GW - 4

PERMITS, RENEWALS, & MODS

VonGonten, Glenn, EMNRD

From: VonGonten, Glenn, EMNRD
Sent: Wednesday, June 13, 2012 10:05 AM
To: 'Hudson, Matt'
Cc: Lowe, Leonard, EMNRD; Gerber, Dean
Subject: RE: GW-004 Permit Modification Request

Mr. Hudson,

OCD has reviewed Chevron's proposal to modify part of its Discharge Permit (GW-004). Chevron proposes to modify its abatement program by relocating its two pilot test areas. OCD has determined that this is a minor modification to Chevron's discharge permit and does not change the scope of the permit. OCD hereby approves Chevron's permit modification request. Chevron may proceed with its field work.

After review, OCD will not require Chevron to permit its remediation injections wells as UIC Class V wells at this time.

Please provide OCD with the results of the well installations when completed. Please include this approval in Chevron's Annual Report.

If you have any questions, please contact me at 505-476-3488 or by email.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505-476-3488
Fax-476-3462
glenn.vongonten@state.nm.us
http://www.emnrd.state.nm.us/ocd/

From: Hudson, Matt [mailto:MHudson@chevron.com]
Sent: Monday, June 11, 2012 2:12 PM
To: VonGonten, Glenn, EMNRD
Cc: Lowe, Leonard, EMNRD; Gerber, Dean
Subject: GW-004 Permit Modification Request

Glenn,

Attached is a proposed modification to Chevron's groundwater discharge permit GW-004 at the Former Eunice North Gas Plant. We are proposing moving the locations of the in-situ pilot test areas, due to continued city water line leaks in the areas originally proposed. No other modifications to the pilot test activities are planned.

Please review and respond with any comments or questions. Should you have any questions, please contact me 713-372-9207.

Thanks

Matt Hudson
Project Manager

Chevron Environmental Management Company
Upstream Business Unit
1400 Smith Street
Room 07076
Houston, TX 77002
Tel 713 372 9207
Mobile 281 460 6521

mhudson@chevron.com

Matthew P. Hudson
Remediation Project
Manager

Upstream Business Unit
Chevron Environmental
Management Company
1400 Smith St
Room 07076
Houston, TX 77002
Tel 713 372 9207
mhudson@chevron.com

June 11, 2012

Mr. Glenn VonGonten
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1200 South Francis Drive
Santa Fe, New Mexico 87505

RE: Proposed Modification to Discharge Plan Permit GW-004
Former Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. VonGonten:

Chevron is submitting this permit modification request for Oil Conservation Division of the New Mexico Energy, Minerals and Natural Resources Department (NMOCD) Discharge Permit GW-004, for the former Chevron Eunice North facility for your review. The permit includes details regarding the use of two existing injection wells (IW023 and IW024) and installation of six groundwater monitor wells, for implementation of two pilot in-situ remediation studies. Following review of site conditions, including recent observations of water line leaks in the vicinity of the two pilot study areas, Chevron believes that it is necessary to select alternate locations for the pilot studies.

A water supply line belonging to the town of Eunice runs between and parallel to the proximal and medial arrays of injection wells (Figure 1) for the site. This water supply line has leaked on two occasions within the past 1 ½ years, resulting in a dilution of total chromium and hexavalent chromium in groundwater in the area, and has likely resulted in other chemical changes to groundwater in the vicinity. The most recent release was reported by a contractor to Chevron, to the city of Eunice the week of May 7, 2012. Injection wells IW023 and IW024 are located along the medial and proximal arrays, respectively, a distance of approximately 100 feet from one another. The effects of the recently discovered water leak on the concentration of total chromium and hexavalent chromium are not known at this time. Chevron anticipates that the recent leak may have resulted in further dilution of constituent concentrations and may have further altered groundwater chemistry. Due to chemical changes in groundwater and the depressed concentration of chromium and hexavalent chromium in the pilot test areas, Chevron believes that these two locations are no longer appropriate for remedial pilot testing purposes. In addition, injection well IW024 is situated such that two of the performance monitoring wells proposed for installation would be located in areas of high vehicular traffic, including the plant entrance and along Main Street (State Loop 207). For these reasons, Chevron is proposing alternate pilot test areas.

The two proposed pilot test areas and wells are illustrated on Figure 2. Pilot Test Area #1 (Sodium Dithioite) is located within the Eunice North facility along the southern boundary of the site. The pilot study will utilize existing groundwater monitor well MW007A as the near downgradient performance monitor well. Recent concentrations of hexavalent chromium in samples from the well have been approximately 0.5 mg/L. A new injection well (IW029), a side-gradient performance monitor well

(MW097), and a distant performance monitor well (MW096) will be installed to monitor the pilot study. The new wells will be installed to a depth of approximately 110 feet with a 10-foot section of screen at the base of the well, similar to monitor well MW007A.

Pilot Test Area #2 (Soy-Lactate) is also located within the Eunice North facility, and is downgradient of Pilot Test Area #1. The pilot test will utilize existing wells MW089A (sidegradient), MW009A (near downgradient) and IW028 (distant downgradient) as performance monitoring locations. Groundwater samples from these wells have all contained hexavalent chromium at concentrations in the range of approximately 0.5 to 1.0 mg/L. Well IW028 is located at the southern end of the proximal array. Groundwater at the well appears to be unaffected by the water leaks in the town of Eunice water line. A new injection well (IW030) will be installed upgradient to complete the well requirements for the pilot test. The new injection well will be installed at a depth of approximately 100 feet, with a 10-foot section of screen at the base of the well, similar to monitor well MW009A.

Chevron is proposing no additional changes to the pilot study plans. Chevron will proceed with well installation activities following approval of this permit modification request. A minimum of one week notice will be provided to NMOCD prior to installing the wells. Chevron requests that NMOCD provide guidance regarding any requirements for permitting the new injection wells as Class V Underground Injection Control (UIC) wells, if necessary.

Should you have any questions or concerns, please do not hesitate to contact me at (713) 372-9207.

Sincerely,

Matthew P. Hudson

Attachments: Figure 1
Figure 2

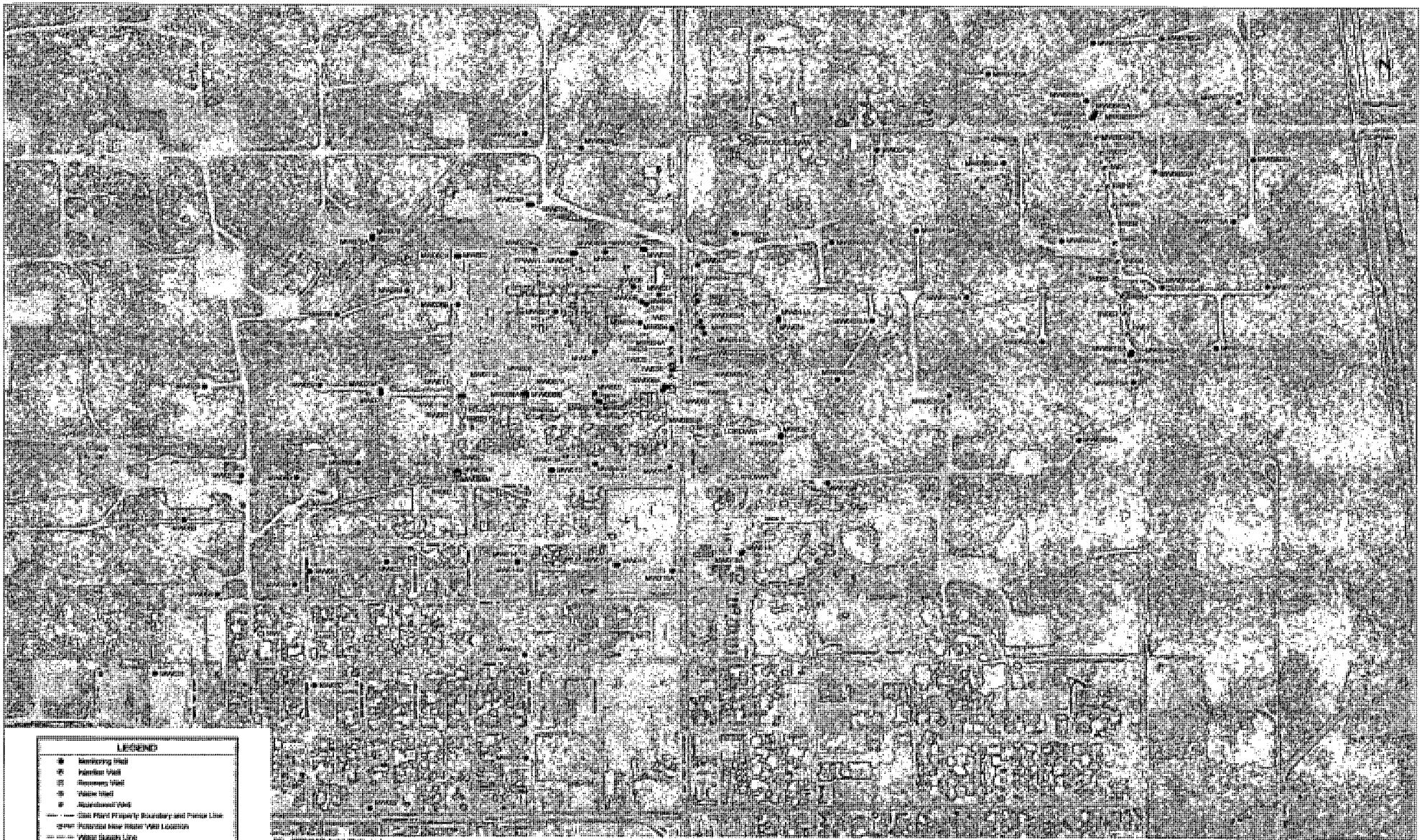


Figure 1
WELL LOCATION MAP
FORMER EUNICE NORTH GAS PLANT
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

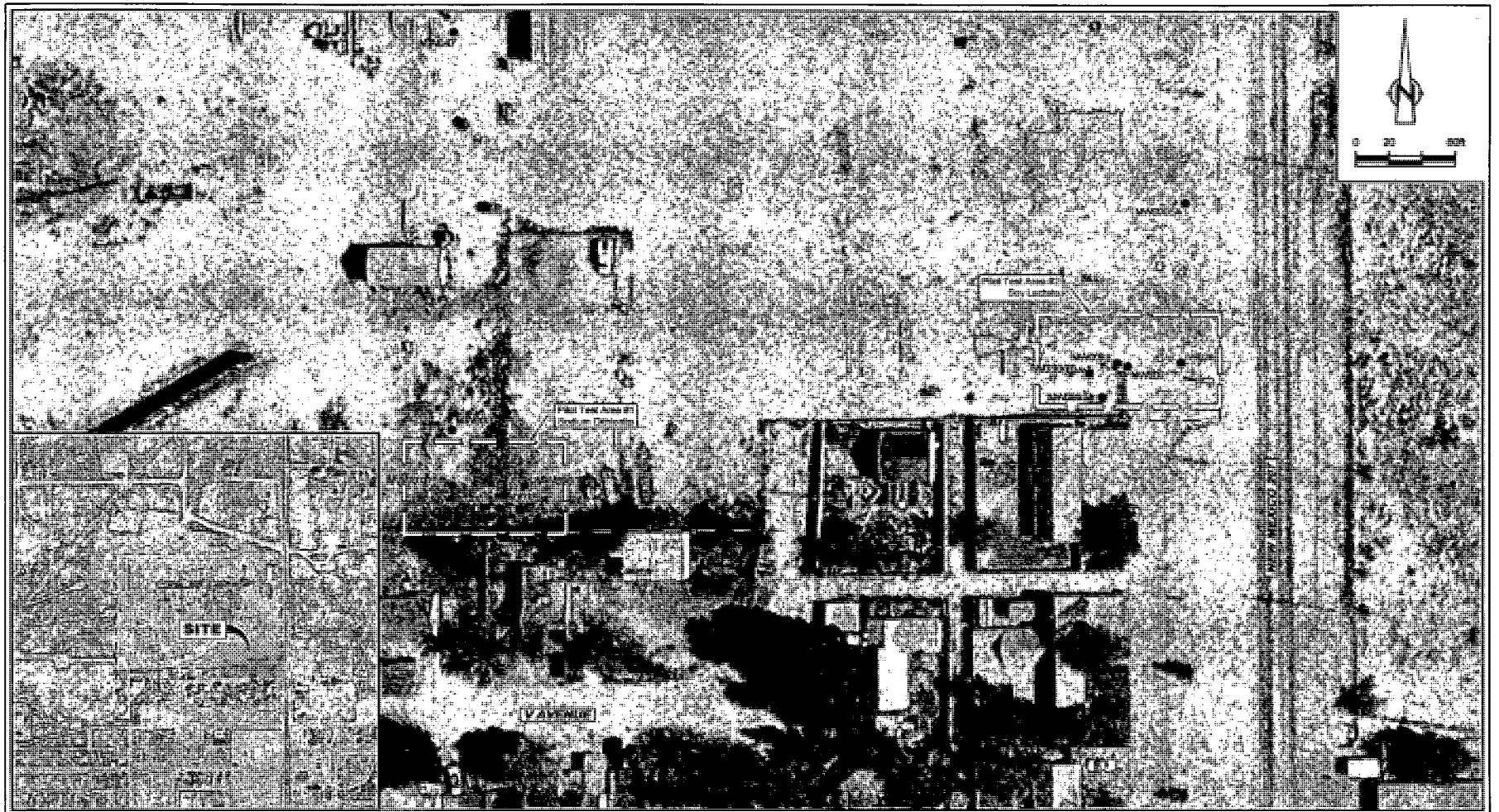


figure 2

PILOT TEST PROPOSED WELLS
FORMER EUNICE NORTH GAS PLANT
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

073018-00(002)GN-DL004 MAY 23/2012

Matthew P. Hudson
Remediation Project
Manager

Upstream Business Unit
Chevron Environmental
Management Company
1400 Smith St
Room 07076
Houston, TX 77002
Tel 713 372 9207
mhudson@chevron.com

January 27, 2012

Mr. Leonard Lowe
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1200 South Francis Drive
Santa Fe, New Mexico 87505

RE: Signed Discharge Plan Renewal Permits:
GW-003 Former Eunice South Gas Plant, Lea County, New Mexico
GW-004 Former Eunice North Gas Plant, Lea County, New Mexico

Dear Mr. Lowe:

Please find enclosed the signed Discharge Renewal Permits, GW-003 and GW-004, along with the associated fees. Should you have any questions or concerns, please do not hesitate to contact me at (713) 372-9207.

Sincerely,

Matthew P. Hudson

Enclosures

ACKNOWLEDGEMENT OF RECEIPT
OF CHECK/CASH

I hereby acknowledge receipt of check No. 24022454 dated 1/20/12

or cash received on _____ in the amount of $ 2600.00

from Chevron

for GW-004

Submitted by: Lawrence Rogers Date: 2/6/12

Submitted to ASD by: [signature] Date: 2/6/12

Received in ASD by: _____ Date: _____

Filing Fee _____ New Facility _____ Renewal ✓

Modification _____ Other _____

Organization Code 521.07 Applicable FY 2012

To be deposited in the Water Quality Management Fund.

Full Payment _____ or Annual Increment _____

DISCHARGE PERMIT GW-004

1. GENERAL PROVISIONS:

A. PERMITTEE AND PERMITTED FACILITY: The Oil Conservation Division (OCD) of the Energy, Minerals and Natural Resources Department issues Discharge Permit GW-004 (Discharge Permit) to Chevron U.S.A., Inc. (Owner/Operator), located at 1400 Smith Street, Houston, Texas 77002 to abate ground water and vadose zone contamination at its Eunice North Gas Plant (Facility) located at State Highway 207 (Eunice-Hobbs Highway) Eunice, New Mexico 88231 in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.

As a result of historical operations at the site, Chevron is proposing to remediate chromium contaminated ground water by injecting 5 percent solution of sodium dithionite and/or a 10 percent soy lactate solution in injection wells to remediate contaminated ground water. Chevron will mix 2800 gallons fresh water with a five percent solution of sodium dithionite and/or mix 2800 gallons fresh water with ten percent soy lactate solution to generate a solution which will then be discharged into the Ogallala aquifer. The ground water will be sampled to determine the effectiveness of the discharged solution to remediate the chromium contamination. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1,200 mg/L. The discharge plan specifies that Chevron will remediate contaminated ground at the site to meet the standards specified in the Water Quality Control Commission regulations (20.6.2.3103 NMAC).

B. SCOPE OF PERMIT: OCD has been granted authority to administer the Water Quality Act (Chapter 74, Article 6 NMSA 1978) as it applies to gas processing plants by statute and by delegation from the Water Quality Control Commission pursuant to Section 74-6-4(E) NMSA 1978.

The Water Quality Act and the rules issued under that Act protect ground water and surface water of the State of New Mexico by providing that, unless otherwise allowed by rule, no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless such discharge is pursuant to an approved discharge plan. See 20.6.2.3104 NMAC and 20.6.2.3106 NMAC.

This Discharge Permit does not authorize any treatment of, or on-site disposal of, any materials, product, by-product, or oil field waste, including, but not limited to, the on-site disposal of lube oil, glycol, antifreeze, filters, elemental sulfur, washdown water, contaminated soil, and cooling tower blowdown water.

This Discharge Permit does not convey any property rights of any sort nor any exclusive privilege, and does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of state, federal, or local laws, rules or regulations.

The Owner/Operator shall operate in accordance with the Discharge Permit conditions to comply with the Water Quality Act and the rules issued pursuant to that Act, so that neither a hazard to public health nor undue risk to property will result (see 20.6.2.3109C NMAC); so that no discharge will cause or may cause any stream standard to be violated (see 20.6.2.3109H(2) NMAC); so that no discharge of any water contaminant will result in a hazard to public health, (see 20.6.2.3109H(3) NMAC); and so that the numerical standards specified of 20.6.2.3103 NMAC are not exceeded.

The Owner/Operator shall not allow or cause water pollution, discharge, or release of any water contaminant that exceeds the Water Quality Control Commission (WQCC) standards specified at 20.6.2.3101 NMAC and 20.6.2.3103 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams).

C. DISCHARGE PERMIT CONDITIONS: By signing this Discharge Permit, the Owner/Operator agrees to the specific provisions set out in this document, and the commitments made in the approved Discharge Plan Application and the attachments to that application, which are incorporated into the Discharge Permit by reference.

If this Discharge Permit is a permit renewal, it replaces the permit being renewed. Replacement of a prior permit does not relieve the Owner/Operator of its responsibility to comply with the terms of that prior permit while that permit was in effect.

D. DEFINITIONS: Terms not specifically defined in this Discharge Permit shall have the same meanings as those in the Water Quality Act or the rules adopted pursuant to that Act, as the context requires.

E. FILING FEES AND PERMIT FEES: Pursuant to 20.6.2.3114 NMAC, every facility that submits a discharge permit application for initial approval or renewal shall pay the permit fees specified in Table 1 and the filing fee specified in Table 2 of 20.6.2.3114 NMAC. OCD has already received the required $100.00 filing fee for this application. The flat fee for "Abatement of Ground Water and Vadose Zone Contamination at Oil and Gas Sites" is $2,600.00. The Owner/Operator shall submit this amount along with the signed Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

F. EFFECTIVE DATE, EXPIRATION, RENEWAL CONDITIONS, AND PENALTIES FOR OPERATING WITHOUT A DISCHARGE PERMIT: This Discharge Permit is effective when the Division's Environmental Bureau receives the signed Discharge Permit from the Owner/Operator and the $2,600.00 fee. This Discharge Permit will expire on March 16, 2016. The Owner/Operator shall submit an application for renewal no later than 120 calendar days before that expiration date, pursuant to 20.6.2.3106F NMAC. If an Owner/Operator submits a renewal application at least 120 calendar days before the Discharge Permit expires and is in compliance with the approved Discharge Permit, then the existing Discharge Permit will not expire until OCD has approved or disapproved the renewal application. Operating with an expired Discharge Permit may subject the Owner/Operator to

civil and/or criminal penalties. See Section 74-6-10.1 NMSA 1978 and Section 74-6-10.2 NMSA 1978.

G. MODIFICATIONS: The Owner/Operator shall notify the Division's Environmental Bureau of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants. See 20.6.2.3107C NMAC. The Division's Environmental Bureau may require the Owner/Operator to submit a permit modification pursuant to 20.6.2.3109E NMAC and may modify or terminate a permit pursuant to Section 74-6-5(M) through (N) NMSA 1978.

H. TRANSFER OF DISCHARGE PERMIT: Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of the Facility, the transferor shall notify the transferee in writing of the existence of the Discharge Permit, and shall deliver or send by certified mail to the Division's Environmental Bureau a copy of such written notification, together with a certification or other proof that such notification has been received by the transferee pursuant to 20.6.2.3111 NMAC. Upon receipt of such notification, the transferee shall inquire into all of the provisions and requirements contained in the Discharge Permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the Division's file or files concerning the Discharge Permit. Upon assuming either ownership or possession of the Facility the transferee shall have the same rights and responsibilities under the Discharge Permit as were applicable to the transferor. See 20.6.2.3111 NMAC.

Transfer of the ownership, control, or possession of the Facility does not relieve the transferor of responsibility or liability for any act or omission which occurred while the transferor owned, controlled, or was in possession of the Facility. See 20.6.2.3111E NMAC.

I. CLOSURE PLAN AND FINANCIAL ASSURANCE: The Owner/Operator shall notify the Division's Environmental Bureau in writing when any operations of its Facility are to be discontinued for a period in excess of six months. Upon review of the Owner/Operator's notice, the Division's Environmental Bureau will determine whether to modify this permit pursuant to 20.6.2.3107 NMAC and 20.6.2.3109E NMAC or to require the Owner/Operator to submit a closure plan and/or post-closure plan, including financial assurance.

J. COMPLIANCE AND ENFORCEMENT: If the Owner/Operator violates or is violating a condition of this Discharge Permit, the Division's Environmental Bureau may issue a compliance order requiring compliance immediately or within a specified time period, suspending or terminating this Discharge Permit, and/or assessing a civil penalty. See Section 74-6-10 NMSA 1978. The Division's Environmental Bureau may also commence a civil action in district court for appropriate relief, including injunctive relief. See Section 74-6-10(A)(2) NMSA 1978 and Section 74-6-11 NMSA 1978. The Owner/Operator may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with

or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. See Section 74-6-10.2 NMSA 1978.

2. GENERAL FACILITY OPERATIONS:

A. OPERATIONAL MONITORING: The Owner/Operator shall comply with its approved monitoring programs pursuant 20.6.2.3107 NMAC.

1. Ground Water Monitoring System: The Owner/Operator shall monitor and sample all ground water monitor wells in accordance with its approved ground water abatement program, including the monitor wells for the hydrocarbon plume, the chloride plume, and the chromium plume.

2. Installation of Monitor Wells Near Injection Wells IW023 and IW024:

a. The Owner/Operator shall install three monitor wells near Injection Well IW023 and three monitor wells near Injection Well IW024 in accordance with its renewal application of December 6, 2010.

b. The Owner/Operator shall monitor the near monitor wells to determine whether it has achieved its primary objectives as specified in its renewal application of December 6, 2010.

3. Dithionite Injection Pilot Study Monitoring

a. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitoring wells hourly for pH, DO, ORP, conductivity, and temperature.

b. Post-Injection Monitoring and Sampling: The Owner/Operator shall sample the three monitor wells and IW023 monthly for 3 months after the injection, using the injection and monitoring wells, to evaluate the effectiveness of the sodium dithionite treatment. Ground water samples will be collected and analyzed for total and hexavalent chromium, bromide, sulfate, sulfide, total organic carbon, sodium, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO and ORP).

4. Biodegradation Pilot Study

a. Baseline Sampling: Prior to the injection of a soy-lactate solution, the Owner/Operator shall sample and analyze IW023 and the three monitoring wells for total and hexavalent chromium, sulfate, sulfide, ammonia-nitrogen, orthophosphate-phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

b. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitor wells hourly for pH, DO, ORP, conductivity, and temperature.

c. Post -Injection Monitoring and Sampling: The Owner/Operator shall sample the IW024 and the three monitoring wells to evaluate the treatment effectiveness. Ground water samples will be collected for successive quarters after the injection event and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate - phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

B. CONTINGENCY PLANS: The Owner/Operator shall implement its approved Contingency Plans to cope with failure of the discharge permit or system in accordance with Permit Condition 2.F.

C. CLOSURE PLAN: After completing abatement of all ground water and vadose contamination required under Permit Condition 2.G, the Owner/Operator shall perform the following closure measures:

1. Remove or plug all lines leading to and from ground water recovery or injection wells so that a discharge can no longer occur.

2. Remove all abatement system components from the site, if applicable.

3. After receiving notification from the Division's Environmental Bureau that post-closure monitoring may cease, the Owner/Operator shall plug and abandon its monitor well(s).

D. RECORD KEEPING: The Owner/Operator shall maintain records of all inspections required by this Discharge Permit at its local office located at 240 Avenue O, Eunice, NM 88231 for a minimum of five years and shall make those records available for inspection by the Division's Environmental Bureau.

E. RELEASE REPORTING: The Owner/Operator shall comply with the following permit conditions, pursuant to 20.6.2.1203 NMAC, if it determines that a release of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, has occurred. The Owner/Operator shall report unauthorized releases of water contaminants in accordance with any additional commitments made in its approved Contingency Plan. If the Owner/Operator determines that any constituent exceeds the standards specified at 20.6.2.3103 NMAC, then it shall report a release to the Division's Environmental Bureau.

1. Oral Notification: As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, the Owner/Operator shall orally notify the Division's Environmental Bureau. The Owner/Operator shall provide the following:

- the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Owner/Operator of the facility;
- the name and location of the facility;

- the date, time, location, and duration of the discharge;
- the source and cause of discharge;
- a description of the discharge, including its chemical composition;
- the estimated volume of the discharge; and,
- any actions taken to mitigate immediate damage from the discharge.

2. **Written Notification:** Within one week after the Owner/Operator has learned of the discharge, the Owner/Operator shall send written notification to the Division's Environmental Bureau verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.

F. ABATEMENT PLAN: Pursuant to 20.6.2.4105A(6) NMAC, an Owner/Operator is exempt from the requirement to obtain and implement an Abatement Plan, as required in 20.6.2.4104 NMAC. However, an Owner/Operator's Discharge Permit must address abatement of contaminated ground water and be consistent with the requirements and provisions of Sections 20.6.2.4101, 20.6.2.4103, Subsections C and E of Section 20.6.2.4106, Sections 20.6.2.4107 and 20.6.2.4112 NMAC.

1. **Purpose of Abatement Plan:** The Owner/Operator shall abate polluted ground water so as to either remediate or protect the ground water for use as domestic and agricultural water supply.

2. **Abatement Standards and Requirements:** The Owner/Operator shall abate the vadose zone so that water contaminants in the vadose zone shall not contaminate ground water or surface water, through leaching, percolation or as the water table elevation fluctuates. The Owner/Operator, where the Total Dissolved Solids concentration is 10,000 mg/L or less, shall abate contaminated ground water so that toxic pollutant(s), as defined in 20.6.2.7WW NMAC, shall not be present and so that the standards of 20.6.2.3103 NMAC shall be met.

3. **Ground Water Abatement:** The Owner/Operator shall implement its approved ground water abatement program until it has remediated the contaminated ground water to meet the standards and requirements set forth in 20.6.2.4103 NMAC.

4. **Completion and Termination:** Pursuant to 20.6.2.4112 NMAC, abatement shall be considered complete when the standards and requirements specified in 20.6.2.4103 NMAC are met. At that time, the Owner/Operator shall submit an abatement completion report, documenting compliance with the standards and requirements set forth in 20.6.2.4103 NMAC and this Discharge Permit, to Division's Environmental Bureau for approval. The abatement completion report also shall propose any changes to long term monitoring and site maintenance activities, if needed, to be performed after termination of the abatement plan.

G. OTHER REQUIREMENTS:

1. Inspection and Entry: Pursuant to 20.6.2.4107A NMAC, the Owner/Operator shall allow the Division's Environmental Bureau, upon the presentation of proper credentials, to:

- enter the facility at reasonable times;
- inspect and copy records required by this discharge permit;
- inspect any treatment works, monitoring, and analytical equipment;
- sample any wastes, ground water, surface water, stream sediment, plants, animals, or vadose-zone material including vadose-zone vapor;
- use the Owner/Operator's monitoring systems and wells in order to collect samples; and
- gain access to off-site property not owned or controlled by the Owner/Operator, but accessible to the Owner/Operator through a third-party access agreement, provided that it is allowed by the agreement.

2. Advance Notice: Pursuant to 20.6.2.4107B NMAC, The Owner/Operator shall provide the Division's Environmental Bureau with at least four (4) working days advance notice of any sampling to be performed pursuant to this Discharge Permit, or any well plugging, abandonment or destruction at the facility site.

3. Plugging and Abandonment: Pursuant to 20.6.2.4107C NMAC, the Owner/Operator shall request by certified mail, approval by the Division's Environmental Bureau to plug and abandon a monitor well, unless such approval is required from the State Engineer. The proposed action shall be designed to prevent water pollution that could result from water contaminants migrating through the well or borehole. The proposed action shall not take place without written approval from the Division's Environmental Bureau, unless written approval or disapproval is not received by the Owner/Operator within thirty (30) days of the date of receipt of the proposal.

H. ANNUAL REPORT: The Owner/Operator shall submit its annual report for each calendar year pursuant to 20.6.2.3107 NMAC to the Division's Environmental Bureau by March 15th of the following year. The annual report shall include the following:

1. Results of its ground water monitoring program; including:

- summary tables listing laboratory analytic results of all ground water and soil samples. Any WQCC constituent found to exceed the groundwater standard shall be highlighted and noted in the annual report. Copies of the most recent year's laboratory analytical data sheets shall also be submitted.
- annual water table potentiometric maps. A corrected water table elevation shall be determined for all wells containing non-aqueous phase liquids. These maps shall show well locations, pertinent site features, and the direction and magnitude of the hydraulic gradient.
- semi-annual isopleth maps for the following constituents: non-aqueous phase liquids; chlorides; chromium; and, BTEX.

- semi-annual geologic cross-sections (both dip and strike), using the geologic/lithologic logs from the monitor, recovery, and injection wells, depicting the concentrations for the following constituents: non-aqueous phase liquids; chlorides; chromium; and, BTEX.
- estimate or measure of the volume of the solutions discharged during each quarter and the total volume discharged to date.

2. Summary of any releases and corrective actions taken in accordance with its approved Contingency Plan.

3. CLASS V WELLS: Pursuant to 20.6.2.5002B NMAC, leach fields and other wastewater disposal systems at Division-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking water are UIC Class V injection wells, including ground water management wells. This Discharge Permit does not authorize the use of a Class V injection well for the disposal of industrial waste at the Facility. Pursuant to 20.6.2.5005 NMAC, the Owner/Operator shall close any Class V industrial waste injection wells at its Facility that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes (*e.g.,* septic systems, leach fields, dry wells, *etc.*) other than the injection remediation wells within 90 calendar days of the issuance of this Discharge Permit. The Owner/Operator shall document the closure of any Class V wells used for the disposal of non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes other than contaminated ground water in its Annual Report.

Other Class V wells, including wells used only for the injection of domestic wastes, must be permitted by the New Mexico Environment Department.

4. SCHEDULE OF COMPLIANCE:

A. PERMIT CERTIFICATION: The Owner/Operator shall sign and return this Permit to the Division's Environmental Bureau within 45 days of its receipt of this Permit.

B. SUBMISSION OF THE PERMIT FEES: As specified in Permit Condition 1.F, the Owner/Operator shall submit the fee of $2,600.00 along with the signed Discharge Permit within 45 days of the receipt of the Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

C. ANNUAL REPORT: As specified in Permit Condition 2.H, the Owner/Operator shall submit its annual report to the Division's Environmental Bureau by March 15th of the following year.

5. CERTIFICATION: (OWNER/OPERATOR) by the officer whose signature appears below, acknowledges receipt of this Discharge Permit, and has reviewed its terms and conditions.

Chevron U.S.A. Inc
Company Name - print name

Robert A. Gulder
Company Representative - print name

Company Representative - Signature

Title: Manager OE/HBS

Date: 01/23/2012

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

JANUARY 11, 2012

CERTIFIED MAIL
RETURN RECEIPT NO: 0919 5860

Mr. Matthew Hudson
Remediation Project Manager
Chevron Environmental Management Company
1400 Smith St, Room 07076
Houston, TX 77002

RE: OCD'S RESPONSE TO COMMENTS OF SEPTEMBER 28, 2011
OCD'S DRAFT APPROVAL FOR DISCHARGE PLAN RENEWAL
DISCHARGE PERMIT GW-004, CHEVRON U.S.A, INC. - EUNICE NORTH GAS PLANT, SECTION 28, TOWNSHIP 21 SOUTH, RANGE 37 EAST, NMPM, LEA COUNTY, NEW MEXICO AND
OCD APPROVAL OF DISCHARGE PERMIT RENEWAL:

Dear Mr. Hudson:

On August 15, 2011, the Oil Conservation Division (OCD) proposed to approve the renewal of Chevron U.S.A, Inc.'s (Owner/Operator) discharge permit for the above referenced facility, pursuant to the Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC. Chevron reviewed the draft discharge permit and provided OCD with comments on September 28, 2011. OCD has reviewed Chevron's comments and prepared this response to Chevron's comments.

Chevron's Comment 1: 1.A Permittee and Permitted Facility: *There appears to be a typo/missing word in the last sentence of the second paragraph, which should read "The discharge plan specifies that Chevron will remediate ground water at the site..." (the word "water" appears to be missing).*

OCD's Response to Chevron's Comment 1: OCD has corrected this typo.

Chevron's Comment 2: 1.E Filing Fees and Permit Fees: *The NMOCD's Discharge Plan Renewal cover letter dated August 15, 2011 acknowledges that the "OCD has received Chevron's request and initial fee to renew GW-004."The $100.00 application fee was submitted*

by Chevron with the application in December 2010, and a receipt of the filing fee has been posted to the NMOCD's website. Please verify that the initial application fee was included with the renewal application.

OCD's Response to Chevron's Comment 2: After review, OCD has determined that Chevron did pay the $100.00 filing fee and has corrected the final permit accordingly. OCD also changed the permit to specify that Chevron must submit a fee of $2,600.00 rather than $2,700.00.

Chevron's Comment 3: Permit Condition 2.A.1 - Ground Water Monitoring System: *Per the previous approved Groundwater Discharge Permit GW-004, dated March 16, 2008, Chevron conducted a chloride source investigation to identify potential source areas within the plant boundaries. Those activities were summarized in a report Eunice North Chlorides Investigation Report (Stantec, October 2010) which was submitted to NMOCD. Data presented within this report indicate dissolved chlorides are a regional groundwater issue, and the source of the chloride levels in groundwater is not associated with historical activities at the former plant location. Chevron recommends that chlorides be eliminated from the future monitoring and reporting plan for GW-004.*

OCD's Response to Chevron's Comment 3: Although OCD has not yet completed its review of the Chevron's October 2010 report submitted on its behalf by Stantec, OCD has not made the requested change because of a file review. OCD's files include a letter from Getty dated of September 3, 1980 (Attachment 1), with a map of the Getty Eunice No. Gas Plant (now Chevron's Eunice North Gas Plant - GW-004) that clearly depicts that Getty was systematically disposing of cooling tower blowdown waste water and other waste water derived from a "sump tank" directly to the ground onsite in two "sprinkler systems." The 1980 letter included an analyses of the "process, boiler blowdown, and cooling tower blowdown" waste water which indicates that the concentration of the chlorides in the waste water being disposed of in the two sprinkler systems ranged from 1318 to 3612 mg/l. OCD's understanding is that the North Gas Plant disposed of various waste water streams by direct discharging to the ground using two sprinkler systems for an extended period of time - possibly from its startup date and continuing until 1980, a period of more than 30 years. The 2010 Stantec report may well indicate other potential oil and gas sites that may have contributed to the local ground water contamination. However, that does not mean that Chevron is not responsible for the chloride plume given the known discharge of various waste waters by Getty at this site for such an extended period of time.

Chevron's Comment 4: Permit Condition 2.H: *Per the previous approved Groundwater Discharge Permit GW-004, dated March 16, 2008, Chevron conducted a chloride source investigation to identify potential source areas within the plant boundaries. Those activities were summarized in a report Eunice North Chlorides Investigation Report (Stantec, October 2010) which was submitted to NMOCD. Data presented within this report indicate dissolved chlorides are a regional groundwater issue, and the source of the chloride levels in groundwater is not associated with historical activities at the former plant location. Chevron recommends that chlorides be eliminated from the future monitoring and reporting plan for GW-004.*

OCD Response to Chevron's Comment 4: OCD did not make the requested change because Chevron is responsible for chloride contamination at its North Eunice Gas Plant (see OCD Response to Chevron's Comment 3 above).

OTHER CHANGES: OCD made other changes to Chevron's permit as a result of comments made by other operators on similar permits. These changes are as follows:

OCD Change 1: OCD revised Section 2 by correcting several incorrect subsections.

OCD Change 2: OCD revised Permit Condition 2.H (formerly 2.I) by removing GRO/DRO and TPH.

OCD APPROVAL OF DISCHARGE PERMIT RENEWAL: Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC, the Oil Conservation Division (OCD) hereby approves the discharge permit for Chevron (Owner/Operator) for the above referenced facility, as revised in response to Chevron's and others comments. Attached are two copies of the discharge permit. Please sign and return one copy to Oil Conservation Division's Santa Fe Office within 45 days of receipt of this letter including permit fees.

Please be advised that approval of this discharge permit does not relieve Chevron of responsibility if operations result in pollution of surface water, ground water, or the environment. Nor does approval of the discharge permit relieve Chevron of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If you have any questions, please contact Leonard Lowe of my staff at (505-476-3492) or E-mail leonard.lowe@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Jami Bailey
Director

JB/gvg

cc: Daniel Sanchez, OCD
Gabrielle Gerholt, OCD

Attachment (1)

ATTACHMENT 1

GW-004
Gen Corr 2007-1980
P.516

Getty

Getty Oil Company | P.O. Box 3000, Tulsa, Oklahoma 74102 • Telephone: (918) 560-6380

Natural Gas Plants Department

September 3, 1980

Not official.
Discussion copy
only.

State of New Mexico
Energy and Minerals Department
Water Quality Control Commission
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey
Director

Re: Water Discharge Plan
Getty Oil Company
Eunice No. 1 and No. 2 Gas Plants

Dear Mr. Ramey:

Eunice No. 1 Gas Plant:

1. Redirect process and waste water from unlined pits "A & B" to lined pit "C" before injecting into disposal well along with salt water.

2. Close pits "A" & "B".

3. Field oil pit "D" has already been closed.

Eunice No. 2 Gas Plant:

1. The process water and boiler blow down discharge will be routed to a new lined pit. The flow is estimated to be 500 GPD without steam tracing condensate. If during the period that steam tracing is required and the flow exceeds evaporation rates, the process water will be hauled to the Eunice No. 1 plant for injection into the disposal well. Unlined pit "E" will be closed. None of the above water is to be used to sprinkle grass.

2. (a) Cooling tower water blow down treatment will be changed from Chromate to Phosphates.

   (b) A variance is requested from present Water Quality Control Commission concentration limits to five (5) times the fresh water concentrations on total dissolved solids and chlorides for water that is used to sprinkle grass.

The fresh water supply runs from 255 to 300 mg/l and the total dissolved solids average about 1,800 mg/l.

The above variance would conserve the use of the Lea County ground water supply yet be an improvement over previous discharges at the Eunice No. 2 Gas Plant.

The cooling tower make-up during the summer at the No. 2 plant averages 800,000 gallons of water per week. Ninety-five percent of this water is supplied from Getty water wells with the remainder from City water supply. A variance of only two (2) concentrations would increase the water demand to 2,000,000 gallons per week.

The maximum output from the Eunice No. 2 Gas Plant water wells is 100 gpm or 1,008,000 gallons per week. A rate of 80 gpm would be maximum for extended periods of time.

Very truly yours,
GETTY OIL COMPANY

Charles R. York

CHARLES R. YORK
ENVIRONMENTAL COORDINATOR

CRY:sd

cc: Mr. J. H. Anderson)w/attach.
Mr. C. F. Gee)w/attach.
Mr. T. L. Trainor)w/attach.

Pampa, Texas 79065

REPORT OF ANALYSIS

SAMPLE SERIAL NO. 5708 ANALYSIS NO.

SAMPLE OF Process, Boiler Blowdown and Cooling Tower Blowdown

FROM: Eunice G.P. #2 ANALYSIS REQUESTED BY: C. R. York

SECURED BY: Boehmisch & York RESULTS TO: J. H. Anderson

DATE SECURED: 7-15-80 W. A. Smith

DATE RECEIVED: 7-16-80 C. R. York

ANALYSIS COMPLETED: 7-22-80 SS File

ANALYST: Gortmaker-Burgess NGPL File

CHECKED BY: JWB DATE: 7-22-80

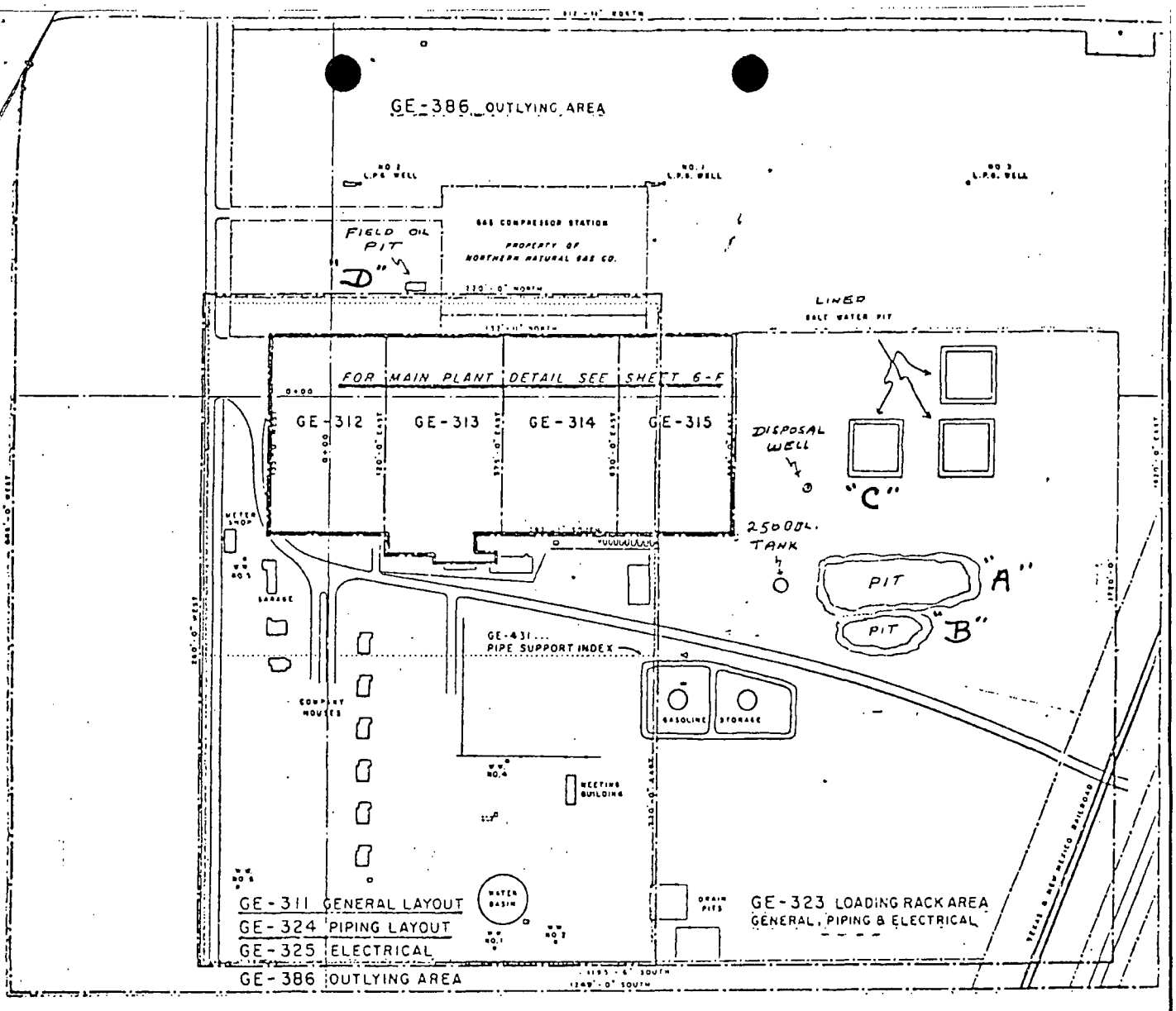
APPROVED BY: JWB DATE: 7-22-80 DATE OF REPORT: 7-23-80

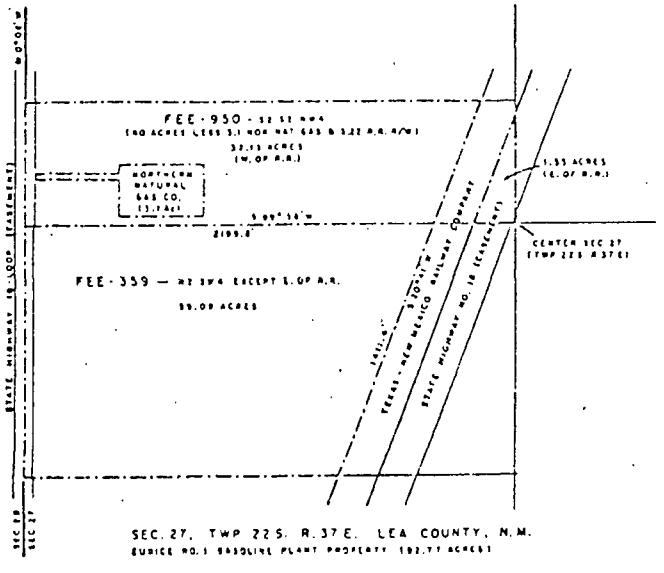
CORRECTED COPY

ANALYSIS

Effluent Characteristics	Process Water & Boiler Blowdown	Cooling Tower Blowdown	New Mexico Limits*
pH	9.35	6.30	6.0 - 9.0
BOD_5 mg/l	125.00	1.35	< 30
COD mg/l	560.00	96.50	< 125
Oil & grease mg/l	33.50	.30	---
Chromium mg/l	15.20	15.90	.05
Cadmium mg/l	.07	.04	.01
Silver mg/l	.02	.04	.05
Lead mg/l	.20	.25	.05
Chloride mg/l	3612.00	1318.00	250
Copper mg/l	.09	.09	1.00
Iron mg/l	.57	.30	1.00
Zinc mg/l	1.45	.72	10.00
Nickel mg/l	.12	.10	.20
T.D.S. µmhos/cm	10870.00	5850.00	10000.00

* The New Mexico limits will depend on which Water Quality Control regulations apply.



