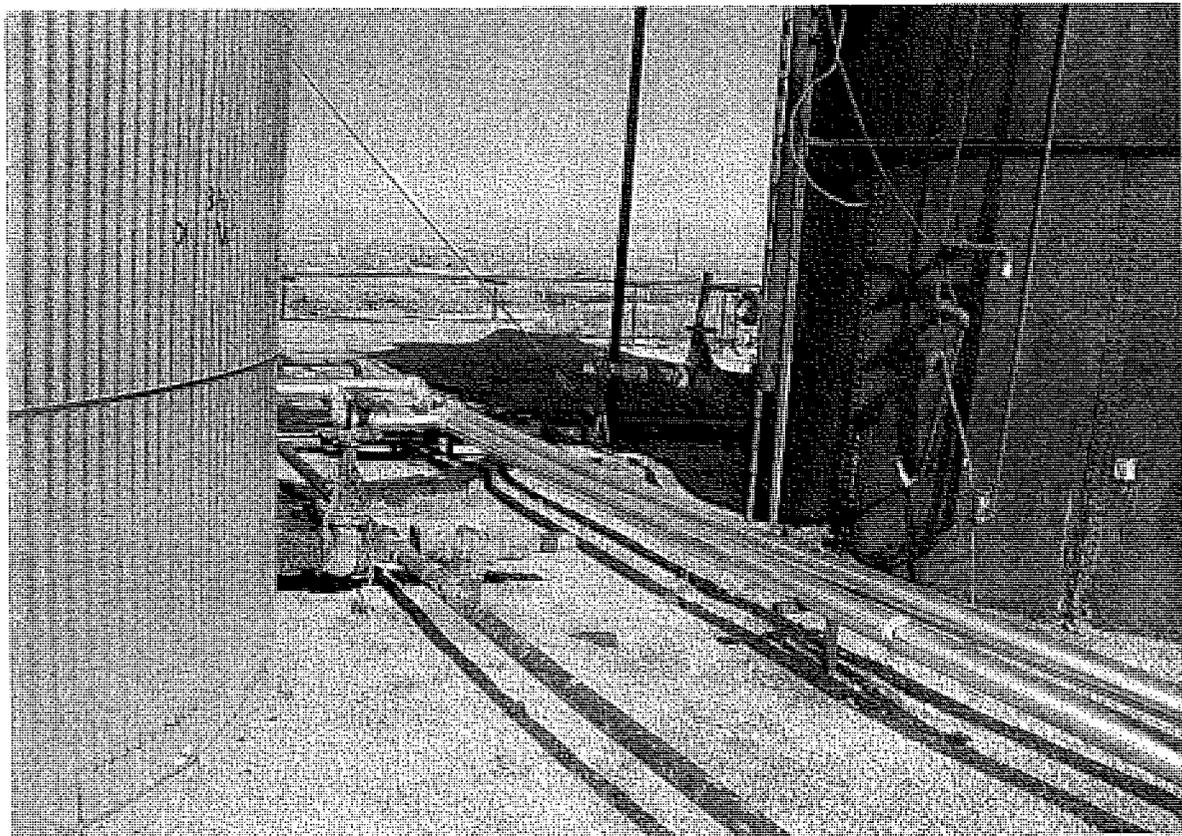
Central Berm



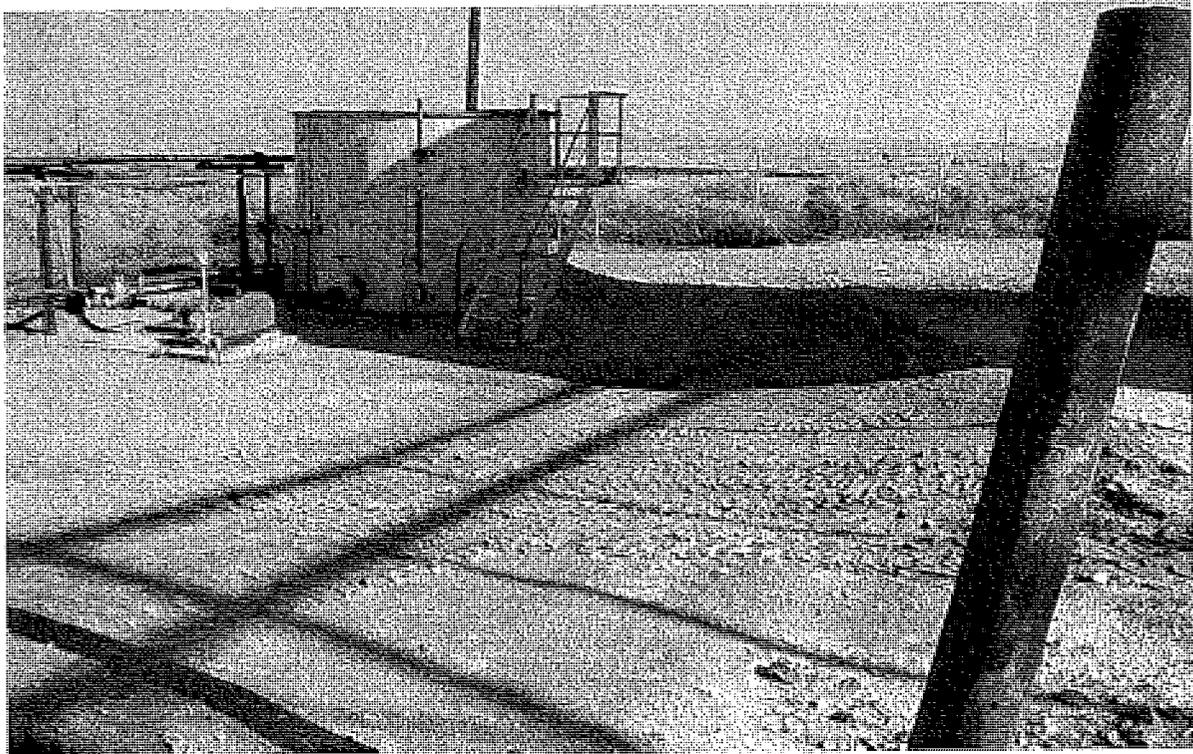
East Fence



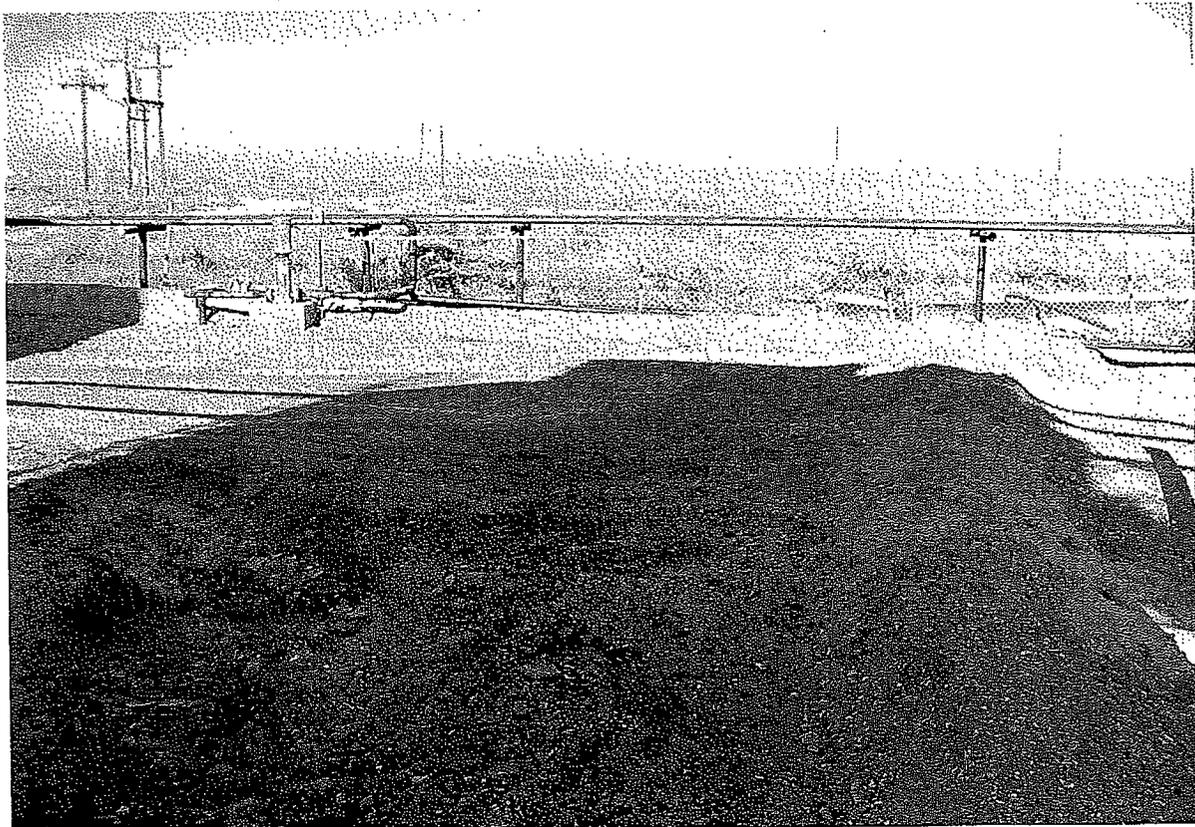
Kill Water & Sump Oil Tanks



Facility Piping



Northeast Corner



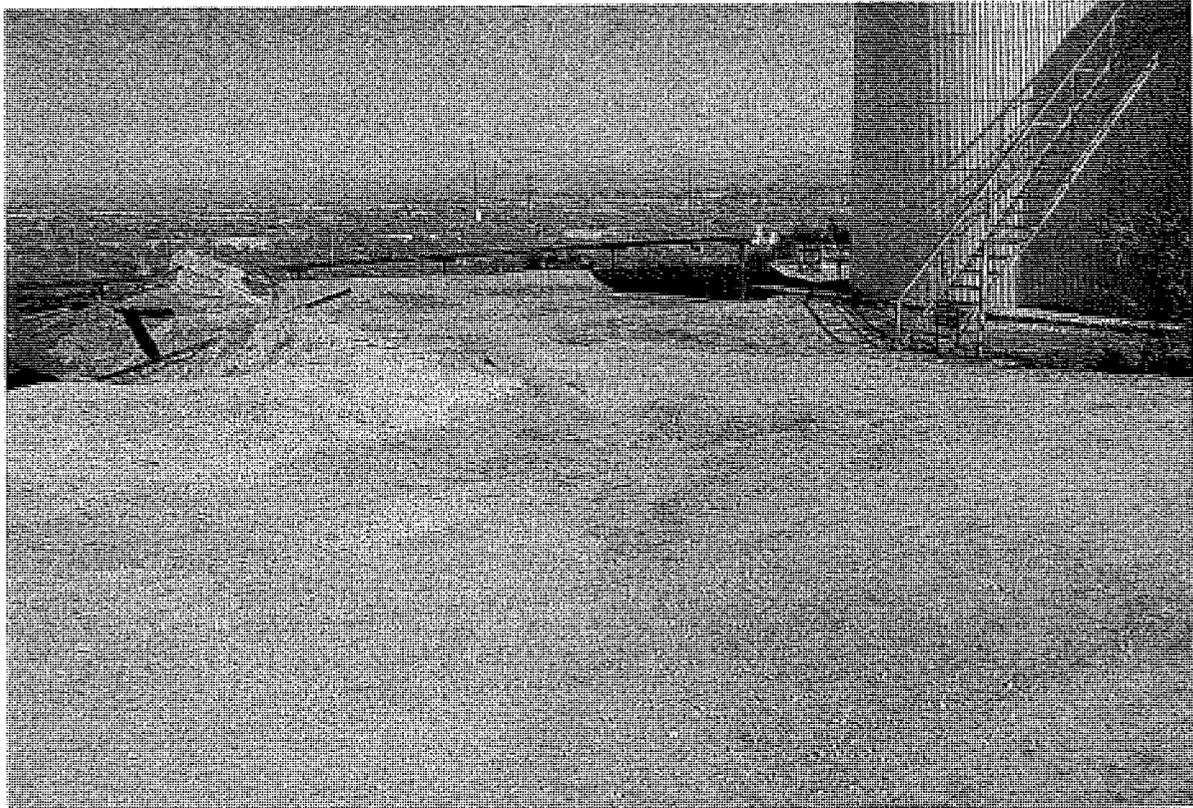
North Fence



North Fence



Northwest Corner



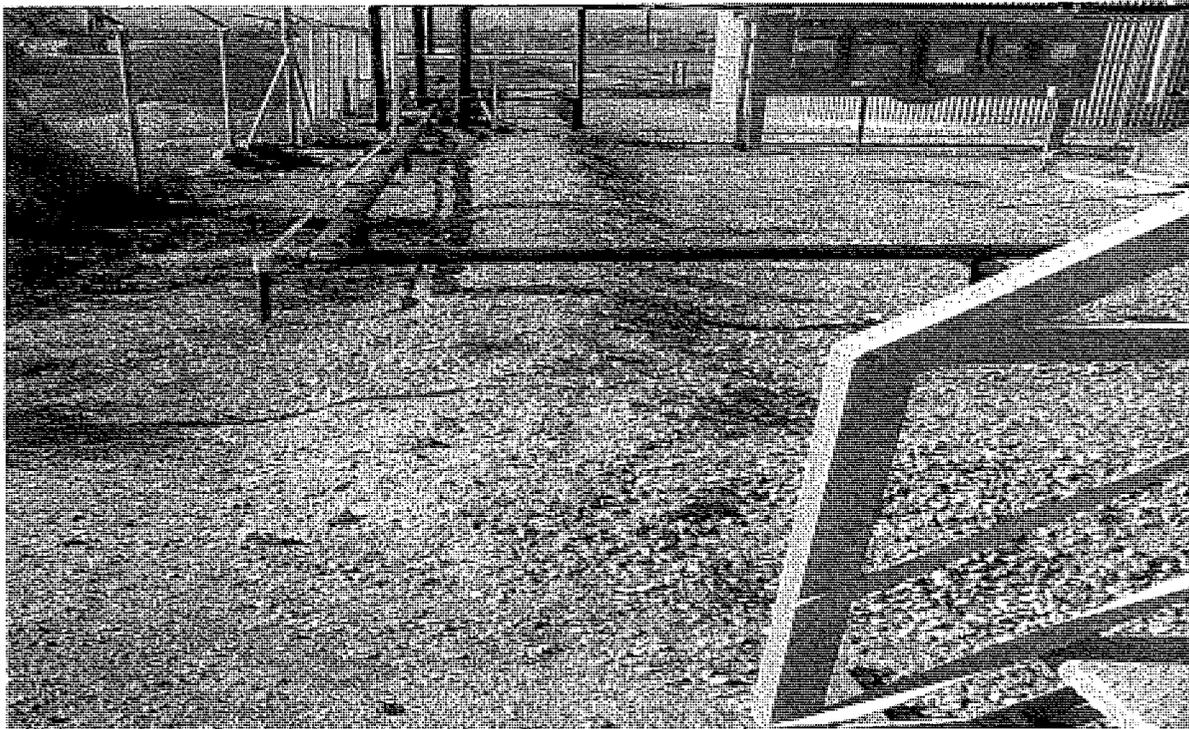
North Center Corners



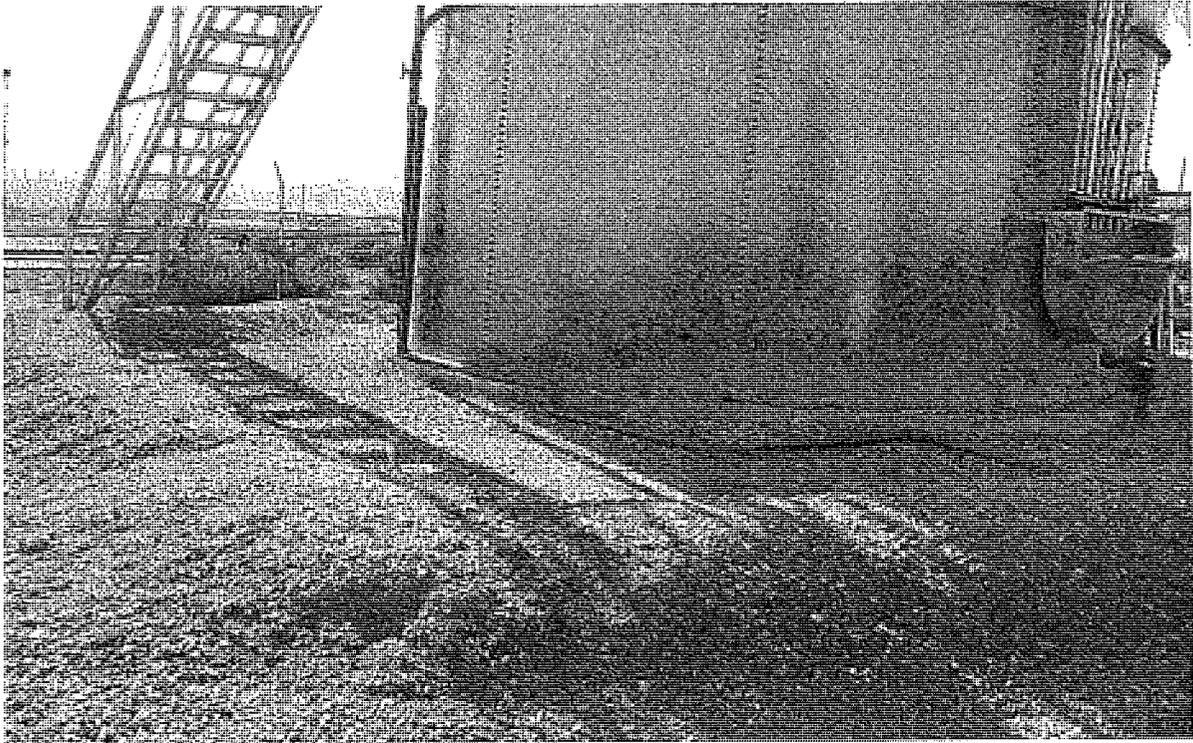
Northwest View from East Fence



Northwest Corner

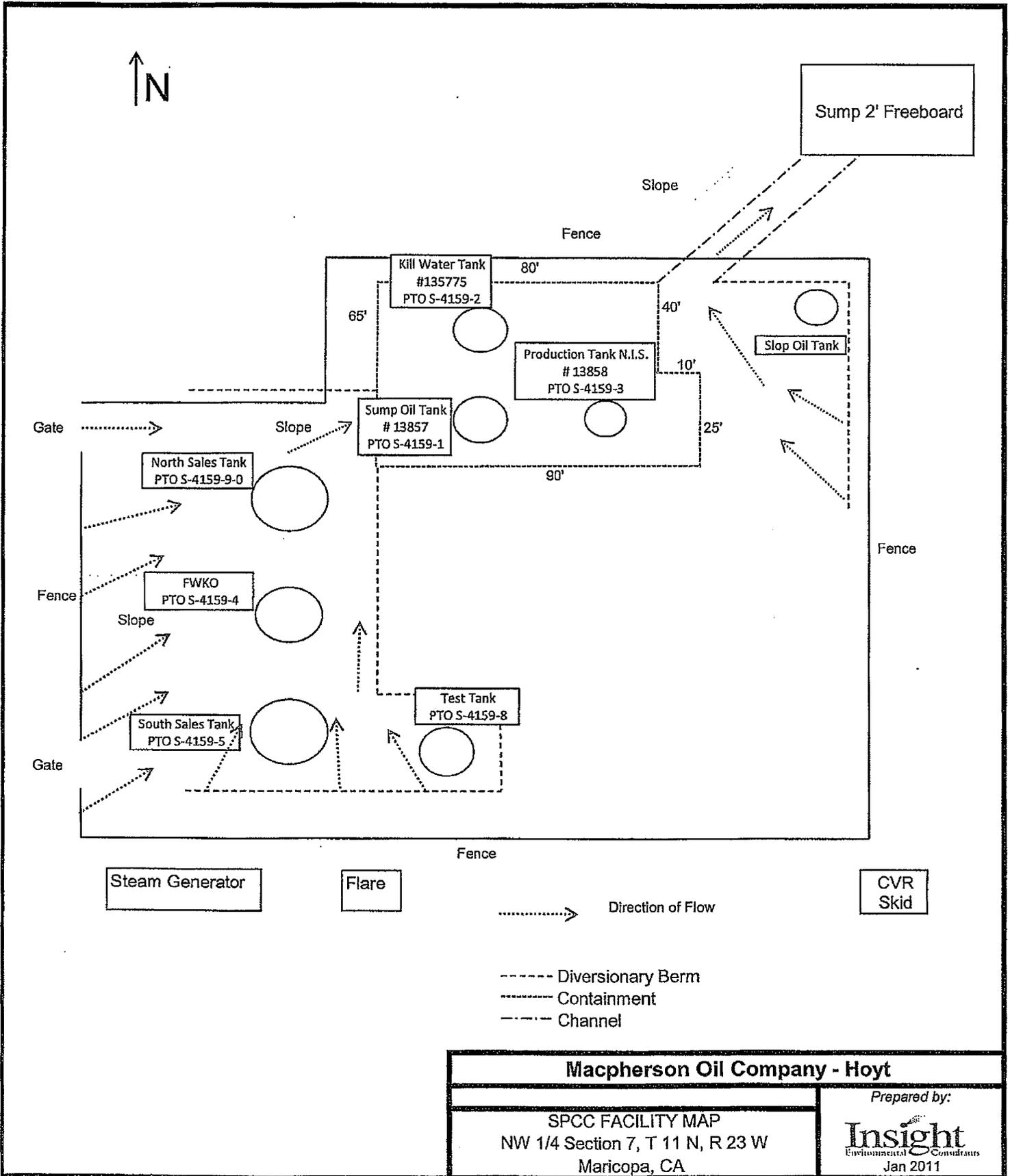


Southeast Corner



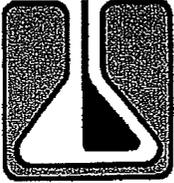
Test Tank

Figure 2: Facility Map



<b>Macpherson Oil Company - Hoyt</b>	
Prepared by:	
<b>Insight</b> Environmental Consultants Jan 2011	
SPCC FACILITY MAP NW 1/4 Section 7, T 11 N, R 23 W Maricopa, CA	

## APPENDIX II



ZALCO LABORATORIES, INC.  
Analytical & Consulting Services

4309 Armour Avenue  
Bakersfield, California 93308

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