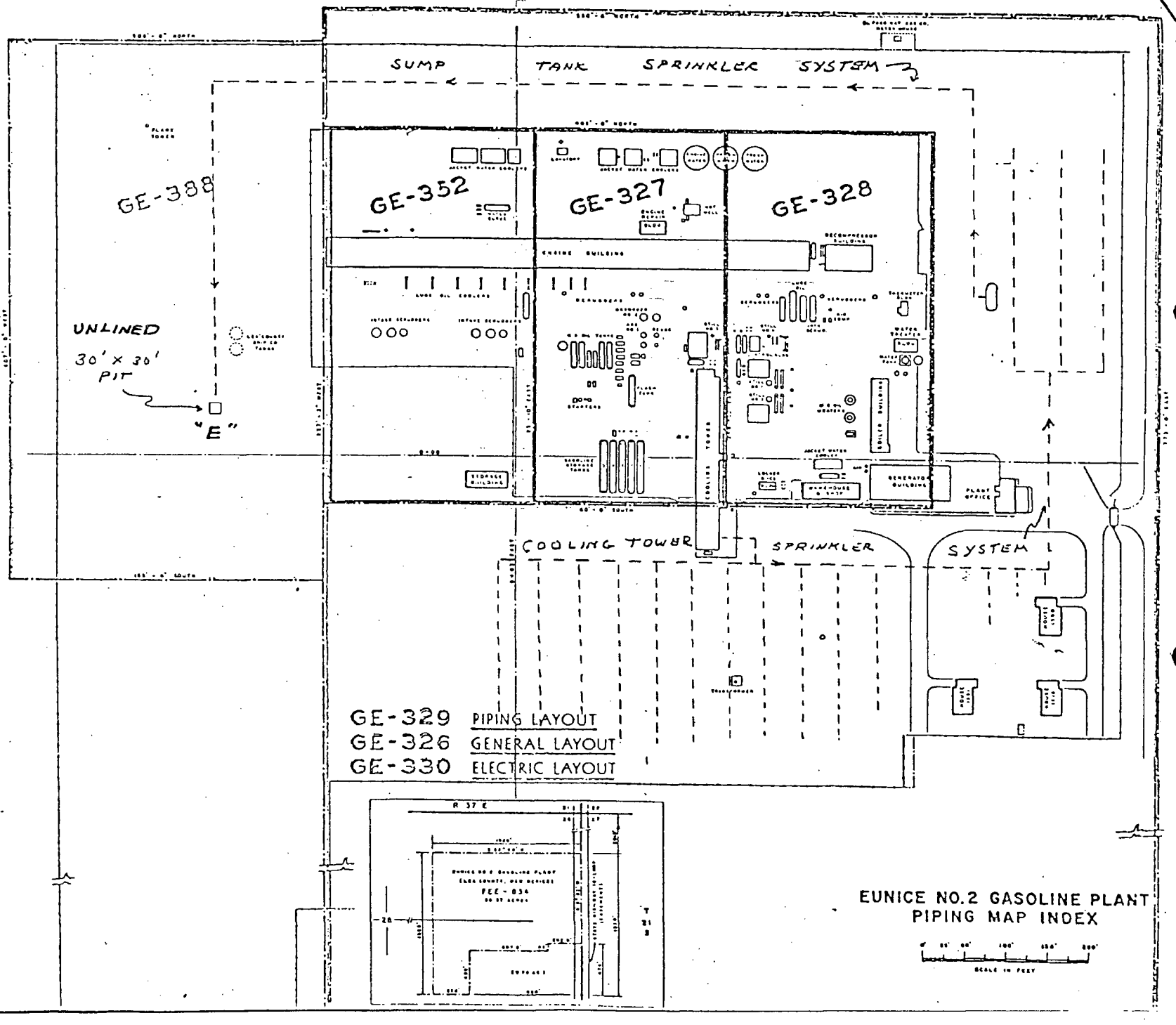


SEC. 27, TWP 22 S. R. 37 E. LEA COUNTY, N.M.
EUNICE NO. 1 GASOLINE PLANT PROPERTY 102.77 ACRES

EUNICE NO. 1 GASOLINE PLANT
PIPING MAP INDEX

100' 50' 0' 100' 200' 300' 400' 500'
SCALE IN FEET

6 - E


SUMP TANK SPRINKLER SYSTEM
GE-388
GE-352
GE-327
GE-328
UNLINED
30' X 30'
PIT
"E"
COOLING TOWER SPRINKLER SYSTEM
GE-329 PIPING LAYOUT
GE-326 GENERAL LAYOUT
GE-330 ELECTRIC LAYOUT
EUNICE NO. 2 GASOLINE PLANT
PIPING MAP INDEX

DISCHARGE PERMIT GW-004

1. GENERAL PROVISIONS:

A. PERMITTEE AND PERMITTED FACILITY: The Oil Conservation Division (OCD) of the Energy, Minerals and Natural Resources Department issues Discharge Permit GW-004 (Discharge Permit) to Chevron U.S.A., Inc. (Owner/Operator), located at 1400 Smith Street, Houston, Texas 77002 to abate ground water and vadose zone contamination at its Eunice North Gas Plant (Facility) located at State Highway 207 (Eunice-Hobbs Highway) Eunice, New Mexico 88231 in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.

As a result of historical operations at the site, Chevron is proposing to remediate chromium contaminated ground water by injecting 5 percent solution of sodium dithionite and/or a 10 percent soy lactate solution in injection wells to remediate contaminated ground water. Chevron will mix 2800 gallons fresh water with a five percent solution of sodium dithionite and/or mix 2800 gallons fresh water with ten percent soy lactate solution to generate a solution which will then be discharged into the Ogallala aquifer. The ground water will be sampled to determine the effectiveness of the discharged solution to remediate the chromium contamination. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1,200 mg/L. The discharge plan specifies that Chevron will remediate contaminated ground at the site to meet the standards specified in the Water Quality Control Commission regulations (20.6.2.3103 NMAC).

B. SCOPE OF PERMIT: OCD has been granted authority to administer the Water Quality Act (Chapter 74, Article 6 NMSA 1978) as it applies to gas processing plants by statute and by delegation from the Water Quality Control Commission pursuant to Section 74-6-4(E) NMSA 1978.

The Water Quality Act and the rules issued under that Act protect ground water and surface water of the State of New Mexico by providing that, unless otherwise allowed by rule, no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless such discharge is pursuant to an approved discharge plan. See 20.6.2.3104 NMAC and 20.6.2.3106 NMAC.

This Discharge Permit does not authorize any treatment of, or on-site disposal of, any materials, product, by-product, or oil field waste, including, but not limited to, the on-site disposal of lube oil, glycol, antifreeze, filters, elemental sulfur, washdown water, contaminated soil, and cooling tower blowdown water.

This Discharge Permit does not convey any property rights of any sort nor any exclusive privilege, and does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of state, federal, or local laws, rules or regulations.

The Owner/Operator shall operate in accordance with the Discharge Permit conditions to comply with the Water Quality Act and the rules issued pursuant to that Act, so that neither a hazard to public health nor undue risk to property will result (see 20.6.2.3109C NMAC); so that no discharge will cause or may cause any stream standard to be violated (see 20.6.2.3109H(2) NMAC); so that no discharge of any water contaminant will result in a hazard to public health, (see 20.6.2.3109H(3) NMAC); and so that the numerical standards specified of 20.6.2.3103 NMAC are not exceeded.

The Owner/Operator shall not allow or cause water pollution, discharge, or release of any water contaminant that exceeds the Water Quality Control Commission (WQCC) standards specified at 20.6.2.3101 NMAC and 20.6.2.3103 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams).

C. DISCHARGE PERMIT CONDITIONS: By signing this Discharge Permit, the Owner/Operator agrees to the specific provisions set out in this document, and the commitments made in the approved Discharge Plan Application and the attachments to that application, which are incorporated into the Discharge Permit by reference.

If this Discharge Permit is a permit renewal, it replaces the permit being renewed. Replacement of a prior permit does not relieve the Owner/Operator of its responsibility to comply with the terms of that prior permit while that permit was in effect.

D. DEFINITIONS: Terms not specifically defined in this Discharge Permit shall have the same meanings as those in the Water Quality Act or the rules adopted pursuant to that Act, as the context requires.

E. FILING FEES AND PERMIT FEES: Pursuant to 20.6.2.3114 NMAC, every facility that submits a discharge permit application for initial approval or renewal shall pay the permit fees specified in Table 1 and the filing fee specified in Table 2 of 20.6.2.3114 NMAC. OCD has already received the required $100.00 filing fee for this application. The flat fee for "Abatement of Ground Water and Vadose Zone Contamination at Oil and Gas Sites" is $2,600.00. The Owner/Operator shall submit this amount along with the signed Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

F. EFFECTIVE DATE, EXPIRATION, RENEWAL CONDITIONS, AND PENALTIES FOR OPERATING WITHOUT A DISCHARGE PERMIT: This Discharge Permit is effective when the Division's Environmental Bureau receives the signed Discharge Permit from the Owner/Operator and the $2,600.00 fee. This Discharge Permit will expire on March 16, 2016. The Owner/Operator shall submit an application for renewal no later than 120 calendar days before that expiration date, pursuant to 20.6.2.3106F NMAC. If an Owner/Operator submits a renewal application at least 120 calendar days before the Discharge Permit expires and is in compliance with the approved Discharge Permit, then the existing Discharge Permit will not expire until OCD has approved or disapproved the renewal application. Operating with an expired Discharge Permit may subject the Owner/Operator to

civil and/or criminal penalties. See Section 74-6-10.1 NMSA 1978 and Section 74-6-10.2 NMSA 1978.

G. MODIFICATIONS: The Owner/Operator shall notify the Division's Environmental Bureau of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants. See 20.6.2.3107C NMAC. The Division's Environmental Bureau may require the Owner/Operator to submit a permit modification pursuant to 20.6.2.3109E NMAC and may modify or terminate a permit pursuant to Section 74-6-5(M) through (N) NMSA 1978.

H. TRANSFER OF DISCHARGE PERMIT: Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of the Facility, the transferor shall notify the transferee in writing of the existence of the Discharge Permit, and shall deliver or send by certified mail to the Division's Environmental Bureau a copy of such written notification, together with a certification or other proof that such notification has been received by the transferee pursuant to 20.6.2.3111 NMAC. Upon receipt of such notification, the transferee shall inquire into all of the provisions and requirements contained in the Discharge Permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the Division's file or files concerning the Discharge Permit. Upon assuming either ownership or possession of the Facility the transferee shall have the same rights and responsibilities under the Discharge Permit as were applicable to the transferor. See 20.6.2.3111 NMAC.

Transfer of the ownership, control, or possession of the Facility does not relieve the transferor of responsibility or liability for any act or omission which occurred while the transferor owned, controlled, or was in possession of the Facility. See 20.6.2.3111E NMAC.

I. CLOSURE PLAN AND FINANCIAL ASSURANCE: The Owner/Operator shall notify the Division's Environmental Bureau in writing when any operations of its Facility are to be discontinued for a period in excess of six months. Upon review of the Owner/Operator's notice, the Division's Environmental Bureau will determine whether to modify this permit pursuant to 20.6.2.3107 NMAC and 20.6.2.3109E NMAC or to require the Owner/Operator to submit a closure plan and/or post-closure plan, including financial assurance.

J. COMPLIANCE AND ENFORCEMENT: If the Owner/Operator violates or is violating a condition of this Discharge Permit, the Division's Environmental Bureau may issue a compliance order requiring compliance immediately or within a specified time period, suspending or terminating this Discharge Permit, and/or assessing a civil penalty. See Section 74-6-10 NMSA 1978. The Division's Environmental Bureau may also commence a civil action in district court for appropriate relief, including injunctive relief. See Section 74-6-10(A)(2) NMSA 1978 and Section 74-6-11 NMSA 1978. The Owner/Operator may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with

or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. See Section 74-6-10.2 NMSA 1978.

2. GENERAL FACILITY OPERATIONS:

A. OPERATIONAL MONITORING: The Owner/Operator shall comply with its approved monitoring programs pursuant 20.6.2.3107 NMAC.

1. Ground Water Monitoring System: The Owner/Operator shall monitor and sample all ground water monitor wells in accordance with its approved ground water abatement program, including the monitor wells for the hydrocarbon plume, the chloride plume, and the chromium plume.

2. Installation of Monitor Wells Near Injection Wells IW023 and IW024:

a. The Owner/Operator shall install three monitor wells near Injection Well IW023 and three monitor wells near Injection Well IW024 in accordance with its renewal application of December 6, 2010.

b. The Owner/Operator shall monitor the near monitor wells to determine whether it has achieved its primary objectives as specified in its renewal application of December 6, 2010.

3. Dithionite Injection Pilot Study Monitoring

a. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitoring wells hourly for pH, DO, ORP, conductivity, and temperature.

b. Post-Injection Monitoring and Sampling: The Owner/Operator shall sample the three monitor wells and IW023 monthly for 3 months after the injection, using the injection and monitoring wells, to evaluate the effectiveness of the sodium dithionite treatment. Ground water samples will be collected and analyzed for total and hexavalent chromium, bromide, sulfate, sulfide, total organic carbon, sodium, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO and ORP).

4. Biodegradation Pilot Study

a. Baseline Sampling: Prior to the injection of a soy-lactate solution, the Owner/Operator shall sample and analyze IW023 and the three monitoring wells for total and hexavalent chromium, sulfate, sulfide, ammonia-nitrogen, orthophosphate-phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

b. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitor wells hourly for pH, DO, ORP, conductivity, and temperature.

c. Post -Injection Monitoring and Sampling: The Owner/Operator shall sample the IW024 and the three monitoring wells to evaluate the treatment effectiveness. Ground water samples will be collected for successive quarters after the injection event and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate - phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

B. CONTINGENCY PLANS: The Owner/Operator shall implement its approved Contingency Plans to cope with failure of the discharge permit or system in accordance with Permit Condition 2.F.

C. CLOSURE PLAN: After completing abatement of all ground water and vadose contamination required under Permit Condition 2.G, the Owner/Operator shall perform the following closure measures:

1. Remove or plug all lines leading to and from ground water recovery or injection wells so that a discharge can no longer occur.

2. Remove all abatement system components from the site, if applicable.

3. After receiving notification from the Division's Environmental Bureau that post-closure monitoring may cease, the Owner/Operator shall plug and abandon its monitor well(s).

D. RECORD KEEPING: The Owner/Operator shall maintain records of all inspections required by this Discharge Permit at its local office located at 240 Avenue O, Eunice, NM 88231 for a minimum of five years and shall make those records available for inspection by the Division's Environmental Bureau.

E. RELEASE REPORTING: The Owner/Operator shall comply with the following permit conditions, pursuant to 20.6.2.1203 NMAC, if it determines that a release of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, has occurred. The Owner/Operator shall report unauthorized releases of water contaminants in accordance with any additional commitments made in its approved Contingency Plan. If the Owner/Operator determines that any constituent exceeds the standards specified at 20.6.2.3103 NMAC, then it shall report a release to the Division's Environmental Bureau.

1. Oral Notification: As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, the Owner/Operator shall orally notify the Division's Environmental Bureau. The Owner/Operator shall provide the following:

- the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Owner/Operator of the facility;
- the name and location of the facility;

- the date, time, location, and duration of the discharge;
- the source and cause of discharge;
- a description of the discharge, including its chemical composition;
- the estimated volume of the discharge; and,
- any actions taken to mitigate immediate damage from the discharge.

2. **Written Notification:** Within one week after the Owner/Operator has learned of the discharge, the Owner/Operator shall send written notification to the Division's Environmental Bureau verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.

F. ABATEMENT PLAN: Pursuant to 20.6.2.4105A(6) NMAC, an Owner/Operator is exempt from the requirement to obtain and implement an Abatement Plan, as required in 20.6.2.4104 NMAC. However, an Owner/Operator's Discharge Permit must address abatement of contaminated ground water and be consistent with the requirements and provisions of Sections 20.6.2.4101, 20.6.2.4103, Subsections C and E of Section 20.6.2.4106, Sections 20.6.2.4107 and 20.6.2.4112 NMAC.

1. **Purpose of Abatement Plan:** The Owner/Operator shall abate polluted ground water so as to either remediate or protect the ground water for use as domestic and agricultural water supply.

2. **Abatement Standards and Requirements:** The Owner/Operator shall abate the vadose zone so that water contaminants in the vadose zone shall not contaminate ground water or surface water, through leaching, percolation or as the water table elevation fluctuates. The Owner/Operator, where the Total Dissolved Solids concentration is 10,000 mg/L or less, shall abate contaminated ground water so that toxic pollutant(s), as defined in 20.6.2.7WW NMAC, shall not be present and so that the standards of 20.6.2.3103 NMAC shall be met.

3. **Ground Water Abatement:** The Owner/Operator shall implement its approved ground water abatement program until it has remediated the contaminated ground water to meet the standards and requirements set forth in 20.6.2.4103 NMAC.

4. **Completion and Termination:** Pursuant to 20.6.2.4112 NMAC, abatement shall be considered complete when the standards and requirements specified in 20.6.2.4103 NMAC are met. At that time, the Owner/Operator shall submit an abatement completion report, documenting compliance with the standards and requirements set forth in 20.6.2.4103 NMAC and this Discharge Permit, to Division's Environmental Bureau for approval. The abatement completion report also shall propose any changes to long term monitoring and site maintenance activities, if needed, to be performed after termination of the abatement plan.

G. OTHER REQUIREMENTS:

1. Inspection and Entry: Pursuant to 20.6.2.4107A NMAC, the Owner/Operator shall allow the Division's Environmental Bureau, upon the presentation of proper credentials, to:

- enter the facility at reasonable times;
- inspect and copy records required by this discharge permit;
- inspect any treatment works, monitoring, and analytical equipment;
- sample any wastes, ground water, surface water, stream sediment, plants, animals, or vadose-zone material including vadose-zone vapor;
- use the Owner/Operator's monitoring systems and wells in order to collect samples; and
- gain access to off-site property not owned or controlled by the Owner/Operator, but accessible to the Owner/Operator through a third-party access agreement, provided that it is allowed by the agreement.

2. Advance Notice: Pursuant to 20.6.2.4107B NMAC, The Owner/Operator shall provide the Division's Environmental Bureau with at least four (4) working days advance notice of any sampling to be performed pursuant to this Discharge Permit, or any well plugging, abandonment or destruction at the facility site.

3. Plugging and Abandonment: Pursuant to 20.6.2.4107C NMAC, the Owner/Operator shall request by certified mail, approval by the Division's Environmental Bureau to plug and abandon a monitor well, unless such approval is required from the State Engineer. The proposed action shall be designed to prevent water pollution that could result from water contaminants migrating through the well or borehole. The proposed action shall not take place without written approval from the Division's Environmental Bureau, unless written approval or disapproval is not received by the Owner/Operator within thirty (30) days of the date of receipt of the proposal.

H. ANNUAL REPORT: The Owner/Operator shall submit its annual report for each calendar year pursuant to 20.6.2.3107 NMAC to the Division's Environmental Bureau by March 15th of the following year. The annual report shall include the following:

1. Results of its ground water monitoring program; including:

- summary tables listing laboratory analytic results of all ground water and soil samples. Any WQCC constituent found to exceed the groundwater standard shall be highlighted and noted in the annual report. Copies of the most recent year's laboratory analytical data sheets shall also be submitted.
- annual water table potentiometric maps. A corrected water table elevation shall be determined for all wells containing non-aqueous phase liquids. These maps shall show well locations, pertinent site features, and the direction and magnitude of the hydraulic gradient.
- semi-annual isopleth maps for the following constituents: non-aqueous phase liquids; chlorides; chromium; and, BTEX.

- semi-annual geologic cross-sections (both dip and strike), using the geologic/lithologic logs from the monitor, recovery, and injection wells, depicting the concentrations for the following constituents: non-aqueous phase liquids; chlorides; chromium; and, BTEX.
- estimate or measure of the volume of the solutions discharged during each quarter and the total volume discharged to date.

2. Summary of any releases and corrective actions taken in accordance with its approved Contingency Plan.

3. **CLASS V WELLS:** Pursuant to 20.6.2.5002B NMAC, leach fields and other wastewater disposal systems at Division-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking water are UIC Class V injection wells, including ground water management wells. This Discharge Permit does not authorize the use of a Class V injection well for the disposal of industrial waste at the Facility. Pursuant to 20.6.2.5005 NMAC, the Owner/Operator shall close any Class V industrial waste injection wells at its Facility that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes (*e.g.,* septic systems, leach fields, dry wells, *etc.*) other than the injection remediation wells within 90 calendar days of the issuance of this Discharge Permit. The Owner/Operator shall document the closure of any Class V wells used for the disposal of non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes other than contaminated ground water in its Annual Report.

Other Class V wells, including wells used only for the injection of domestic wastes, must be permitted by the New Mexico Environment Department.

4. **SCHEDULE OF COMPLIANCE:**

A. PERMIT CERTIFICATION: The Owner/Operator shall sign and return this Permit to the Division's Environmental Bureau within 45 days of its receipt of this Permit.

B. SUBMISSION OF THE PERMIT FEES: As specified in Permit Condition 1.F, the Owner/Operator shall submit the fee of $2,600.00 along with the signed Discharge Permit within 45 days of the receipt of the Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

C. ANNUAL REPORT: As specified in Permit Condition 2.H, the Owner/Operator shall submit its annual report to the Division's Environmental Bureau by March 15th of the following year.

5. CERTIFICATION: (OWNER/OPERATOR) by the officer whose signature appears below, acknowledges receipt of this Discharge Permit, and has reviewed its terms and conditions.

_____
Company Name - print name

_____
Company Representative - print name

_____
Company Representative - Signature

Title:_____

Date: _____

Matthew P. Hudson
Remediation Project Manager

Upstream Business Unit
Chevron Environmental Management Company
1400 Smith St
Room 07076
Houston, TX 77002
Tel 713 372 9207
mhudson@chevron.com

September 28, 2011

Mr. Leonard Lowe
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1200 South Francis Drive
Santa Fe, New Mexico 87505

RE: Comments on DRAFT Approval for Discharge Plan Renewal Permit GW-004
Former Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. Lowe:

Chevron U.S.A. Inc (Chevron) is please to provide the New Mexico Oil Conservation Division (NMOCD) comments to the DRAFT Approval Discharge Plan Renewal Permit GW-004 for the former Eunice North Gas Plant. The plant is located approximately 0.25 miles north of Eunice in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.

Specific comments to items in the Draft Discharge Permit:

1. 1.A *Permittee and Permitted Facility*

   Comment – There appears to be a typo/missing word in the last sentence of the second paragraph, which should read "The discharge plan specifies that Chevron will remediate ground water at the site..." (the word "water" appears to be missing).

2. 1.E *Filing Fees and Permit Fees*

   Currently Stated – "OCD has not received the required $100.00 filing fee for this application."

   Comment – The NMOCD's Discharge Plan Renewal cover letter dated August 15, 2011 acknowledges that the "OCD has received Chevron's request and **initial fee** to renew GW-004." The $100.00 application fee was submitted by Chevron with the application in December 2010, and a receipt of the filing fee has been posted to the NMOCD's website. Please verify that the initial application fee was included with the renewal application.

3. *2.A.1. Ground Water Monitoring System*

   Currently Stated - "The Owner/Operator shall monitor and sample all ground waste monitor wells in accordance with its approved ground water abatement program, including the monitor wells for the hydrocarbon plume, **the chloride plume**, and the chromium plume."

4. *2.I.1. Third Bullet Item- Annual Report*

   Currently Stated - "Semi-annual isopleths maps for the following constituents: non-aqueous phase liquids; **chlorides**; GRO/DRO; Chromium; and, BTEX."

   Comments to both sections referenced above (2.A.1. & 2.I.1.)

   Per the previous approved Groundwater Discharge Permit GW-004, dated March 16, 2008, Chevron conducted a chloride source investigation to identify potential source areas within the plant boundaries. Those activities were summarized in a report *Eunice North Chlorides Investigation Report* (Stantec, October 2010) which was submitted to NMOCD. Data presented within this report indicate dissolved chlorides are a regional groundwater issue, and the source of the chloride levels in groundwater is not associated with historical activities at the former plant location. Chevron recommends that chlorides be eliminated from the future monitoring and reporting plan for GW-004.

Should you have any questions or concerns, please do not hesitate to contact me at (713) 372-9207.

Sincerely,

Matthew P. Hudson

Enclosure

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

AUGUST 15, 2011

Mr. Matt Hudson
Chevron U.S.A, Inc.
1400 Smith Street, Room 40028
Houston, TX 77002

Re: Discharge Plan Renewal Permit GW-004
Chevron U.S.A, Inc. Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. Hudson:

The Oil Conservation Division (OCD) has received Chevron's request and initial fee to renew GW-004 for their Eunice North Gas Plant located in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The initial submittal provided the required information in order to deem the application "administratively" complete.

Therefore, the Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to OCD. OCD will provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3492 or leonard.lowe@state.nm.us. On behalf of the staff of the NMOCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Leonard Lowe
Environmental Engineer

LRL/lrl
xc: OCD District III Office, Aztec

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

AUGUST 15, 2011

CERTIFIED MAIL
RETURN RECEIPT NO: 0919 5815

Mr. Matt Hudson
Chevron U.S.A, Inc.
1400 Smith Street, Room 40028
Houston, TX 77002

Re: Draft Approval for Discharge Plan Renewal Permit GW-004
Chevron U.S.A, Inc. Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. Hudson:

Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC, the Oil Conservation Division (OCD) hereby proposes to approve the renewal of Chevron's (Owner/Operator) discharge permit for the above referenced facility contingent upon the conditions specified in the attached draft Discharge Permit. Please review and provide comments to OCD on the draft Discharge Permit within 45 days of receipt of this letter.

If you have any questions, please contact Leonard Lowe of my staff at (505-476-3492) or E-mail leonard.lowe@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Glenn von Gonten
Acting Environmental Bureau Chief

GvG/gvg

DISCHARGE PERMIT GW-004

1. GENERAL PROVISIONS:

A. PERMITTEE AND PERMITTED FACILITY: The Oil Conservation Division (OCD) of the Energy, Minerals and Natural Resources Department issues Discharge Permit GW-004 (Discharge Permit) to Chevron U.S.A., Inc. (Owner/Operator), located at 1400 Smith Street, Houston, Texas 77002 to abate ground water and vadose zone contamination at its Eunice North Gas Plant (Facility) located at State Highway 207 (Eunice-Hobbs Highway) Eunice, New Mexico 88231 in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.

As a result of historical operations at the site, Chevron is proposing to remediate chromium contaminated ground water by injecting 5 percent solution of sodium dithionite and/or a 10 percent soy lactate solution in injection wells to remediate contaminated ground water. Chevron will mix 2800 gallons fresh water with a five percent solution of sodium dithionite and/or mix 2800 gallons fresh water with ten percent soy lactate solution to generate a solution which will then be discharged into the Ogallala aquifer. The ground water will be sampled to determine the effectiveness of the discharged solution to remediate the chromium contamination. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1,200 mg/L. The discharge plan specifies that Chevron will remediate contaminated ground at the site to meet the standards specified in the Water Quality Control Commission regulations (20.6.2.3103 NMAC).

B. SCOPE OF PERMIT: OCD has been granted authority to administer the Water Quality Act (Chapter 74, Article 6 NMSA 1978) as it applies to gas processing plants by statute and by delegation from the Water Quality Control Commission pursuant to Section 74-6-4(E) NMSA 1978.

The Water Quality Act and the rules issued under that Act protect ground water and surface water of the State of New Mexico by providing that, unless otherwise allowed by rule, no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless such discharge is pursuant to an approved discharge plan. See 20.6.2.3104 NMAC and 20.6.2.3106 NMAC.

This Discharge Permit does not authorize any treatment of, or on-site disposal of, any materials, product, by-product, or oil field waste, including, but not limited to, the on-site disposal of lube oil, glycol, antifreeze, filters, elemental sulfur, washdown water, contaminated soil, and cooling tower blowdown water.

This Discharge Permit does not convey any property rights of any sort nor any exclusive privilege, and does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of state, federal, or local laws, rules or regulations.

The Owner/Operator shall operate in accordance with the Discharge Permit conditions to comply with the Water Quality Act and the rules issued pursuant to that Act, so that neither a hazard to public health nor undue risk to property will result (see 20.6.2.3109C NMAC); so that no discharge will cause or may cause any stream standard to be violated (see 20.6.2.3109H(2) NMAC); so that no discharge of any water contaminant will result in a hazard to public health, (see 20.6.2.3109H(3) NMAC); and so that the numerical standards specified of 20.6.2.3103 NMAC are not exceeded.

The Owner/Operator shall not allow or cause water pollution, discharge, or release of any water contaminant that exceeds the Water Quality Control Commission (WQCC) standards specified at 20.6.2.3101 NMAC and 20.6.2.3103 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams).

C. DISCHARGE PERMIT CONDITIONS: By signing this Discharge Permit, the Owner/Operator agrees to the specific provisions set out in this document, and the commitments made in the approved Discharge Plan Application and the attachments to that application, which are incorporated into the Discharge Permit by reference.

If this Discharge Permit is a permit renewal, it replaces the permit being renewed. Replacement of a prior permit does not relieve the Owner/Operator of its responsibility to comply with the terms of that prior permit while that permit was in effect.

D. DEFINITIONS: Terms not specifically defined in this Discharge Permit shall have the same meanings as those in the Water Quality Act or the rules adopted pursuant to those Act, as the context requires.

E. FILING FEES AND PERMIT FEES: Pursuant to 20.6.2.3114 NMAC, every facility that submits a discharge permit application for initial approval or renewal shall pay the permit fees specified in Table 1 and the filing fee specified in Table 2 of 20.6.2.3114 NMAC. OCD has not received the required $100.00 filing fee for this application. The flat fee for "Abatement of Ground Water and Vadose Zone Contamination at Oil and Gas Sites" is $2,600.00. The Owner/Operator shall submit this amount along with the signed Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

F. EFFECTIVE DATE, EXPIRATION, RENEWAL CONDITIONS, AND PENALTIES FOR OPERATING WITHOUT A DISCHARGE PERMIT: This Discharge Permit is effective when the Division's Environmental Bureau receives the signed Discharge Permit from the Owner/Operator and the $2,700.00 fee. This Discharge Permit will expire on March 16, 2016. The Owner/Operator shall submit an application for renewal no later than 120 calendar days before that expiration date, pursuant to 20.6.2.3106F NMAC. If an Owner/Operator submits a renewal application at least 120 calendar days before the Discharge Permit expires and is in compliance with the approved Discharge Permit, then the existing Discharge Permit will not expire until OCD has approved or disapproved the renewal application. Operating with an expired Discharge Permit may subject the Owner/Operator to

civil and/or criminal penalties. See Section 74-6-10.1 NMSA 1978 and Section 74-6-10.2 NMSA 1978.

G. MODIFICATIONS: The Owner/Operator shall notify the Division's Environmental Bureau of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants. See 20.6.2.3107C NMAC. The Division's Environmental Bureau may require the Owner/Operator to submit a permit modification pursuant to 20.6.2.3109E NMAC and may modify or terminate a permit pursuant to Section 74-6-5(M) through (N) NMSA 1978.

H. TRANSFER OF DISCHARGE PERMIT: Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of the Facility, the transferor shall notify the transferee in writing of the existence of the Discharge Permit, and shall deliver or send by certified mail to the Division's Environmental Bureau a copy of such written notification, together with a certification or other proof that such notification has been received by the transferee pursuant to 20.6.2.3111 NMAC. Upon receipt of such notification, the transferee shall inquire into all of the provisions and requirements contained in the Discharge Permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the Division's file or files concerning the Discharge Permit. Upon assuming either ownership or possession of the Facility the transferee shall have the same rights and responsibilities under the Discharge Permit as were applicable to the transferor. See 20.6.2.3111 NMAC.

Transfer of the ownership, control, or possession of the Facility does not relieve the transferor of responsibility or liability for any act or omission which occurred while the transferor owned, controlled, or was in possession of the Facility. See 20.6.2.3111E NMAC.

I. CLOSURE PLAN AND FINANCIAL ASSURANCE: The Owner/Operator shall notify the Division's Environmental Bureau in writing when any operations of its Facility are to be discontinued for a period in excess of six months. Upon review of the Owner/Operator's notice, the Division's Environmental Bureau will determine whether to modify this permit, pursuant to 20.6.2.3107 NMAC and 20.6.2.3109E NMAC, to require the Owner/Operator to submit a closure plan and/or post-closure plan, including financial assurance.

J. COMPLIANCE AND ENFORCEMENT: If the Owner/Operator violates or is violating a condition of this Discharge Permit, the Division's Environmental Bureau may issue a compliance order requiring compliance immediately or within a specified time period, suspending or terminating this Discharge Permit, and/or assessing a civil penalty. See Section 74-6-10 NMSA 1978. The Division's Environmental Bureau may also commence a civil action in district court for appropriate relief, including injunctive relief. See Section 74-6-10(A)(2) NMSA 1978 and Section 74-6-11 NMSA 1978. The Owner/Operator may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with

or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. See Section 74-6-10.2 NMSA 1978.

2. GENERAL FACILITY OPERATIONS:

A. OPERATIONAL MONITORING: The Owner/Operator shall comply with its approved monitoring programs pursuant 20.6.2.3107 NMAC.

1. Ground Water Monitoring System: The Owner/Operator shall monitor and sample all ground waste monitor wells in accordance with its approved ground water abatement program, including the monitor wells for the hydrocarbon plume, the chloride plume, and the chromium plume.

2. Installation of Monitor Wells Near Injection Wells IW023 and IW024:

a. The Owner/Operator shall install three monitor wells near Injection Well IW023 and three monitor wells near Injection Well IW024 in accordance with its renewal application of December 6, 2010.

b. The Owner/Operator shall monitor the near monitor wells to determine whether it has achieved its primary objectives as specified in its renewal application of December 6, 2010.

3. Dithionite Injection Pilot Study Monitoring

a. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitoring wells hourly for pH, DO, ORP, conductivity, and temperature.

b. Post-Injection Monitoring and Sampling: The Owner/Operator shall sample the three monitor wells and IW023 monthly for 3 months after the injection, using the injection and monitoring wells, to evaluate the effectiveness of the sodium dithionite treatment. Ground water samples will be collected and analyzed for total and hexavalent chromium, bromide, sulfate, sulfide, total organic carbon, sodium, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO and ORP).

4. Biodegradation Pilot Study

a. Baseline Sampling: Prior to the injection of a soy-lactate solution, the Owner/Operator shall sample and analyze IW023 and the three monitoring wells for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate -phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

b. Field Monitoring: During the injection, the Owner/Operator shall monitor the three monitor wells hourly for pH, DO, ORP, conductivity, and temperature.

c. Post -Injection Monitoring and Sampling: The Owner/Operator shall sample the IW024 and the three monitoring wells to evaluate the treatment effectiveness. Ground water samples will be collected for successive quarters after the injection event and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate - phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

B. CONTINGENCY PLANS: The Owner/Operator shall implement its approved Contingency Plans to cope with failure of the discharge permit or system in accordance with Permit Condition 2.F.

C. CLOSURE PLAN: After completing abatement of all ground water and vadose contamination required under Permit Condition 2.G, the Owner/Operator shall perform the following closure measures:

1. Remove or plug all lines leading to and from ground water recovery or injection wells so that a discharge can no longer occur.

2. Remove all abatement system components from the site, if applicable.

3. After receiving notification from the Division's Environmental Bureau that post-closure monitoring may cease, the Owner/Operator shall plug and abandon its monitor well(s).

D. RECORD KEEPING: The Owner/Operator shall maintain records of all inspections required by this Discharge Permit at its local office located at 240 Avenue O, Eunice, NM 88231 for a minimum of five years and shall make those records available for inspection by the Division's Environmental Bureau.

F. RELEASE REPORTING: The Owner/Operator shall comply with the following permit conditions, pursuant to 20.6.2.1203 NMAC, if it determines that a release of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, has occurred. The Owner/Operator shall report unauthorized releases of water contaminants in accordance with any additional commitments made in its approved Contingency Plan. If the Owner/Operator determines that any constituent exceeds the standards specified at 20.6.2.3103 NMAC, then it shall report a release to the Division's Environmental Bureau.

1. Oral Notification: As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, the Owner/Operator shall orally notify the Division's Environmental Bureau. The Owner/Operator shall provide the following:

- the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Owner/Operator of the facility;
- the name and location of the facility;

- the date, time, location, and duration of the discharge;
- the source and cause of discharge;
- a description of the discharge, including its chemical composition;
- the estimated volume of the discharge; and,
- any actions taken to mitigate immediate damage from the discharge.

2. **Written Notification:** Within one week after the Owner/Operator has learned of the discharge, the Owner/Operator shall send written notification to the Division's Environmental Bureau verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.

G. ABATEMENT PLAN: Pursuant to 20.6.2.4105A(6) NMAC, an Owner/Operator is exempt from the requirement to obtain and implement an Abatement Plan, as required in 20.6.2.4104 NMAC. However, an Owner/Operator's Discharge Permit must address abatement of contaminated ground water and be consistent with the requirements and provisions of Sections 20.6.2.4101, 20.6.2.4103, Subsections C and E of Section 20.6.2.4106, Sections 20.6.2.4107 and 20.6.2.4112 NMAC.

1. **Purpose of Abatement Plan:** The Owner/Operator shall abate polluted ground water so as to either remediate or protect the ground water for use as domestic and agricultural water supply.

2. **Abatement Standards and Requirements:** The Owner/Operator shall abate the vadose zone so that water contaminants in the vadose zone shall not contaminate ground water or surface water, through leaching, percolation or as the water table elevation fluctuates. The Owner/Operator, where the Total Dissolved Solids concentration is 10,000 mg/L or less, shall abate contaminated ground water so that toxic pollutant(s), as defined in 20.6.2.7WW NMAC, shall not be present and so that the standards of 20.6.2.3103 NMAC shall be met.

3. **Ground Water Abatement:** The Owner/Operator shall implement its approved ground water abatement program until it has remediated the contaminated ground water to meet the standards and requirements set forth in 20.6.2.4103 **NMAC**

4. **Completion and Termination:** Pursuant to 20.6.2.4112 NMAC, abatement shall be considered complete when the standards and requirements specified in 20.6.2.4103 NMAC are met. At that time, the Owner/Operator shall submit an abatement completion report, documenting compliance with the standards and requirements set forth in 20.6.2.4103 **NMAC** and this Discharge Permit, to Division's Environmental Bureau for approval. The abatement completion report also shall propose any changes to long term monitoring and site maintenance activities, if needed, to be performed after termination of the abatement plan.

H. OTHER REQUIREMENTS:

1. **Inspection and Entry:** Pursuant to 20.6.2.4107A NMAC, the Owner/Operator shall allow the Division's Environmental Bureau, upon the presentation of proper credentials, to:

- enter the facility at reasonable times;
- inspect and copy records required by this discharge permit;
- inspect any treatment works, monitoring, and analytical equipment;
- sample any wastes, ground water, surface water, stream sediment, plants, animals, or vadose-zone material including vadose-zone vapor;
- use the Owner/Operator's monitoring systems and wells in order to collect samples; and
- gain access to off-site property not owned or controlled by the Owner/Operator, but accessible to the Owner/Operator through a third-party access agreement, provided that it is allowed by the agreement.

2. **Advance Notice:** Pursuant to 20.6.2.4107B NMAC, The Owner/Operator shall provide the Division's Environmental Bureau with at least four (4) working days advance notice of any sampling to be performed pursuant to this Discharge Permit, or any well plugging, abandonment or destruction at the facility site.

3. **Plugging and Abandonment:** Pursuant to 20.6.2.4107C NMAC, the Owner/Operator shall request by certified mail, approval by the Division's Environmental Bureau to plug and abandon a monitor well, unless such approval is required from the State Engineer. The proposed action shall be designed to prevent water pollution that could result from water contaminants migrating through the well or borehole. The proposed action shall not take place without written approval from the Division's Environmental Bureau, unless written approval or disapproval is not received by the Owner/Operator within thirty (30) days of the date of receipt of the proposal.

I. ANNUAL REPORT: The Owner/Operator shall submit its annual report pursuant to 20.6.2.3107 NMAC to the Division's Environmental Bureau by March 15th of each year. The annual report shall include the following:

1. Results of its ground water monitoring program; including:

- Summary tables listing laboratory analytic results of all ground water and soil samples. Any WQCC constituent found to exceed the groundwater standard shall be highlighted and noted in the annual report. Copies of the most recent year's laboratory analytical data sheets shall also be submitted.
- Annual water table potentiometric maps. A corrected water table elevation shall be determined for all wells containing non-aqueous phase liquids. These maps shall show well locations, pertinent site features, and the direction and magnitude of the hydraulic gradient.
- Semi-annual isopleth maps for the following constituents: non-aqueous phase liquids; chlorides; GRO/DRO; Chromium; and, BTEX.

- Semi-annual geologic cross-sections (both dip and strike), using the geologic/lithologic logs from the monitor, recovery, and injection wells, depicting the concentrations for the following constituents: non-aqueous phase liquids; chlorides; TPH; Chromium; and, BTEX.
- Estimate or measure of the volume of the solutions discharged during each quarter and the total volume discharged to date.

2. Summary of any releases and corrective actions taken in accordance with its approved Contingency Plan.

3. **CLASS V WELLS:** Pursuant to 20.6.2.5002B NMAC, leach fields and other wastewater disposal systems at Division-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking water are UIC Class V injection wells, including ground water management wells. This Discharge Permit does not authorize the use of a Class V injection well for the disposal of industrial waste at the Facility. Pursuant to 20.6.2.5005 NMAC, the Owner/Operator shall close any Class V industrial waste injection wells at its Facility that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes (*e.g.*, septic systems, leach fields, dry wells, *etc.*) other than the injection remediation wells within 90 calendar days of the issuance of this Discharge Permit. The Owner/Operator shall document the closure of any Class V wells used for the disposal of non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes other than contaminated ground water in its Annual Report.

Other Class V wells, including wells used only for the injection of domestic wastes, must be permitted by the New Mexico Environment Department.

4. **SCHEDULE OF COMPLIANCE:**

A. **PERMIT CERTIFICATION:** The Owner/Operator shall sign and return this Permit to the Division's Environmental Bureau within 30 days of its receipt of this Permit.

B. **SUBMISSION OF THE PERMIT FEES:** As specified in Permit Condition 1.F, the Owner/Operator shall submit the fee of $2,700.00 along with the signed Discharge Permit within 30 days of the receipt of the Discharge Permit. Checks should be payable to the **"New Mexico Water Quality Management Fund,"** not the Oil Conservation Division.

C. **ANNUAL REPORT:** As specified in Permit Condition 2.I, the Owner/Operator shall submit its annual report to the Division's Environmental Bureau by March 15th of each year.

5. **CERTIFICATION: (OWNER/OPERATOR)** by the officer whose signature appears below, acknowledges receipt of this Discharge Permit, and has reviewed its terms and conditions.

Company Name - print name

_____

Company Representative - print name

_____

Company Representative - Signature

Title: _____

Date: _____

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

AUGUST 15, 2011

Mr. Matt Hudson
Chevron U.S.A, Inc.
1400 Smith Street, Room 40028
Houston, TX 77002

Re: Discharge Plan Renewal Permit GW-004
Chevron U.S.A, Inc. Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. Hudson:

The Oil Conservation Division (OCD) has received Chevron's request and initial fee to renew GW-004 for their Eunice North Gas Plant located in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The initial submittal provided the required information in order to deem the application "administratively" complete.

Therefore, the Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to OCD. OCD will provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3492 or leonard.lowe@state.nm.us. On behalf of the staff of the NMOCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Leonard Lowe
Environmental Engineer

LRL/lrl
xc: OCD District III Office, Aztec

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

AUGUST 15, 2011

CERTIFIED MAIL
RETURN RECEIPT NO: 0919 5815

Mr. Matt Hudson
Chevron U.S.A, Inc.
1400 Smith Street, Room 40028
Houston, TX 77002

Re: Draft Approval for Discharge Plan Renewal Permit GW-004
Chevron U.S.A, Inc. Eunice North Gas Plant
Lea County, New Mexico

Dear Mr. Hudson:

Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC, the Oil Conservation Division (OCD) hereby proposes to approve the renewal of Chevron's (Owner/Operator) discharge permit for the above referenced facility contingent upon the conditions specified in the attached draft Discharge Permit. Please review and provide comments to OCD on the draft Discharge Permit within 45 days of receipt of this letter.

If you have any questions, please contact Leonard Lowe of my staff at (505-476-3492) or E-mail leonard.lowe@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Glenn von Gonten
Acting Environmental Bureau Chief

GvG/gvg

DISCHARGE PERMIT GW-004

1. GENERAL PROVISIONS:

A. PERMITTEE AND PERMITTED FACILITY: The Oil Conservation Division (OCD) of the Energy, Minerals and Natural Resources Department issues Discharge Permit GW-004 (Discharge Permit) to Chevron U.S.A., Inc. (Owner/Operator), located at 1400 Smith Street, Houston, Texas 77002 to abate ground water and vadose zone contamination at its Eunice North Gas Plant (Facility) located at State Highway 207 (Eunice-Hobbs Highway) Eunice, New Mexico 88231 in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.

As a result of historical operations at the site, Chevron is proposing to remediate chromium contaminated ground water by injecting 5 percent solution of sodium dithionite and/or a 10 percent soy lactate solution in injection wells to remediate contaminated ground water. Chevron will mix 2800 gallons fresh water with a five percent solution of sodium dithionite and/or mix 2800 gallons fresh water with ten percent soy lactate solution to generate a solution which will then be discharged into the Ogallala aquifer. The ground water will be sampled to determine the effectiveness of the discharged solution to remediate the chromium contamination. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1,200 mg/L. The discharge plan specifies that Chevron will remediate contaminated ground at the site to meet the standards specified in the Water Quality Control Commission regulations (20.6.2.3103 NMAC).

B. SCOPE OF PERMIT: OCD has been granted authority to administer the Water Quality Act (Chapter 74, Article 6 NMSA 1978) as it applies to gas processing plants by statute and by delegation from the Water Quality Control Commission pursuant to Section 74-6-4(E) NMSA 1978.

The Water Quality Act and the rules issued under that Act protect ground water and surface water of the State of New Mexico by providing that, unless otherwise allowed by rule, no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless such discharge is pursuant to an approved discharge plan. See 20.6.2.3104 NMAC and 20.6.2.3106 NMAC.

This Discharge Permit does not authorize any treatment of, or on-site disposal of, any materials, product, by-product, or oil field waste, including, but not limited to, the on-site disposal of lube oil, glycol, antifreeze, filters, elemental sulfur, washdown water, contaminated soil, and cooling tower blowdown water.

This Discharge Permit does not convey any property rights of any sort nor any exclusive privilege, and does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of state, federal, or local laws, rules or regulations.

civil and/or criminal penalties. See Section 74-6-10.1 NMSA 1978 and Section 74-6-10.2 NMSA 1978.

G. MODIFICATIONS: The Owner/Operator shall notify the Division's Environmental Bureau of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants. See 20.6.2.3107C NMAC. The Division's Environmental Bureau may require the Owner/Operator to submit a permit modification pursuant to 20.6.2.3109E NMAC and may modify or terminate a permit pursuant to Section 74-6-5(M) through (N) NMSA 1978.

H. TRANSFER OF DISCHARGE PERMIT: Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of the Facility, the transferor shall notify the transferee in writing of the existence of the Discharge Permit, and shall deliver or send by certified mail to the Division's Environmental Bureau a copy of such written notification, together with a certification or other proof that such notification has been received by the transferee pursuant to 20.6.2.3111 NMAC. Upon receipt of such notification, the transferee shall inquire into all of the provisions and requirements contained in the Discharge Permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the Division's file or files concerning the Discharge Permit. Upon assuming either ownership or possession of the Facility the transferee shall have the same rights and responsibilities under the Discharge Permit as were applicable to the transferor. See 20.6.2.3111 NMAC.

Transfer of the ownership, control, or possession of the Facility does not relieve the transferor of responsibility or liability for any act or omission which occurred while the transferor owned, controlled, or was in possession of the Facility. See 20.6.2.3111E NMAC.

I. CLOSURE PLAN AND FINANCIAL ASSURANCE: The Owner/Operator shall notify the Division's Environmental Bureau in writing when any operations of its Facility are to be discontinued for a period in excess of six months. Upon review of the Owner/Operator's notice, the Division's Environmental Bureau will determine whether to modify this permit, pursuant to 20.6.2.3107 NMAC and 20.6.2.3109E NMAC, to require the Owner/Operator to submit a closure plan and/or post-closure plan, including financial assurance.

J. COMPLIANCE AND ENFORCEMENT: If the Owner/Operator violates or is violating a condition of this Discharge Permit, the Division's Environmental Bureau may issue a compliance order requiring compliance immediately or within a specified time period, suspending or terminating this Discharge Permit, and/or assessing a civil penalty. See Section 74-6-10 NMSA 1978. The Division's Environmental Bureau may also commence a civil action in district court for appropriate relief, including injunctive relief. See Section 74-6-10(A)(2) NMSA 1978 and Section 74-6-11 NMSA 1978. The Owner/Operator may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with

c. Post -Injection Monitoring and Sampling: The Owner/Operator shall sample the IW024 and the three monitoring wells to evaluate the treatment effectiveness. Ground water samples will be collected for successive quarters after the injection event and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate - phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

B. CONTINGENCY PLANS: The Owner/Operator shall implement its approved Contingency Plans to cope with failure of the discharge permit or system in accordance with Permit Condition 2.F.

C. CLOSURE PLAN: After completing abatement of all ground water and vadose contamination required under Permit Condition 2.G, the Owner/Operator shall perform the following closure measures:

1. Remove or plug all lines leading to and from ground water recovery or injection wells so that a discharge can no longer occur.

2. Remove all abatement system components from the site, if applicable.

3. After receiving notification from the Division's Environmental Bureau that post-closure monitoring may cease, the Owner/Operator shall plug and abandon its monitor well(s).

D. RECORD KEEPING: The Owner/Operator shall maintain records of all inspections required by this Discharge Permit at its local office located at 240 Avenue O, Eunice, NM 88231 for a minimum of five years and shall make those records available for inspection by the Division's Environmental Bureau.

F. RELEASE REPORTING: The Owner/Operator shall comply with the following permit conditions, pursuant to 20.6.2.1203 NMAC, if it determines that a release of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, has occurred. The Owner/Operator shall report unauthorized releases of water contaminants in accordance with any additional commitments made in its approved Contingency Plan. If the Owner/Operator determines that any constituent exceeds the standards specified at 20.6.2.3103 NMAC, then it shall report a release to the Division's Environmental Bureau.

1. Oral Notification: As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, the Owner/Operator shall orally notify the Division's Environmental Bureau. The Owner/Operator shall provide the following:

- the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Owner/Operator of the facility;
- the name and location of the facility;

H. OTHER REQUIREMENTS:

1. **Inspection and Entry:** Pursuant to 20.6.2.4107A NMAC, the Owner/Operator shall allow the Division's Environmental Bureau, upon the presentation of proper credentials, to:

- enter the facility at reasonable times;
- inspect and copy records required by this discharge permit;
- inspect any treatment works, monitoring, and analytical equipment;
- sample any wastes, ground water, surface water, stream sediment, plants, animals, or vadose-zone material including vadose-zone vapor;
- use the Owner/Operator's monitoring systems and wells in order to collect samples; and
- gain access to off-site property not owned or controlled by the Owner/Operator, but accessible to the Owner/Operator through a third-party access agreement, provided that it is allowed by the agreement.

2. **Advance Notice:** Pursuant to 20.6.2.4107B NMAC, The Owner/Operator shall provide the Division's Environmental Bureau with at least four (4) working days advance notice of any sampling to be performed pursuant to this Discharge Permit, or any well plugging, abandonment or destruction at the facility site.

3. **Plugging and Abandonment:** Pursuant to 20.6.2.4107C NMAC, the Owner/Operator shall request by certified mail, approval by the Division's Environmental Bureau to plug and abandon a monitor well, unless such approval is required from the State Engineer. The proposed action shall be designed to prevent water pollution that could result from water contaminants migrating through the well or borehole. The proposed action shall not take place without written approval from the Division's Environmental Bureau, unless written approval or disapproval is not received by the Owner/Operator within thirty (30) days of the date of receipt of the proposal.

I. ANNUAL REPORT: The Owner/Operator shall submit its annual report pursuant to 20.6.2.3107 NMAC to the Division's Environmental Bureau by March 15th of each year. The annual report shall include the following:

1. Results of its ground water monitoring program; including:

- Summary tables listing laboratory analytic results of all ground water and soil samples. Any WQCC constituent found to exceed the groundwater standard shall be highlighted and noted in the annual report. Copies of the most recent year's laboratory analytical data sheets shall also be submitted.
- Annual water table potentiometric maps. A corrected water table elevation shall be determined for all wells containing non-aqueous phase liquids. These maps shall show well locations, pertinent site features, and the direction and magnitude of the hydraulic gradient.
- Semi-annual isopleth maps for the following constituents: non-aqueous phase liquids; chlorides; GRO/DRO; Chromium; and, BTEX.

Company Name - print name

_____
Company Representative - print name

_____
Company Representative - Signature

Title:_____

Date: _____

Chevron

Matthew P. Hudson
Remediation Project Manager

Upstream Business Unit
Chevron Environmental Management Company
1400 Smith St
Room 07062
Houston, TX 77002
Tel 713 372 9207
mhudson@chevron.com

December 6, 2010

Mr. Glen von Gonten
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Subject: Permit Renewal (GW-004)
Eunice North Gas Plant
Lea County, New Mexico

Dear Glen:

Chevron U.S.A Inc. (Chevron) is pleased to provide the attached Discharge Permit Application and attachments for the Eunice North Gas Plant (GW-004) permit renewal. The Eunice North Gas Plant is located approximately ¼-mile north of the town of Eunice, New Mexico.

The Discharge Permit renewal application along with the $100 filing fee are being submitted for your review and subsequent approval.

If you have any questions regarding the application, please contact me at (713) 372-9207.

Sincerely,

Matthew P. Hudson

Attachments:

cc: NMOCD – District I (Hobbs)
CRA Midland

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES,GAS PLANTS, REFINERIES, COMPRESSOR, GEOTHERMAL FACILITES AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

☐ New ☒ Renewal ☐ Modification

1. Type: Eunice North Gas Plant (GW-004)
2. Operator: Chevron U.S.A., Inc.

   Address: 1400 Smith Street, Room 07062, Houston, Texas 77002

   Contact Person: Matt Hudson Phone: (713) 372-9207

3. Location: NE /4 SE /4 Section 28 Township 21 S Range 37 E
   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site.
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
6. Attach a description of all materials stored or used at the facility.
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
10. Attach a routine inspection and maintenance plan to ensure permit compliance.
11. Attach a contingency plan for reporting and clean-up of spills or releases.
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.
14. CERTIFICATIONI hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: MATTHEW P. HUDSON Title: PROJECT MANAGER

Signature: [signature] Date: 12/6/2010

E-mail Address: mhudson@chevron.com

DISCHARGE PLAN APPLICATION ATTACHMENTS
Eunice North Gas Plant (GW-004)
Chevron U.S.A., Inc.

Item #1: See referenced form titled *Discharge Plan Application for Service Companies, Gas Plants, Refineries, Compressor, Geothermal Facilities and Crude Oil Pump Stations* (Discharge Plan Application)

Item #2: Chevron U.S.A. Inc. (Chevron) is successor through merger with Texaco Exploration and Production, Inc. (Texaco), the prior owner and operator of the Eunice North Gas Plant (ENGP). Texaco retained certain environmental liabilities at the plant. The operator contact information is presented on the Discharge Plan Application form.

Item #3: See Discharge Plan Application form.

Item #4: **Owner Name:** Versado L.L.P. (Versado) is the current owner of record of the plant site. Versado is a limited liability partnership originally between Chevron and Dynegy Midstream Services (Dynegy). Dynegy subsequently was purchased by Targa Midstream Services (Targa), and Targa currently is a partner in Versado.

Site Address: Targa Midstream Services
State Highway 207 (Eunice-Hobbs Highway)
Eunice, New Mexico 88231

ATTN: Gary Markell, Area Manager

Telephone: (575) 394-2534, ext. 226

The Chevron representative for Versado is Mike Brumley, who can be contacted at (432) 687-7135.

Item #5: The Eunice North Gas Plant was constructed in the 1940s and operated by Texaco as a gas processing facility into the 1980s, when gas plant operations ceased and much of the equipment was dismantled and/or shut-in. Structures remaining on Site include two compressors, a compressor building, a cooling tower, former office buildings, above-ground storage tanks, sumps, and piping. Targa operates the two compressors in the northwest portion of the former gas plant -- on behalf of Versado. The only ongoing commercial operation at the ENGP is Versado's natural gas compressor station.

To the extent present, Figure 2 depicts fences, pits, dikes and tanks on the facility.

Item #6: All materials stored or used at facility are detailed on Table 1, attached.

Item #7: No discharge of effluent(s) or waste water is planned or intended at the Eunice North Gas Plant.

Item #8: The majority of solid wastes generated at the Site will include empty sacks, containers, drums, groundwater sampling supplies and rubbish. These wastes will be collected into containers for proper transport and disposal off-site. No hazardous wastes will be generated, stored or transported at the Site.

Item #9: Dissolved chromium has been detected in groundwater above standards at the Eunice North Gas Plant (ENGP). The source of the chromium was speculated to be cooling tower blow-down discharged to the surface southwest of the plant.

REDUCTION OF CHROMIUM BY INJECTION OF A REDUCING AGENT

The oxidation states of chromium (Cr) range from $CrII^-$ to $CrVI^+$, but only the $CrIII^+$ and $CrVI^+$ states are stable under most natural water conditions. Hexavalent Chromium ($CrVI^+$) is known to be toxic to humans, animals, and plants, and is more mobile in the environment than $CrIII^+$. Conversely, $CrIII^+$ is less toxic and readily precipitates as $Cr(OH)_3$ under alkaline or even slightly acidic conditions. Therefore, reduction of $CrVI^+$ to $CrIII^+$ is a viable option for treatment of sites contaminated with $CrVI^+$ and can be accomplished by several methods.

In situ geofixation of chromium is the process of introducing a suitable reducing chemical reagent into the subsurface to reduce $CrVI^+$ to $CrIII^+$. The reduced chromium would be stable because it undergoes geochemical fixation onto the aquifer solids. Reagents such as calcium polysulfide, sodium dithionite, and sodium bisulfite can be used for the geofixation of chromium. It has been observed that short, alternating injections of reducing agent can result in effective distribution of the reducing agent in the subsurface. The reduction of the chromium can be monitored by collection of groundwater samples. When the groundwater samples turn gray in color with a distinct black precipitate, chromium is being reduced. If the samples are yellow, $CrVI^+$ is still present. It has also been observed that the amount of other dissolved metals may increase but their levels are well below their toxicity limit.

REDUCTION OF CHROMIUM BY BIODEGRADATION

In this procedure, $CrVI^+$ is reduced by anaerobic bacteria, which grow in the present of an adequate nutrient medium and in the absence of oxygen. The soil contaminated with $CrVI^+$ is first treated with a nutrient medium and the pH is adjusted to an optimum level for the growth of anaerobic bacteria. The nutrient medium is usually a combination of a carbon source and a source of energy for the growth of the anaerobic bacteria. The carbon source is typically a lactate, molasses, or a soy -lactate mixture. It is relatively low cost and is very effective. Under optimal conditions, bacteria grow and reduce $CrVI^+$ to $CrIII^+$.

RECENT EFFORTS TO REDUCE CHROMIUM CONTAMINATION AT ENGP

A bench-scale treatability study was performed in 2005 to optimize the in-situ treatment reagents. The November 2005 study, documented in a report titled *Reductive Treatment Bench-Scale Testing Evaluation for Chevron Environmental Management Company Eunice North Gas Plant-Eunice, New Mexico* (SECOR, 2006),

evaluated two biological reducing agents (molasses and sodium acetate) and two chemical reducing agents (sodium metabisulfite and calcium polysulfide). The results of the study indicated calcium polysulfide treatment provided the optimum reduction of hexavalent chromium to trivalent chromium, and subsequent precipitation of the trivalent chromium from solution, at the lowest chemical dosage. Although the dosage rates are higher and the kinetics slower, the study also indicated alternate electron donors could be used successfully. Alkanoic salts like sodium acetate could provide pH buffering to prevent excessive pH drops in the groundwater during biological degradation processes.

In 2007, a pilot study for in-situ treatment of the hexavalent chromium groundwater plume was selected. Injection of an inorganic reducing agent (calcium polysulfide) along with an electron donor (sodium acetate) would be the remedial approach. It was anticipated the calcium polysulfide would provide rapid reduction of hexavalent chromium within the injection area, while the sodium acetate would create a reducing zone through biological activity capable of treating hexavalent chromium migrating into the injection area.

The pilot study was conducted July 21 through July 28, 2008. The goal of the pilot study was to convert hexavalent chromium to trivalent chromium, and reduce overall total dissolved chromium concentrations by an order of magnitude to levels that approach the maximum contaminant level (MCL) of 50 micrograms per liter (µg/l). The results were that chromium concentrations were reduced in the area of the injection, but clogging of the well occurred.

The well fouling observed in the pilot study does not appear to be a result of well construction, as the sodium acetate was successfully injected. The fouling during calcium polysulfide injection was probably a combination of reactions with iron and manganese as well as precipitation of elemental sulfur. Reducing the polysulfide solution concentration and increasing volume, or alternating clean flush water with solution also is anticipated to have reduced the buildup. The use of a sequestering agent would not be recommended, because it may interfere with chromium precipitation.

Calcium polysulfide is a viscous material with a high pH, which may have led to the fouling observed. Fouling occurred as the calcium polysulfide was being injected, which was immediately after the sodium acetate injection. This suggests the fouling was caused by the calcium sulfide and not from biological growth caused by the addition of a carbon source. Therefore, the sodium acetate carbon source is unlikely to have been the cause of the observed fouling in the wells.

An alternate to the use of calcium polysulfide is necessary to cure the well-fouling problem: Sodium dithionite. Both calcium polysulfide and sodium dithionite have been used successfully to precipitate chromium, but sodium dithionite does not increase pH and may, therefore, be the reagent that produces the smallest amount of fouling. Additionally, flushing the substrate with clean water after the injection would clear the reagent from the well casing and sand pack, further assisting in preventing fouling. Finally, long-term biological polishing can occur by injecting a slow release carbon source such as emulsified soy-lactate once chromium concentrations have been initially reduced by the sodium dithionite treatment.

The remainder of this item describes a work plan for a pilot study wherein sodium dithonite will be substituted for calcium polysulfide to eliminate well fouling. Also, to enhance long-term biological polishing, emulsified soy-lactate will be used instead of sodium acetate.

FIELD PILOT STUDY

OBJECTIVES

The primary objectives of the pilot tests are to gather the data necessary to:

i) Determine whether sodium dithionite can successfully lower concentrations of hexavalent chromium in the groundwater.
ii) Determine the radius of influence and downgradient influence of the injection wells for dithionite injection.
iii) Determine whether the injection of sodium dithionite causes fouling of the injection wells.
iv) Determine whether soy-lactate addition can successfully lower concentrations of hexavalent chromium in the groundwater.
v) Determine the radius of influence and downgradient influence of the injection wells.
vi) Determine whether the injection of soy-lactate causes fouling of the injection wells.
vii) Determine the volume that can be injected in to the injection wells.

The objectives will be accomplished by performing the following:

i) Injection of a sodium dithionite solution into IW024.
ii) Injection of a soy-lactate solution into IW023.
iii) Monitoring and evaluation of the test results.

WELL PLACEMENT

Two pilot study areas will be constructed. Injections will be made using existing Injection wells IW024 and IW023. Monitoring wells will be installed in the area of each injection well. The monitoring wells will be advanced to the same depth as the injection wells and screened in the same interval as the injection wells. Each monitoring well will be constructed using schedule (sch) 40 polyvinyl chloride (PVC) screen and riser pipe. A minimum 8 -inch diameter borehole will be advanced using air rotary drilling methods. A 4 -inch diameter, 10-foot long, 20-slot sch 40 PVC screen will be installed, with a 4-inch diameter sch 40 PVC riser extending to ground surface. The annular space will consist of 20-40 grade filter sand from the bottom of the hole to 1 foot above the screen, with a 1-foot bentonite seal above the filter sand followed by concrete bentonite grout poured up to ground surface.

Three monitoring wells will be installed in the area of each injection well. The monitoring wells will be placed at distances of 20 and 40 feet downgradient, and 15 feet side gradient to the injection wells.

SCOPE OF WORK

Site Health and Safety Plan

A comprehensive Site Health and Safety Plan (HASP) will be prepared to protect Site workers and the public. The plan will be kept on Site during field activities and will be reviewed and signed by each Site worker and visitor daily. Appropriate personal protective equipment (PPE) will be worn to ensure no chemical solution comes in contact with bare skin or the eyes.

PILOT STUDY #1. DITHIONITE INJECTION STUDY

Baseline Sampling

Prior to injection of sodium-dithionite solution, injection well IW024 and the three monitor wells will be sampled and analyzed for total and hexavalent chromium, bromide, sulfate, sulfide, total organic carbon, sodium, total and dissolved iron, and field parameters (pH, temperature, conductivity, dissolved oxygen [DO], and oxidation reduction potential [ORP]).

Injection of Sodium Dithionite

2,800 gallons of a 5-percent sodium dithionite solution will be injected into the injection well. This solution will be prepared by dissolving 1,170 pounds of sodium dithionite into 2,800 gallons of water. Injection rates will be noted during injection to determine whether clogging of the well has occurred.

Depending on Site conditions, it may not be possible to inject the above volume into the well within a reasonable amount of time. Volumes may need to be adjusted based on field conditions.

Tracer

A bromide tracer will be included in the injection solution as a conservative tracer to ensure the dispersal can be monitored even if the sodium dithionite is exhausted by chromium reduction. The bromide tracer will be injected as a 0.1-percent solution in the sodium dithionite solution.

Field Monitoring

During the injection, the three monitoring wells will be monitored hourly for pH, DO, ORP, conductivity, and temperature.

Post-Injection Monitoring and Sampling

Sampling will be performed monthly for 3 months after the injection, using the injection and monitoring wells, to evaluate the effectiveness of the sodium dithionite treatment. Groundwater samples will be collected and analyzed for total and hexavalent chromium, bromide, sulfate, sulfide, total organic carbon, sodium, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO and ORP).

PILOT STUDY #2. BIODEGRADATION STUDY

Baseline Sampling

Prior to the injection of a soy-lactate solution, the injection well IW023 and the three monitoring wells will be sampled and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate -phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

Injection of Soy-Lactate

2,800 gallons of 10 percent soy-lactate solution will be injected into the injection well. This solution will be prepared by mixing five drums of soy-lactate emulsion with 2,500 gallons of water. 500 gallons of chase water will be injected to push the soy-lactate into the formation.

Depending on Site conditions, it may not be possible to inject the above volume into the well within a reasonable amount of time. Volumes may need to be adjusted based on field conditions.

Field Monitoring

During the injection, the three monitoring wells will be monitored hourly for pH, DO, ORP, conductivity, and temperature.

Post -Injection Monitoring and Sampling

Both the injection and the monitoring wells will be sampled to evaluate the treatment effectiveness. Groundwater samples will be collected for successive quarters after the injection event and analyzed for total and hexavalent chromium, sulfate, sulfide, ammonia -nitrogen, orthophosphate -phosphorus, total anaerobic microbial counts, total organic carbon, total and dissolved iron, and field parameters (pH, temperature, conductivity, DO, and ORP).

Residuals Management

Any chemicals not used during the activities described in this work plan will be transported off-site and disposed according to applicable rules and regulations. Disposal documentation, as needed, will be included in the final pilot test report.

DATA EVALUATION AND REPORTING

Upon completion of the field pilot study, the data will be compiled and tabulated. The percent reduction of chromium as a result of the treatments will be calculated to assess the effectiveness of the tested reagents. The field pilot study report will include the recommended injection well spacing and dosage rates for the full-scale application.

Item #10: Routine inspection and maintenance activities will be conducted on a weekly basis and include the following:

- Visual inspection of each tank, fitting, valve and piping.
- Visual inspection of each well, well cover, cap and security lock.
- Visual inspection of each surface pump and associated valves and gages.
- Testing, tightening and repair of connections and flanges.
- Visual, electrical and hydraulic inspection of control boxes and panels.
- Visual inspection of compressors and regulators.
- Remove, replace and/or repair broken, worn, or defective materials.

Item #11: The following two categories of releases could possibly occur at the Site during the proposed pilot test activities:

- Spill or release of groundwater contaminated by dissolved chromium. Potentially this might occur due to failure of a tank, piping, fitting, valve or fixture; due to human act, accident or mistake; or due to Act of God, such as weather condition, lightning, or earthquake. Valves and gages will be utilized to prevent over-pressuring injection systems. Weekly inspections will focus on examination of the complete injection system to catch failures and releases before they occur.

- Spill or release of a chemical agent. All chemicals and reagents will be stored on an adequately bermed pad. All mixing activities will be conducted within an adequately bermed containment feature. Chemicals and reagents will be stored in properly sealed containers, in an area protected from access and detrimental weather conditions.

In the event of a chromium-impacted groundwater release, personnel discovering the release immediately will make notification to Chevron management, who will in turn make notification to the NMOCD. Concurrent with notifications, field personnel immediately will begin necessary response actions – as dictated by the circumstance. Response actions include the following:

- Shut down and/or repair release point to prevent further loss.
- Contain and manage as much free liquids as possible, through placement of spill kits and/or construction of berms around the release area.
- Utilize a vacuum truck to remove free liquids.
- Utilize excavation equipment to remove shallow impacted soils.
- Continue oversight of the release area to ensure no further release occurs and maintain the integrity of the management system.
- Determination and initiation of remedial alternatives to control and prevent widening impacts to soils and/or groundwater.

In the event of a spill or release of a chemical agent, personnel discovering the release immediately will make notification to Chevron management, who will in turn make notification to the NMOCD or other appropriate regulatory entity. Concurrent with notifications, field personnel immediately will begin necessary

response actions – as dictated by the circumstance. Response actions include the following:

- Shut down and/or repair release point to prevent further loss.
- Contain and manage as much free liquids as possible, through placement of spill kits and/or construction of berms around the release area.
- Utilize a vacuum truck to remove free liquids.
- Utilize excavation equipment to remove shallow impacted soils.
- Continue oversight of the release area to ensure no further release occurs and maintain the integrity of the management system.
- Determination and initiation of remedial alternatives to control and prevent widening impacts to soils and/or groundwater.

Item #12: **Site Geological Summary**

The geologic formations at the Site include the following (from oldest to youngest): Triassic Chinle, Tertiary Ogallala, and Quaternary Blackwater Draw formations.

A brief description of each formation is presented in the following:

- **Triassic Chinle** - The Triassic Chinle Formation is composed of red and yellowish-green claystone with minor sandstones and siltstones. The top of the Chinle (base of the Tertiary Ogallala) is an erosional surface that rises in elevation from west to east under the Site.
- **Tertiary Ogallala** – The Tertiary Ogallala Formation is a heterogeneous combination of clay, silt, sand and gravel of braided-stream deposits and is the primary fresh water-bearing formation underlying the Site.
- **Quaternary Blackwater Draw Formation** - The Blackwater Draw Formation occurs near the ground surface of the Site and contains reddish sediments composed of up to six well-developed buried soils with similar lithology and morphology.

Site Hydrological Summary

The primary source of freshwater at the Site is the Ogallala Formation. The base of the Ogallala is composed of a 5 to 10-foot interval of gravel/sand/clay, which is termed the "deep" water-bearing zone. This interval is overlain by a red to yellow sand with vertical heterogeneity with alternating layers of loose and well-consolidated sand, known as the "shallow" water-bearing zone. Overall depth to groundwater varies with local topography, ranging from 37 to 73 feet below ground surface (bgs).

Site Groundwater Summary

Historical groundwater gauging data at the Site reveals depths to groundwater ranging from approximately 49 to 54 feet bgs. Regionally, the groundwater gradient is to the southeast. However, a mounding effect is present at the Site creating variable gradient directions toward the southwest, west, northwest, north and northeast trends. This relatively recent groundwater mounding effect

is thought to arise from surface irrigation of lawns, parks, golf courses, etc. in and around the City of Eunice.

Historical groundwater analytical data indicates widespread contamination of shallow groundwater by chlorides at and around the ENGP. This contamination doubtless occurred due to releases and spills of brines produced by the many petroleum wells in the vicinity of the Site. No activities at the ENGP utilized chloride-containing salts.

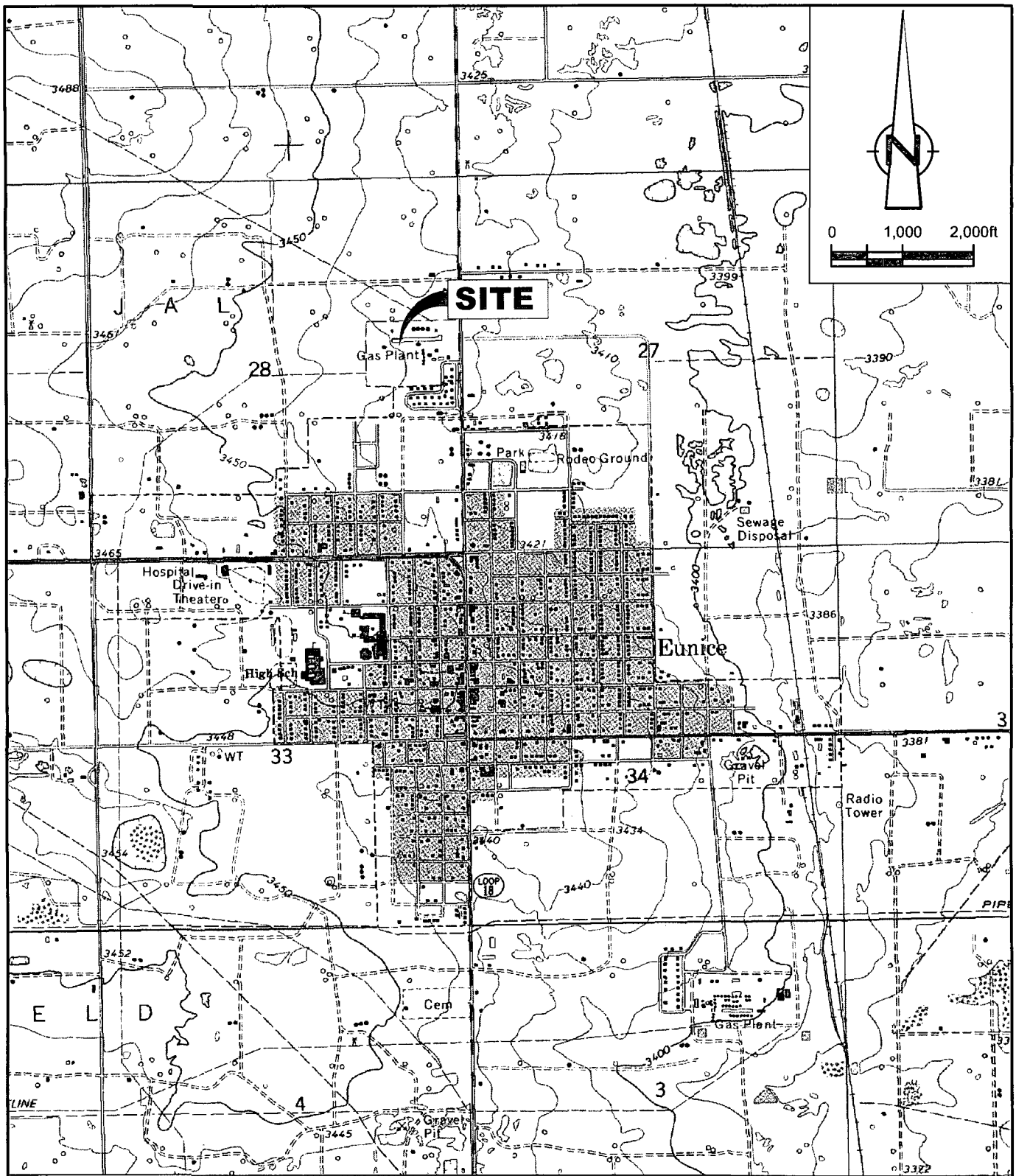
Item #13: Site-wide demolition activities are ongoing at the ENGP – with the exception of the Compressor Station and associated facilities, which are not scheduled for demolition. The Compressor Station will continue in operation, with no plans for termination of those operations. NMOCD will be kept apprised of the progress of demolition activities.

Remedial activities will continue at the ENGP until chromium impacts to groundwater have been remediated to be in compliance with regulatory requirements. These remedial activities will require continuing and variable infrastructure on-site until successful amelioration of impacts to groundwater have been accomplished.

Once the Compressor Station operations are terminated and all impacted environmental media have been remediated, final closure of the ENGP site will be achieved by the following:

- Removal of all surface structures, buildings, processing facilities, above-ground piping, tankage, sumps, flares, etc.
- Properly abandon below-ground piping.
- Properly plug and abandon all wells.
- Removal of all foundations, pads and decks.
- Removal of all asphalt, caliche, concrete, etc. from roadways, parking areas, receiving areas, etc.
- Grade the Site to approximate original contours.
- Restore native vegetation to the Site.

All wastes, debris, refuse and trash will be removed from the Site and properly disposed.



RE: USGS 7.5 MINUTE TOPOGRAPHIC MAPS, "EUNICE AND RATTLESNAKE CANYON NEW MEXICO".

figure 1

VICINITY MAP
EUNICE NORTH GAS PLANT
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

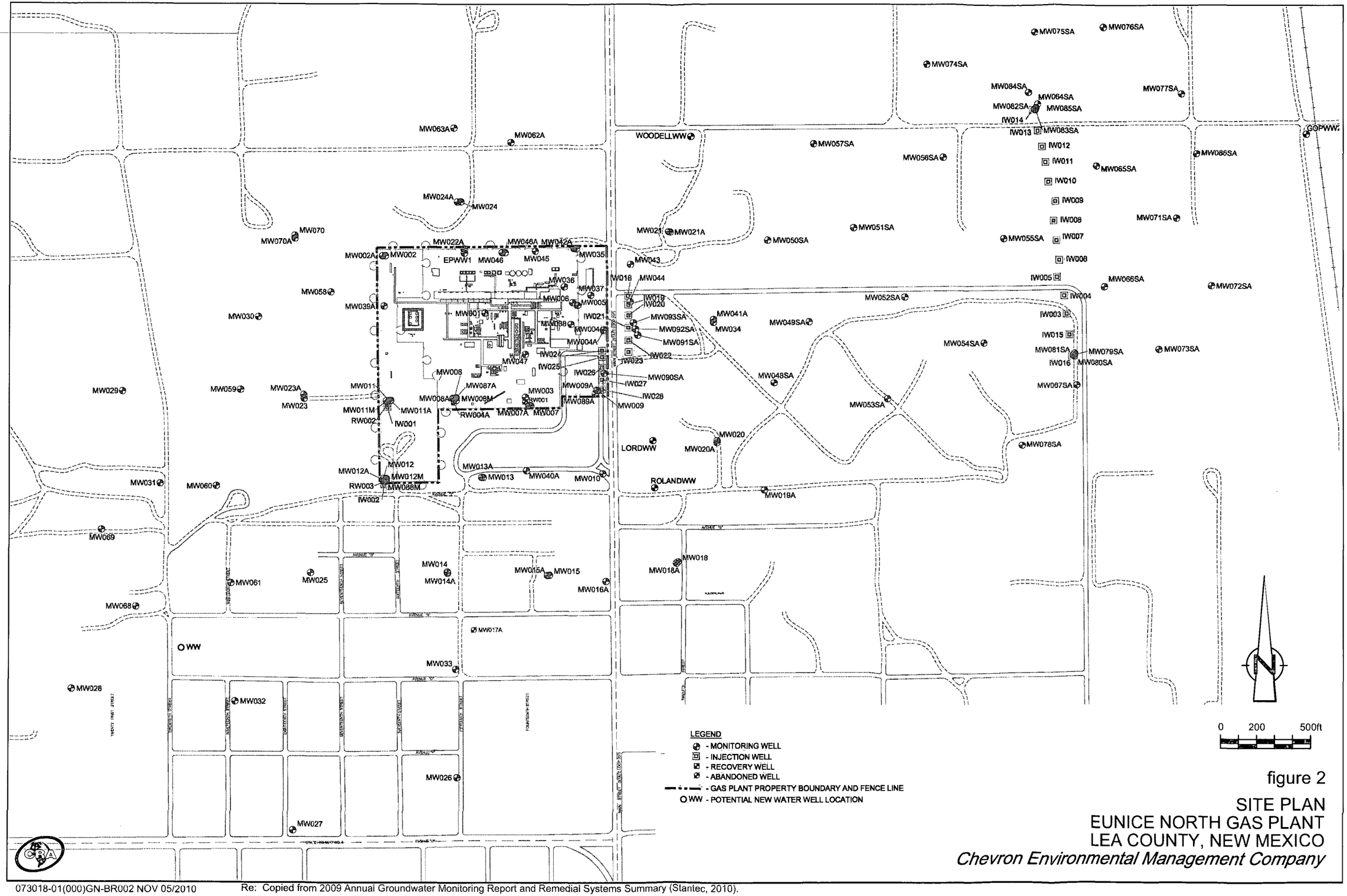


figure 2

SITE PLAN
EUNICE NORTH GAS PLANT
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

073018-01(000)GN-BR002 NOV 05/2010

Re: Copied from 2009 Annual Groundwater Monitoring Report and Remedial Systems Summary (Stantec, 2010).

TABLE 1

AMOUNTS AND VOLUMES PER INJECTION
EUNICE NORTH GAS PLANT SITE
EUNICE, NEW MEXICO

Injection Well	*Reagent*	*Amount of Reagent*	*Injection*	*Volume per Inj. Point*	*Volume of Chase Water per Inj. Point*
IW024	Sodium Dithionite Sodium Bromide	1,170 lb 23 lb	5% sodium dithionite 0.1% NaBr	2,800 gal	
IW023	Soy-Lactate	2,100 lb	10% Soy Lactate	2,800 gal	500 gal

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

April 17, 2008

Ms. Jeneé Homer, Project Manager
Chevron Environmental Management Company
Upstream Business Unit
1400 Smith Street
Room 19001B
Houston, TX 77002

RE: Discharge Permit GW-004
Chevron Eunice North Gas Plant

Dear Ms. Homer:

Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - .3114 NMAC, the Oil Conservation Division (OCD) hereby approves the discharge permit for the **Chevron U.S.A., Inc.** (owner/operator) Eunice North Gas Plant (GW-004) located in the NE/4 . SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico, under the conditions specified in the enclosed **Attachment To The Discharge Permit**. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within 30 working days of receipt of this letter.**

Please be advised that approval of this permit does not relieve the owner/operator of responsibility if operations result in a release. Nor does it relieve the owner/operator of its responsibility to comply with any other governmental authority's rules and regulations.

If you have any questions, please contact Glenn von Gonten of my staff at 505-476-3488 or by email at glenn.vongonten@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Wayne Price
Environmental Bureau Chief

LWP/gvg
Attachments-1
xc: OCD Hobbs Office

ATTACHMENT TO THE DISCHARGE PERMIT
CHEVRON U.S.A., INC. EUNICE NORTH GAS PLANT (GW-004)
DISCHARGE PERMIT APPROVAL CONDITIONS
APRIL 17, 2008

Please remit a check for $2600.00 made payable to Water Quality Management Fund:

Water Quality Management Fund
C/o: Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

1. **Payment of Discharge Plan Fees:** All discharge permits are subject to WQCC Regulations. Every billable facility that submits a discharge permit application will be assessed a filing fee of $100.00, plus a flat fee (*see* WQCC Regulation 20.6.2.3114 NMAC). The Oil Conservation Division (OCD) has received the required $100.00 filing fee. ***The flat fee for "Abatement of ground water and vadose zone contamination at oil and gas sites is $2600.00. Please submit this amount along with the signed certification item 23 of this document after the final permit is issued in approximately 45 days. Checks should be made out to the New Mexico Water Quality Management Fund.***

2. **Permit Expiration, Renewal Conditions and Penalties:** Pursuant to WQCC Regulation 20.6.2.3109.H.4 NMAC, this permit is valid for a period of five years. **The permit will expire on March 16, 2011** and an application for renewal should be submitted no later than 120 days before that expiration date. Pursuant to WQCC Regulation 20.6.2.3106.F NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved. ***Expired permits are a violation of the Water Quality Act {Chapter 74, Article 6, NMSA1978} and civil penalties may be assessed accordingly.***

3. **Permit Terms and Conditions:** Pursuant to WQCC Regulation 20.6.2.3104 NMAC, when a permit has been issued, the owner/operator must ensure that all discharges shall be consistent with the terms and conditions of the permit. In addition, all facilities shall abide by the applicable rules and regulations administered by the OCD pursuant to the Oil and Gas Act, NMSA 1978, Sections 70-2-1 through 70-2-38.