July 23, 2014

Tim Lovley  
Macpherson Oil Company  
PO Box 5368  
Bakersfield, CA 93388

TEL: (661) 368-3909  
FAX: (661) 393-8065

Project ID:  
RE: 1407047

Dear Tim Lovley:

Zalco Laboratories, Inc. received 1 samples on 7/2/2014 for the analyses presented in the following report.

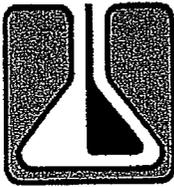
We appreciate your business and look forward to serving you in the future. Please feel free to call our office if you have any questions regarding these test results.

Sincerely,

Juan Magana  
Project Manager  
CC:AJ Dennington

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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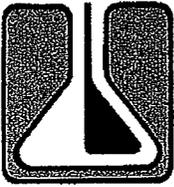
Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1407047 Reported: 07/23/2014 Received: 07/02/2014 15:31
--	---	---

Lab Sample ID: 1407047-01 Client Sample ID: Inlet to #1 Perk Pond	Collected By: Jeremiah Johnson Date Collected: 7/2/2014 11:10:00AM
--	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Alkalinity</b>								
Total Alkalinity	1800	10	mg/L		SM 2320B	7/2/14	7/2/14	SAM
Bicarbonate (HCO <sub>3</sub> )	1800	10	mg/L		SM 2320B	7/2/14	7/2/14	SAM
Carbonate (CO <sub>3</sub> )	<10	10	mg/L		SM 2320B	7/2/14	7/2/14	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	7/2/14	7/2/14	SAM
<b>CAM, Toxicity (17 Metals)</b>								
			<i>TTL Limits</i>					
Antimony	<0.20	0.20	500	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Arsenic	<0.020	0.020	500	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Barium	2.9	0.10	10000	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Beryllium	<0.010	0.010	75	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Cadmium	<0.010	0.010	100	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Chromium	<0.050	0.050	2500	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Cobalt	<0.10	0.10	8000	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Copper	<0.050	0.050	