4. **Owner/Operator Commitments:** The owner/operator shall abide by all commitments submitted in its November 8, 2005 discharge plan application, including attachments and subsequent amendments and these conditions for approval. Permit applications that reference previously approved plans on file with the division shall be incorporated in this permit and the owner/operator shall abide by all previous commitments of such plans and these conditions for approval.

5. **Modifications:** WQCC Regulations 20.6.2.3107.C and 20.6.2.3109 NMAC address possible future modifications of a permit. The owner/operator (discharger) shall notify the OCD of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants. The Division Director may require a permit modification if any water quality standard specified at 20.6.2.3103 NMAC is being or will be exceeded, or if a toxic pollutant as defined in WQCC Regulation 20.6.2.7 NMAC is present in ground water at any place of withdrawal for present or reasonably foreseeable future use, or that the Water Quality Standards for Interstate and Intrastate streams as specified in 20.6.4 NMAC are being or may be violated in surface water in New Mexico.

6. **Waste Disposal and Storage:** The owner/operator shall dispose of all wastes at an OCD-approved facility. Only oil field RCRA-exempt wastes may be disposed of by injection in a Class II well. RCRA non-hazardous, non-exempt oil field wastes may be disposed of at an OCD-approved facility upon proper waste determination pursuant to 40 CFR part 261. Any waste stream that is not listed in the discharge permit application must be approved by the OCD on a case-by-case basis.

A. **OCD Rule 712 Waste:** Pursuant to OCD Rule 712 (19.15.9.712 NMAC) disposal of certain non-domestic waste without notification to the OCD is allowed at NMED permitted solid waste facilities if the waste stream has been identified in the discharge permit and existing process knowledge of the waste stream does not change.

B. **Waste Storage:** The owner/operator shall store all waste in an impermeable bermed area, except waste generated during emergency response operations for up to 72 hours. All waste storage areas shall be identified in the discharge permit application. Any waste storage area not identified in the permit shall be approved on a case-by-case basis only. The owner/operator shall not store oil field waste on-site for more than 180 days unless approved by the OCD.

7. **Drum Storage:** The owner/operator must store all drums, including empty drums, containing materials other than fresh water on an impermeable pad with curbing. The owner/operator must store empty drums on their sides with the bungs in place and lined up on a horizontal plane. The owner/operator must store chemicals in other containers, such as tote tanks, sacks, or buckets on an impermeable pad with curbing.

8. **Process, Maintenance and Yard Areas:** The owner/operator shall either pave and curb or have some type of spill collection device incorporated into the design at all process, maintenance, and yard areas which show evidence that water contaminants from releases, leaks and spills have reached the ground surface.

9. **Above Ground Tanks:** The owner/operator shall ensure that all aboveground tanks have impermeable secondary containment (*e.g.*, liners and berms), which will contain a volume of at least one-third greater than the total volume of the largest tank or all interconnected tanks and shall

retrofit all existing tanks before the next discharge permit renewal. Tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt from this condition.

10. Labeling: The owner/operator shall clearly label all tanks, drums, and containers to identify their contents and other emergency notification information. The owner/operator may use a tank code numbering system that is incorporated into their emergency response plans.

11. Below-Grade Tanks/Sumps and Pits/Ponds.

A. All below-grade tanks and sumps must be approved by the OCD prior to installation and must incorporate secondary containment with leak detection into the design. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal. All existing below-grade tanks and sumps without secondary containment and leak detection must be tested annually or as specified herein. Systems that have secondary containment with leak detection shall have a monthly inspection of the leak detection system to determine if the primary containment is leaking. Small sumps or depressions in secondary containment systems used to facilitate fluid removal are exempt from these requirements if fluids are removed within 72 hours.

B. All pits and ponds, including modifications and retrofits, shall be designed by a certified registered professional engineer and approved by the OCD prior to installation. In general, all pits or ponds shall have approved hydrologic and geologic reports, location, foundation, liners, and secondary containment with leak detection, monitoring and closure plans. All pits or ponds shall be designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health, safety and the environment for the foreseeable future. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal.

C. The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted, or otherwise rendered non-hazardous to wildlife, including migratory birds.

D. The owner/operator shall maintain the results of all tests and inspections at the facility covered by this discharge permit and available for OCD inspection. The owner/operator shall report the discovery of any system which is found to be leaking or has lost integrity to the OCD within 15 days. The owner/operator may propose various methods for testing such as pressure testing to 3 pounds per square inch greater than normal operating pressure and/or visual inspection of cleaned tanks and/or sumps, or other OCD-approved methods. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

12. Underground Process/Wastewater Lines:

A. The owner/operator shall test all underground process/wastewater pipelines at least once every five (5) years to demonstrate their mechanical integrity, except lines containing fresh water or fluids that are gases at atmospheric temperature and pressure. Pressure rated pipe shall be tested by pressuring up to one and one-half times the normal operating pressure, if possible, or for atmospheric drain systems, to 3 pounds per square inch greater than normal operating pressure, and pressure held for a minimum of 30 minutes with no more than a 1% loss/gain in pressure. The owner/operator may use other methods for testing if approved by the OCD.

B. The owner/operator shall maintain underground process and wastewater pipeline schematic diagrams or plans showing all drains, vents, risers, valves, underground piping, pipe type, rating, size, and approximate location. All new underground piping must be approved by the OCD prior to installation. The owner/operator shall report any leaks or loss of integrity to the OCD within 15 days of discovery. The owner/operator shall maintain the results of all tests at the facility covered by this discharge permit and they shall be available for OCD inspection. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

13. Class V Wells: The owner/operator shall close all Class V wells (*e.g.*, septic systems, leach fields, dry wells, etc.) that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes unless it can be demonstrated that ground water will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department (NMED).

14. Housekeeping: The owner/operator shall inspect all systems designed for spill collection/prevention and leak detection at least monthly to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices shall be emptied of fluids within 72 hours of discovery. The owner/operator shall maintain all records at the facility and available for OCD inspection.

15. Spill Reporting: The owner/operator shall report all unauthorized discharges, spills, leaks and releases and conduct corrective action pursuant to WQCC Regulation 20.5.12.1203 NMAC and OCD Rule 116 (19.15.3.116 NMAC). The owner/operator shall notify both the OCD District Office and the Santa Fe Office within 24 hours and file a written report within 15 days.

16. OCD Inspections: The OCD may place additional requirements on the facility and modify the permit conditions based on OCD inspections.

17. Storm Water: The owner/operator shall implement and maintain run-on and run-off plans and controls. The owner/operator shall not discharge any water contaminant that exceeds the WQCC standards specified in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) including any oil sheen in any stormwater run-off. The

owner/operator shall notify the OCD within 24 hours of discovery of any releases and shall take immediate corrective action(s) to stop the discharge.

18. Unauthorized Discharges: The owner/operator shall not allow or cause water pollution, discharge or release of any water contaminant that exceeds the WQCC standards listed in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) unless specifically listed in the permit application and approved herein. ***An unauthorized discharge is a violation of this permit.***

19. Vadose Zone and Water Pollution: The owner/operator shall address any contamination through the discharge permit process or pursuant to WQCC 20.6.2.4000 - .4116 NMAC (Prevention and Abatement of Water Pollution). The OCD may require the owner/operator to modify its permit for investigation, remediation, abatement, and monitoring requirements for any vadose zone or water pollution. Failure to perform any required investigation, remediation, abatement and submit subsequent reports will be a violation of the permit. The previously submitted investigation(s) and remediation plans (Stage 1 and Stage 2 Abatement Plans) were submitted pursuant to the discharge permit and all future discoveries of contamination will be addressed through the discharge permit. OCD will separately review and approve or approve with conditions any pending or future investigation or remediation work plans or reports.

20. Additional Site Specific Conditions:

A. The owner/operator shall submit a *Chlorides Investigation Workplan* to determine the possible sources of detected chlorides in vicinity of the Eunice North Gas Plant to OCD by July 18, 2008.

B. The owner/operator shall submit a *Hydrocarbon Remediation Workplan*, substantially meeting the requirements for Stage 2 Abatement Plan (see 20.6.2.4106.D NMAC) to address the remaining hydrocarbon contamination released from the Eunice North Gas Plant to OCD by July 18, 2008.

C. The owner/operator shall submit an annual ground water monitoring and abatement report to the OCD by April 15th of each year. The annual report shall contain the following information for all monitoring and remediation systems:

1. A description of the monitoring and remediation activities that occurred during the year, including conclusions and recommendations.

2. Summary tables listing laboratory analytic results of all ground water and soil samples. Any WQCC constituent found to exceed the groundwater standard shall be highlighted and noted in the annual report. Copies of the most recent years laboratory analytical data sheets shall also be submitted.

3. Annual water table potentiometric maps. A corrected water table elevation shall be determined for all wells containing phase-separated hydrocarbons. These maps shall show well locations, pertinent site features, and the direction and magnitude of the hydraulic gradient.

4. Semi-annual isopleth maps for the following constituents: total chromium (dissolved phase) and hexavalent chromium (dissolved phase); non-aqueous phase liquids; chlorides; TPH; and, BTEX.

5. Semi-annual geologic cross-sections (both dip and strike), using the geologic/lithologic logs from the monitor, recovery, and injection wells, depicting the concentrations for the following constituents: total chromium (dissolved phase) and hexavalent chromium (dissolved phase); non-aqueous phase liquids; chlorides; TPH; and, BTEX.

6. Estimate or measure of the volume of non-aqueous phase liquid recovered in the recovery wells during each quarter and the total recovered to date.

D. The owner/operator shall notify the OCD Santa Fe and local district office at least 2 weeks in advance of all scheduled activities so that the OCD has the opportunity to witness the events and split samples.

E. The owner/operator shall notify the NMOCD within 15 days of the discovery of separated-phase hydrocarbons or the exceedance of a WQCC standard in any monitor well where separate-phase hydrocarbons were not present or where contaminant concentrations did not exceed WQCC standards during the preceding monitoring event.

21. Transfer of Discharge Permit (WQCC 20.6.2.3111 NMAC): Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of a facility with a discharge permit, the transfer or shall notify the transferee in writing of the existence of the discharge permit, and shall deliver or send by certified mail to OCD a copy of such written notification, together with a certification or other proof that such notification has in fact been received by the transferee. Upon receipt of such notification, the transferee shall have the duty to inquire into all of the provisions and requirements contained in such discharge permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in OCD's file or files concerning such discharge permit. The transferee (new owner/operator) shall sign and return an original copy of these permit conditions and provide a written commitment to comply with the terms and conditions of the previously approved discharge permit.

22. Closure Plan and Financial Assurance: Pursuant to 20.6.2.3107 NMAC an owner/operator shall notify OCD when any operations of the facility are to be discontinued for a period in excess of six months. Prior to closure, or as a condition of this permit, or request from the OCD, the operator will submit an approved closure plan, modified plan, and/or provide adequate financial assurance.

23. **Certification:** The **owner/operator**, by the officer whose signature appears below, accepts this permit and agrees to comply with all submitted commitments, including these terms and conditions contained here. The **owner/operator** further acknowledges that the OCD may, for good cause shown, as necessary to protect fresh water, public health, safety, and the environment, change the conditions and requirements of this permit administratively.

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

CHEVRON USA INC.
Company Name - print name above

MICHAEL T. McDONALD
Company Representative - print name

Michael T. McDonald
Company Representative- Signature

HEALTH ENVIRONMENT & SAFETY MANAGER
Title ATTORNEY IN FACT

JUNE 12, 2008
Date

VonGonten, Glenn, EMNRD

From: Homer, Jenee' M [JHomer@chevron.com]
Sent: Thursday, June 12, 2008 3:01 PM
To: VonGonten, Glenn, EMNRD
Subject: RE: Permit Renewal for Chevron North Plant (GW-004)

Attachments: GW_004 Ground Water Discharge Permit 06-08.pdf

GW_004 Ground
Water Discharge .

Glenn,
I am attaching the signed final permit. I apologize for the time it took to have this signed within Chevron but we have a very rigorous review process before a certified corporate officer (as required by the permit) can sign it. Thank you again for your followup and patience.

Jeneé Homer (last name change from Briggs) Project Manager

Chevron Environmental Management Company Upstream Business Unit 1400 Smith Street Room 19001B Houston, TX 77002 Tel 713.372.1035 Fax 713.372.1107 Mobile 281.543.9826
jhomer@chevron.com

-----Original Message-----
From: Homer, Jenee' M
Sent: Tuesday, June 10, 2008 1:33 PM
To: 'Glenn.VonGonten@state.nm.us'
Subject: Re: Permit Renewal for Chevron North Plant

Glenn,
I left you a voice mail message about 45 minutes ago. We understand we are getting close to the 30 business days from date of receipt of the letter. We are working on expediting our corporate required signature and returning the permit to the OCD ASAP. I appreciate your patience and willingness to resolve this without enforcement.

Sent from BlackBerry

----- Original Message -----
From: VonGonten, Glenn, EMNRD <Glenn.VonGonten@state.nm.us>
To: Homer, Jenee' M
Cc: Price, Wayne, EMNRD <wayne.price@state.nm.us>
Sent: Tue Jun 10 12:10:08 2008
Subject: Permit Renewal for Chevron North Plant

Jenee,

Chevron has exceeded the time frame that OCD specified in its letter transmitting the final permit of April 17, 2008. Also, you have not to respond to my email of June 4, 2008. Please contact immediately at 505-476-3488 so that we can resolve this issue

without OCD having to take enforcement action against Chevron.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505
505-476-3488
fax -476-3462
glenn.vongonten@state.nm.us

VonGonten, Glenn, EMNRD

From: Homer, Jenee' M [JHomer@chevron.com]
Sent: Tuesday, June 10, 2008 12:33 PM
To: VonGonten, Glenn, EMNRD
Subject: Re: Permit Renewal for Chevron North Plant

Glenn,
I left you a voice mail message about 45 minutes ago. We understand we are getting close to the 30 business days from date of receipt of the letter. We are working on expediting our corporate required signature and returning the permit to the OCD ASAP. I appreciate your patience and willingness to resolve this without enforcement.

Sent from BlackBerry

----- Original Message -----
From: VonGonten, Glenn, EMNRD <Glenn.VonGonten@state.nm.us>
To: Homer, Jenee' M
Cc: Price, Wayne, EMNRD <wayne.price@state.nm.us>
Sent: Tue Jun 10 12:10:08 2008
Subject: Permit Renewal for Chevron North Plant

Jenee,

Chevron has exceeded the time frame that OCD specified in its letter transmitting the final permit of April 17, 2008. Also, you have not to respond to my email of June 4, 2008. Please contact immediately at 505-476-3488 so that we can resolve this issue without OCD having to take enforcement action against Chevron.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505
505-476-3488
fax -476-3462
glenn.vongonten@state.nm.us

VonGonten, Glenn, EMNRD

From: VonGonten, Glenn, EMNRD
Sent: Tuesday, June 10, 2008 11:10 AM
To: 'Briggs, Jenee' M'
Cc: Price, Wayne, EMNRD
Subject: Permit Renewal for Chevron North Plant

Tracking:

Recipient	Delivery	Read
'Briggs, Jenee' M'		
Price, Wayne, EMNRD	Delivered: 6/10/2008 11:08 AM	Read: 6/10/2008 11:19 AM

Jenee,

Chevron has exceeded the time frame that OCD specified in its letter transmitting the final permit of April 17, 2008. Also, you have not to respond to my email of June 4, 2008. Please contact immediately at 505-476-3488 so that we can resolve this issue without OCD having to take enforcement action against Chevron.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505
505-476-3488
fax -476-3462
glenn.vongonten@state.nm.us

VonGonten, Glenn, EMNRD

From: VonGonten, Glenn, EMNRD
Sent: Wednesday, June 04, 2008 8:20 AM
To: 'Briggs, Jenee' M'
Cc: Price, Wayne, EMNRD
Subject: RE: North Eunice Gas Plant (GW-004)

Tracking:

Recipient	Read
'Briggs, Jenee' M'	
Price, Wayne, EMNRD	Read: 6/4/2008 12:53 PM

Jenee':

Please advise us on when the North Plant permit will be signed and returned to OCD. Also, when will Chevron submit the South Plant application?

Thanks.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505
505-476-3488
fax -476-3462
glenn.vongonten@state.nm.us

From: Briggs, Jenee' M [mailto:JHomer@chevron.com]
Sent: Tuesday, May 13, 2008 7:13 AM
To: VonGonten, Glenn, EMNRD
Subject: North Eunice Gas Plant (GW-004)

Glenn,
Chevron is ready to sign the Discharge Permit and have it returned to you by the required deadline (30 working days from April 17), but per our discussion and per Matt Hudson's previous comment Chevron has the below concern with the 20.A condition of submitting a Chloride Investigation Workplan to determine possible sources.

Current knowledge indicates that the North Eunice gas plant has never conducted operations that included the utilization or waste production of brines. However, there are now, and have historically been numerous producing wells in the general area of the gas plant and thus it is requested that this be considered regional in nature and not the remedial responsibility of North Eunice gas plant, especially tied to this discharge permit.

For example the below four wells have historically exhibited elevated chloride concentrations:

1) MW069 has chloride concentrations that have ranged in 2006 and 2007 from 1,490 mg/L to 4,330 mg/L. MW069 is located approximately 1,700 feet west of the gas plant and there are four wells between the gas plant and MW069 that have historically indicated chloride concentrations less than those detected in MW069 (MW031,

MW060, MW059, MW023).

2) MW015 has chloride concentrations that have ranged in 2006 and 2007 from 2,380 mg/L to 2,900 mg/L. MW015 is located approximately 1,000 feet south of the gas plant and there are six wells between the gas plant and MW015 that have historically indicated chloride concentrations less than those detected in MW015 (MW013, MW015A, MW040A, MW013A, MW007A, MW007).

3) MW21A has chloride concentrations that have ranged in 2006 and 2007 from 3,350 mg/L to 7,720 mg/L. MW21A is located approximately 400 feet east of the gas plant and there are two wells between the gas plant and MW21A that have historically indicated chloride concentrations less than those detected in MW21A (MW021, MW043).

4) MW049SA has chloride concentrations that have ranged in 2006 and 2007 from 2,320 mg/L to 2,770 mg/L. MW049SA is located approximately 1,200 feet east of the gas plant and there are six wells between the gas plant and MW049SA that have historically indicated chloride concentrations less than those detected in MW049SA (MW041, MW091SA, MW092SA, MW093SA, MW044, MW034).

Please advise how your review of the file and the above, will result in your consideration of this matter.

A separate email will address the Eunice South Gas Plant's (GW-003) revised discharge permit application.

Jeneé Homer (last name change from Briggs)
Project Manager

Chevron Environmental Management Company
Upstream Business Unit
1400 Smith Street
Room 19001B
Houston, TX 77002
Tel 713.372.1035
Fax 713.372.1107
Mobile 281.543.9826
jhomer@chevron.com

VonGonten, Glenn, EMNRD

From: VonGonten, Glenn, EMNRD
Sent: Thursday, May 15, 2008 1:59 PM
To: 'Briggs, Jenee' M'
Cc: Price, Wayne, EMNRD; Griswold, Jim, EMNRD
Subject: RE: North Eunice Gas Plant (GW-004)
Attachments: GW004.xls

Jenee',

Chloride contamination has been an issue at the North Plant since at least 1997 and it is appropriate for OCD to require Chevron to propose an investigation work plan that will enable it to determine definitely whether it alone or jointly with another Responsible Person is responsible for the chlorides contamination detected in the vicinity of the former gas plant. The burden of demonstrating that it is not responsible is Chevron's alone. Given that there is a confirmed release from that site, Chevron must demonstrate an alternate source of the chlorides contamination to OCD's satisfaction. It is not sufficient to merely point out offsite contamination - Chevron must identify and demonstrate to OCD's satisfaction that the potential source is responsible for a certain part of the chlorides contamination. Your observation that concerning brines is a bit off target because the concentrations detected are not high enough to be from a "brine" source (OCD would expect chlorides contamination derived from a brine source to be a tens of thousands of mg/l, not a few thousand mg/l).

OCD will not change permit condition 20.A; however, I have conducted a database review and determined that the environmental cases listed in the attached excel spreadsheet are located in the same section as the north plant and could be potential offsite sources. You will note that Chevron is the "Applicant" in four of the seven cases. Targa is the "applicant" for two of the seven cases, which are located at the North Plant. OCD is intimately involved in the remaining site (Ruth property) and it does not seem likely that it is a major chloride source.

Chevron will be required to complete its chlorides investigation in a timely manner and move on to remediation. If Chevron is able to pinpoint a probably, but merely possible, offsite source, OCD will certainly take that into consideration when deciding what remedial actions is appropriate.

Glenn von Gonten
Senior Hydrologist
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505
505-476-3488
fax -476-3462
glenn.vongonten@state.nm.us

From: Briggs, Jenee' M [mailto:JHomer@chevron.com]
Sent: Tuesday, May 13, 2008 7:13 AM
To: VonGonten, Glenn, EMNRD
Subject: North Eunice Gas Plant (GW-004)

Glenn,
Chevron is ready to sign the Discharge Permit and have it returned to you by the required deadline (30 working

days from April 17), but per our discussion and per Matt Hudson's previous comment Chevron has the below concern with the 20.A condition of submitting a Chloride Investigation Workplan to determine possible sources.

Current knowledge indicates that the North Eunice gas plant has never conducted operations that included the utilization or waste production of brines. However, there are now, and have historically been numerous producing wells in the general area of the gas plant and thus it is requested that this be considered regional in nature and not the remedial responsibility of North Eunice gas plant, especially tied to this discharge permit.

For example the below four wells have historically exhibited elevated chloride concentrations:

1) MW069 has chloride concentrations that have ranged in 2006 and 2007 from 1,490 mg/L to 4,330 mg/L. MW069 is located approximately 1,700 feet west of the gas plant and there are four wells between the gas plant and MW069 that have historically indicated chloride concentrations less than those detected in MW069 (MW031, MW060, MW059, MW023).

2) MW015 has chloride concentrations that have ranged in 2006 and 2007 from 2,380 mg/L to 2,900 mg/L. MW015 is located approximately 1,000 feet south of the gas plant and there are six wells between the gas plant and MW015 that have historically indicated chloride concentrations less than those detected in MW015 (MW013, MW015A, MW040A, MW013A, MW007A, MW007).

3) MW21A has chloride concentrations that have ranged in 2006 and 2007 from 3,350 mg/L to 7,720 mg/L. MW21A is located approximately 400 feet east of the gas plant and there are two wells between the gas plant and MW21A that have historically indicated chloride concentrations less than those detected in MW21A (MW021, MW043).

4) MW049SA has chloride concentrations that have ranged in 2006 and 2007 from 2,320 mg/L to 2,770 mg/L. MW049SA is located approximately 1,200 feet east of the gas plant and there are six wells between the gas plant and MW049SA that have historically indicated chloride concentrations less than those detected in MW049SA (MW041, MW091SA, MW092SA, MW093SA, MW044, MW034).

Please advise how your review of the file and the above, will result in your consideration of this matter.

A separate email will address the Eunice South Gas Plant's (GW-003) revised discharge permit application.

Jeneé Homer (last name change from Briggs)
Project Manager

Chevron Environmental Management Company
Upstream Business Unit
1400 Smith Street
Room 19001B
Houston, TX 77002
Tel 713.372.1035
Fax 713.372.1107
Mobile 281.543.9826
jhomer@chevron.com

VonGonten, Glenn, EMNRD

From: Scott Olivier [dolivier@secor.com]
Sent: Monday, March 10, 2008 8:54 AM
To: VonGonten, Glenn, EMNRD
Cc: Briggs, Jenee' M; Ronnie Kallus
Subject: North Eunice Gas Plant (GW-004) - Affidavits of Publication
Attachments: Affidavits of Publication - North Eunice (GW-0004) - 2.27.08.pdf

Mr. von Gonten
I have attached the affidavit of publication documents related to the pilot testing proposed to be performed at the North Eunice Gas Plant (GW-004). These documents were provided by the *Hobbs News-Sun* verifying the February 27, 2008 publication of the Public Notice documents (Spanish and English).

Please reply to this e-mail as confirmation of receipt of these documents as meeting the requirement of 20.6.2.3108.D NMAC.

Thanks Glenn.

Regards,

Scott Olivier
Senior Project Manager
SECOR International, now Stantec
Ph: (972) 872-5528
Fax: (817) 640-9149
scott.olivier@stantec.com
stantec.com

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, KENNETH NORRIS

ADVERTISING MANAGER

of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published in the regular and entire issue of said paper, and not a supplement thereof for a period

of 1 issue(s).
Beginning with the issue dated
FEBRUARY 27, 2008
and ending with the issue dated
FEBRUARY 27, 2008

ADVERTISING MANAGER
Sworn and subscribed to before me this 4TH day of MARCH, 2008

Notary Public.

My Commission expires
February 07, 2009
(Seal)

PUBLIC NOTICE

Chevron U.S.A. Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant, located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment that is currently operated by Targa Midstream Services on behalf of Versado L.L.P. (a limited partnership between Chevron and Dynegy Midstream Services). The address of the facility is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231.

As a result of historical operations at the site, Chevron is proposing to remediate chromium impacted ground water by injecting calcium polysulfide at 14 injection wells to reduce the hexavalent chromium to trivalent chromium, with subsequent precipitation of the trivalent chromium from solution on a monthly basis.

Materials generated or used at this facility include calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with 55 gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly schedule. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface, and the background total dissolved solids concentration is approximately 1200 mg/l.

Any interested person or persons may obtain information, submit comments or request to be placed on a facility-specific mailing list for future notices by contacting Glenn von Gonten at the New Mexico OCD at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3488. The OCD will accept comments and statements of interest regarding the renewal and will create a facility-specific mailing list for persons who wish to receive future notices.

OFFICIAL SEAL
DORA MONTZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: _____

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

49101858-000 49686179
SECOR INTERNATIONAL
3300 N. A STREET, BLDG. 8, STE. 220
MIDLAND, TX 79705

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, KENNETH NORRIS

ADVERTISING MANAGER

of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published in the regular and entire issue of said paper, and not a supplement thereof for a period

of 1 issue(s).
Beginning with the issue dated
FEBRUARY 27, 2008
and ending with the issue dated
FEBRUARY 27, 2008

ADVERTISING MANAGER
Sworn and subscribed to before me this 4TH day of MARCH, 2008

Notary Public.

My Commission expires
February 07, 2009
(Seal)

OFFICIAL SEAL
DORA MONTZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires:

AVISO PÚBLICO

Chevron U.S.A Inc., 11111 South Wilcrest, Houston, TX 77099, ha sometido un uso de la renovación a la New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) del aceite para el plan previamente aprobado de la descarga (GW-004) para Eunice North Gas Plant, situado en el NE/4 SE/4 de la sección 28, municipio 21 del sur, se extiende 37 del este, NMPM, condado de Lea, New México. La planta del gas esta cerrada, desmontado parcialmente, y esta fuera de operación con la excepción de un poco de equipo de la compresión en este momento el equipo esta bajo de operacion de Targa Midstream Services de parte de Versado L.L.P. (una colaboración limitada en medio de Chevron y Dynegy Midstream). La dirección de la facilidad es la carretera 207 (carretera de Eunice-Hobbs), Eunice, New México, 88231 del estado.

Como resultado de operaciones históricas en el sitio, Chevron esta proponiendo remediar el cromo afectó en el agua subterránea inyectando el polysulfide del calcio en 14 pozos de inyección para reducir el cromo hexavalente al cromo trivalente, con la precipitación subsecuente del cromo trivalente de la solución sobre una base mensual.

Los materiales generados o usados en esta facilidad incluyen polysulfide del calcio almacenado en los tambores 55-gallon. Aproximadamente 900 galones de serán mezclados con 55 galones del polysulfide del calcio para generar una solución química de la inyección que entonces sea bombeada en el Ogallala aquifer en 14 pozos de inyección en un horario mensual. La profundidad al agua subterránea en el Ogallala es 37 a 73 pies debajo de la superficie, y la concentración disuelta total de los sólidos del fondo es aproximadamente 1200 mg/l.

Cualquier persona interesada puede obtener la información, someter comentarios o la petición de ser colocado en una lista que envía facilidad-específica para los avisos futuros entrando en contacto con Glenn von Gonten en el New México OCD 1220 South St. Francis Drive, Santa Fe, New México 87505, teléfono (505) 476-3488. El OCD aceptará comentarios y declaraciones del interés con respecto a la renovación y creará una lista que envía facilidad-específica para las personas que desean recibir los avisos futuros.

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

49101858-000 49686177
SECOR INTERNATIONAL
3300 N. A STREET, BLDG. 8, STE. 220
MIDLAND, TX 79705

VonGonten, Glenn, EMNRD

From: Briggs, Jenee' M [JBriggs@chevron.com]

Sent: Thursday, February 07, 2008 4:14 PM

To: VonGonten, Glenn, EMNRD

Cc: dolivier@secor.com

Subject: North Eunice Gas Plant(GW-004) public notification process for application of permit renewal

Attachments: GW-004 Applicant Synopsis - North Eunice Gas Plant redlined.doc; GW-004 Applicant Synopsis - North Eunice Gas Plant clean version.doc; GW-004 Applicant Synopsis - North Eunice Gas Plant.pdf

Glenn,
Thank you for taking the time today to discuss the next steps on following the public notification and comment process for the North Eunice Gas Plant's (GW-004) application for permit renewal.

I have attached three documents for your review; the first is our redlined version of the initial synopsis as drafted by OCD in October 2007. I apologize for the delay in submitting these comments for revision and hope that OCD is willing to consider the proposed changes as redlined. The second document is a clean version with the redlined changes accepted for ease of review. The third document is the initial synopsis content (thus without redlined changes) with both the English and Spanish version translated which demonstrates the proposed format only to be published. Please reply your comments to the redlined changes or confirm if the OCD is agreeable to accept the redlined changes.

Once the synopsis is finalized, we propose to enact the following notification process flow in accordance with our phone conversation this afternoon and the regulations set forth in 20.6.2.3108.C (sub-subsections 1 and 2) NMAC:

- Publish the final agreed upon synopsis (in Spanish and English) in a 2"x3" display ad in the *Hobbs News-Sun* for thirty days; and
- The regulations stipulate we submit a copy of the synopsis, via certified mail, to the owner of the discharge site if not the owner. However, since Chevron is the owner this will not be necessary.
- Within fifteen days following the thirty day publication period SECOR shall provide you with proof of newspaper publication for the thirty day period in accordance with 20.6.2.3108.D NMAC.

It is my understanding that following submittal of the preceding newspaper proof document (or if after your discussions with your supervisor OCD can concurrently perform them, if so please advise), the following will occur:

- Within thirty days - The NMOCD will post a notice on the department website and mail notice to any affected government agency or associations identified by the NMOCD (20.6.2.3108.E NMAC);
- Within sixty days (this process may run concurrently with the preceding bullet) – The NMOCD will make a proposed approval or disapproval of the application available on the NMOCD website, in a local newspaper , to the landowner, all persons requesting notification from the prior newspaper notification, and to any affected government agency or associations identified by the NMOCD (20.6.2.3108.H NMAC);
- Thirty day public comment period to begin on the date of publication of the notice in the newspaper (20.6.2.3108.K NMAC); and
- Following this 60-90 day period the NMOCD may make a decision on permit approval and provide permit approval copies to permittee and interested parties.
- At this time permittee will sign-off on permit and submit required fees.

In addition please confirm that the Draft Discharge Permit that was issued on January 10, 2008 will be reissued with deliverable dates revised as it will be impossible to meet these dates due to reinitiating the public notification and comment process.

Please contact me and/or Scott Olivier by the e-mail addresses presented in the distribution list of this e-mail with any questions and/or comments you might have. Once I receive your approval or comments on the

attached redlined synopsis and choice of newspaper for publication the process described above will be immediately started.

Thank you for your help,

Jeneé Briggs
Project Manager

Chevron Environmental Management Company
Upstream Business Unit
1400 Smith Street
Room 19001B
Houston, TX 77002
Tel 713.372.1035
Fax 713.372.1107
Mobile 281.543.9826
jbriggs@chevron.com

Scott Olivier

SECOR International, Inc.
2225 East Randol Mill Road - Suite 530
Arlington, Texas 76011

Phone - (972) 872-5528
Fax - (214) 222-4882
E-mail - dolivier@secor.com

NEW MEXICAN
Founded 1849

RECEIVED
2007 OCT 22 PM 2 13

NM EMNRD OIL CONSERV
1220 S ST FRANCIS DR
SANTA FE NM 87505

ALTERNATE ACCOUNT: 56689
AD NUMBER: 00235111 ACCOUNT: 00002212
LEGAL NO: 81806 P.O. #: 52100-00000075

500 LINES 1 TIME(S)	544.60
AFFIDAVIT:	6.00
TAX:	43.36
TOTAL:	593.96

AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO
COUNTY OF SANTA FE

I, T. Valencia, being first duly sworn declare and say that I am Legal Advertising Representative of THE SANTA FE NEW MEXICAN, a daily newspaper published in the English language, and having a general circulation in the Counties of Santa Fe and Los Alamos, State of New Mexico and being a newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 on Session Laws of 1937; that the publication # 81806 a copy of which is hereto attached was published in said newspaper 1 day(s) between 10/19/2007 and 10/19/2007 and that the notice was published in the newspaper proper and not in any supplement; the first date of publication being on the 19th day of October, 2007 and that the undersigned has personal knowledge of the matter and things set forth in this affidavit.

/S/_____
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 19th day of October, 2007

Notary Pamela Anne Beach

Commission Expires: May 31, 2011

OFFICIAL SEAL
Pamela Anne Beach
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 5-31-11

(GW-363) Energen Resources, Inc., Ms. Kellie Skelton, 2198 Bloomfield Highway, Farmington, New Mexico 87401, has submitted an application for a new discharge plan for their Carracas Mesa Compressor Station built in 2007. It is located in the SW/4 NW/4 of Section 28, Township 32 North, Range 4 West, NMPM, Rio Arriba County, New Mexico. The station provides metering, liquid removal and gas compression to local production lines. Approximately 400 bbl/month of waste water and hydrocarbon liquids, 205 bbl/year maximum waste water, and 605 gal/month of waste oil are generated and stored in OCD approved containers on-site within a bermed area prior to disposal at an NMOCD approved facility. Groundwater most likely to be affected by a spill, leak or accidental discharge is at a depth of approximately 800 feet, with a total dissolved solids concentration of approximately 600 - 800 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-004) Chevron U.S.A, Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant, located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment. The address of the facility is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231. As a result of historical operations at the site, ground water has been contaminated by chromium. Chevron is proposing to remediate the contaminated ground water by injecting calcium polysulfide at fourteen injection wells to reduce the hexavalent chromium to trivalent chromium, with subsequent precipitation of the trivalent chromium from solution on a monthly basis. Materials generated or used at this facility include calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with fifty-five gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly schedule. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1200 mg/l.

The NMOCD has determined that the application is administratively complete and has prepared a draft permit. The NMOCD will accept comments and statements of interest regarding this application and will create a facility-specific mailing list for persons who wish to receive future notices. Persons interested in obtaining further information, submitting comments or requesting to be on a facility-specific mailing list for future notices may contact the Environmental Bureau Chief of the Oil Conservation Division at the address given above. The administrative completeness determination and draft permit may be viewed at the above address between 8:00 a.m. and 4:00 p.m. Monday through Friday, or may also be viewed at the NMOCD web site http://www.emnrd.state.nm.us/ocd/. Persons interested in obtaining a copy of the application and draft permit may contact the NMOCD at the address given above. Prior to ruling on any proposed discharge permit or major modification, the Director shall allow a period of at least thirty (30) days after the date of publication of this notice, during which interested persons may submit comments or request that NMOCD hold a public hearing. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines that there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed permit based on information available, including all comments received. If a public hearing is held, the director will approve or disapprove the proposed permit based on information in the permit application and information submitted at the hearing.

Para obtener más información sobre esta solicitud en espan_ol, sírvase comunicarse por favor: New Mexico Energy, Minerals and Natural Resources Department (Depto. Del Energia, Minerals y Recursos Naturales de Nuevo México), Oil Conservation Division (Depto. Conservacio´n Del Petróleo), 1220 South St. Francis Drive, Santa Fe, New México (Contacto: Dorothy Phillips, 505-476-3461)

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 01 day of October, 2007.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

Mark Fesmire,
Director
Legal#81806
Pub. Oct. 19, 2007

Advertising Receipt

Hobbs Daily News-Sun
201 N Thorp
P O Box 850
Hobbs, NM 88241-0850
Phone: (505) 393-2123
Fax: (505) 397-0610

LEONARD LOWE
OIL CONSERVATION DIVISION, EMNRD *
1220 S. SAINT FRANCIS DR.
SANTA FE, NM 87505

Cust#: 01101546-000
Ad#: 02596726
Phone: (505)476-3487
Date: 10/15/07

Ad taker: C2 **Salesperson:** 08 **Classification:** 673

Description	Start	Stop	Ins.	Cost/Day	Surcharges	Total
07 07 Daily News-Sun	10/19/07	10/19/07	1	117.60		117.60
Bold						1.00
Affidavit for legals						3.00

Payment Reference:

Total:	121.60
Tax:	0.00
Net:	121.60
Prepaid:	0.00
Total Due	121.60

LEGAL NOTICE
October19, 2007

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations (20.6.2.3106 NMAC), the following discharge permit application(s) has been submitted to the Director of the New Mexico Oil Conservation Division ("NMOCD"), 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

(GW-004) Chevron U.S.A, Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, KATHI BEARDEN

PUBLISHER

of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published once a week in the regular and entire issue of said paper, and not a supplement thereof for a period.

of 1

weeks.

Beginning with the issue dated

October 19 2007

and ending with the issue dated

October 19 2007

Kathi Bearden

PUBLISHER

Sworn and subscribed to before me this 19th day of

October 2007

Notary Public.

My Commission expires
February 07, 2009
(Seal)

OFFICIAL SEAL
DORA MONTZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: _____

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

October19, 2007

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations (20.6.2.3106 NMAC), the following discharge permit application(s) has been submitted to the Director of the New Mexico Oil Conservation Division ("NMOCD"), 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

(GW-004) Chevron U.S.A. Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant, located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment. The address of the facility is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231. As a result of historical operations at the site, ground water has been contaminated by chromium. Chevron is proposing to remediate the contaminated ground water by injecting calcium polysulfide at fourteen injection wells to reduce the hexavalent chromium to trivalent chromium, with subsequent precipitation of the trivalent chromium from solution on a monthly basis. Materials generated or used at this facility include calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with fifty-five gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly schedule. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1200 mg/l.

The NMOCD has determined that the application is administratively complete and has prepared a draft permit. The NMOCD will accept comments and statements of interest regarding this application and will create a facility-specific mailing list for persons who wish to receive future notices. Persons interested in obtaining further information, submitting comments or requesting to be on a facility-specific mailing list for future notices may contact the Environmental Bureau Chief of the Oil Conservation Division at the address given above. The administrative completeness determination and draft permit may be viewed at the above address between 8:00 a.m. and 4:00 p.m. Monday through Friday, or may also be viewed at the NMOCD web site http://www.emnrd.state.nm.us/ocd/. Persons interested in obtaining a copy of the application and draft permit may contact the NMOCD at the address given above. Prior to ruling on any proposed discharge permit or major modification, the Director shall allow a period of at least thirty (30) days after the date of publication of this notice, during which interested persons may submit comments or request that NMOCD hold a public hearing. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines that there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed permit, based on information available, including all comments received. If a public hearing is held, the director will approve or disapprove the proposed permit based on information in the permit application and information submitted at the hearing.

Para obtener más información sobre esta solicitud en espan ol, sírvase comunicarse por favor: New Mexico Energy, Minerals and Natural Resources Department (Depto. Del Energía, Minerals y Recursos Naturales de Nuevo México), Oil Conservation Division (Depto. Conservació n Del Petróleo), 1220 South St. Francis Drive, Santa Fe, New México (Contacto: Dorothy Phillips, 505-476-3461).

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 01 day of October, 2007.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

Mark Fesmire, Director

#23590

01101546000 02596726

OIL CONSERVATION DIVISION, EMN
1220 S. SAINT FRANCIS DR.
SANTA FE, NM 87505

GW004

PUBLIC NOTICE for Glenn

Chevron U.S.A, Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant, located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment. The address of the facility is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231.

As a result of historical operations at the site, ground water has been contaminated by chromium. Chevron is proposing to remediate the contaminated ground water by injecting calcium polysulfide at fourteen injection wells to reduce the hexavalent chromium to trivalent chromium, with subsequent precipitation of the trivalent chromium from solution on a monthly basis.

Materials generated or used at this facility include calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with fifty-five gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly schedule. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1200 mg/l.

Any interested person or persons may obtain information, submit comments or request to be placed on a facility-specific mailing list for future notices by contacting Glenn von Gonten at the New Mexico OCD at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3488. The OCD will accept comments and statements of interest regarding the renewal and will create a facility-specific mailing list for persons who wish to receive future notices.

PN. Hobbs ☑ 10/15/07

PN S.F. ☑ 10/15/07

Lowe, Leonard, EMNRD

From: Lowe, Leonard, EMNRD
Sent: Monday, October 15, 2007 4:06 PM
To: 'legals@sfnewmexican.com'
Cc: VonGonten, Glenn, EMNRD
Subject: Public Notice for GW-364, 365, 266,132, 363, 004

Ms. Tracy Valencia
Santa Fe New Mexican
Phone: 505-986-3071/505-995-3818

Re: Public Notice Publication for the **Santa Fe New Mexican**:
Purchase Order Number: **52100-0000007521**
Account Number: **56689 (for the Oil Conservation Division)**
For: The following Discharge Plans:

GW-364, Bancos Compressor Station, Williams Four Corners Inc.
GW-365, Eul Compressor Station, Williams Four Corners Inc.
GW-266, Eunice Station, Conoco Phillips Pipeline Co.
GW-132, Gavilan Compressor Station, Black Hills Gas Resources Inc.
GW-363 Carracas Compressor Station, Energen Resources Inc.
GW-004, Eunice Gas Plant North, Chevron USA

Please publish (one day only) the attached Public Notice in the classified notice section of your newspaper. The PO Number and account Number for your newspaper is provided above. Please mail me an affidavit of proof of publication for the public notice to my mailing address provided below.

Please address your invoice/affidavit to the state employee requesting ad placement in your paper. This will speed up the processing of invoice payment.

Thank you for your attention and have a nice day.

Leonard Lowe
Environmental Engineer
Oil Conservation Division, EMNRD
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505
Phone: (505) 476-3492
Fax: (505) 476-3462
E-mail: leonard.lowe@state.nm.us

Lowe, Leonard, EMNRD

From: Lowe, Leonard, EMNRD
Sent: Monday, October 15, 2007 4:01 PM
To: 'classifieds@hobbsnews.com'
Cc: VonGonten, Glenn, EMNRD
Subject: Publish Public Notice GW-004
Attachments: GW-004 Public Notice.DOC

To whom it may concern,

Re: Public Notice Publication for the **Hobbs Sun News**
Purchase Order Number: **52100-0000007519**
Account Number: **1101546 (for the Oil Conservation Division)**
For: The attached Chevron Discharge Plan, GW-004

Please publish (one day only) the attached Public Notice in the classified notice section of your newspaper. The PO Number and account Number for your newspaper is provided above. Please mail me an affidavit of proof of publication for the public notice to my mailing address provided below.

Please address your invoice/affidavit to the state employee requesting ad placement in your paper. This will speed up the processing of invoice payment.

Thank you for your attention and have a nice day.

llowe

Leonard Lowe
Environmental Engineer
Oil Conservation Division, EMNRD
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505
Phone: (505) 476-3492
Fax: (505) 476-3462
E-mail: leonard.lowe@state.nm.us

VonGonten, Glenn, EMNRD

From: Lowe, Leonard, EMNRD
Sent: Monday, October 15, 2007 4:01 PM
To: classifieds@hobbsnews.com
Cc: VonGonten, Glenn, EMNRD
Subject: Publish Public Notice GW-004
Attachments: GW-004 Public Notice.DOC

To whom it may concern,

Re: Public Notice Publication for the **Hobbs Sun News**
Purchase Order Number: **52100-0000007519**
Account Number: **1101546 (for the Oil Conservation Division)**
For: The attached Chevron Discharge Plan, GW-004

Please publish (one day only) the attached Public Notice in the classified notice section of your newspaper. The PO Number and account Number for your newspaper is provided above. Please mail me an affidavit of proof of publication for the public notice to my mailing address provided below.

Please address your invoice/affidavit to the state employee requesting ad placement in your paper. This will speed up the processing of invoice payment.

Thank you for your attention and have a nice day.

llowe

Leonard Lowe
Environmental Engineer
Oil Conservation Division, EMNRD
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505
Phone: (505) 476-3492
Fax: (505) 476-3462
E-mail: leonard.lowe@state.nm.us

GW004

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, KENNETH NORRIS

ADVERTISING MANAGER

of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published in the regular and entire issue of said paper, and not a supplement thereof for a period

of 1 issue(s).
Beginning with the issue dated
FEBRUARY 27, 2008
and ending with the issue dated
FEBRUARY 27, 2008

ADVERTISING MANAGER
Sworn and subscribed to before me this 4TH day of MARCH, 2008

Notary Public.

My Commission expires
February 07, 2009
(Seal)

OFFICIAL SEAL
DORA MONTZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: _____

PUBLIC NOTICE

Chevron U.S.A. Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant, located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment that is currently operated by Targa Midstream Services on behalf of Versado L.L.P. (a limited partnership between Chevron and Dynegy Midstream Services). The address of the facility is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231.

As a result of historical operations at the site, Chevron is proposing to remediate chromium impacted ground water by injecting calcium polysulfide at 14 injection wells to reduce the hexavalent chromium to trivalent chromium, with subsequent precipitation of the trivalent chromium from solution on a monthly basis.

Materials generated or used at this facility include calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with 55 gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly schedule. The depth to ground water in the Ogallala aquifer is 37 to 73 feet below the surface, and the background total dissolved solids concentration is approximately 1200 mg/l.

Any interested person or persons may obtain information, submit comments or request to be placed on a facility-specific mailing list for future notices by contacting Glenn von Gonten at the New Mexico OCD at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3488. The OCD will accept comments and statements of interest regarding the renewal and will create a facility-specific mailing list for persons who wish to receive future notices.

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

49101858-000 49686179
SECOR INTERNATIONAL
3300 N. A STREET, BLDG. 8, STE. 220
MIDLAND, TX 79705

GW004

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, KENNETH NORRIS

ADVERTISING MANAGER

of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published in the regular and entire issue of said paper, and not a supplement thereof for a period

of 1 issue(s).
Beginning with the issue dated
FEBRUARY 27, 2008
and ending with the issue dated
FEBRUARY 27, 2008

ADVERTISING MANAGER
Sworn and subscribed to before me this 4TH day of MARCH, 2008

Notary Public

My Commission expires
February 07, 2009
(Seal)

OFFICIAL SEAL
DORA MONTZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires

AVISO PÚBLICO

Chevron U.S.A Inc., 11111 South Wilcrest, Houston, TX 77099, ha sometido un uso de la renovación a la New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) del aceite para el plan previamente aprobado de la descarga (GW-004) para Eunice North Gas Plant, situado en el NE/4 SE/4 de la sección 28, municipio 21 del sur, se extiende 37 del este, NMPM, condado de Lea, New México. La planta del gas esta cerrada, desmontado parcialmente, y esta fuera de operacion con la excepcion de un poco de equipo de la compresión en este momento el equipo esta bajo de operacion de Targa Midstream Services de parte de Versado L.L.P (una colaboración limitada en medio de Chevron y Dynegy Midstream). La dirección de la facilidad es la carretera 207 (carretera de Eunice-Hobbs), Eunice, New México, 88231 del estado.

Como resultado de operaciones históricas en el sitio, Chevron esta proponiendo remediar el cromo afectó en el agua subterránea inyectando el polysulfide del calcio en 14 pozos de inyección para reducir el cromo hexavalente al cromo trivalente, con la precipitación subsecuente del cromo trivalente de la solución sobre una base mensual.

Los materiales generados o usados en esta facilidad incluyen polysulfide del calcio almacenado en los tambores 55 gallon. Aproximadamente 900 galones de serán mezclados con 55 galones del polysulfide del calcio para generar una solución química de la inyección que entonces sea bombeada en el Ogallala aquifer en 14 pozos de inyección en un horario mensual. La profundidad al agua subterránea en el Ogallala es 37 a 73 pies debajo de la superficie, y la concentración disuelta total de los sólidos del fondo es aproximadamente 1200 mg/l.

Cualquier persona interesada puede obtener la información, someter comentarios o la petición de ser colocado en una lista que envía facilidad-específica para los avisos futuros entrando en contacto con Glenn von Gonten en el New México OCD 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, teléfono (505) 476-3488. El OCD aceptará comentarios y declaraciones del interés con respecto a la renovación y creará una lista que envía facilidad-específica para las personas que desean recibir los avisos futuros.

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

49101858-000 49686177
SECOR INTERNATIONAL
3300 N. A STREET, BLDG. 8, STE. 220
MIDLAND, TX 79705

GW004

NEW MEXICAN

Founded 1849

RECEIVED

2007 OCT 22 PM 2 13

NM EMNRD OIL CONSERV
1220 S ST FRANCIS DR
SANTA FE NM 87505

ALTERNATE ACCOUNT: 56689
AD NUMBER: 00235111 ACCOUNT: 00002212
LEGAL NO: 81806 P.O. #: 52100-00000075

500 LINES 1 TIME(S)	544.60
AFFIDAVIT:	6.00
TAX:	43.36
TOTAL:	593.96

AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO
COUNTY OF SANTA FE

I, T. Valencia, being first duly sworn declare and say that I am Legal Advertising Representative of THE SANTA FE NEW MEXICAN, a daily newspaper published in the English language, and having a general circulation in the Counties of Santa Fe and Los Alamos, State of New Mexico and being a newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 on Session Laws of 1937; that the publication # 81806 a copy of which is hereto attached was published in said newspaper 1 day(s) between 10/19/2007 and 10/19/2007 and that the notice was published in the newspaper proper and not in any supplement; the first date of publication being on the 19th day of October, 2007 and that the undersigned has personal knowledge of the matter and things set forth in this affidavit.

/S/_____
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 19th day of October, 2007

Notary Pamela Anne Beach

Commission Expires: May 31, 2011

OFFICIAL SEAL
Pamela Anne Beach
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 5-31-11

HOBBS

(GW-363) Energen Resources Inc., Ms. Kellie Skelton, P.E., 2198 Bloomfield Highway, Farmington, New Mexico, 87401, has submitted an application for a new discharge plan for their Carracas Mesa Compressor Station built in 2007. It is located in the SW/4 NW/4 of Section 28, Township 32 North, Range 4 West, NMPM, Rio Arriba County, New Mexico. The station provides metering, liquid removal, and gas compression to local production. Approximately 400 bbl/month of wastewater and hydrocarbon liquids, 2,205 bbl/year maximum waste water, and 605 gal/month of waste oil are generated and stored in OCD approved containers on site within a bermed area prior to disposal at an NMOCD approved facility. Groundwater most likely to be affected by a spill, leak or accidental discharge is at a depth of approximately 800 feet, with a total dissolved solids concentration of approximately 600-800 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect freshwater.

(GW-004) Chevron U.S.A. Inc., 11111 South Wilcrest, Houston, TX 77099, has submitted a renewal application to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division for the previously approved discharge plan (GW-004) for its Eunice North Gas Plant located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico. The gas plant is shut down, partially dismantled, and is out of operation with the exception of some compression equipment. The address of the facility is State Highway 207 (Eunice Hobbs Highway), Eunice, New Mexico 88231. As a result of historical operations at the site, groundwater has been contaminated by chromium. Chevron is proposing to remediate the contaminated groundwater by injecting calcium polysulfide at fourteen injection wells to reduce the hexavalent chromium to trivalent chromium, with a subsequent precipitation of the trivalent chromium from solution on a monthly basis. Materials generated or used at this facility includes calcium polysulfide stored in 55-gallon drums. Approximately 900 gallons of make-up water will be mixed with fifty five gallons of calcium polysulfide to generate a chemical injection solution which will then be pumped into the Ogallala aquifer at 14 injection wells on a monthly scheduled. The depth to groundwater in the Ogallala aquifer is 37 to 73 feet below the surface and the background total dissolved solids concentration is approximately 1200 mg/l.

The NMOCD has determined that the application is administratively complete and has prepared a draft permit. The NMOCD will accept comments and statements of interest regarding this application and will create a facility specific mailing list for persons who wish to receive future notices. Persons interested in obtaining further information, submitting comments or requesting to be on a facility specific mailing list for future notices may contact the Environmental Bureau Chief of the Oil Conservation Division at the address given above. The administrative completeness determination and draft permit may be viewed at the above address between 8:00 a.m. and 4:00 p.m. Monday through Friday or may also be viewed at the NMOCD web site: http://www.emnrd.state.nm.us/ocd/. Persons interested in obtaining a copy of the application and draft permit may contact the NMOCD at the address given above. Prior to ruling on any proposed discharge permit or major modification, the Director shall allow a period of at least thirty (30) days after the date of publication of this notice during which interested persons may submit comments or request that NMOCD hold a public hearing. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines that there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed permit based on information available, including all comments received. If a public hearing is held, the Director will approve or disapprove the proposed permit based on information in the permit application and information submitted at the hearing.

Para obtener mas información sobre esta solicitud en espan ol, sirvase comunicarse por favor: New Mexico Energy, Minerals and Natural Resources Department, (Depto. Del Energia, Minerals y Recursos Naturales de Nuevo Mexico) Oil Conservation Division (Depto. de Conservacion Del Petroleo), 1220 South St Francis Drive, Santa Fe, New Mexico. (Contacto: Dorothy Phillips, 505-476-3461).

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 01st day of October, 2007.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Mark Fesmire,
Director

Legal#81806
Pub. Oct. 19, 2007

GW004

Chevron

Matthew P. Hudson
Remediation Project Manager

Abandonment Business Unit
Chevron Environmental Management Company
11111 S Wilcrest Dr
Room N2104A
Houston, TX 77009
Tel 281 561 3466
Fax 281 561 3841
mhkw@chevron.com

May 21, 2007

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

© Gen Cor.

RE: Permit Modification for the Eunice North Gas Plant (GW-004), Lea County, New Mexico

Dear Mr. Price:

Chevron Environmental Management Company *(CEMC)* is pleased to provide the enclosed *In-Situ Pilot Study Work Plan for the Eunice North Gas Plant* (Work Plan) to comply with the requirements in the Discharge Plan Application to modify the existing discharge permit for the Eunice North Gas Plant (GW-004) in Lea County, New Mexico. The attached Work Plan was prepared by SECOR International Incorporated (SECOR) on behalf of CEMC.

Specific details of the following application line items are described in the attached Work Plan and cross-referenced below:

1. *See Permit Application.*

2. *See Permit Application.*

3. *See Permit Application*

4. Attach the name, telephone number and address of the landowner of the facility site.
   Section 1.0 fourth paragraph

5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
   Section 1.0 and Figure 2, Figure 3

6. Attach a description of all materials stored or used at the facility.
   Section 2.0, Appendix B

7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
   Section 1.1-chromium plume present, no further discharge.

8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
   Sections 3.4

9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
   Section 1.1 and Appendix A

10. Attach a routine inspection and maintenance plan to ensure permit compliance.
Section 3.1, 3.2, 3.5, and 3.6

11. Attach a contingency plan for reporting and clean-up of spills or releases.
Section 3.8

12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
Section 1.2

13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.
Section 4.0

CEMC has also developed the following public notice that will be used to comply with the New Mexico Public Notice and Participation regulations (Part 20.6.2.3108):

(GW-004) Chevron U.S.A., Inc., Keith Hall, Facilities Engineering Manager, 11111 South Wilcrest, Houston, Texas, 77099 (Phone: (281) 561-3582), has submitted a discharge plan modification application for the previously approved discharge plan for the North Eunice Gas Plant, located in the SE/4 NE/4 of Section 28, Township 21 South, Range 37 East, Lea County, New Mexico. Groundwater impacted with dissolved chromium will be remediated through the injection of two treatment chemicals: calcium polysulfide and sodium acetate. The treatment chemicals will be stored on-site and the groundwater most likely to be affected by a spill, leak, or accidental discharge to the surface is at a depth of approximately 37 to 73 feet with a total dissolved solids concentration of approximately 5,000 mg/l. The discharge plan addresses how the treatment chemicals will be handled, stored, and injected - including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

Should you have any questions regarding the enclosed application, or the public notice language, please contact me at 281-561-3466.

Sincerely,

Matthew P. Hudson

Attachments: Discharge Plan Application
In-Situ Pilot Study Work Plan for the Eunice North Gas Plant

cc:
Glenn von Gonten, NMOCD
Scott Olivier, SECOR

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES,GAS PLANTS, REFINERIES, COMPRESSOR, GEOTHERMAL FACILITES AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

☐ New ☐ Renewal ☒ Modification

1. Type: Eunice North Gas Plant (GW-004)
2. Operator: Chevron U.S.A. Inc.

   Address: 11111 South Wilcrest, Houston, TX 77099

   Contact Person: Matt Hudson Phone: (281) 561-3653
3. Location: NE /4 SE /4 Section 28 Township 21-S Range 37-E
   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site.
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
6. Attach a description of all materials stored or used at the facility.
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
10. Attach a routine inspection and maintenance plan to ensure permit compliance.
11. Attach a contingency plan for reporting and clean-up of spills or releases.
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.
14. CERTIFICATION I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: MATT HUDSON Title: PROJECT MANAGER

Signature: [signature] Date: 05/21/07

E-mail Address: MHKW@CHEVRON.COM

FINAL

IN-SITU PILOT STUDY WORK PLAN FOR THE EUNICE NORTH GAS PLANT

Chevron Environmental Management Company

May 21, 2007
89CH.49526.07

Prepared by:

Jeremy Rasmussen, P.E.
Senior Engineer

Submitted by:

David Scott Olivier
Senior Project Manager

Reviewed by:

Dan Oberle, P.E.
Principal Engineer

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Geologic Setting 2
1.3 Purpose 4
2.0 CHEMICAL INFORMATION AND STORAGE 5
2.1 Chemical Information 5
2.1.1 Calcium Polysulfide 5
2.1.2 Sodium Acetate 7
2.1.2.1 Sodium Bicarbonate 8
2.1.2.2 Acetic Acid 9
2.2 Chemical Storage and Delivery 9
3.0 PILOT STUDY ACTIVITIES 10
3.1 Health and Safety 10
3.2 Baseline Groundwater Sampling 10
3.3 Incorporation of Lessons Learned 11
3.4 Pilot Study Activities 13
3.4.1 Groundwater Extraction 13
3.4.2 Sodium Bicarbonate Addition 13
3.4.3 Acetic Acid Addition 14
3.4.4 Injection 14
3.4.5 Calcium Polysulfide Addition 15
3.5 Pilot Study Data Collection 15
3.6 Confirmation Groundwater Sampling 16
3.7 Investigative Derived Waste Management 16
3.8 Spill Contingency 16
3.9 Utilities 16
4.0 SCHEDULE AND COMPLIANCE 18
5.0 STATEMENT OF LIMITATIONS 19
6.0 REFERENCES 20
6.1 General 20
6.2 Calcium Polysulfide 20
6.3 Sodium Acetate 21

LIST OF FIGURES

Figure 1 Site Location Map
Figure 2 Site Map
Figure 3 Expanded Site Map
Figure 4 Pilot Study Layout Map
Figure 5 Pilot Study Detail Map
Figure 6 Process Flow Diagram
Figure 7 Piping and Instrumentation Diagram

TABLE OF CONTENTS (Continued)

LIST OF APPENDICES

APPENDIX A..... REDUCTIVE TREATMENT BENCH-SCALE TESTING EVALUATION
APPENDIX B..... MSDS SHEETS
APPENDIX C ..... GROUNDWATER SAMPLING FIELD DATA SHEETS
APPENDIX D .....GROUNDWATER FIELD LOG
APPENDIX E.....CALCIUM POLYSULFIDE FIELD TITRATION

1.0 INTRODUCTION

On behalf of Chevron Environmental Management Company (CEMC), SECOR International Incorporated (SECOR) has prepared this In-Situ Pilot Study Work Plan for the Eunice North Gas Plant (Site). The Eunice North Gas Plant is located in Lea County, New Mexico, approximately 0.25 miles north of the town of Eunice. The legal description is the south half (S/2) of the southeast quarter (SE/4) of the northeast quarter (NE/4) of Section 28, Township 21 South (T-21-S), Range 37 East (R-37-E). A Site Location Map is presented on Figure 1.

The Eunice North Gas Plant was originally constructed in the 1940s, and was owned and operated by Texaco from the 1940s through the 1980s. The gas plant was constructed and modified to operate as a turbo expander type natural gas processing plant for extraction of NGLC natural gas liquids.

Ownership transferred to Versado LLP (Versado), and gas plant operations have ceased and the operational equipment has been partially dismantled with much of the equipment shut-in. There are several buildings, structures, and tanks across the Site, including sumps, the compressor building, and the cooling tower.

The plant is currently operated as a natural gas compressor station under an agreement with Chevron. Targa Midstream Services, L.P. (Targa) operates two compressors in the northwest portion of the Site for Versado. The address is State Highway 207 (Eunice-Hobbs Highway), Eunice, New Mexico, 88231. The gas plant operator, Lewis Tarin, can be reached at (505) 394-3452.

1.1 Background

Impacts to the soil within the plant boundaries, as well as groundwater impacts in the area of the plant, were discovered when Texaco was renewing the New Mexico Oil Conservation Division (NMOCD) Groundwater Discharge Plan for the plant in the early 1990s. In August 1996, the NMOCD required an initial investigation to evaluate the integrity of process area sumps at the Site. Dissolved benzene and dissolved chromium were detected in groundwater above standards, which was documented in the *Subsurface Environmental Assessment Report* (Highlander, 1996). The source of the chromium was speculated to be cooling tower blowdown discharged to the surface southwest of the plant.

Several soil and groundwater investigations were conducted between 1996 and 2003, with semi-annual groundwater monitoring beginning in 2004. Based on the groundwater investigations, the three primary groundwater constituents of concern (COCs) for this Site are:

- Metals (specifically chromium and hexavalent chromium) in the groundwater that have migrated beyond the plant boundaries toward Monument Draw;
- Dissolved solids (represented by chloride concentrations) in the groundwater south and east of the plant; and
- Petroleum hydrocarbons in groundwater in the vicinity of an old sump inside the plant.

In addition to dissolved-phase concentrations in groundwater, hydrocarbons in the soil and groundwater at the Site are mainly located within a limited area inside the plant boundary. The source of the hydrocarbons has been removed. Two wells in the plant area (MW005 and MW006) historically exhibited the presence of phase-separated hydrocarbon (PSH) accumulations.

Beginning in 2003, remedial efforts for chromium impacts began through In-Situ Reactive Zone (IRZ) treatment at a "study area" consisting of three injection wells near the area of the highest chromium concentrations. This was followed by an array of 14 injection wells at the distal end of the chromium plume (distal array). The IRZ process used a carbohydrate-based electron donor (molasses) to stimulate reducing conditions in the subsurface to convert hexavalent chromium to trivalent chromium. IRZ was discontinued in September 2005 based on the bench-scale test results detailed below.

A bench-scale treatability study was performed in 2005 by SECOR to optimize the in-situ treatment reagent. The November 2005 study, entitled *Reductive Treatment Bench-Scale Testing Evaluation for Chevron Environmental Management Company Eunice North Gas Plant Eunice, New Mexico* (Appendix A), evaluated two biological reducing agents (molasses and sodium acetate) and two chemical reducing agents (sodium metabisulfite and calcium polysulfide). The results of the study indicate that calcium polysulfide treatment provided the optimum reduction of hexavalent chromium to trivalent chromium, and subsequent precipitation of the trivalent chromium from solution, at the lowest chemical dosage. Although the dosage rates are higher and the kinetics slower, the study also indicated that alternate electron donors could be successfully used. Alkanoic salts like sodium acetate could provide pH buffering to prevent excessive pH drops in the groundwater during biological degradation processes.

The remedial approach selected for future in-situ treatment of the hexavalent chromium groundwater plume is injection of an inorganic reducing agent (calcium polysulfide) along with an electron donor (sodium acetate). The calcium polysulfide will provide rapid reduction of hexavalent chromium within the injection area, while the sodium acetate will create a reducing zone through biological activity capable of treating hexavalent chromium migrating into the injection area. Additional bench-scale testing was performed in January 2007 to optimize chemical injection rates and minimize solids generation to prevent well clogging issues, as described in Section 3.0.

A Site Map, including locations of the study area, medial array, and distal array injection wells along with the associated monitoring wells is included as Figure 2.

1.2 Geologic Setting

The regional geology and hydrogeology is referenced from the *Groundwater Investigation and Remediation Activities Report 2004* (ARCADIS, 2005). Monument Draw is the major surface drainage feature in southern Lea County, and runs north to south slightly over two miles east of the Site. The overall topography in the area of the Site slopes gently toward Monument Draw at an approximate slope of 35 feet per mile. Small closed basins or playas exist on this sloping surface.

The geologic formations of interest at the Site include the Triassic Chinle, Cretaceous undifferentiated, Tertiary Ogallala and Quaternary eolian sedimentation, designated the Blackwater Draw. Of particular interest with regard to the impact of hexavalent chromium released to groundwater are the Tertiary Ogallala and Quaternary Blackwater Draw.

The lower Tertiary Ogallala formation is composed of fluvial sediments of the Miocene-Pliocene epochs. It is a heterogeneous combination of clay, silt, sand, and gravel of braided-stream deposits interbedded with, and overlain by, eolian sediments deposited as sand sheets and loess resting directly upon an erosional surface carved into the Triassic Chinle Formation under the Site. The fluvial sediments were deposited on a sloping plain in the form of coalescing alluvial fans, by streams that originated in the Rocky Mountains to the west and northwest. The Ogallala Formation was deposited in laterally restricted lenses of material, predominantly medium to yellowish-gray conglomeratic sandstone and fine to medium-grained well-sorted sandstone. The primary fresh water-bearing formation under and in the vicinity of the Site is the Ogallala.

In contrast to the fluvial deposition of the lower Ogallala sediments, the upper part of the Ogallala and all of the Blackwater Draw Formation overlying the Ogallala are composed of windblown (eolian) deposits. The very fine sand facies of the upper Ogallala are thick, ranging up to 125 feet and capped by the Caprock caliche or calcrete, marking the top of the Ogallala.

The Blackwater Draw Formation occurs as a mantle of Quaternary eolian sediment locally as thick as 100 feet, covering an area of the South High Plains of northeastern Texas and eastern New Mexico. Throughout the depositional time of the Blackwater Draw Formation, laterally restricted lenticular layers of eolian and playa or lacustrine facies were formed. The Blackwater Draw Formation occurs near the ground surface at the Site and contains reddish sediments composed of up to six well-developed buried soils with similar lithology and morphology. The soil development occurred during periods of landscape stability, separated by intermittent periods of deposition or by deflation that stripped surface horizons from newly developed soils.

The primary source of freshwater at the Site is the Ogallala Formation, which is hydraulically unconfined in the area of the Site. It is bounded on the base of the aquifer by an eroded surface of a firm red silty clay of the Chinle Formation. The base of the Ogallala is composed of a 5 to 10-foot interval of gravel/sand/clay, which is termed the "deep" water-bearing zone. The gravel unit is overlain by a red to yellow sand that exhibits vertical heterogeneity with alternating layers of loose and well-consolidated sand. This overlying unit constitutes the "shallow" water-bearing zone. Wells screened in the gravel unit have 40 to 50 feet of hydraulic head. Wells screened in the shallow water-bearing zone have screens that intersect the groundwater table and typically have 10 to 45 feet of saturation. Overall depth to groundwater varies with local topography and ranges from 37 to 73 feet below ground surface (bgs).

Regionally, the groundwater gradient was to the southeast in the area of the Site. However, a mounding effect now exists south of the plant, due to lawn watering within the City of Eunice. This mounding effect creates variable hydraulic gradient directions that tend towards southwest, west, northwest, north, and northeast trends. The elevations of the groundwater in the shallow and deep zones are similar, indicating there is hydraulic continuity between the zones.

1.3 Purpose

This work plan is intended to provide detailed information on the specifications and procedures to be followed to perform a pilot study of in-situ treatment of chromium-impacted groundwater. This pilot study will be performed on select wells in the medial array. The pilot study area is shown in Figure 3. The results of the injection activities described in this work plan will be used to develop a full-scale remediation plan.

Selected injection and monitoring wells, injection and sampling frequency, analytes and analytical methods, quality control (QC) procedures, groundwater injection and sampling procedures, and reporting requirements are described in the subsequent sections.

2.0 CHEMICAL INFORMATION AND STORAGE

Three chemicals (calcium polysulfide, sodium bicarbonate, and acetic acid) will be used in the in-situ pilot study. Acetic acid is an alkanoic acid, and when combined with sodium bicarbonate forms an alkanoic salt (sodium acetate). Information on these chemicals, along with the handling and storage procedures, is detailed in the following sections.

2.1 Chemical Information

2.1.1 Calcium Polysulfide

The following reference list presents documents describing where calcium polysulfide injection has been used in-situ to treat hexavalent chromium impacts in groundwater at other sites throughout the United States, including Arizona and California:

- Storch, P., A. Messer, D. Palmer and R. Pyrih. "Pilot Test for In-Situ Geochemical Fixation of Chromium (VI) Using Calcium Polysulfide" in A.R. Gavaskar and A.S.C. Chen (eds), Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2002, Battelle Press.
- Rouse, J., I Davies, A. DeSantis, and J. Hutton, "In-situ Hexavalent Chromium Reduction and Geochemical Fixation in Varied Geohydrological Regines", Best Sulfur Products Technical Paper, 2000.
- Storch, P. A. Messer, M. Barone, and R. Pyrih, "In Situ Geochemical Fixation of Cr(VI) in Soil Using Calcium Polysulfide, in A.R. Gavaskar and A.S.C. Chen (eds), Proceedings of the Fourth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2004, Battelle Press.
- Thomasser, R. and J. Rouse, "In-Situ Remediation of Chromium Contamination of Soil and Groundwater", Best Sulfur Products Technical Paper, 2000.
- Rouse, J and R. Thomasser, "Hexavalent Chromium Remediation by Bore-Hole Placed Reactive Barriers and Monitored Natural Attenuation", Proceedings from the Third International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, October, 2004.
- Zawislanski, P., J. Beatty and W. Carlson, "Long-Term Stability of Metals Following In-situ Treatment of Acidic Groundwater Using Calcium Polysulfide", Proceedings from the Third International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, October, 2004.
- Yu, G. and J. Tremaine, "Pilot Test Using Cascade to Treat Cr(VI) In Groundwater of A Carbonate Aquifer", Proceedings from the Second International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, November 2002.

A 29% calcium polysulfide solution will be used during the pilot study, and the calcium polysulfide material safety data sheet (MSDS) is included in Appendix B. Some minimal

hydrogen sulfide (H_2S) odor is distinguishable when the calcium polysulfide is exposed to air. The chemical is stable because it is pH amended so the vapor concentrations are low. Airborne concentrations will quickly dissipate. Monitoring equipment will be used during mixing and handling as a safety precaution.

There should not be concerns with the residual following injection of calcium polysulfide. Calcium polysulfide is a commonly used treatment chemical approved for use in drinking water by the National Sanitation Foundation (NSF International) and also becoming widely used for in-situ treatment of hexavalent chromium, as well as other metals, in groundwater. Calcium polysulfide oxidizes under aerobic conditions to form calcium, sulfate, and elemental sulfur.

Calcium polysulfide has been recently used more frequently as a reducing agent for hexavalent chromium owing to its ability to reduce hexavalent chromium to trivalent chromium without the need for acidification. Sulfur atoms have the ability to catenate into linear chains of sulfur atoms to create a polysulfide salt when reacted with a metal. When sulfur is reacted with calcium metal, a calcium polysulfide salt is formed that contains anywhere from 2 sulfur atoms (CaS_2) to 7 sulfur atoms (CaS_7). The average amount of sulfur in the polysulfide salts is 5 sulfur atoms per calcium atom. Therefore, calcium polysulfide is often written with the chemical formula CaS_5. When the polysulfide anion (S_5^{-2}) reacts with hexavalent chromium in the groundwater, the last sulfur atom on the polysulfide chain (which is a sulfide anion) is converted from a -2 oxidation state to a zero oxidation state, thus releasing two moles of electrons for each mole of polysulfide anion reacted. The CaS_5 reduction reaction with hexavalent chromium in the form of the dissolved chromate anion (CrO_4^{-2}) therefore occurs as shown in the reaction below:

$$10H^+_{(aq)} + 2CrO_4^{2-}{}_{(aq)} + 3CaS_{5(aq)} \rightarrow 2Cr(OH)_{3(s)} + 3Ca^{2+}{}_{(aq)} + 2H_2O_{(l)} + 15S^0_{(s)}$$

hydrogen — chromate — calcium polysulfide — chromium hydroxide — calcium — water — elemental sulfur

Following injection, the polysulfide will reduce the hexavalent chromium to trivalent chromium, causing the trivalent chromium to precipitate out of solution as chromium hydroxide [$Cr(OH)_3$]. Chromium hydroxide is a solid; therefore, it will remain in the soil matrix instead of the groundwater. Bench-scale testing with groundwater from the Site indicates there should be no pH issues related to calcium polysulfide treatment. As long as the pH of the aquifer remains above 6.0, the trivalent chromium will remain sorbed to the soil matrix and not soluble. The pH will remain above 6.0 using bicarbonate buffering (described in Section 2.1.2) to keep the trivalent chromium in its solid form once it is reduced.

The trivalent chromium is also thermodynamically stable and will not revert back to hexavalent chromium following calcium polysulfide injection. The only potential mechanism for trivalent chromium to revert back to hexavalent chromium is the introduction of a strong oxidant into the aquifer, such as permanganate or persulfate. Long term remediation plans at the Site do not involve the use of these strong oxidants. Thermodynamic calculations also indicate that dissolved oxygen within the aquifer will not cause trivalent chromium to revert back to hexavalent chromium.

Calcium will also precipitate out of the groundwater when it reacts with natural carbonate and sulfate in the groundwater. The maximum concentration of calcium to remain in solution is dependant upon pH and solubility. Typically, it will reach a maximum of 500 to 600 mg/l at neutral pH values, which is typical of hard-water aquifers. The remaining elemental sulfur from the calcium polysulfide is insoluble; therefore, it will precipitate out of solution and also remain in the soil matrix.

Calcium polysulfide will also react with minerals in the soil such as iron and manganese. Because of this reaction, it expends itself in the soil matrix before it can travel too far downgradient. It is anticipated that this reaction will occur within the first 50 feet of distance based on existing Site data and an understanding of the local soil chemistry.

2.1.2 Sodium Acetate

The use of sodium acetate as a terminal electron donor for biological reduction of chromium has been documented in the following literature sources:

- Dermou. E, A. Velissariou, D. Xenos, D.V. Vayena, *Biological Removal of Hexavalent Chromium in Trickling Filters Operating with Different Media Types*, Desalination, 211, pp. 156-163, 2007.
- Marsh, T.L. and M.J. McInerney, Relationship of Hydrogen Bioavailability to Chromate Red Sediments, Applied Environmental Microbiology, 67(4), pp. 1517-1521, April 2001.
- McLean, J. and T.J. Beveridge, *Chromate Reduction by a Pseudomonad isolated from a Site Contaminated with Chromated Copper Arsenate*, Applied and Environmental Microbiology, 67, pp. 1076-1084, March 2003.
- Pattanapipitpaisal, P, N.L. Brown and L.E. Macaskie, *Chromate Reduction and 16S Identifiaction of Bacteria Isolated from a Cr(VI)-Contaminated Site*, Applied Microbiology Biotechnology, 57, pp. 257-261, 2001.
- SECOR International Inc., *Reductive Treatment Bench-Scale Testing Evaluation for Chevron Environmental Management Company, Eunice North Gas Plant – Eunice, New Mexico*, January 23, 2006.
- Williams, S.M., C.S. Criddle and M.J. Dybas, *Assessing the Potential for Biological Cr(VI) Reduction in an Aquifer Contaminated with Mixed Wastes*, in Chromium (VI) Handbook, 348-356 (James A. Jacobs, et al. eds., 2005), CRC Press.

Sodium acetate has been used extensively across the United States as an electron donor for in-situ groundwater treatment applications. Native bacteria within the aquifer utilize the electron donor as a carbon source, thereby creating reducing conditions which beneficially reduce contaminants such as hexavalent chromium through the biological activity. In-situ bioremediation of groundwater with sodium acetate has been documented in New Mexico. Sodium acetate was used in Mountainview, New Mexico for the in-situ treatment of nitrates *(In-Situ Groundwater Bio-Denitrification, McQuillan, Faris, New Mexico Environment Department).*

Sodium acetate ($NaC_2H_3O_2$) is an alkanoic salt that is commonly used as a food preservative or additive. It is a colorless, odorless salt that readily dissolves in water (solubility > 50%). When

dissolved in water, the acetate anion can be used as a terminal electron donor for the biological reduction of hexavalent chromium as shown in the simplified reaction below.

$$3\ CH_3CO_2^-{}_{(aq)} + 8\ CrO_4^{2-}{}_{(aq)} + 17\ H_2O_{(l)} \rightarrow 8Cr(OH)_{3(s)} + 6HCO_3^-{}_{(aq)} + 13OH^-{}_{(aq)}$$

acetate | chromate | water | chromium hydroxide | bicarbonate | hydroxide

Sodium acetate and calcium polysulfide have alkaline pH values when dissolved in water. Since groundwater will be re-circulated as part of the pilot treatment, it is important to buffer the pH of the re-circulated groundwater to prevent the precipitation of dissolved calcium from the groundwater as calcium carbonate as shown in the reaction below:

$$HCO_3^-{}_{(aq)} + OH^-{}_{(aq)} + Ca^{+2}{}_{(aq)} \rightarrow CaCO_{3(s)} + H_2O_{(l)}$$

bicarbonate | hydroxide | calcium | calcium carbonate | water

To prevent calcium carbonate precipitation from occurring (which leads to well fouling), the sodium acetate solution will be prepared on-site by adding sodium bicarbonate ($NaHCO_3$) and acetic acid (CH_3COOH) to re-circulated groundwater flow. This will create dissolved sodium acetate and dissolved carbon dioxide (in the form of weak carbonic acid) that creates stable bicarbonate equilibrium as shown in the reaction below:

$$NaHCO_{3(aq)} + CH_3COOH_{(aq)} \rightarrow NaC_2H_3O_{2(aq)} + H_2CO_{3(aq)}$$

sodium bicarbonate | acetic acid | sodium acetate | carbonic acid

Calcium carbonate cannot precipitate from solution under a balanced bicarbonate system since excess alkalinity in the form of hydroxide reacts with carbonic acid to form bicarbonate instead of carbonate. Therefore, calcium remains in solution instead of precipitating, which would result in excessive well fouling.

$$H_2CO_{3(aq)} + OH^-{}_{(aq)} + Ca^{+2}{}_{(aq)} \rightarrow Ca^{+2}{}_{(aq)} + HCO_3^-{}_{(aq)} + H_2O_{(l)}$$

carbonic acid | hydroxide | calcium | calcium | bicarbonate | water

Handling and storage procedures for use of the sodium bicarbonate and acetic acid to create a pH-buffered sodium acetate solution are detailed in the following sections.

2.1.2.1 Sodium Bicarbonate

Sodium bicarbonate (better known as baking soda) is a white, odorless salt commonly used in preparation of baked goods. A 5% sodium bicarbonate solution will be used during the pilot study, and the sodium bicarbonate MSDS is included in Appendix B. The chemical is stable under ordinary conditions of use and storage. Conditions to avoid include heat, moisture, and incompatible materials such as strong acids; therefore, the sodium bicarbonate will be stored on a wooden pallet away from other materials and will be kept covered. A dust mask and goggles will be worn when preparing the sodium bicarbonate solution (prepared by adding 50-lb bags of the salt into a mix tank with Site groundwater) to prevent minor irritation that occurs when the salt contacts the eyes or mucous membranes. The pH of the salt and solution is near neutral.

2.1.2.2 Acetic Acid

A 56% acetic acid solution will be used during the pilot study, and the acetic acid MSDS is included in Appendix B. Acetic acid is stable, but should be stored in a cool, dry environment and kept away from sources of ignition, heat, and oxidizing agents. Skin contact and inhalation should be avoided as acetic acid is a mild acid. Gloves and chemical goggles should be worn when handling the chemical. Acetic acid is readily biodegradable and is safe for discharge when diluted; therefore, should not result in a residual issue.

2.2 Chemical Storage and Delivery

Containers of 29% (10.6 lbs/gallon) calcium polysulfide and 56% acetic acid (8.5 lbs/gallon) will be delivered and stored on-site in 55-gallon drums. The chemicals will be set up and stored on separate secondarily-contained spill containment pallets. Sodium bicarbonate will be delivered in 50-lb bags, and will be stored on a wooden pallet. A total of two drums of calcium polysulfide, five drums of acetic acid, and 33 bags of sodium bicarbonate will be required. The chemical storage area will be within the fenced exclusion zone. A Pilot Study Layout Map is presented on Figure 4, and Pilot Study Detail Map, including specific tank locations and containment layout, is presented on Figure 5.

3.0 PILOT STUDY ACTIVITIES

Eleven injection wells are situated in the medial array (approximate 50-foot spacing), which bi-sects the chromate plume in a north-south orientation, perpendicular to the groundwater flow direction. Two of these wells (IW024 and IW025), as well as a nearby monitoring well (MW090SA) were selected for the pilot study. In-situ injection of calcium polysulfide, sodium bicarbonate, and acetic acid to reduce hexavalent chromium to trivalent chromium will be conducted following the procedures outlined below.

3.1 Health and Safety

To ensure safe completion of pilot study activities, the site-specific Health and Safety Plan (HASP) will be updated and task-specific job safety analyses (JSAs) will be created or updated, as necessary, prior to commencing fieldwork. SECOR will perform dry-runs on each activity (gauging, sampling, etc.) to ensure any gaps in the JSAs are filled. Two SECOR personnel will be on-site during activities. Daily health and safety briefings will be conducted at the start of each day and after lunch, to detail upcoming hazards and lessons learned from the previous day's events. Applicable JSAs will be reviewed daily at the two tailgate meetings and whenever field personnel change tasks.

As the pilot study will be conducted for nine days in a row for 24 hours a day, there will be several personnel working on-site in rotation. Personnel will work in teams of two for shifts of approximately eight to ten hours, and there will be enough personnel dedicated to the job that no one will work more than five days in a row. Meetings will be held between the changing shifts to make sure all pertinent information is passed between the teams.

3.2 Baseline Groundwater Sampling

Prior to the pilot study, baseline groundwater elevations will be measured in five wells: IW023, IW024, IW025, IW026, and MW090SA and recorded on the Groundwater Sampling Field Data Sheet (Appendix C). Well locations are detailed on Figure 4 and well details are summarized below:

Well ID	Surveyed Measuring Point Elevation (ft AMSL)	Surveyed Ground Elevation (ft AMSL)	Screened Interval (ft bgs)	Completed Well Depth (ft bgs)
IW023	3426.05	3423.49	34-98	99
IW024	3426.63	3424.06	41-101	103
IW025	3427.62	3425.06	41-101	103
IW026	3428.01	3425.53	37-102	105
MW090SA	3428.33	3425.63	36-101	103

Groundwater samples will also be collected at these five wells using either a bailer or low-flow sampling procedures. If using low-flow procedures, the bladder pump intake will be lowered into the well to the midpoint of the well screen. The pump will be started at its lowest speed setting and speed will be slowly increased until discharge occurs.

During well purging, indicator field parameters will be measured using a multi-meter with flow-through-cell and recorded on the Groundwater Sampling Field Data Sheet (Appendix C) every two to five minutes. Purging is considered complete and sampling will begin when three consecutive parameter readings are stable, within the following limits:

- Dissolved oxygen (DO) - 10%
- Conductivity - 3%
- Temperature - 3%
- pH - ± 0.1 unit
- Oxidation reduction potential (ORP) - ± 10 millivolts

Sample containers will be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. Groundwater samples collected for dissolved metals analysis will be field filtered into pre-preserved containers using high-capacity, 0.45-µm disposable filters and a small pump. If a sample can not be filtered in the field, the chain of custody will be marked "Filter at Lab" and an unpreserved bottle will be used.

Following collection, groundwater samples will be labeled, logged on a laboratory chain of custody, and placed on ice in an insulated cooler to maintain a temperature of approximately 4°C. Water samples will be transmitted via FedEx to the analytical laboratory. Proper chain of custody documentation will be maintained throughout the sampling and analysis process.

Groundwater samples will be sent for analysis to Lancaster Laboratories in Lancaster, Pennsylvania, a CEMC-approved analytical laboratory. Samples will be analyzed for dissolved chromium, hexavalent chromium, total organic carbon (TOC), and sodium.

After collection of the groundwater samples, the pump tubing will either be properly discarded or dedicated to the well for re-sampling. To decontaminate sampling equipment, an Alconox-water solution will be pumped from buckets through the pump and associated equipment. The equipment will then be rinsed thoroughly with deionized water pumped from buckets. One-time use disposable equipment will not be decontaminated, but packaged for appropriate disposal.

Additional details on groundwater sampling procedures can be found in the *Sampling and Analysis Plan for the Eunice North Gas Plant* dated June 5, 2006.

3.3 Incorporation of Lessons Learned

Historical pump testing data and in-situ treatment data from the Site was evaluated to determine anticipated pumping rates from extraction wells, injection rates at injection wells, injection back-pressure, and radius of influence.

Constant-rate 48-hour pump tests were performed at RW004A, RW002, and RW003 in 2001 (ARCADIS, 2004). RW004A is screened in the deep Ogallala zone (95 to 115 feet bgs), RW002 is screened in the shallow Ogallala zone (48 to 68 feet bgs), and RW003 is also screened in the shallow Ogallala zone (45 to 65 feet bgs). A summary of the pump test data valuable to the pilot study design is provided in the following table:

Pumping Well	Flow Rate (gpm)	Maximum Drawdown at Pumping Well (ft)	Maximum Drawdown at Observation Well (ft)	Distance from Pumping Well to Observation Well (ft)
RW004A	3.3	32	6	25
RW002	9.25	10	1	23
RW003	7.2	10	1	19

The data suggests a pumping rate of at least 5 gallons per minute (gpm) could be expected at a 4-inch well screened across the shallow and deep Ogallala. The data also suggests a radius of influence of greater than 20 feet can be expected from the extraction effort.