2500	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Lead	<0.050	0.050	1000	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Mercury	<0.0020	0.0020	20	mg/L	SW846 7470A	7/9/14	7/9/14	AA
Molybdenum	<0.10	0.10	3500	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Nickel	<0.050	0.050	2000	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Selenium	<0.05	0.05	100	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Silver	<0.020	0.020	600	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Thallium	<0.50	0.50	700	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Vanadium	<0.10	0.10	2400	mg/L	SW846 6010B	7/7/14	7/8/14	SS
Zinc	<0.050	0.050	5000	mg/L	SW846 6010B	7/7/14	7/8/14	SS
<b>General Chemistry</b>								
			<i>MCL Limits</i>					
Electrical Conductivity	21	0.010		mmhos/cm	SM 2510B	7/2/14	7/2/14	SAM
pH	7.41			pH Units	EPA 150.1	7/2/14	7/2/14	SAM
Total Dissolved Solids	11000	10		mg/L	SM 2540C	7/2/14	7/2/14	SAM
<b>Hardness</b>								
Hardness (as CaCO <sub>3</sub> )	360	2.0		mg/L	SM 2340B	7/7/14	7/8/14	SS
<b>Metals</b>								
Boron	93	1.0		mg/L	EPA 200.7	7/7/14	7/10/14	SS

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.

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Table with 3 columns: Client Information (Macpherson Oil Company, PO Box 5368, Bakersfield, CA 93388), Project Information (Project: Master-4Q2013, Project #: , Attention: Tim Lovley), and Work Order Information (Work Order No.: 1407047, Reported: 07/23/2014, Received: 07/02/2014 15:31)

Table with 2 columns: Lab Sample Information (Lab Sample ID: 1407047-01, Client Sample ID: Inlet to #1 Perk Pond) and Collection Information (Collected By: Jeremiah Johnson, Date Collected: 7/2/2014 11:10:00AM)

Main results table with columns: Analyte, Results, PQL, Units, Flag, Method, Date Prepared, Date Analyzed, Init. Rows include Diesel Range Hydrocarbons, Gasoline Range Hydrocarbons, and Motor Oil Range Hydrocarbons.