Data from past molasses injection efforts were also evaluated. Molasses injections occurred between 2003 and 2005 at three study area injection wells (RW004A, IW001, and IW002), and between 2004 and 2005 at 14 distal array injection wells (IW003 through IW016). All injection wells except RW004A had a 4-inch diameter. During an injection event, 250 to 1,000 gallons of a 5 to 15% molasses solution was injected into the subsurface. On average, the injections occurred every month. The injection pressure and flow rate data are summarized in the following table:

Area	Average Injection Pressure (psi)	Range of Average Injection Pressures (psi)	Average Injection Flow Rate (gpm)	Range of Average Injection Flow Rates (gpm)
Study Area	7.9	6.6-10.2	11.7	10.0-14.0
Distal Array	3.0	0.0-8.7	18.2	7.3-27.7

The data suggest an injection rate of at least 10 gpm could be expected at a 4-inch well screened across the shallow and deep Ogallala, at a pressure less than 10 psi.

Groundwater elevation data from monitoring wells in the vicinity of study area injection wells indicate measurable mounding effects from the injections. The monitoring wells are located at distances between 15 and 40 feet from the injection wells. Although the hydraulic effects were immediate during the injection period, analytical monitoring data indicate changes in groundwater chemistry took several weeks to occur.

Monitoring well clusters adjacent to injection wells IW016 and IW014 were used to monitor changes in groundwater chemistry due to injections at the distal array. For IW016, changes in groundwater chemistry at the nearest monitoring well (10 feet away) took 7 days to occur. For IW014, changes in groundwater chemistry at the nearest monitoring well (10 feet away) took 41 days to occur. The distal array injection wells are spaced approximately 100 feet apart.

To increase the radial influence of treatment and ensure contact with the treatment chemicals, groundwater recirculation versus batch injections is proposed for the medial array pilot study. Groundwater will be extracted from IW024 and MW090SA at a combined flow rate of approximately 10 gpm, amended with treatment chemicals, and then injected into IW025 at a flow rate of approximately 10 gpm and a pressure less than 10 psi.

3.4 Pilot Study Activities

A Pilot Study Detail Map is provided as Figure 5. A Process Flow Diagram is included as Figure 6, and a Piping and Instrumentation Diagram is included as Figure 7. The following sections provide detail on groundwater extraction, treatment chemical addition, and injection of the amended groundwater.

3.4.1 Groundwater Extraction

Groundwater will be extracted from IW024 and MW090SA using ½-HP stainless steel submersible pumps (Grundfos, Model #16S05-5) capable of delivering 10 gpm against 125 feet of total dynamic head (TDH). The anticipated 5 gpm from each well will be routed to a secondarily contained 1,100-gallon polyethylene mixing tank. The anticipated pH of the extracted groundwater is 7.0 to 7.2. In-line pitot tube style acrylic flowmeters (BlueWhite, Model #F-30100PR) will be installed to monitor the flow rate from each extraction well. Sample ports will also be installed as shown on Figure 7. Using a bypass line, a portion of the extracted groundwater (475 gallons per batch) will be occasionally routed to the 550-gallon polyethylene mix tank for creating batches of 5% sodium bicarbonate.

The pilot study design requires one pore volume exchange within the vicinity of IW025. Assuming a saturated thickness of 15 feet (deep zone only), a radius of influence of 35 feet (distance to nearest well IW024), and a porosity of 30%, the volume of injected groundwater will be approximately 130,000 gallons. At a groundwater extraction/injection rate of 10 gpm, this equates to a nine-day, 24-hour per day pilot study. The desired concentration of treatment chemicals in the pore volume is 1,500 mg/l sodium bicarbonate; 1,000 mg/l acetic acid; and 250 mg/l calcium polysulfide. The mixture of sodium bicarbonate and acetic acid creates a 1,600 mg/l sodium acetate solution within the mix tank. The total mass of chemicals required is therefore 1,625 lbs of sodium bicarbonate; 1,083 lbs of acetic acid; and 267 lbs of calcium polysulfide. Chemical addition is described in greater detail in the following sections.

3.4.2 Sodium Bicarbonate Addition

The generation of solids is a significant consideration with any in-situ groundwater treatment technology. Sodium bicarbonate and acetic acid were chosen for the pilot study to help eliminate the generation of solids during groundwater extraction and injection activities. Solids generated could foul injection wells and result in a significant mass of sludge to handle and properly dispose of. Solids handling would increase the complexity and cost of the remedial approach.

Recent bench-scale testing suggests that when extracted groundwater (pH of 7.0 to 7.2) is treated with 1,000 mg/l acetic acid and 1,500 mg/l sodium bicarbonate, the resulting solution has a well-buffered pH in the range of 5.8 to 6.0 and a sodium acetate concentration of

1,600 mg/l. The pH needs to be maintained above 5.0 to prevent stripping of H_2S (from the subsequent calcium polysulfide addition), and below 6.8 to prevent calcium carbonate fouling. Bench-scale testing was also performed to evaluate pre-treatment with caustic (sodium hydroxide) to precipitate calcium carbonate out of solution prior to the mix tank. This would result in the accumulation of up to 4% of the groundwater volume as sludge, or approximately 5,000 gallons of sludge having 2% solids content.

Batches of 5% sodium bicarbonate will be made within a secondarily contained 550-gallon polyethylene batch tank. Four 50-lb bags of sodium bicarbonate will be added to the batch tank along with 475 gallons of make-up water (groundwater). The solution will have a pH near neutral, with a small submersible pump within the tank continually mixing the contents. From the batch tank, the sodium bicarbonate solution will be pumped by metering pump (LMI, Model #C741-36, 20 gallons per hour [gph] max) into the 1,100-gallon mix tank. To ensure the pH stays in the specified range of 5.8 to 6.0, pH will be monitored in the mix tank using a portable YSI 63 pH/Conductivity meter. Adjustments will be made to the chemical metering pump, as necessary, to maintain the desired pH range.

At an injection rate of 10 gpm, the 5% sodium bicarbonate will be added at a rate of 17.4 gph to create a 1,500 mg/l sodium bicarbonate solution in the mix tank. A total of 1,625 lbs of sodium bicarbonate will be required for the pilot study. A total of 3,750 gallons of 5% sodium bicarbonate will be required, which equates to nearly one batch a day of treatment chemical. Polyethylene tubing (1/2-inch OD) will be used to deliver the treatment chemical.

3.4.3 Acetic Acid Addition

Acetic acid (56%) will be pumped from secondarily contained 55-gallon drums to the mix tank. A chemical metering pump (LMI, Model #B741-313SI, 7 gph maximum) will be used to deliver the chemical. At an injection rate of 10 gpm, the 56% acetic acid will be added at a rate of 1.05 gph to create a 1,000 mg/l solution. A total of 1,083 lbs of acetic acid will be required, with equates to 228 gallons at a 56% concentration and density of 8.5 lbs/gallon. Polyvinylidene fluoride (PVDF) tubing (1/2-inch OD) will be used to deliver the treatment chemical. To ensure process control and proper mixing, the hydraulic retention time (HRT) in the mix tank will be at least 50 minutes (100 minutes is provided at 10 gpm).

3.4.4 Injection

The chemically-amended groundwater (1,600 mg/l sodium acetate, pH of 5.8 to 6.0) will be pumped from the mix tank to injection well IW025 at a rate of 10 gpm. A stainless steel centrifugal pump (Goulds, Model #IMSIC4E4) will be used to transfer the groundwater. The injection pump has been sized to deliver 30 gpm against 50 feet TDH. A one-micron bag filter (Polyline, Model #FLT4202) will be installed upstream of the injection well to capture any residual solids. Prior to the bag filter, there will be a re-circulation line back to the mix tank to aid in mixing.

An in-line totalizer and flowmeter (7/8-inch NuFlo, 3-30 gpm range, 1-inch MT ends, MCII analyzer) will be installed after the bag filter. A pressure gauge installed at the wellhead will be used to monitor injection pressure, with a target maximum of 10 psi established for the pilot study. Additional pressure gauges and sample ports will be installed as shown on Figure 7.

Rebecca Melendez with the Office of the State Engineer in Roswell, New Mexico indicated that no permits would be required for the 130,000-gallon pilot study since it is a short term, one time event. However, a permanent full-scale remedial system requiring extraction and injection of groundwater would require additional paperwork through the Office of the State Engineer. New Mexico is a Clean Water Act primacy state. Therefore, a class 5 injection well permit may be required by the New Mexico Environment Department (NMED). The state of New Mexico would then likely report to the United States Environmental Protection Agency (USEPA) on the injection. All applicable permits and notification required by the State of New Mexico (NMOCD, NMED, Office of the State Engineer) and the USEPA will be acquired prior to implementation of this work plan.

3.4.5 Calcium Polysulfide Addition

The final treatment chemical, a 29% calcium polysulfide solution, will be injected in-line at the wellhead versus at the mix tank. The calcium polysulfide is injected in-line to avoid H_2S stripping from solution and to mitigate any health and safety issues associated with handling calcium polysulfide. The calcium polysulfide solution has a pH of 11.3 to 11.5. A chemical metering pump (LMI, Model #B741-313SI, 7 gph maximum) will be used to pump the calcium polysulfide from 55-gallon drums to IW025. At an injection rate of 10 gpm, the 29% calcium polysulfide will be added at a rate of 0.4 gph to create a 250 mg/l solution. A total of 267 lbs, or 87 gallons at a 29% concentration and density of 10.6 lbs/gallon, of calcium polysulfide will be required. Polyethylene tubing (1/2-inch OD) will be used to deliver the treatment chemical.

The target dose for calcium polysulfide is 250 mg/l, as testing shows higher concentrations could precipitate out too much elemental sulfur. This dosage rate will increase the pH of the groundwater to between 6.2 and 6.3, with a final alkalinity of 1,400 mg/l. This solution is stable and will not precipitate calcium carbonate from solution, thereby minimizing clogging of the well screen and formation. The alkalinity sequesters H_2S and, along with the in-line injection technique, keeps it from stripping from solution. The alkalinity also prevents the groundwater from going acidic at a later date as the acetate is consumed biologically to create reducing conditions.

3.5 Pilot Study Data Collection

During pilot study activities, groundwater elevation and indicator field parameters (conductivity, ORP, pH, DO, and temperature) will be monitored at IW023, IW024, IW026, and MW090SA to determine the influence of the injection activities and recorded on the Groundwater Field Log (Appendix D).

In addition, to confirm the presence of calcium polysulfide at the wells adjacent to IW025 (IW023, IW024, IW026, and MW090SA), a field titration will be performed daily. The field titration procedure is included in Appendix E. A Hach test kit will also be used to monitor hexavalent chromium concentrations in the field daily.

3.6 Confirmation Groundwater Sampling

Following the pilot study, confirmation groundwater samples will be collected from five wells (IW023, IW024, IW025, IW026, and MW090SA) and analyzed for dissolved chromium, hexavalent chromium, TOC, and sodium. Groundwater sampling activities and field data collection will follow the same procedures detailed in Section 3.2 for baseline sample collection.

3.7 Investigative Derived Waste Management

The only waste expected to be generated during the pilot study is purge water from sampling activities. Purge water will be pumped from the wells into a 500-gallon polyethylene tank during sampling activities, and later pumped into an on-site disposal well.

The pilot study will also generate waste that can be disposed of at a municipal landfill. This includes empty chemical drums (which will be properly rinsed out prior to disposal), empty chemical bags, and pallets.

3.8 Spill Contingency

Piping will be inspected daily during the pilot study to detect any weak points or leaks in the system. Should a spill or leak of the acetic acid or calcium polysulfide solutions occur within one of the spill containment pallets, it will be pumped out and returned to a new 55-gallon drum for re-use. Any material in leaking drums will be pumped into a new drum and the damaged drum removed from the Site. All mixing and pumping of the sodium bicarbonate solution will be conducted within a fiberglass containment basin (7 feet wide, 8 feet long, 18 inches deep, 500 gallon capacity). The 1,100-gallon mix tank, injection pump, and bag filter will also be placed within a fiberglass containment basin (8 feet wide, 10 feet long, 20 inches deep, 1,000 gallon capacity).

Any spill or leak outside of the containment areas will be remediated, per the MSDS and the product label, to protect human health and minimize any effects to the environment. Sand, or other appropriate absorbent material, shall be used to contain a spill. At no time shall acidic substances be used to remedy a spill. Absorbent material that comes in contact with any spilled solution will be containerized for proper disposal. Following removal of the absorbent material, chase water will be applied to the ground surface to further dilute the spilled solution and expedite its infiltration into the geologic formation. Any spill volume that poses immediate danger to human health or the environment or that is greater than or equal to 55 gallons shall be reported, within 24 hours, to the NMED (emergencies: 505-827-9329, non-emergencies: 866-428-6535). A 55-gallon spill kit will be located within the exclusion zone, as shown on Figure 5.

Further reference should be made to the MSDS and the product label prior to commencing any handling or transport of the sodium bicarbonate, acetic acid, and calcium polysulfide.

3.9 Utilities

Water provided by the City of Eunice will be used for general housekeeping activities and will also supply a portable eye wash & shower in the chemical storage area, as shown on Figure 5.

To power the system (three metering pumps, one centrifugal pump, two extraction pumps, one mixing pump, and temporary lighting), a temporary 120-volt electrical drop will be installed at a nearby power pole. In the event this option cannot be implemented in the field, a gas powered generator could be used or power could be routed from the fenced aboveground storage tank (AST) area (approximately 1,000 feet).

4.0 SCHEDULE AND COMPLIANCE

Per 20.6.2.3108 Public Notice and Participation, the NMOCD should approve the Groundwater Discharge Permit Renewal Application within 75 days of receipt from CEMC. The Public Notice requirements must also be completed by CEMC within this time period. SECOR will initiate the pilot study activities within 45 days of receiving NMOCD approval of the application. Therefore, four months will likely elapse between the time the application is submitted and the pilot study is initiated.

Initially, baseline groundwater sampling of the five wells will be completed prior to commencement of injection activities, as discussed in Section 3.2. Pilot study activities are expected to last for a 14-day duration, which includes time for mobilization, set-up, 9-day pilot test, and demobilization. Following the pilot study, confirmation groundwater sampling of the five wells will be completed as described in Section 3.6.

Following the pilot study activities and confirmation groundwater sampling, results will be reviewed and presented in a letter report. This information will be used to develop a full-scale remedial approach for the Site.

5.0 STATEMENT OF LIMITATIONS

The recommendations contained in this work plan are based upon professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location, and are subject to the following limitations:

1. The data and findings presented are valid as of the dates when the investigations were performed. The passage of time, manifestation of latent conditions, or occurrence of future events may require further exploration at the Site, analysis of the data, and reevaluation of the findings, observations, and conclusions expressed in the report.

2. The data reported and the findings, observations, and conclusions expressed are limited by the Scope of Work. The Scope of Work was defined by the request of the client, the time and budgetary constraints imposed by the client, and availability of access to the Site. SECOR cannot verify the accuracy of data provided by previous consultants.

3. Because of the limitations stated above, the findings, observations, and conclusions expressed by SECOR are not, and should not be, considered an opinion concerning the compliance of any past or present owner or operator of the Site with any federal, state, or local law or regulation.

4. No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon Site conditions in existence at the time of the investigations.

5. SECOR reports present professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be constructed to offer legal opinion or representations as to the requirements of, nor the compliance with, environmental laws, rules, regulations, or policies of federal, state, or local governmental agencies. Any use of this report constitutes acceptance of the limits of SECOR's liability. SECOR's liability extends only to its client and not to any other parties who may obtain the report. Appropriate legal counsel should review issues raised by the report.

6.0 REFERENCES

6.1 General

ARCADIS, 2004, *North Eunice Chromate Remediation Phase One Study,* dated January 30, 2004.

ARCADIS, 2005, *Groundwater Investigation and Remediation Activities Report 2004,* dated March 2005.

New Mexico Energy, Minerals, and Natural Resource Department Oil Conservation Division, Title 20 Environmental Protection, Chapter 6 Water Quality, Part 2 Ground and Surface Water Protection, 20.6.2.3108 Public Notice and Participation, www.emnrd.state.nm.us/ocd.

New Mexico Environment Department, www.nmenv.state.nm.us.

New Mexico Environment Department, *In-Situ Groundwater Bio-Denitrification*, Dennis McQuillan, Bart Farris and H. Eric Nuttall, Lijun Deng from University of New Mexico, www.nmenv.state.nm.us/gwb/Technical%20resources/biodenit.html.

6.2 Calcium Polysulfide

Storch, P., A. Messer, D. Palmer and R. Pyrih. "Pilot Test for In-Situ Geochemical Fixation of Chromium (VI) Using Calcium Polysulfide" in A.R. Gavaskar and A.S.C. Chen (eds), Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2002, Battelle Press.

Rouse, J., I Davies, A. DeSantis, and J. Hutton, "In-situ Hexavalent Chromium Reduction and Geochemical Fixation in Varied Geohydrological Regines", Best Sulfur Products Technical Paper, 2000.

Storch, P. A. Messer, M. Barone, and R. Pyrih, "In Situ Geochemical Fixation of Cr(VI) in Soil Using Calcium Polysulfide, in A.R. Gavaskar and A.S.C. Chen (eds), Proceedings of the Fourth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2004, Battelle Press.

Thomasser, R. and J. Rouse, "In-Situ Remediation of Chromium Contamination of Soil and Groundwater", Best Sulfur Products Technical Paper, 2000.

Rouse, J and R. Thomasser, "Hexavalent Chromium Remediation by Bore-Hole Placed Reactive Barriers and Monitored Natural Attenuation", Proceedings from the Third International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, October, 2004.

Zawislanski, P., J. Beatty and W. Carlson, "Long-Term Stability of Metals Following In-situ Treatment of Acidic Groundwater Using Calcium Polysulfide", Proceedings from the Third International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, October, 2004.

Yu, G. and J. Tremaine, "Pilot Test Using Cascade to Treat Cr(VI) In Groundwater of A Carbonate Aquifer", Proceedings from the Second International Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater, November 2002.

6.3 Sodium Acetate

Dermou. E, A. Velissariou, D. Xenos, D.V. Vayena, *Biological Removal of Hexavalent Chromium in Trickling Filters Operating with Different Media Types*, Desalination, 211, pp. 156-163, 2007.

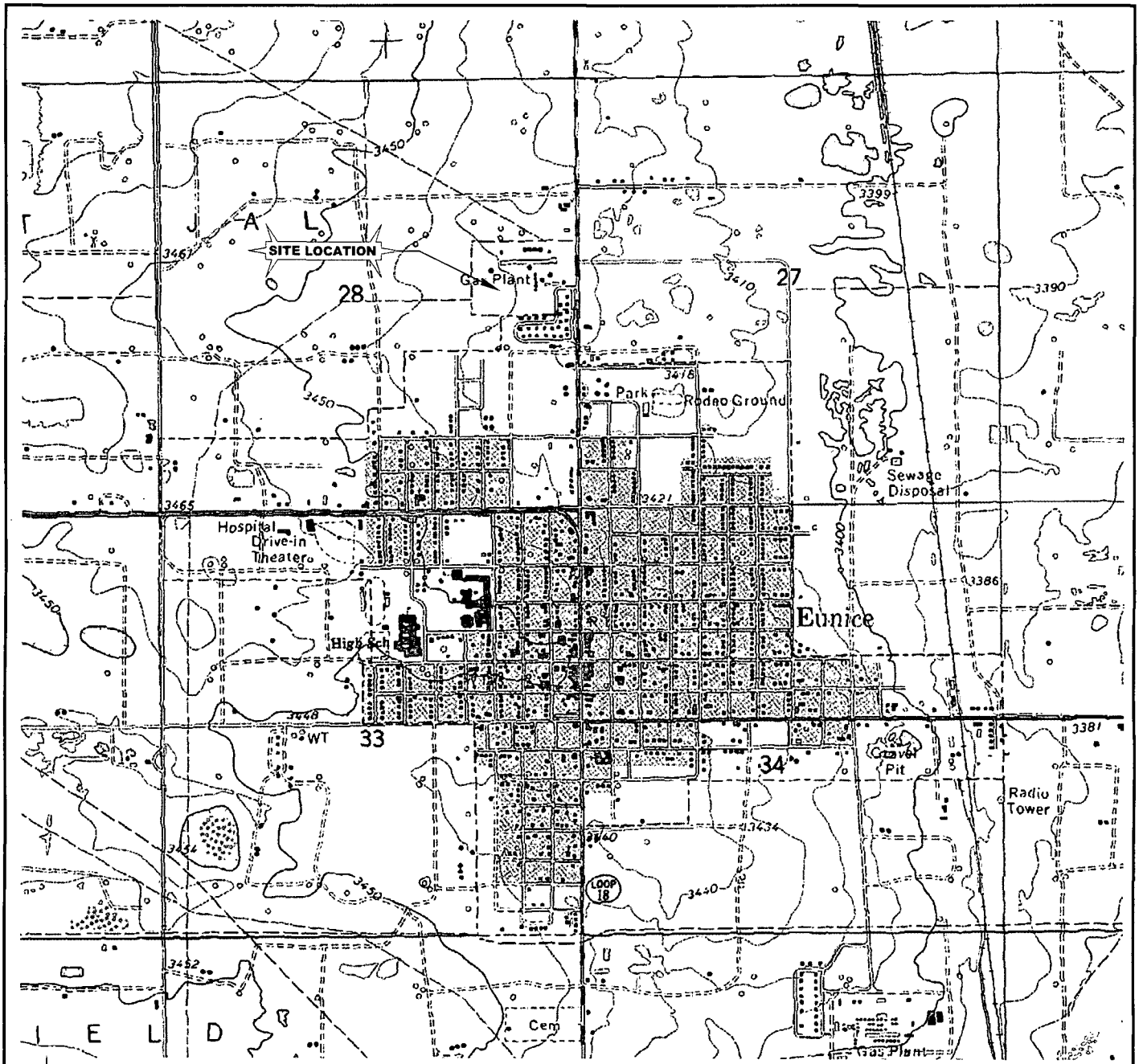
Marsh, T.L. and M.J. McInerney, Relationship of Hydrogen Bioavailability to Chromate Red Sediments, Applied Environmental Microbiology, 67(4), pp. 1517-1521, April 2001.

McLean, J. and T.J. Beveridge, *Chromate Reduction by a Pseudomonad isolated from a Site Contaminated with Chromated Copper Arsenate*, Applied and Environmental Microbiology, 67, pp. 1076-1084, March 2003.

Pattanapipitpaisal, P, N.L. Brown and L.E. Macaskie, *Chromate Reduction and 16S Identifiaction of Bacteria Isolated from a Cr(VI)-Contaminated Site*, Applied Microbiology Biotechnology, 57, pp. 257-261, 2001.

SECOR International Inc., *Reductive Treatment Bench-Scale Testing Evaluation for Chevron Environmental Management Company, Eunice North Gas Plant – Eunice, New Mexico*, January 23, 2006.

Williams, S.M., C.S. Criddle and M.J. Dybas, *Assessing the Potential for Biological Cr(VI) Reduction in an Aquifer Contaminated with Mixed Wastes*, in Chromium (VI) Handbook, 348-356 (James A. Jacobs, et al. eds., 2005), CRC Press.



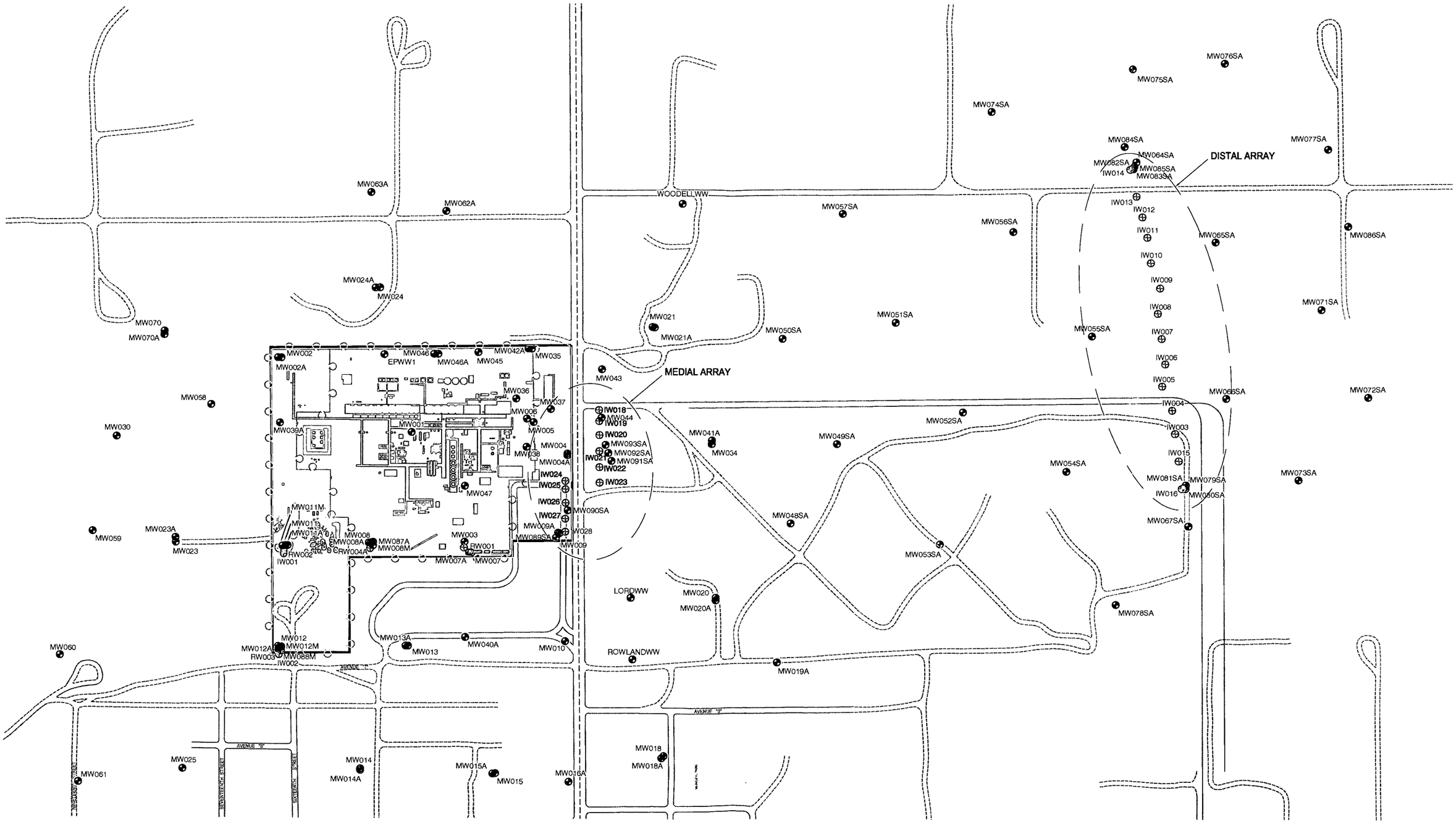
REFERENCE: USGS 7.5 MINUTE QUADRANGLE; EUNICE AND RATTLESNAKE CANYON, NEW MEXICO

SECOR
2321 Club Meridian Drive, Suite E
Okemos, Michigan
PHONE:(517) 349-9499 FAX:(517) 349-6863

FOR:		FIGURE:
CHEVRON EUNICE NORTH GAS PLANT EUNICE, NEW MEXICO	SITE LOCATION MAP	1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49410.01	ERM	RDT	RDT	10/21/05

Eunice North Site Location Map.dwg



SECOR
2321 CLUB MERIDIAN DR., SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499

FOR:
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

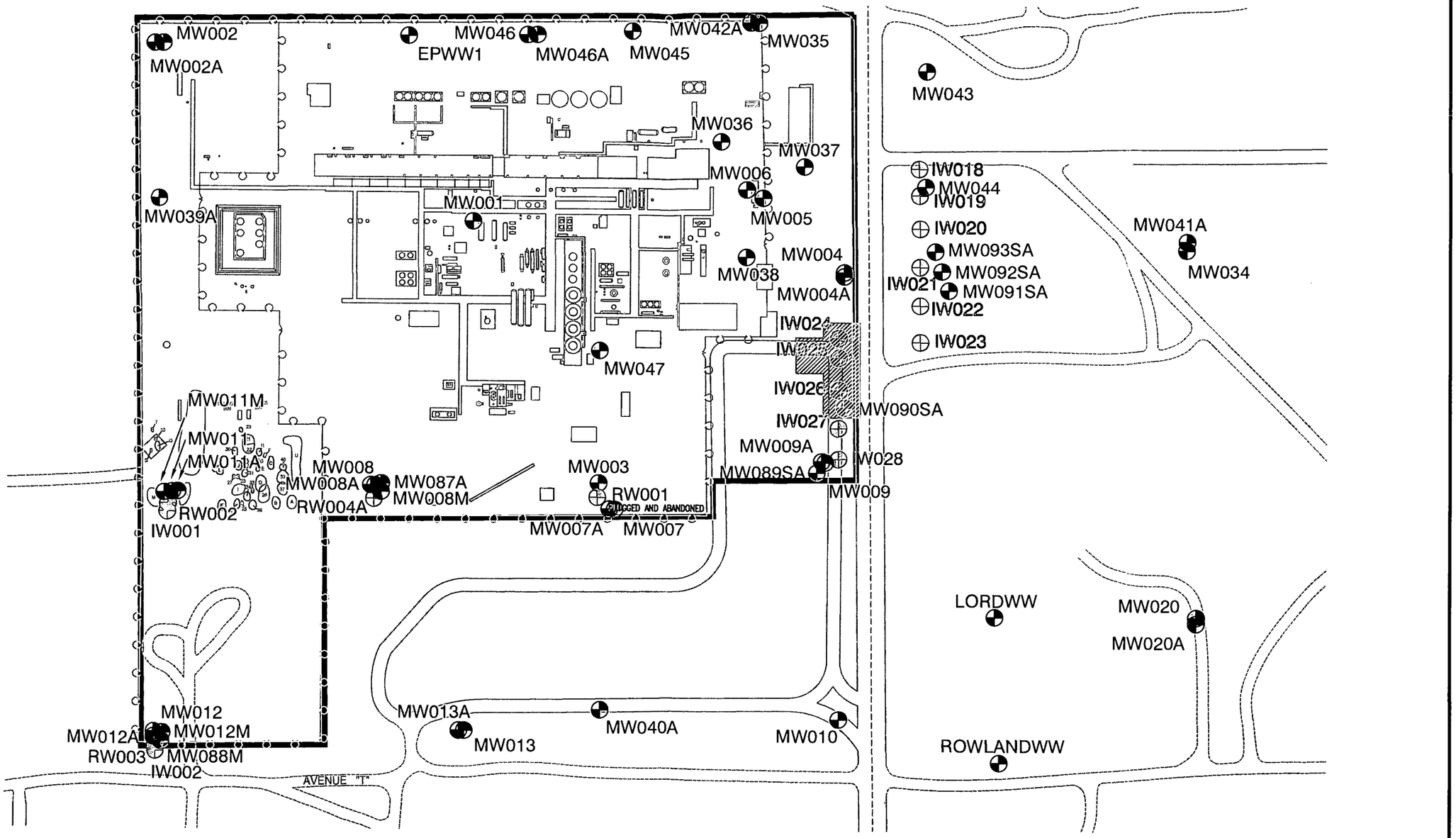
EUNICE NORTH GAS PLANT
EUNICE, NM

SITE MAP

FIGURE-SHEET: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49526.07	MRP	JMR	DO	2/15/2007

FILENAME: PILOT STUDY SITE PLANS



SECOR
2321 CLUB MERIDIAN DR., SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499

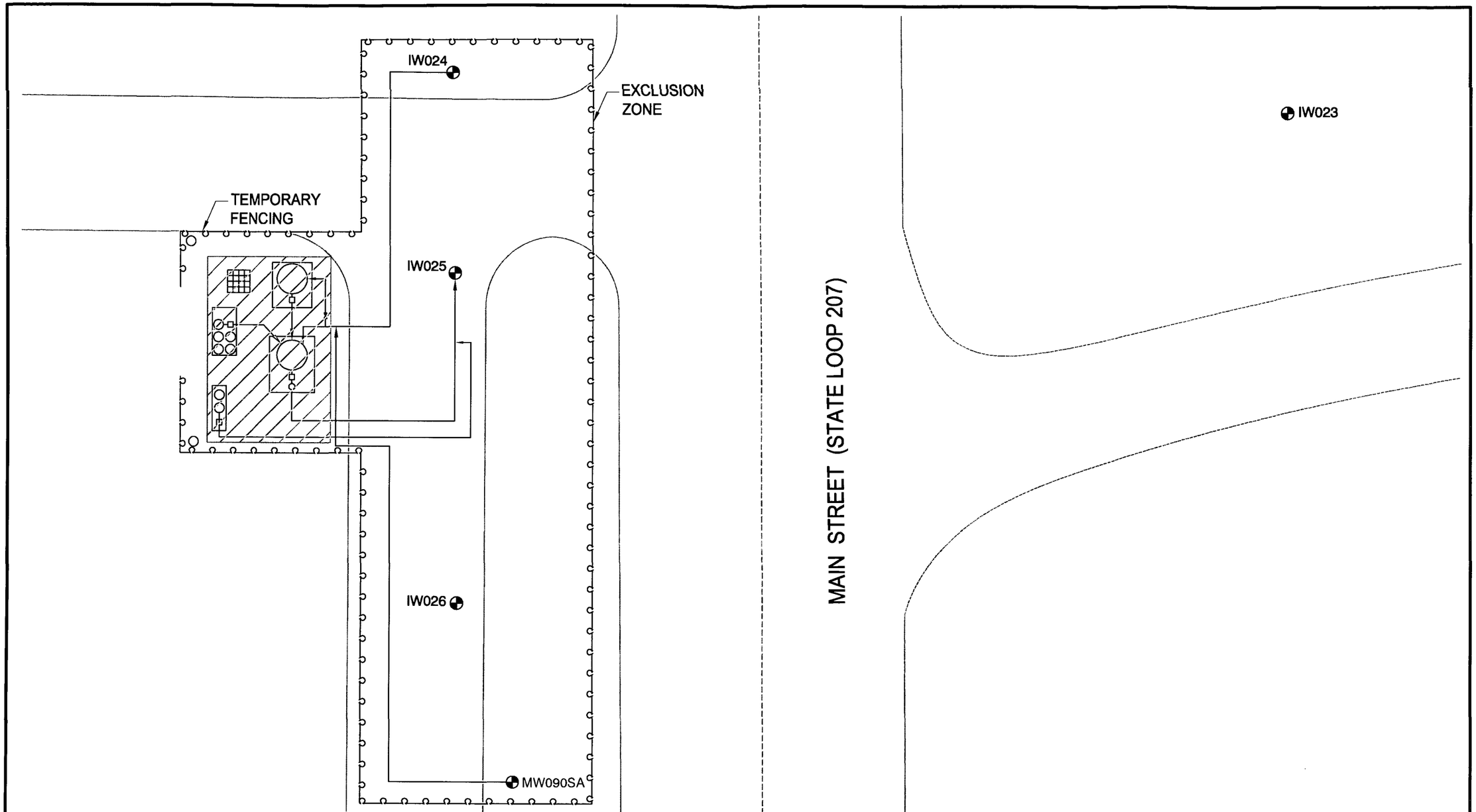
FOR: CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
EUNICE NORTH GAS PLANT
EUNICE, NM

EXPANDED SITE MAP

FIGURE-SHEET: **3**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49526.07	MRP	JMR	DO	5/22/2007

FILENAME: PILOT STUDY SITE PLAI



SECOR
2321 CLUB MERIDIAN DR., SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499

FOR: CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

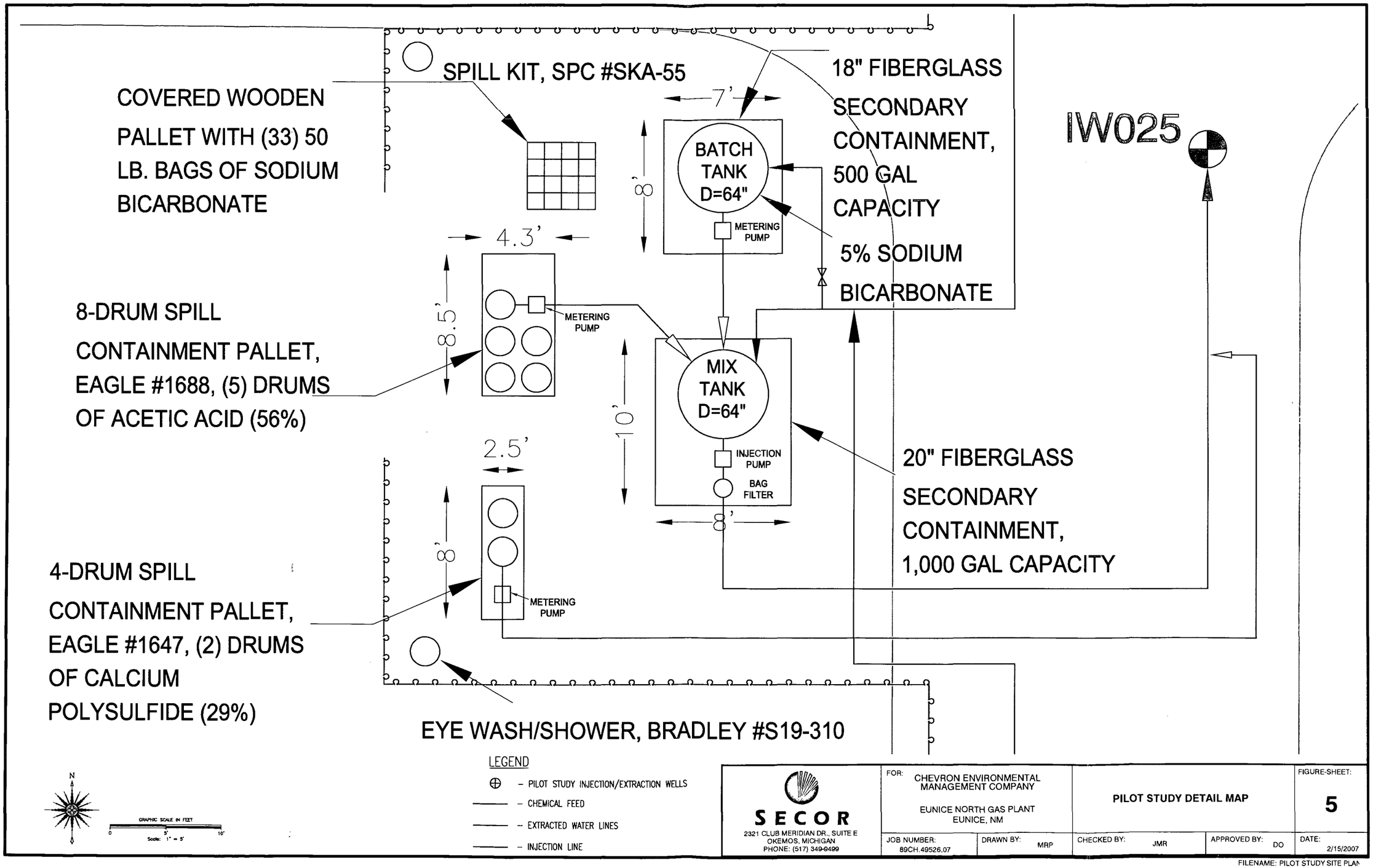
EUNICE NORTH GAS PLANT
EUNICE, NM

PILOT STUDY LAYOUT MAP

FIGURE-SHEET: **4**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49526.07	MRP	JMR	DO	5/22/2007

FILENAME: PILOT STUDY SITE PLAN



SECOR
2321 CLUB MERIDIAN DR., SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499

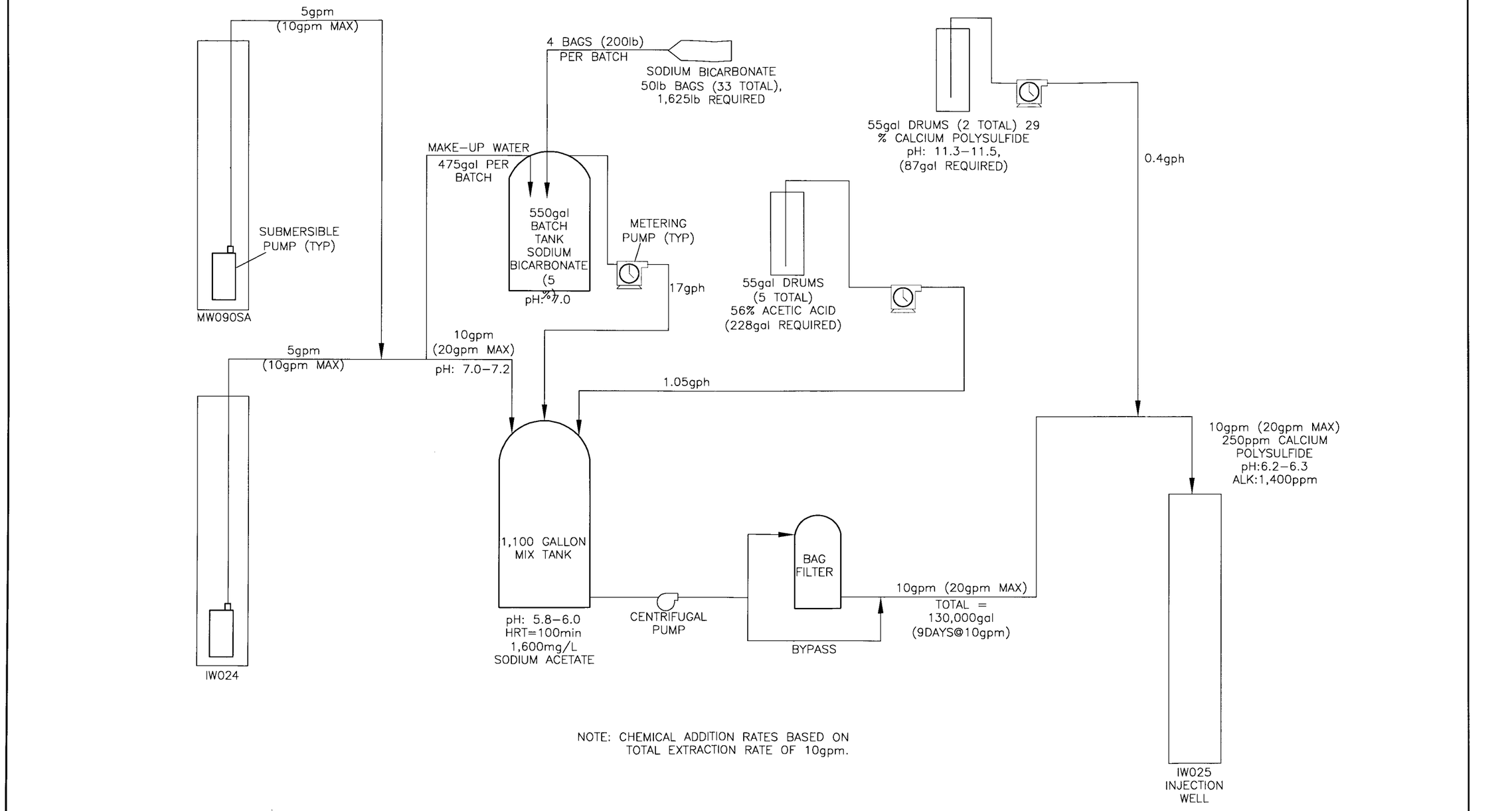
FOR: CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
EUNICE NORTH GAS PLANT
EUNICE, NM

PILOT STUDY DETAIL MAP

FIGURE-SHEET: **5**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49526.07	MRP	JMR	DO	2/15/2007

FILENAME: PILOT STUDY SITE PLAN

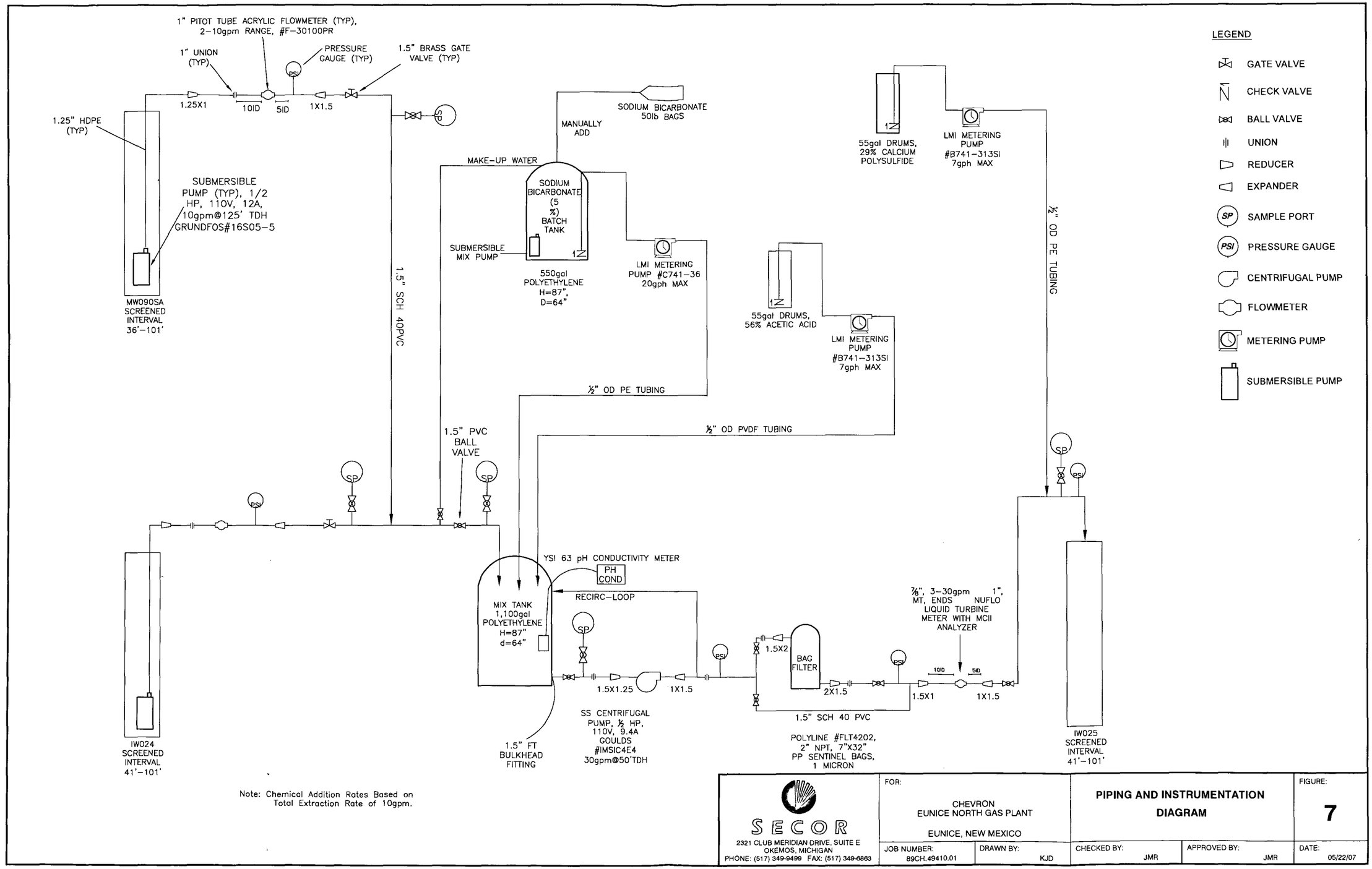


NOTE: CHEMICAL ADDITION RATES BASED ON TOTAL EXTRACTION RATE OF 10gpm.

SECOR
2321 CLUB MERIDIAN DRIVE, SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499 FAX: (517) 349-6863

FOR: CHEVRON EUNICE NORTH GAS PLANT, EUNICE, NEW MEXICO		PROCESS FLOW DIAGRAM		FIGURE: 6
JOB NUMBER: 89CH.49410.01	DRAWN BY: KJD	CHECKED BY: JMR	APPROVED BY: JMR	DATE: 05/22/07

FILEPATH:



Note: Chemical Addition Rates Based on Total Extraction Rate of 10gpm.

SECOR
2321 CLUB MERIDIAN DRIVE, SUITE E
OKEMOS, MICHIGAN
PHONE: (517) 349-9499 FAX: (517) 349-6863

FOR:
CHEVRON
EUNICE NORTH GAS PLANT
EUNICE, NEW MEXICO

PIPING AND INSTRUMENTATION DIAGRAM

FIGURE: **7**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
89CH.49410.01	KJD	JMR	JMR	05/22/07

FILEPATH:

APPENDIX A
REDUCTIVE TREATMENT BENCH-SCALE TESTING EVALUATION

In-Situ Pilot Study Work Plan
for the Eunice North Gas Plant

Chevron Environmental Management Company
89CH.49526.07
May 21, 2007

FINAL

REDUCTIVE TREATMENT BENCH-SCALE TESTING EVALUATION FOR

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

Eunice North Gas Plant - Eunice, New Mexico

January 23, 2006
89CH.49410.06

Prepared by:

Tony Zapp/Daniel Oberle, P.E.
SECOR Treatability Testing Laboratory
4035 King Road, Suite D
Sylvania, OH 43560

Reviewed by:

Jeremy Rasmussen, P.E.
Senior Engineer

FINAL

REDUCTIVE TREATMENT BENCH-SCALE TESTING EVALUATION FOR

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

Eunice North Gas Plant -
Eunice, New Mexico

January 23, 2006
89CH.49410.06

Prepared by:

Tony Zapp/Daniel Oberle, P.E.
SECOR Treatability Testing Laboratory
4035 King Road, Suite D
Sylvania, OH 43560

Reviewed by:

Jeremy Rasmussen, P.E.
Senior Engineer

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
2.0 TREATABILITY STUDY APPROACH 2
2.1 Test Objectives and Rationale 2
2.2 Experimental Design and Procedures 2
2.2.1 Testing for Biological Activity 2
2.2.2 Batch Reaction Tests 3
2.2.3 Testing for Hexavalent Chromium and Total Chromium 5
2.3 Equipment and Materials 5
3.0 RESULTS AND DISCUSSION 7
3.1 Test Results for Biological Activity 7
3.2 Batch Reaction Tests for Chromium Reduction 7
3.2.1 Sodium Acetate 7
3.2.2 Molasses 8
3.2.3 Calcium Polysulfide 8
3.2.4 Sodium Metabisulfite 9
3.3 Total Chromium Removal Evaluation 9
3.4 Cost Analysis 10
4.0 CONCLUSIONS AND RECOMMENDATONS 12

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

FIGURE 1: Sodium Acetate Test Group – ORP versus Time
FIGURE 2: Sodium Acetate Test Group– pH versus Time
FIGURE 3: Sodium Acetate Test Group – Hex Chrome Concentration versus Time
FIGURE 4 Molasses Test Group – ORP versus Time
FIGURE 5: Molasses Test Group – pH versus Time
FIGURE 6: Calcium Polysulfide Test Group – ORP versus Time
FIGURE 7: Metabisulfite Test Group @ pH 7 – ORP versus Time
FIGURE 8: Metabisulfite Test Group @ pH 10 – ORP versus Time
FIGURE 9: Metabisulfite at pH 7 Test Group - Hex Chrome Concentration versus Time
FIGURE 10: Metabisulfite at pH 10 Test Group - Hex Chrome Concentration versus Time
FIGURE 11: Treatment Efficiency for Total Chromium Removal
FIGURE 12: Calcium Polysulfide Test Group – Total Chrome Concentration versus Time
FIGURE 13: Calcium Polysulfide Test Group – Hex Chrome Concentration versus Time
FIGURE 14: Calcium Polysulfide Test Group – pH versus Time

LIST OF TABLES

TABLE 1: Sodium Acetate Test Group – ORP (mV)
TABLE 2: Sodium Acetate Test Group – pH versus Time
TABLE 3: Sodium Acetate Test Group– Hex Chrome (mg/L)
TABLE 4: Molasses Test Group – ORP (mV)
TABLE 5: Molasses Test Group – pH versus Time
TABLE 6 Calcium Polysulfide Test Group – ORP (mV)
TABLE 7: Metabisulfite @ pH 7 Test Group – ORP (mV)
TABLE 8: Metabisulfite @ pH 10 Test Group – ORP (mV)
TABLE 9: Metabisulfite @ pH 7 Test Group – Hex Chrome (mg/L)
TABLE 10: Metabisulfite @ pH 10 Test Group – Hex Chrome (mg/L)
TABLE 11: 14-Day Test Results for Total Chromium
TABLE 12: 28-Day Test Results for Total Chromium
TABLE 13: Treatment Efficiency for Total Chromium Removal

Note: Figures and Tables appear at the end of report.

EXECUTIVE SUMMARY

Three different treatment reagents were tested at the bench-scale level to determine if the reagents could provide similar or better treatment results for hexavalent chromium when compared to the current molasses treatment. The results of the study showed sodium acetate, sodium metabisulfite, and calcium polysulfide were all effective reagents for chromium reduction. Sodium metabisulfite and calcium polysulfide are inorganic reducing reagents that directly treat the hexavalent chromium by chemical reduction. Sodium acetate is an electron donor that stimulates subsurface biological activity which leads to the reduction of chromium.

Although all of the reagents tested showed promise as reducing agents for chromium, the treatment of hexavalent chromium *in-situ* is a two-step process and both steps must be successful for effective treatment. In the first step of treatment, the chromium is reduced from the hexavalent state to the trivalent state. In the second step, the trivalent chromium must precipitate from solution so the amount of chromium remaining in the groundwater is below MCLs.

Each of the reagents was tested to determine how they performed in the second step of the chromium treatment process. The results showed that the calcium polysulfide provided the fastest reduction kinetics and best consistent removal efficiency for chromium from groundwater (> 98% removal). Sodium metabisulfite and sodium acetate also provided good removal efficiencies for chromium (91.4 to > 98%) but higher dosages of treatment chemical were required. The samples treated with molasses were the only samples that did not achieve MCLs during the testing. Although molasses was able to quickly reduce the chromium to its trivalent state, the fermentation of the molasses significantly lowered the pH and prevented the chromium from precipitating out of solution. The total removal efficiency of total dissolved chromium by the molasses treatment was only 20 percent.

The results of this study suggest that molasses treatment will lower the pH of groundwater during treatment and that chelating effects could suspend metals in solution. Site data collected by Arcadis shows groundwater pH values as low as 4.37 and dissolved calcium concentrations in excess of 3,000 mg/L. These are consistent with the results of bench-scale testing. Based on these findings, it is recommended that the treatment chemical for in-situ chromium treatment be changed from molasses to calcium polysulfide.

1.0 INTRODUCTION

The Chevron Eunice #2 North Plant (the site) is a former natural gas processing plant that operated just north of Eunice, New Mexico. Chromate biocides were used in the plant's cooling tower operations when the plant was in operation. Hexavalent chromium impacts have been detected in the groundwater beneath the facility at concentrations exceeding 1,000 ug/L. A plume of hexavalent chromium exceeding 100 ug/L extends approximately 4,000 feet down-gradient of the original source area.

A pilot remedial program was conducted in 2004 and 2005 by Arcadis at the distal end of the chromate plume to evaluate molasses treatment for the reduction and precipitation of chromium. The program included 14 pilot injection wells screened into the deep zone. Once per month, each injection well is injected with between 400 to 800 gallons of 30 percent molasses solution followed by a chase solution of 250 gallons of city water.

In September 2005, Arcadis installed a row of medial array wells within the central portion of the plume along route NM-18, with SECOR providing oversight. Groundwater at this location is approximately 42 feet below grade. Samples of soil were collected from depth intervals of 42 feet, 60 feet and 90 feet below grade during installation of well IW-022. Water samples were collected from the well after it was completed.

The soil and groundwater samples were shipped to SECOR's treatability testing laboratory in Sylvania, Ohio on September 30, 2005 for *in-situ* chemical reduction bench-scale testing. The bench-scale testing compared the effectiveness of molasses treatment with other reduction technologies for hexavalent chromium treatment. The treatment reagents evaluated as part of the study included calcium polysulfide, sodium acetate, and sodium metabisulfite. Bench scale testing with the soil and groundwater samples began on October 3, 2005.

2.0 TREATABILITY STUDY APPROACH

2.1 Test Objectives and Rationale

The objectives of the treatability testing were to:

- Determine if the addition of non-carbohydrate organics to the groundwater would induce *in-situ* reductive treatment of chromium;
- Determine if sodium metabisulfite could be utilized to reduce and precipitate hexavalent chromium *in-situ* and how pH affects the kinetics of the reaction;
- Determine if calcium polysulfide could be utilized for *in-situ* reduction of hexavalent chromium in a soil/water system without interference from reactions with the soil; and
- Compare the effectiveness of each treatment reagent to the current reagent (molasses) and a comparative group to determine which reductive treatment(s) will be most effective for on-going site operations.

2.2 Experimental Design and Procedures

The procedures used for testing are summarized in the sections below.

2.2.1 Testing for Biological Activity

When the site groundwater samples arrived at the laboratory, a sample was immediately tested and found to contain approximately 0.3 mg/L hexavalent chromium. This value is below the value that is typically toxic to bacteria, thus indicating that biologically-driven reducing reactions were a feasible treatment technology for the site. For confirmation, testing was performed on the water sample to identify and quantify baseline populations of indigenous heterotrophic aerobic and anaerobic bacteria.

This testing was performed using a BART™ biological activity reaction test kit manufactured by Droycon Bioconcepts, Inc. Fifteen milliliters of site groundwater were added to the test kit chamber and the chamber was inverted for 30 seconds to dissolve a culture medium into the groundwater. The reaction chamber was then placed upright, out of the sunlight, for a five-day incubation period.

During this period, bacteria present in the groundwater were allowed to multiply within the test chamber. The test chamber included an interceding device to restrict diffusion of oxygen into the groundwater to produce different environments for biological activity. The interceding device created an aerobic zone at the surface of the reaction chamber to support aerobic biological activity and an anaerobic zone at the bottom of the reaction chamber to support anaerobic biological activity. The use of a biodegradable indicator die allowed for a visual determination of whether the predominant bacteria were aerobic or anaerobic based on the location in the chamber in which the indicator die was consumed. The rate in which the die is consumed

provides information that is used to determine the initial population of bacteria in the groundwater.

2.2.2 Batch Reaction Tests

Four treatment reagent combinations were evaluated for in-situ chemical reduction testing. The reagents included calcium polysulfide, sodium acetate, sodium metabisulfite (at two pH values), and molasses. The testing was conducted using different concentrations of each reagent. Control samples were also prepared for baseline comparison. Each one-liter glass jar for the batch reaction testing was amended with 200 grams of site soil and 600 milliliters of site groundwater. The treatment reagents were added to each test group at different concentrations and the pH and ORP of the samples were monitored as a function of time after preparation.

Water samples were also tested for hexavalent chromium as a function of time to evaluate reaction kinetics with respect to the chemical reduction of hexavalent chromium. Post treatment samples were then tested for total dissolved chromium to determine the overall effectiveness of each treatment with respect to total removal of chromium from the groundwater. The preparation of each reagent test group is described below.

2.2.2.1 Sodium Acetate

The addition of organics to stimulate chromium reduction is dependant upon biological processes. Bacteria in the soil and groundwater consume organics while using electron acceptors in the groundwater to metabolize them. The loss of electron acceptors causes a decrease in the oxidation-reduction potential (ORP) in the groundwater. This change in geochemistry facilitates the chemical reduction of chromium, especially if ferrous iron dissolves into the groundwater from soil as part of the reduced conditions or biological activity.

The type of organic placed into the subsurface affects the rate at which the chromium will be reduced. For example, simple sugar carbohydrates like molasses degrade quickly which results in rapid reduction of chromium. However, these sugars degrade by fermentation which releases acid into the groundwater and lowers the groundwater pH. The reduced groundwater pH may prevent the necessary second step of chromium treatment which involves precipitating the chromium from solution.

To overcome the problems with carbohydrate fermentation, alkanoic salts such as sodium acetate and sodium lactate may be used as the organic food source for the bacteria. These organics degrade slower than carbohydrates and produce only minor pH effects during degradation, thus allowing the chromium to precipitate out of the groundwater. For this bench-scale test, sodium acetate was selected as the non-carbohydrate, organic food source for stimulation of biological activity. Sodium acetate is the sodium salt of vinegar and is a food grade product. The sodium acetate was evaluated at two different dosages (1,000 mg/L and 2,000 mg/L) in test samples containing 200 grams of site soil and 600 milliliters of site groundwater.

2.2.2.2 Molasses

Molasses is a by-product of the sugar refining process. When sugar cane is harvested, it is mashed and boiled to extract the sugar. After the crystallized sucrose is removed from the boiled-down solution, the remaining by-product is referred to as unsulfured molasses. If the sugar cane is too green, it is often treated with sulfur dioxide to assist in the sugar extraction process. The product of this treatment is referred to as sulfured molasses. Sugar cane is typically extracted in a three-step process. The final by-product from the last extraction is referred to as "blackstrap molasses."

Blackstrap molasses still contains a large amount of sugar, but the economics of extracting the sugar exceeds its market value. The blackstrap molasses is a dark, viscous liquid that typically contains around 20 percent sucrose, 20 percent reducing sugars, 20 percent water, 10 percent organic non-sugars, and 10 percent dissolved solids. The elevated dissolved solids and dissolved organics in the molasses give it a high fluid density of approximately 12.5 pounds per gallon. The dissolved solids in the molasses consist primarily of potassium (3 to 4 percent by weight) and calcium (1 to 2 percent by weight). However, it is also a natural chelating agent and contains many other dissolved metals. These include magnesium at around 3,000 mg/L, iron at around 300 mg/L, sodium at about 800 mg/L, copper at about 30 mg/L, zinc at about 15 mg/L, and selenium at about 0.3 mg/L.

Because of its rich nutrients and carbohydrates, blackstrap molasses is often used in cattle feed. It can usually be purchased inexpensively for less than $0.10 per pound. Because of its low price, molasses is sometimes used as an inexpensive organic food source for biological treatments to produce reducing conditions in groundwater as is currently being performed at the site. The blackstrap molasses for this bench-scale test was evaluated at three different dosages (500 mg/L, 1,000 mg/L and 2,000 mg/L) in test samples containing 200 grams of site soil and 600 milliliters of site groundwater.

2.2.2.3 Calcium Polysulfide

Sulfur atoms have the ability to catenate into linear chains of sulfur atoms to create a polysulfide salt when reacted with a metal. When sulfur is reacted with calcium metal, a calcium polysulfide salt is formed that contains anywhere from two sulfur atoms (CaS_2) to seven sulfur atoms (CaS_7) per calcium atom. The average amount of sulfur is four to five sulfur atoms per calcium atom. This material is called calcium polysulfide.

Calcium polysulfide is a NSF International approved reagent for drinking water treatment. It is a nontoxic reagent that has recently received attention as a reducing reagent for hexavalent chromium due to its ability to quickly reduce chromium without the need for acidification. When the polysulfide anion (S_5^{2-}) reacts with hexavalent chromium in the groundwater, the sulfide converts from the -2 oxidation state to the zero oxidation state, thus releasing two moles of electrons for each mole of polysulfide anion reacted.

Three test samples were prepared to evaluate calcium polysulfide as a reducing agent in a site-specific soil/groundwater system at dosages of 10, 25 and 50 mg/L. The samples were prepared using 200 grams of site soil and 600 milliliters of site groundwater.

2.2.2.4 Sodium Metabisulfite

Sodium metabisulfite is a reducing agent that is commonly used to reduce hexavalent chromium to trivalent chromium in water treatment applications. However, the reactions typically require acidic pH values to achieve reasonable kinetics. Sodium metabisulfite was tested with and without sodium hydroxide amendment at two different concentrations (250 mg/L and 500 mg/L) to determine how the pH of the groundwater would affect reaction kinetics and chromium precipitation. The test samples contained 200 grams of site soil and 600 milliliters of site groundwater.

2.2.3 Testing for Hexavalent Chromium and Total Chromium

Water samples from each of the above groups were tested for hexavalent chromium after 3, 7 and 14 days using a Hach Chromium 6^+ Test Kit. After 14 days, a water sample was removed from each sample at the highest dosage for analysis of total dissolved chromium. The samples were filtered with a 0.45-micron filter to remove any precipitated solids, and the filtered water was placed into four-ounce plastic sample containers preserved with nitric acid. The samples were then placed in a cooler on ice and shipped to Merit Laboratories in East Lansing, Michigan for total dissolved chromium analysis.

After four weeks of reaction time, additional water samples were collected from each reactor. The samples were filtered with a 0.45-micron filter, and shipped to Merit Laboratories for a final analysis of total dissolved chromium. The total dissolved chromium tests were performed to evaluate overall effectiveness of each treatment technology in removing chromium from solution.

2.3 Equipment and Materials

The following equipment/instruments were used during the treatability study:

- Ohaus GT480 Laboratory Balance
- Labconco laboratory fume hood
- 70-mm plastic weigh boats
- Stainless steel spatula
- Oakton pH meter
- Oakton ORP meter
- One-liter glass jars
- BD 10-ml Disposable Syringes
- Cole-Parmer Syringe Filter, pore size 0.45-micron
- 4-oz Nalgene HDPE wide mouth jar preserved with nitric acid
- HACH Chromium 6^+ Test Kit

The following solutions were used in the treatability study:

- Distilled water
- Calcium polysulfide (28% weight: weight)
- Sodium hydroxide (2% weight)

- Sodium metabisulfite (100% pure)
- Sodium acetate (100% pure)
- Unsulfured Blackstrap Molasses
- YSI 3682 Zobell ORP standard
- Oakton pH 7 buffer standards

3.0 RESULTS AND DISCUSSION

3.1 Test Results for Biological Activity

The site groundwater sample tested positive for anaerobic heterotrophs. The biological activity reaction chamber indicated that the initial microbial count in the groundwater was between 7,000 and 50,000 heterotrophic bacteria counts per milliliter. This shows that the groundwater and soil were not sterilized by the presence of hexavalent chromium. Therefore, electron-donor amendments may be used at this site for purposes of stimulating biological processes that result in secondary reduction of chromium.

3.2 Batch Reaction Tests for Chromium Reduction

The pH and ORP of the groundwater in the batch reaction tests were monitored over a one-month testing period. During this time-frame, samples were collected periodically from the batch reaction tests for analyses of hexavalent chromium until the results were below detection limits of 0.05 mg/L. On the 14th day and 28th day of the test, samples were analyzed for total dissolved chromium to evaluate total chromium removal efficiency. The results of the testing are summarized below with respect to each of the test groups.

3.2.1 Sodium Acetate

The sodium acetate solutions slowly degraded as a result of biological activity over the 28-day test period. The most notable drop in ORP occurred during the first 14 days of the test, with the ORP stabilizing in the range of -50 to -100 mV thereafter. The ORP of the sodium acetate solutions are shown as a function of time in Table 1 and are illustrated in Figure 1. The decrease in ORP was noted to occur slightly faster with increased dosage. As the acetate degraded, a sour odor developed in the samples. The pH of the sodium acetate systems decreased only slightly during the testing period, starting at an original pH of approximately 7.0 and ending at a pH value of approximately 6.7. The pH data for the sodium acetate test groups are shown in Table 2 and are illustrated in Figure 2.

Little reduction of hexavalent chromium was initially observed in the sodium acetate samples during biological acclimation. However, the concentrations began to decrease around the 7th day of the study. Hexavalent chromium was reduced to 0.1 mg/L by the 14th day of the study, and the concentrations were below detection limits of 0.05 mg/L by the 28th day of the study. The hexavalent chromium concentrations as a function of time are summarized in Table 3 and are illustrated in Figure 3. Assuming a first-order reaction for reductive kinetics, the data suggests that the hexavalent chromium was being reduced at a pseudo first order reaction rate constant of 0.047 days^{-1} which is equivalent to a half life of approximately 15 days.

The sample containing 1,000 mg/L sodium acetate maintained a clear appearance throughout the study. The 2,000 mg/L sodium acetate turned slightly turbid during the last week of the study. Both samples had a slightly sour odor but did not contain any suspended solids as a result of the treatment.

3.2.2 Molasses

The solutions of molasses degraded very quickly after they were placed into the batch reaction containers. This is not unexpected since molasses is rich in carbohydrates, and carbohydrates are degraded rapidly by many types of bacteria. The ORP of all three test groups dropped to below -100 mV within the first week of the study and remained in this highly negative range throughout the duration of the test. The ORP of the molasses solutions are shown as a function of time in Table 4 and are illustrated in Figure 4. The ORP decrease occurred slightly faster with increased dosage. As the molasses degraded, all three test samples turned dark brown in color and developed a strong sewage odor. White gelatinous solids (presumably biosolids) became suspended within all three test samples with the amount of solids increasing proportionally with dosage.

As the molasses degraded, a notable drop in the pH of the samples was observed. The samples originally started at a pH of approximately 7.0, but ended pH values in the range of 5.42 to 5.92. The pH of the solutions decreased proportional to the dosage of molasses addition. The pH data for the molasses test groups are shown in Table 5 and are illustrated in Figure 5.

Hexavalent chromium reduction occurred quickly in the samples dosed with molasses. The hexavalent chromium concentrations were all below the detection limits of 0.05 mg/L when analyzed on the third day of the test. The fast kinetics are likely partially due to the high concentrations of dissolved iron in the molasses. Assuming a first-order reaction for reductive kinetics, the data suggest that hexavalent chromium was being reduced at a pseudo first order reaction rate constant in excess of 0.4 $days^{-1}$.

3.2.3 Calcium Polysulfide

The solutions treated with low dosages of calcium polysulfide showed gradual reduction in ORP over time. The gradual reduction in ORP suggested possible under-dosage. However, when samples of the water were tested for hexavalent chromium on the third day of the test, all three samples were below detection limits of 0.05 mg/L. The concentration of hexavalent chromium over time in the calcium polysulfide group is shown in Figure 13. A sample collected on the 14^{th} day of the test from the 50 mg/L dosage sample also showed that the total chromium in the sample had been reduced to 0.006 mg/L. These results are shown as a function of time in Figure 12. This shows that the calcium polysulfide serves as a very effective treatment reagent despite the fact that significant ORP decreases were not observed in the test water at low dosages. The ORP of the calcium polysulfide solutions are shown as a function of time in Table 6 and are illustrated in Figure 6. Assuming a first order reaction for reductive kinetics, the calcium polysulfide reduced hexavalent chromium at a pseudo first order reaction rate constant that exceeded 0.4 $days^{-1}$. The calcium polysulfide samples remained translucent throughout the study without the formation of odors or solids in the samples. The pH of the samples were monitored over the course of the testing. The pH's of the samples versus time is shown graphically in Figure 14. There was no significant change in pH over the time of testing.

3.2.4 Sodium Metabisulfite

Sodium metabisulfite was tested at two different pH values to determine how both pH and concentration would affect the results. The sodium metabisulfite at pH 7 slowly reduced the ORP of the test systems. The lowest dosage of sodium metabisulfite produced the fastest drop in ORP. The ORP of the metabisulfite samples at pH 7 are shown as a function of time in Table 7 and are illustrated in Figure 7.

The sodium metabisulfite at pH 10 had a more dramatic decrease in ORP which was likely the result of the higher pH values. The ORP of the metabisulfite samples at pH 10 also approached negative values by the end of the study. These data are shown as a function of time in Table 8 and are illustrated in Figure 8. No significant difference was noted as a function of sample dosage.

The reduction of hexavalent chromium in the sodium metabisulfite samples occurred slowly over time. The reaction kinetics were a function of both dosage and pH. Higher concentrations of sodium metabisulfite provided faster kinetics as did lower pH values. Although the kinetics were somewhat slow, each of the sodium metabisulfite test groups were able to reduce the concentrations of hexavalent chromium to below detection limits of 0.05 mg/L by the end of the study. The hexavalent chromium concentrations for the sodium metabisulfite samples at pH 7 and 10 are shown in Tables 9 and 10, respectively. The data are also illustrated graphically in Figures 9 and 10.

Assuming a first order reaction for reductive kinetics, the data suggest that the hexavalent chromium was being reduced at a pseudo first order reaction rate constant of 0.08 $days^{-1}$ at pH 7 with a dosage of 250 mg/L. The reaction rate constant increased to 0.17 $days^{-1}$ when the dosage was increased to 500 mg/L. The test samples at pH 10 had similar kinetics with a pseudo first order reaction rate constant of approximately 0.04 $days^{-1}$. The samples treated with sodium metabisulfite remained translucent throughout the study without the formation of odors or solids in the samples.

3.3 Total Chromium Removal Evaluation

In-situ treatment of hexavalent chromium requires a two-step process. In the first step, the chromium must be reduced from its hexavalent state to its trivalent state. As the bench-scale testing demonstrates, many different types of chemicals can achieve the first step. However, the second step is equally important. In the second step, the trivalent chromium must precipitate from solution to reduce the concentration of dissolved chromium in the groundwater. If the treatment only reduces chromium but does not remove it from solution, then no real progress has been made with respect to achieving maximum contaminant levels (MCLs).

After 14 days of testing, a water sample was removed from each of the test groups (except the sodium acetate group) from the sample group's highest dosed sample for analyses of total dissolved chromium. These samples were collected to provide a mid-test view of how each treatment reagent was performing with respect to achieving MCLs. The sodium acetate group was not sampled as part of this test because the hexavalent chromium analyses indicated that the hexavalent chromium was still above the MCLs.

The water samples were each filtered with a 0.45-micron filter, and the filtrate was placed into a four-ounce plastic sampling container preserved with nitric acid. The samples were shipped to Merit Laboratories on ice for analyses of total dissolved chromium. The results of the analyses are shown in Table 11.

The results showed that the calcium polysulfide treatment at 50 mg/L had already achieved chromium removal to well below the MCLs. However, none of the other samples had achieved MCLs during the initial 14-day test period. The metabisulfite samples had removed between 42 to 55 percent of the total chromium from the groundwater after 14 days and the molasses treatment had removed only 11 percent of the total dissolved chromium.

After 28 days of testing, samples of water were removed from all of the samples in each test group for analyses. The samples were filtered with a 0.45-micron filter and the filtrates were placed into four-ounce, nitric-preserved, plastic containers. The samples were placed on ice inside a cooler and shipped to Merit Laboratories for analyses of total dissolved chromium. The results of these analyses are shown in Table 12.

Most of the samples tested after 28 days showed good removal for chromium from the groundwater. The three calcium polysulfide samples had reduced the total concentration of chromium in solution to between 0.006 and 0.015, well below the MCL of 0.1 mg/L. The sodium metabisulfite samples and sodium acetate samples also performed well, producing total dissolved chromium numbers ranging from less than detection limits of 0.005 mg/L to 0.062 mg/L. Of the samples tested, only the molasses appeared to perform poorly for removal of total chromium. The total chromium concentrations in the samples treated with molasses ranged from 0.129 to 0.25 mg/L total chromium. All of the values were above the MCLs, and the data showed that the amount of dissolved chromium in the groundwater increased with increased dosages of molasses. This effect is likely the result of acidity released by the fermentation of the molasses.

Table 13 shows a summary of the treatment efficiencies for the highest dosage of each treatment chemical evaluated. The results are also illustrated graphically in Figure 11. The results show that the sodium metabisulfite, calcium polysulfide and sodium acetate treatments were all able to provide greater than 95 percent removal efficiency for total chromium from the groundwater. The molasses, however, was only able to remove 20 percent of the total dissolved chromium. Since hexavalent chromium testing showed that the molasses was very successful in reducing the chromium from its hexavalent state to its trivalent state, the elevated chromium concentrations are likely the result of groundwater acidification and possible chelating effects.

3.4 Cost Analysis

The results of the testing show that calcium polysulfide and sodium metabisulfite are the most effective methods of treatment. The cost of each of these chemicals is between $2.00 and $2.50 per pound depending on the vendor. Because the cost of each chemical is relatively the same, it is important to look at the concentrations of the chemicals needed to for effective treatment. Sodium metabisulfite effective as low as 250 ppm would cost between $4,170 and $5,210 per million gallons of water treated. Calcium polysulfide at its most effective concentration of 50 ppm would cost between $830 and $1045 per million gallons of water

treated. The 10 ppm concentration of calcium polysulfide also lowed hexavalent chromium below detection limits of 0.05 mg/L and total chromium to 0.015 mg/L, below the standard of 0.1 mg/L, would cost between $166 and $209 per million gallons of water treated.

4.0 CONCLUSIONS AND RECOMMENDATONS

The following conclusions can be drawn from the treatability testing:

- Non-carbohydrate organics, such as sodium lactate, can be used in place of molasses to achieve effective in-situ reduction of chromium by creating biologically-induced reducing conditions;

- Alkanoic salts like sodium acetate and sodium lactate can also provide pH buffering to prevent the groundwater pH from falling too low during biodegradation processes;

- Metabisulfite can be utilized to reduce and precipitate hexavalent chromium *in-situ*, and reduced kinetics at higher pH values can be overcome by the use of increased dosage concentrations;

- Calcium polysulfide provided the best treatment results at the lowest chemical dosage without significant interference from reactions with the soil;

- Calcium polysulfide and molasses provided the fastest reaction kinetics for chromium reduction, but sodium metabisulfite and sodium acetate were also able to complete reduce the hexavalent chromium with 28 days at dosages of 500 mg/L and 2,000 mg/L, respectively; and

- A low pH developed in the molasses-treated samples from the fermentation of the molasses. The low pH and possible chelating effects of the molasses prevented the chromium from precipitating from solution, thus resulting in a total dissolved chromium removal efficiency of only 20 percent.

The following recommendations can be drawn from the conclusions of this study:

- Molasses treatment should be discontinued since bench-testing indicates that it will reduce the pH of the groundwater and retain dissolved metals in solution. Site data collected by Arcadis showing site groundwater pH values as low 4.37 and dissolved calcium concentrations in excess of 3,000 mg/L corroborate with this observation; and

- Treatment with calcium polysulfide is recommended in place of the molasses treatment since it provides rapid and economic treatment kinetics while increasing the alkalinity of the groundwater to effectively remove dissolved chromium from solution.

Table 1: Sodium Acetate Test Group - ORP (mV)		
Day	**1,000 mg/l**	**2,000 mg/l**
0	155	155
3	125	112
7	50	25
14	-53	-90
28	-42	< -100

Table 2: Sodium Acetate Test Group - pH versus Time		
Day	**1,000 mg/l**	**2,000 mg/l**
0	6.97	6.97
3	6.84	7.02
7	6.85	6.93
14	6.82	6.82
28	6.73	6.7

Table 3: Sodium Acetate Test Group - Hex Chrome (mg/l)		
Day	**1,000 mg/l**	**2,000 mg/l**
0	0.3	0.3
3	0.3	0.3
7	0.25	0.2
14	0.15	0.15
28	< 0.05	< 0.05

Table 4: Molasses Test Group - ORP (mV)			
Day	**500 mg/l**	**1,000 mg/l**	**2,000 mg/l**
0	155	155	155
3	-40	-80	-101
7	< -100	< -100	< -100
14	< -100	< -100	< -100
28	< -100	< -100	< -100

Table 5: Molasses Test Group - pH versus Time			
Day	**500 mg/l**	**1,000 mg/l**	**2,000 mg/l**
0	6.97	6.97	6.97
3	6.85	6.67	6.43
7	6.55	6.34	6.13
14	5.98	5.77	5.46
28	5.92	5.67	5.42

Table 6: Calcium Polysulfide Test Group - ORP (mV)			
Day	**10 mg/l**	**25 mg/l**	**50 mg/l**
0	155	155	155
3	137	141	125
7	90	96	101
14	74	75	73
28	40	36	34

Table 7: Metabisulfite @ pH 7 Test Group - ORP (mV)		
Day	**250 mg/l**	**500 mg/l**
0	155	155
3	72	154
7	60	104
14	60	72
28	49	52

Table 8: Metabisulfite @ pH 10 Test Group - ORP (mV)		
Day	**250 mg/l**	**500 mg/l**
0	155	155
3	72	107
7	60	82
14	11	8
28	2	-1

Table 9: Metabisulfite @ pH 7 Test Group - Hex Chrome (mg/l)		
Day	**250 mg/l**	**500 mg/l**
0	0.3	0.3
3	0.25	0.15
7	0.1	< 0.05
14	< 0.05	< 0.05

Table 10: Metabisulfite @ pH 10 Test Group - Hex Chrome (mg/l)		
Day	**250 mg/l**	**500 mg/l**
0	0.3	0.3
3	0.3	0.15
7	0.15	0.1
14	0.1	0.1
28	< 0.05	< 0.05

Table 11: 14-Day Test Results for Total Chromium	
Sample I.D.	**Dissolved Cr (mg/l)**
Control	0.313
Calcium Polysulfide	0.006
Molasses	0.278
Sodium Metabisulfite (pH 7)	0.14
Sodium Metabisulfite (pH 10)	0.18

Table 12: 28-Day Test Results for Total Chromium		
Sample I.D.	**Reagent Dose (mg/l)**	**Dissolved Cr (mg/l)**
Sodium Metabisulfite (pH 7)	250	0.062
Sodium Metabisulfite (pH 7)	500	< 0.005
Sodium Metabisulfite (pH 10)	250	0.048
Sodium Metabisulfite (pH 10)	500	0.027
Molasses	500	0.129
Molasses	1000	0.199
Molasses	2000	0.25
Calcium Polysulfide	10	0.015
Calcium Polysulfide	25	0.01
Calcium Polysulfide	50	0.006
Sodium Acetate	1000	0.033
Sodium Acetate	2000	0.011

Highlighted samples exceed the MCL of 0.1 mg/l Cr

Table 13: Treatment Efficiency for Total Chromium Removal		
Sample I.D.	**Reagent Dose (mg/l)**	**Removal Efficiency**
Sodium Metabisulfite (pH 7)	500	98.4%
Sodium Metabisulfite (pH 10)	500	91.4%
Molasses	2000	20.1%
Calcium Polysulfide	50	98.1%
Sodium Acetate	2000	96.5%