Table with columns: Surrogates, % Recovery, Recovery Limits, Flag. Row for a,a,o-Trifluorotoluene showing 97.0% recovery and 69-125 recovery limits.

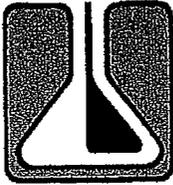
Volatile Organic Compounds

Large table listing various Volatile Organic Compounds (Acetone, Acrolein, Acrylonitrile, m,p-Xylene, Benzene, Xylenes, total, etc.) with their respective results, PQLs, units, flags, and methods.

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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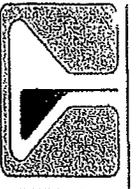
Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1407047 Reported: 07/23/2014 Received: 07/02/2014 15:31
--	---	---

Lab Sample ID: 1407047-01 Client Sample ID: Inlet to #1 Perk Pond	Collected By: Jeremiah Johnson Date Collected: 7/2/2014 11:10:00AM
--	---

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Inf.
<b>Volatile Organic Compounds</b>								
1,2,4-Trimethylbenzene	26.4	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Methylene chloride	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,3,5-Trimethylbenzene	5.81	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
4-Methyl-2-pentanone	<50.0	50.0	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Xylenes, total	38.1		ug/L		SW846 8260B	7/3/14	7/3/14	HLP
m,p-Xylene	23.5	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Naphthalene	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,1,2-Trichloro-1,2,2-Trifluoro ethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Styrene	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,1,1,2-Tetrachloroethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,1,2,2-Tetrachloroethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Tetrachloroethene	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Toluene	101	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,2,4-Trichlorobenzene	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,1,1-Trichloroethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,1,2-Trichloroethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Trichloroethene	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Trichlorofluoromethane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
1,2,3-Trichloropropane	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Vinyl acetate	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
Vinyl chloride	<5.00	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
o-Xylene	14.6	5.00	ug/L		SW846 8260B	7/3/14	7/3/14	HLP
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>				
1,2-Dichloroethane-d4		89.4	89-165				7/3/14 10:21	
Toluene-d8		86.0	65-124				7/3/14 10:21	
4-Bromofluorobenzene		84.5*	94-114	S-GC			7/3/14 10:21	
1,2-Dichloroethane-d4		89.4	71-117				7/3/14 10:32	
Toluene-d8		86.0	85-124				7/3/14 10:32	
4-Bromofluorobenzene		84.5	70-118				7/3/14 10:32	

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.

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**ZALCO LABORATORIES, INC.**  
 4309 Armour Avenue, Bakersfield, CA 93308 (661) 395-0539 FAX (661) 395-3069  
 2186 Eastman Avenue, Suite 103, Ventura, CA 93003, (805) 477-0114, Fax (805) 477-0125

www.zalcolabs.com

CHAIN OF CUSTODY, ID# 7407047

Client PO: \_\_\_\_\_  
 Project ID: \_\_\_\_\_  
 Quote ID: \_\_\_\_\_

ANALYSIS REQUESTED

COMPANY: Mac Pherson Oil  
 CONTRACT: Tim Lovley  
 PHONE: (661) 201-8320 FAX: \_\_\_\_\_  
 ADDRESS: POBox 5368  
 Bakersfield CA 93388  
 EMAIL: Tim.Lovley@macphersonoil.com  
 SAMPLER SIGNATURE: *Tim Lovley*

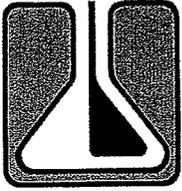
LAB #	SAMPLE DESCRIPTION	DATE	TIME	TYPE	# OF CONTAINERS	General Minerals / minus the MBAS	Anion-Cation Balance	Fuel Finger Print	Halogenated VOC's by 8260B	Cam 17 Metals	BTEX by 8260	TEMPERATURE (C)	Notes
1	Inlet to #1 Perk Pond	7/2/2014	11:10	AQ	9	X	X	X	X	X	X	42.7°C	CC- results to AJ Dennington aj.dennington@macphersonoil.com Monthly Hoyt lease
													<b>RUSH!</b>
													Loss-in Subbed pipes Several Shortfold times

Relinquished By:	Company:	Date:	Time:	Received By:	Company:
Johnson	Zalco labs	07/02/14	1531	<i>Paula Boyer</i>	Zalco Labs

NOTE: Samples Discarded 30 days after results unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

\* Sample Type Key: Aq-Aqueous; BS-Biosolid; DW-Drinking Water; GW-Groundwater; G-Gas; LPG-Liquid Petroleum Gas; OL-Oil; P-Petroleum; S-Solid; Sol-Sol; ST-Storm water; WW-Wastewater

AL to level



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

4309 Armour Avenue  
Bakersfield, California 93308

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

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August 8, 2014

Tim Lovley  
Macpherson Oil Company  
PO Box 5368  
Bakersfield, CA 93388

TEL: (661) 368-3909  
FAX: (661) 393-8065

Project ID:  
RE: 1408018

Dear Tim Lovley:

Zalco Laboratories, Inc. received 1 samples on 8/1/2014 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.

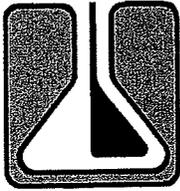
Sincerely,

A handwritten signature in cursive script, appearing to read "Juan Magana".

Juan Magana  
Project Manager  
CC:AJ Dennington .

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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**ZALCO LABORATORIES, INC.**  
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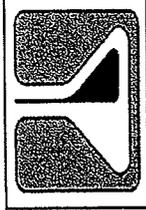
Macpherson Oil Company PO Box 5368 Bakersfield, CA 93388	Project: Master-4Q2013 Project #: Attention: Tim Lovley	Work Order No.: 1408018 Reported: 08/08/2014 Received: 08/01/2014 16:16
--	---	---

Lab Sample ID: 1408018-01 Client Sample ID: Inlet to #1 Perk Pond	Collected By: Jeremiah Johnson Date Collected: 8/1/2014 1:40:00PM
--	--

Analyte	Results	PQL	Units	Flag	Method	Date Prepared	Date Analyzed	Init.
<b>Alkalinity</b>								
Total Alkalinity	1900	10	mg/L		SM 2320B	8/1/14	8/1/14	SAM
Bicarbonate (HCO <sub>3</sub> )	1900	10	mg/L		SM 2320B	8/1/14	8/1/14	SAM
Carbonate (CO <sub>3</sub> )	<10	10	mg/L		SM 2320B	8/1/14	8/1/14	SAM
Hydroxide (OH)	<10	10	mg/L		SM 2320B	8/1/14	8/1/14	SAM
<b>General Chemistry</b>								
<i>MCL Limits</i>								
Chloride	7000	1000	mg/L		EPA 300.0	8/1/14	8/1/14	MSS
MBAS (calculated as LAS, mol wt ___)	0.10	0.050	mg/L	0.5	SM 5540C	8/1/14	8/1/14	HG
pH	7.42		pH Units		EPA 150.1	8/1/14	8/1/14	SAM
Specific Conductance	23000	10	umhos/cm		SM 2510B	8/1/14	8/1/14	SAM
Sulfate as SO <sub>4</sub>	190	5.0	mg/L		EPA 300.0	8/1/14	8/1/14	MSS
Total Dissolved Solids	13000	10	mg/L		SM 2540C	8/4/14	8/4/14	SAM
<b>Hardness</b>								
Hardness (as CaCO <sub>3</sub> )	740	2.0	mg/L		SM 2340B	8/4/14	8/4/14	SS
<b>Inorganic Chemical</b>								
<i>MCL Limits</i>								
Copper	<250	250	ug/L	1000	EPA 200.7	8/4/14	8/4/14	SS
Iron	<500	500	ug/L	300	EPA 200.7	8/4/14	8/4/14	SS
Manganese	340	100	ug/L	50	EPA 200.7	8/4/14	8/4/14	SS
Silver	<50	50	ug/L	100	EPA 200.7	8/4/14	8/4/14	SS
Zinc	<250	250	ug/L	5000	EPA 200.7	8/4/14	8/4/14	SS
<b>Metals</b>								
Calcium	170	0.25	mg/L		EPA 200.7	8/4/14	8/4/14	SS
Magnesium	79	0.25	mg/L		EPA 200.7	8/4/14	8/4/14	SS
Potassium	220	2.5	mg/L		EPA 200.7	8/4/14	8/4/14	SS
Sodium	5000	70	mg/L		EPA 200.7	8/4/14	8/4/14	SS
<b>Oil &amp; Grease Testing</b>								
TRPH	<5.00	5.00	mg/L		EPA 1664	8/7/14	8/8/14	BIG

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.

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CHAIN OF CUSTODY, ID#   
 www.zalcolabs.com

Client PO:   
 Project ID: **1408018**  
 Quote ID:

ANALYSIS REQUESTED **1161018**

COMPANY <b>Mac Pherson Oil</b> CONTACT <b>Tim Lovley</b> PHONE <b>(661) 201-8320</b> FAX <span style="border-bottom: 1px solid black; width: 100px;"></span> ADDRESS <b>POBox 5368</b> <b>Bakersfield CA 93388</b> E-MAIL <b>Tim Lovley@macphersonoil.com</b> SAMPLER (SIGNATURE) <i>[Signature]</i>		COMMENTS Turnaround Time: <input type="checkbox"/> X Routine (# working days) <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td></tr></table> Rush By <input type="checkbox"/> Working Days EDT <input type="checkbox"/> State Form <input type="checkbox"/> EMAIL <input type="checkbox"/>						
# OF CONTAINERS <b>3</b>		Notes CC- results to AJ Dennington aj_dennington@macpherson oil.com Monthly Hoyt lease <b>42.60</b> <del>Loss to Subbed Permit</del> <del>SEPARATE SURVEYING</del>						
TEMPERATURE (C)		TEMPERATURE (C)						
General Minerals <input checked="" type="checkbox"/> X Bact 3x5 <input checked="" type="checkbox"/> X TRPH <input checked="" type="checkbox"/> X		TEMPERATURE (C)						
LAB #	SAMPLE DESCRIPTION	DATE	TIME	TYPE*				
1	Inlet to #1 Perk Pond	8/11/2014	13:40	AQ				
<b>8/11/14 - Will Resample for 3x5 due to not being able to accept on Fridays - 11</b>								
Relinquished By: <b>J. Johnson</b>		Date: <b>08/01/14</b>		Company: <b>Zalco labs</b>				
Relinquished By: <i>[Signature]</i>		Date:		Company: <b>Zalco</b>				

NOTE: Samples Discarded 30 days after results unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

\* Sample Type Key:  
 Aq-Aqueous; BS-Biosolid; DW-Drinking Water; GW-Groundwater; G-Gas  
 LPG-Liquid Petroleum Gas; OL-Oil; P-Petroleum; S-Solid/Soil; ST-Storm water  
 WW-Wastewater

## APPENDIX III



**Macpherson Oil Company  
Hoyt Lease  
Preliminary Closure Plan**

*October 2014*

*Submitted to:*  
Macpherson Oil Company

*Prepared by:*  
WZI Inc.  
1717 28<sup>th</sup> Street  
Bakersfield, CA 93301

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## **1.0 SITE DESCRIPTION**

Macpherson Oil Company operates an oil and gas lease in the Midway Sunset Oil Field located in the southwest end of the San Joaquin Valley in Kern County. The lease is owned by the Federal government, administered by the Bureau of Land Management. Similar to surrounding oil and gas leases, produced water from the oil and gas operations has been disposed of in surface percolation ponds. Four ponds are present on the site, although only three are in use at the present time.

### **1.1 Closure Date**

The closure date for the Macpherson Oil facility has not yet been determined. This preliminary closure plan is being submitted in accordance with a Report of Waste Discharge application. Once the facility ceases operation, the facility will be clean closed.

### **1.2 Surrounding Land Use**

The site and the surrounding land is zoned A-1, Exclusive Agriculture. The site land use designation is 1.1, Non-jurisdictional Land and the surrounding land use designation is 8.4 Mineral Petroleum, some with a flood hazard overlay (2.5). With the exception of the City of Maricopa located to the west, the surrounding land use is related to petroleum development.

## **2.0 SETTING**

### **2.1 Regional Geology**

The site is located in the southwest portion of the San Joaquin Valley within the Maricopa Flats region. The San Joaquin Valley is an alluvial plain underlain by up to 28,000 feet of marine and non-marine deposits of Quaternary and Tertiary age. The surficial deposits consist of alluvial fan, fluvial and lacustrine deposits of Quaternary age. The Valley is bounded on the south by the San Emigdio Mountains and on the west by the Temblor Range, where the Tertiary rocks are exposed at the surface which dip beneath the Valley. The San Andreas Fault zone, located approximately 7 miles to the southwest of the Hoyt Lease, is the nearest active fault to the site.

Soil beneath the impoundments has been classified as Gujarral-Klipstein complex (Natural Resources Conservation Service, 2009). This soil type is derived from calcareous sedimentary rock consisting of sandy loam and gravelly sandy loam and is well drained.

### **2.2 Topography**

The site slopes gently to the east-northeast, ranging in elevation from 754 feet in the southwest corner of the lease to 676 feet in the northeast corner of the lease. Earthen berms and diversionary structures surround the production facility (. A 10-inch pipeline connects the produced water tank to Sump 1, the westernmost impoundment.

## **2.3 Hydrology**

### **Surface Water**

The Hoyt lease is situated between Bitter Creek and Bitterwater Creek. The water quality of these streams ranges from approximately 5,500 mg/l to 8,800 mg/l TDS with sulfate being the primary anion (Wood and Dale, 1964). The groundwater in this area is present in the alluvial fans of the streams that drain the surrounding San Emigdio Mountains to the south and the Temblor Range to the west.

There are no drainages that cross the site. There are no springs on the site or in the vicinity of the site. The 100-year flood zone is present approximately ¼ mile to the south of the Hoyt lease boundary. Another 100-year flood zone is located approximately ½ mile to the north of the Hoyt lease. Neither of these zones cross the Hoyt lease.

## **3.0 SITE CLOSURE NOTIFICATION**

At the present time the closure date for the Hoyt Lease production facility has not been determined. The purpose of this report is to outline the procedures to be followed should the lease term approach expiration and the determination is made to close the facility.

For the Regional Water Quality Control Board (RWQCB) the first step in the process is to provide a Work Plan which is similar to the Preliminary Closure Plan which is written for Kern County General Services.

Within 90 days of the notification to close, Macpherson will notify the county and the RWQCB of the schedule for final closure.

## **4.0 CLEAN CLOSURE PROCEDURE**

Clean closure of this oil and gas production facility refers to the complete removal of all hydrocarbons and residue, and restoration of the site to a condition similar to the condition prior to use as a production facility. In addition if any hazardous materials are discovered during the removal process, they will be removed disposed at an appropriate site.

The closure of this oil and gas production facility is a multiple step process. The specific steps associated with this site are;

1. Preparation of the Final Closure Plan;
2. Review and approval of the closure plan;
3. Implementation of the plan; and
4. Verification and approval of the clean closure.

## **5.0 PRELIMINARY CLEAN CLOSURE PLAN**

### **5.1 Sump Cleanout**

To begin the closure, percolation sumps will be cleaned out. This will entail removal of all sludge and residue, and disposal at the appropriate disposal site.

**5.2 Soils Testing and Remediation**

After the sump cleanout, the remaining soil in the sump locations will be sampled by an accredited soils testing contractor. Any contaminated soil discovered in this process will be removed, tested and properly disposed.

**5.3 Re-contouring**

Once the sumps have been cleaned out and tested, grading equipment will be used to re-contour the site. Contours will be designed to approximate original site conditions prior to use as an oil and gas production facility.

**5.4 Final Site Inspection**

Macpherson will notify the RWQCB of the completion of the site closure and participate in the final inspection. The RWQCB will provide written verification of the clean closure of the site.