Figure 1
Sodium Acetate Test Group - ORP versus Time

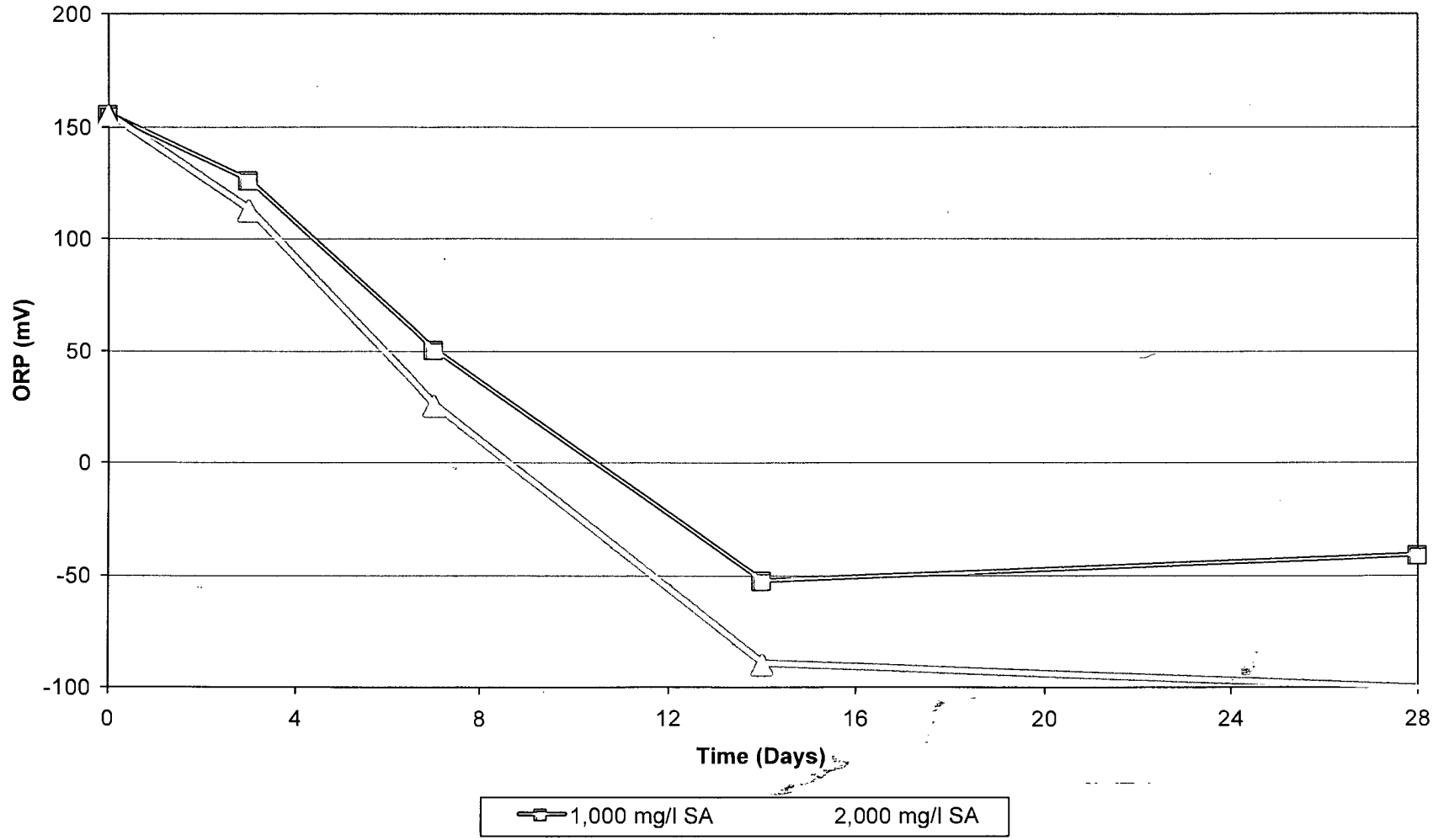


Figure 2
Sodium Acetate Test Group - pH versus Time

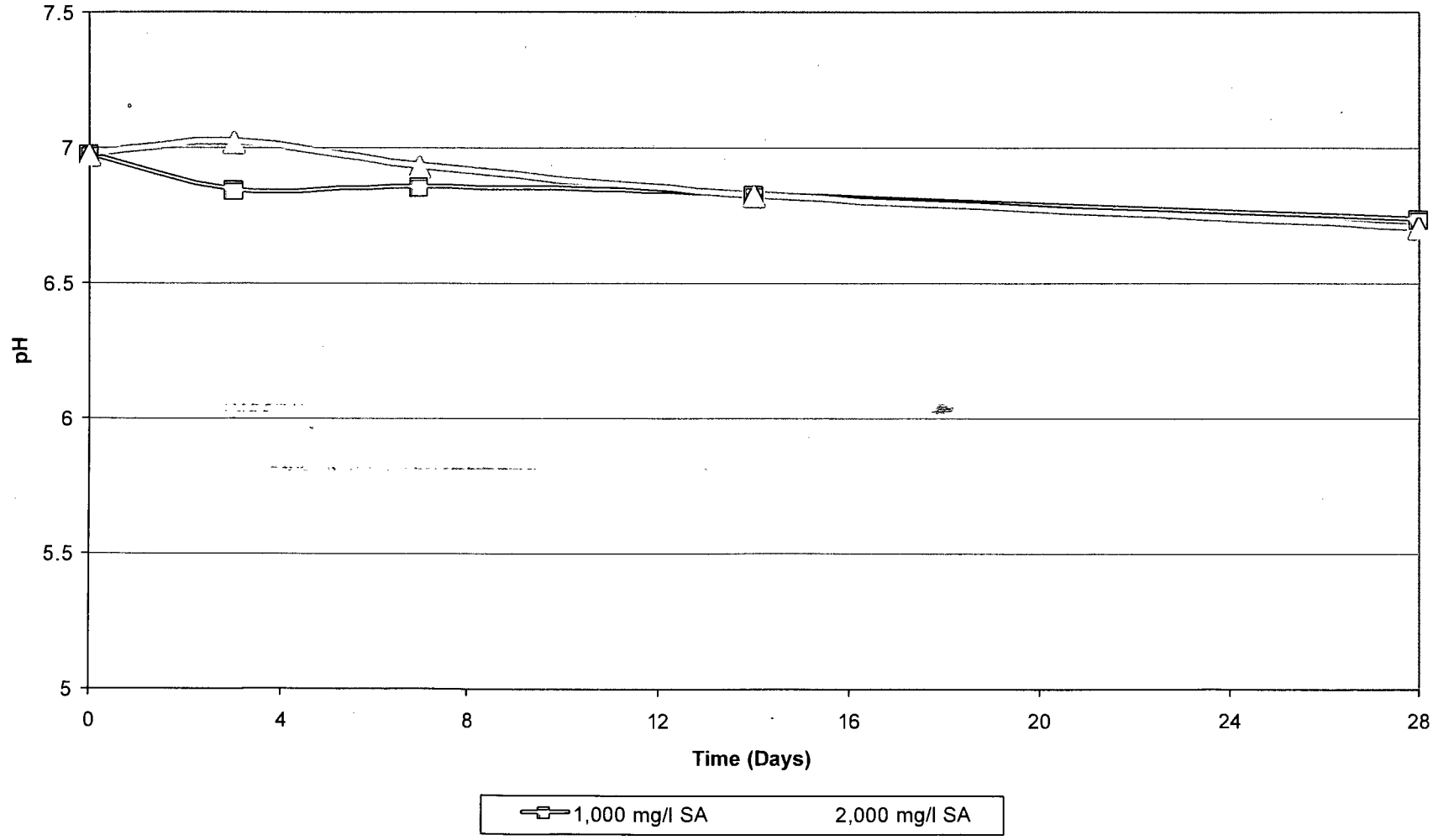


Figure 3
Sodium Acetate Test Group
Hex Chrome Concentration versus Time

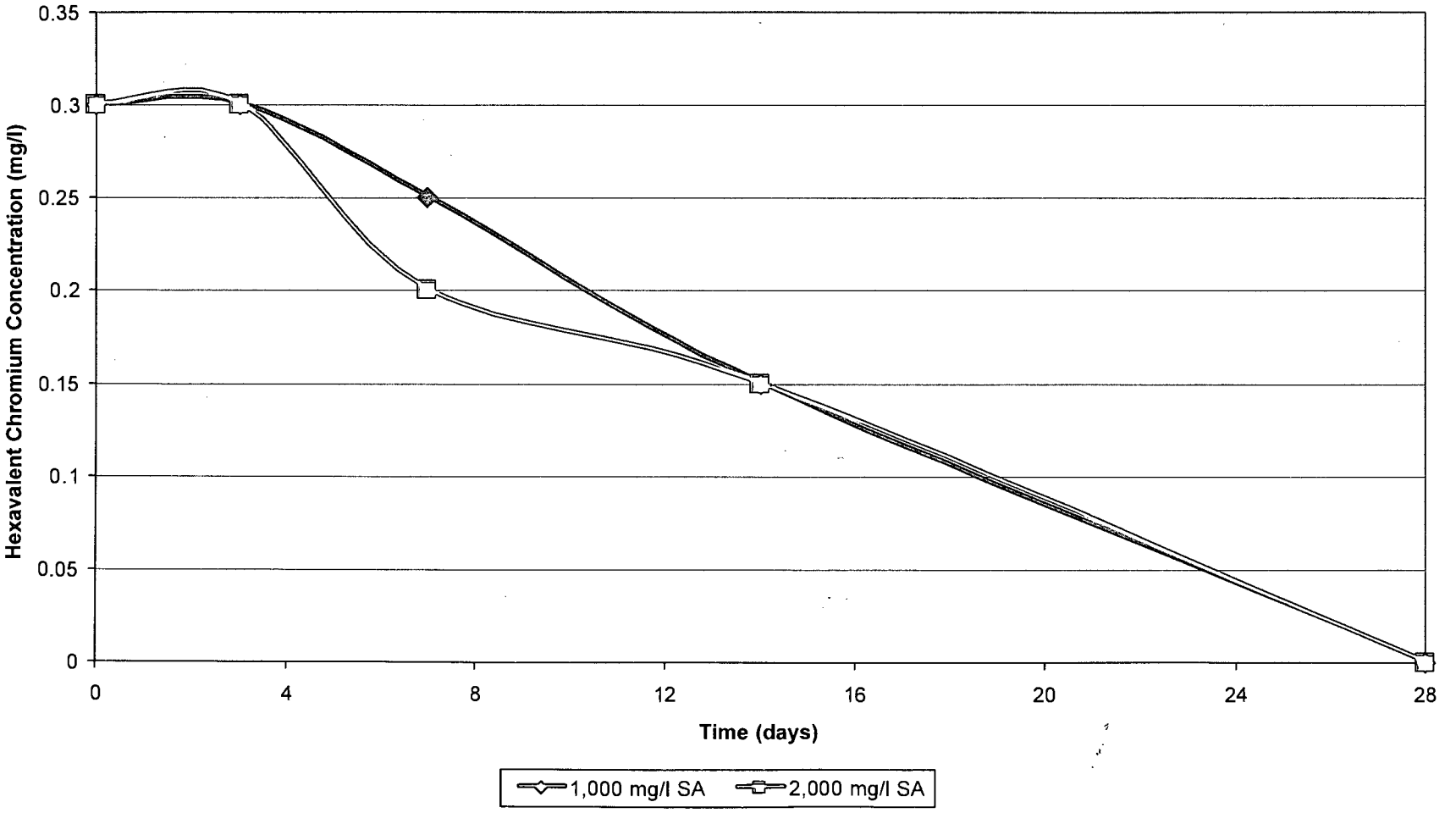


Figure 4
Molasses Test Group - ORP versus Time

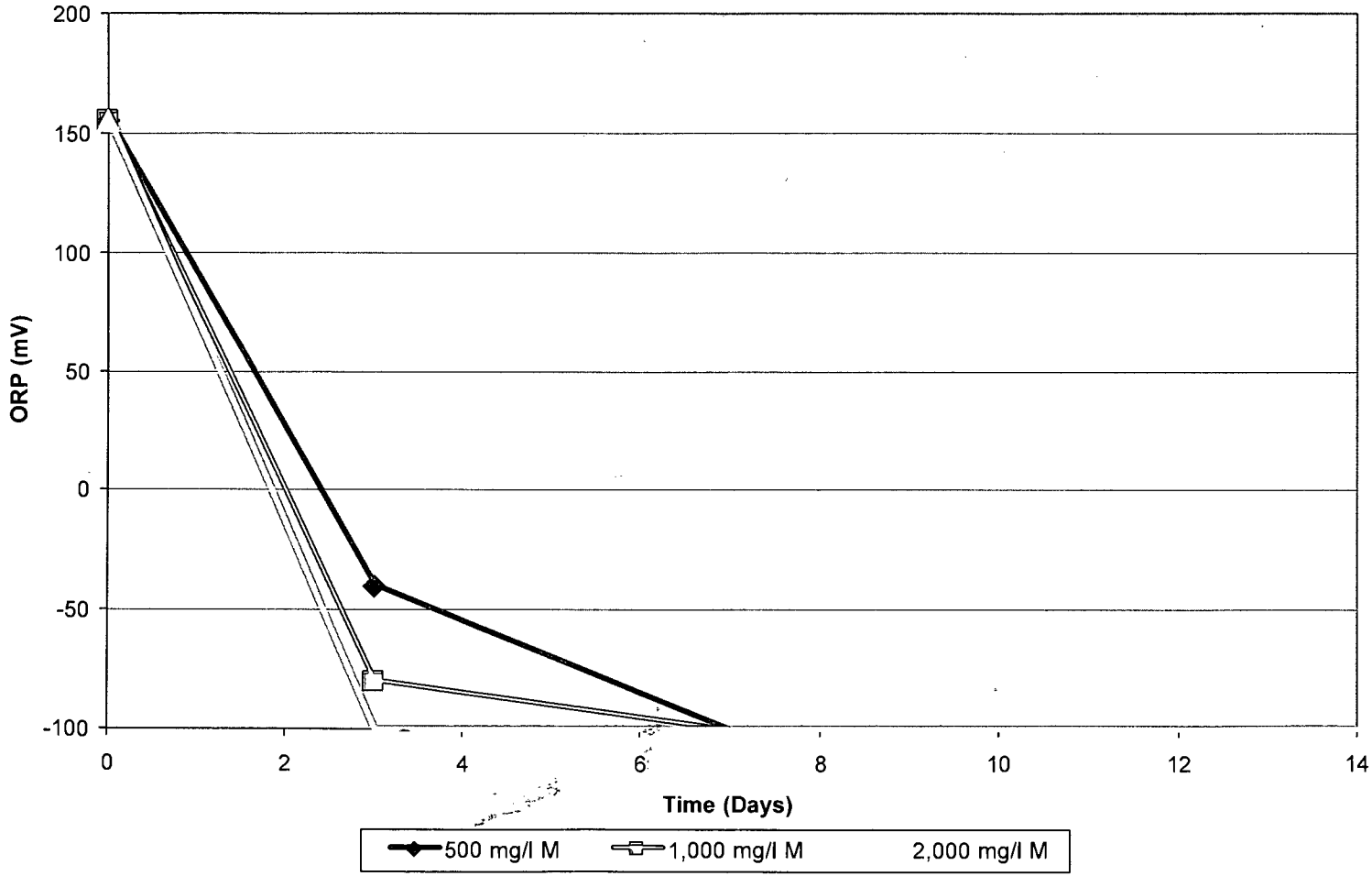


Figure 5
Molasses Test Group - pH versus Time

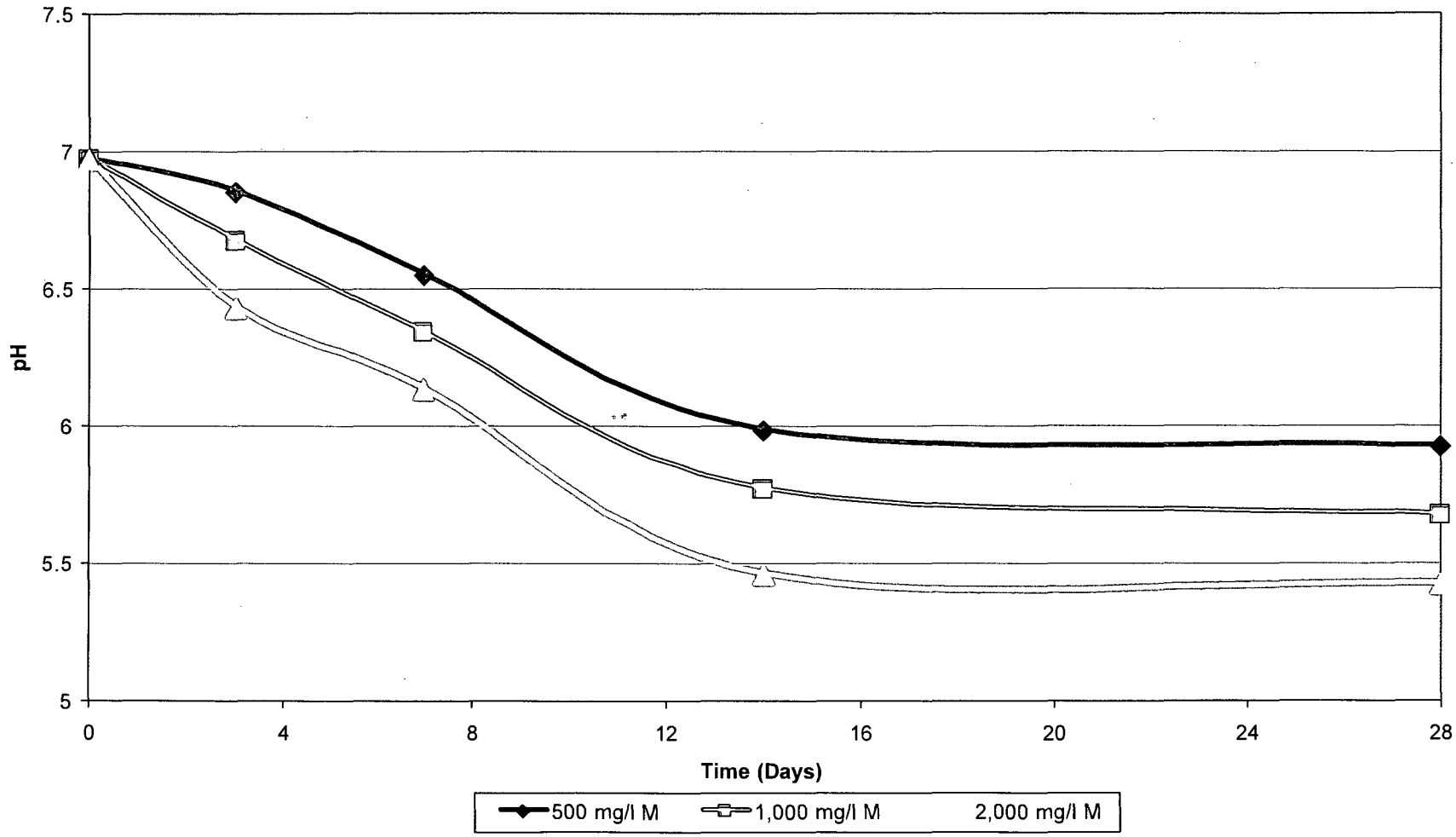


Figure 6
Calcium Polysulfide Test Group - ORP versus Time

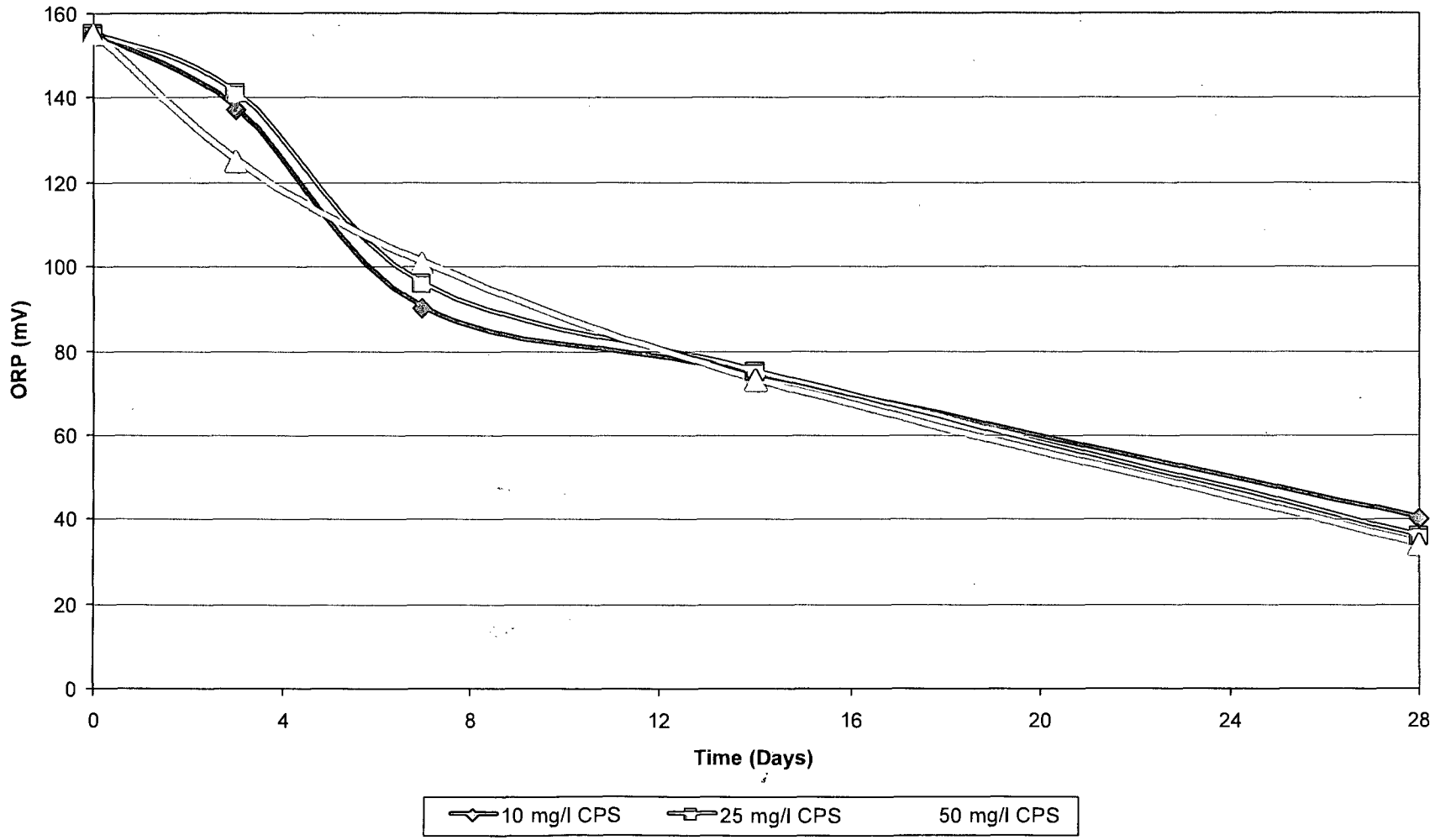


Figure 7
Metabisulfite Test Group @ pH 7 - ORP versus Time

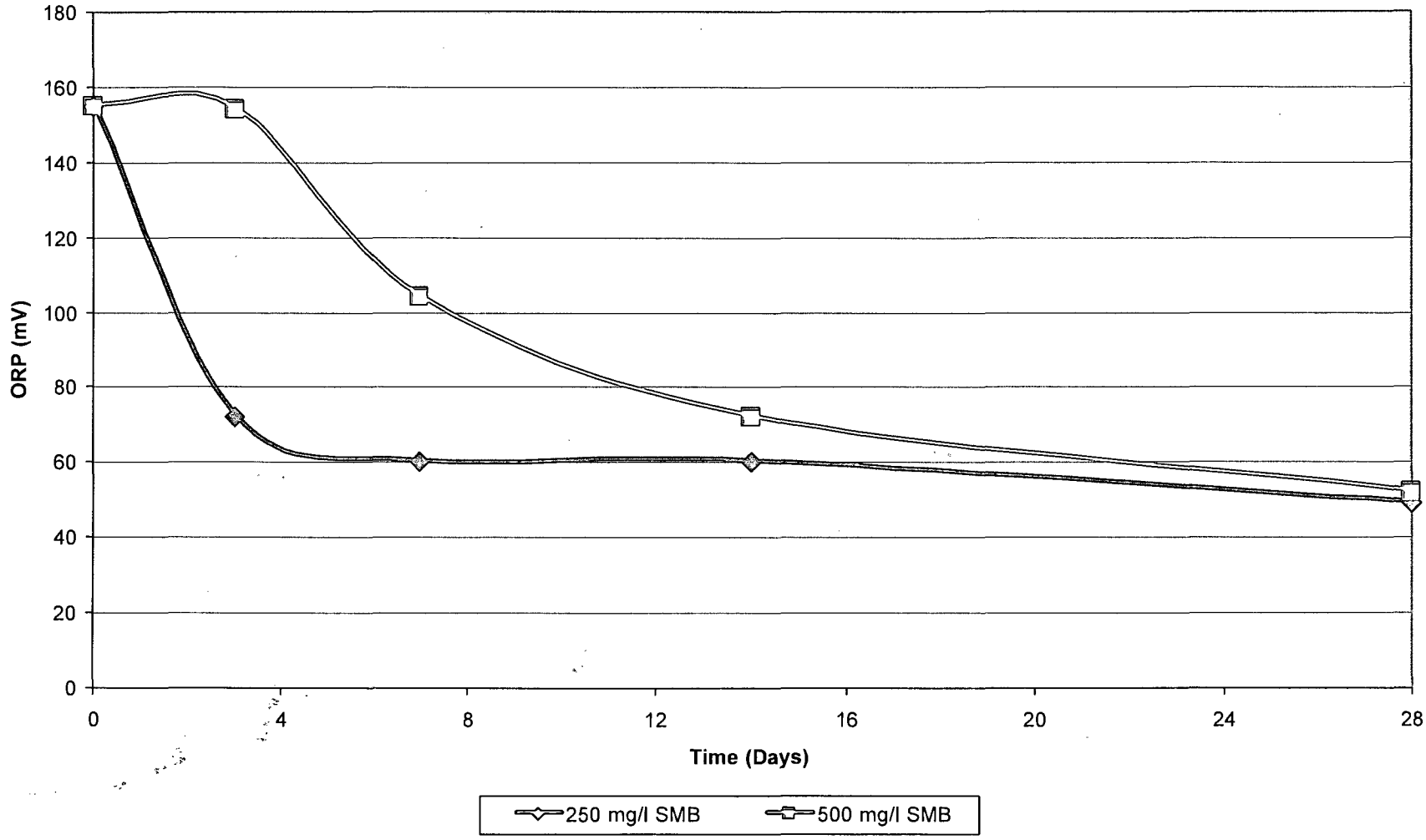


Figure 8
Metabisulfite Test Group @ pH 10 - ORP versus Time

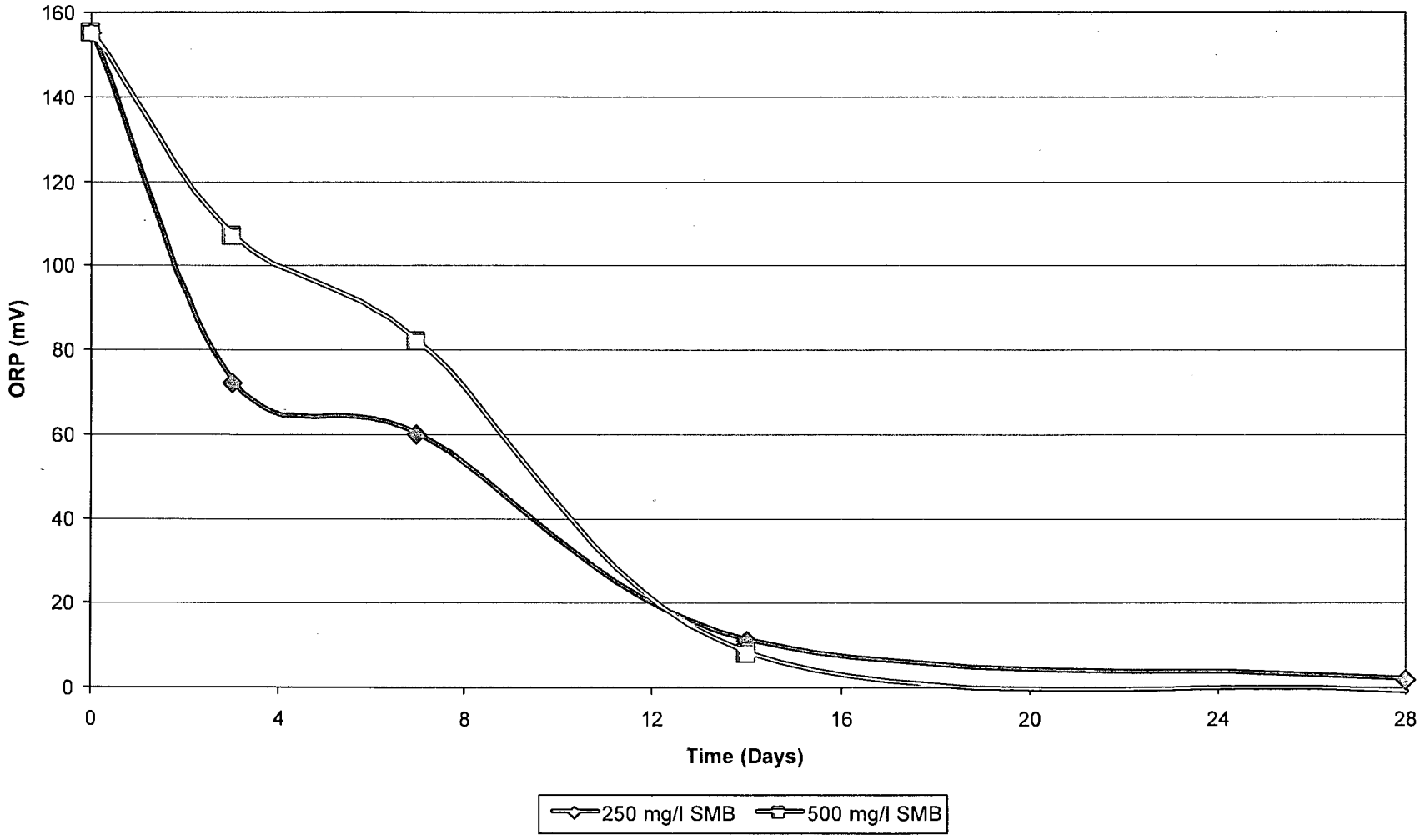


Figure 9

Metabisulfate at pH 7 Test Group
Hex Chrome Concentration verus Time

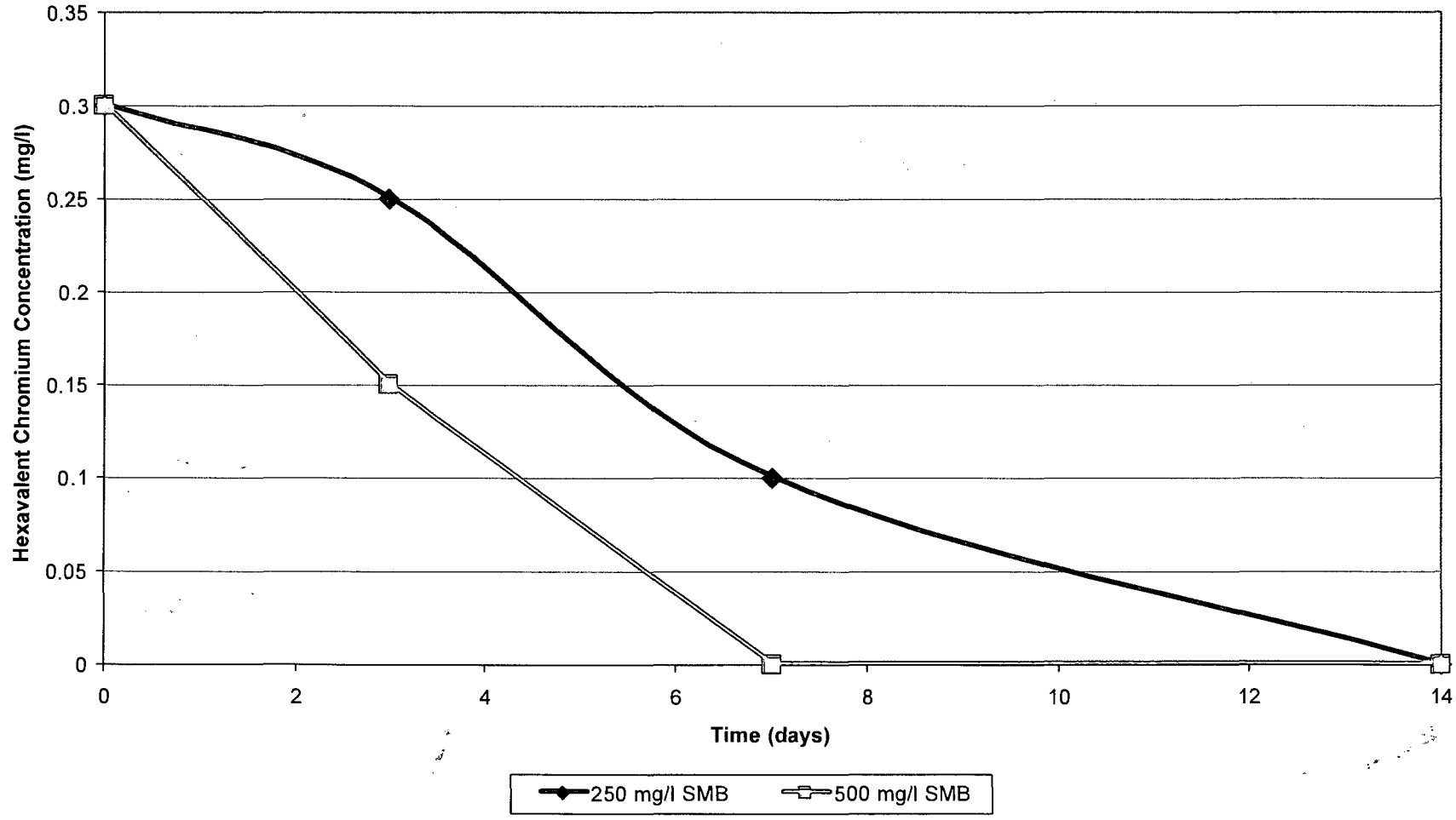


Figure 10

Metabisulfate at pH 10 Test Group
Hex Chrome Concentration verus Time

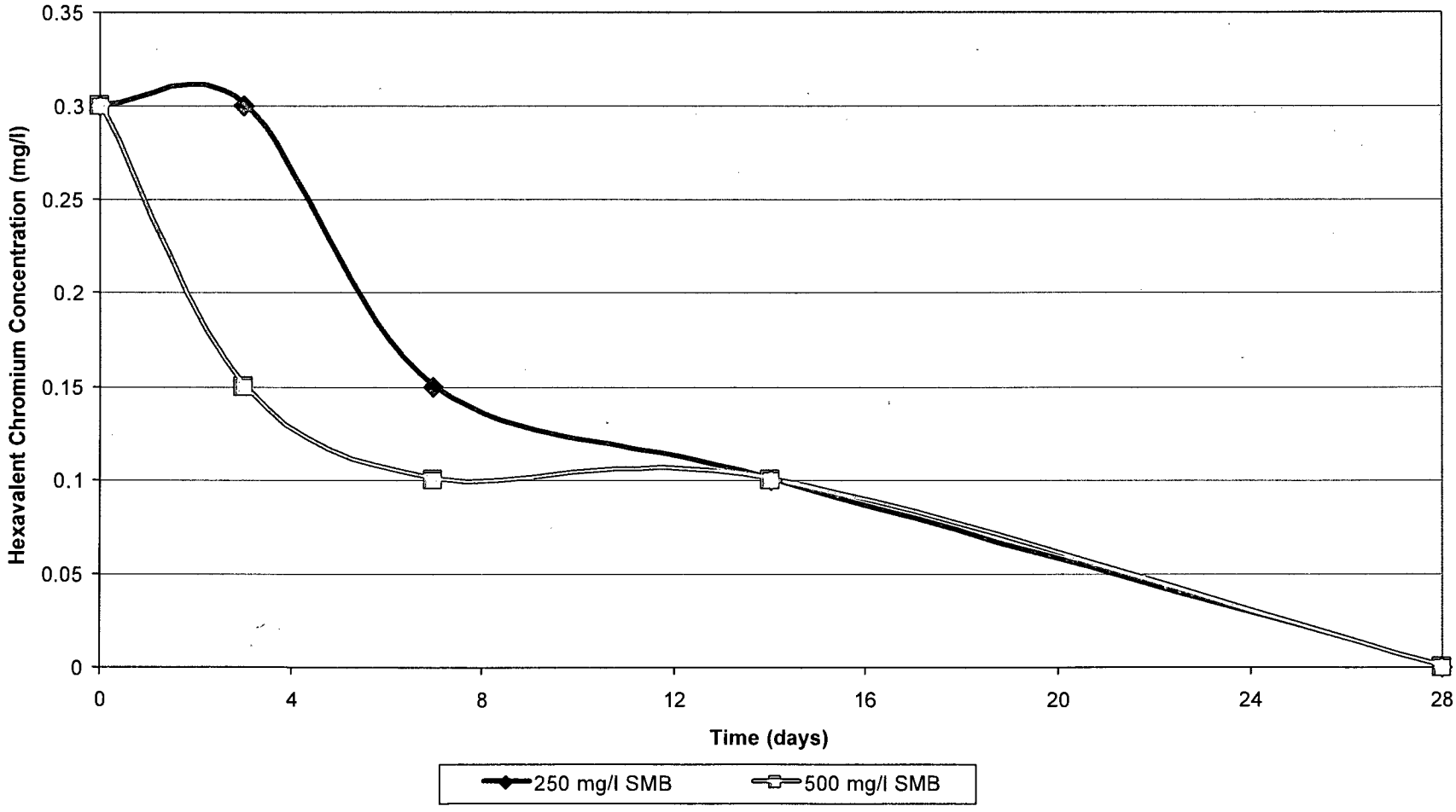


Figure 11

Treatment Efficiency for Total Chromium Removal

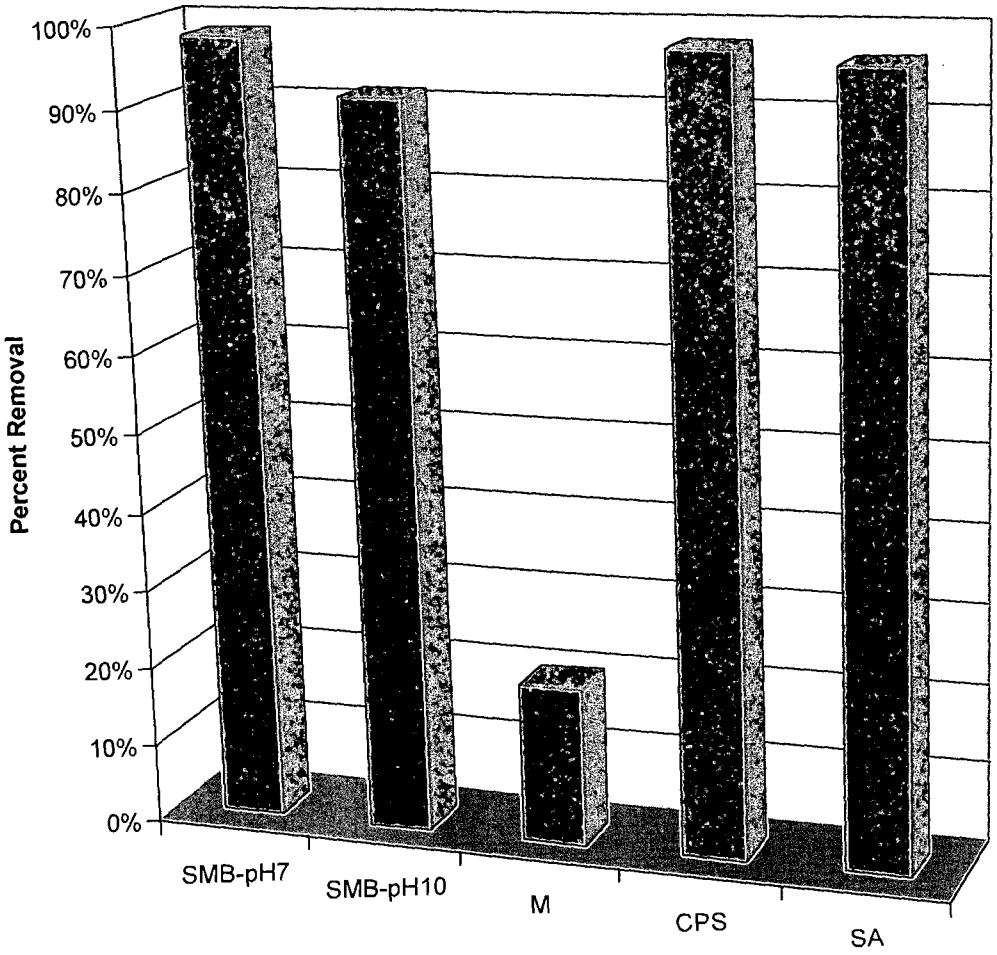


Figure 12
Calcium Polysulfide Test Group
Total Chrome Concentraion versus Time

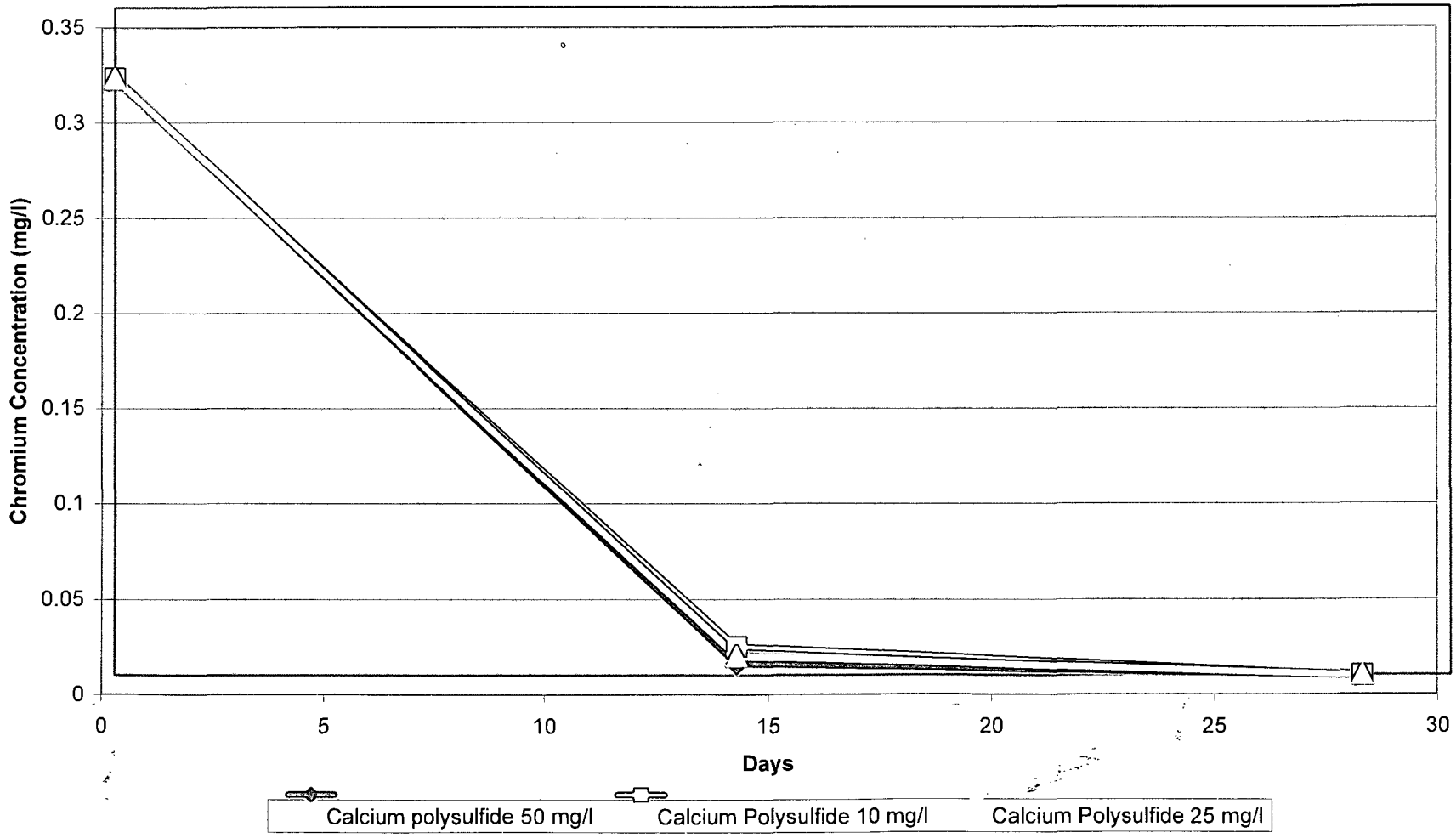


Figure 13
Calcium Polysulfide Test Group
Hex Chrome Concentration versus Time

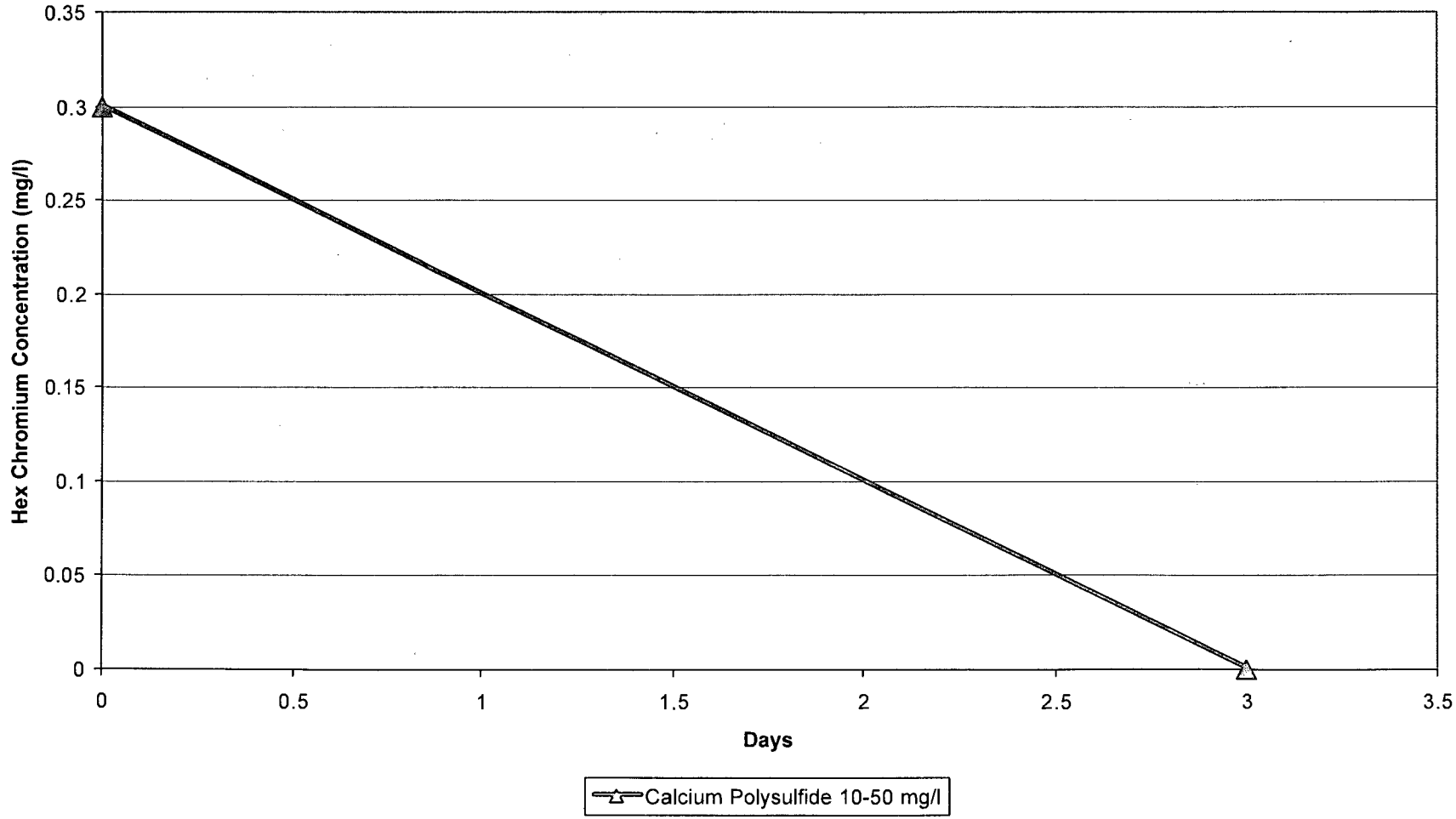
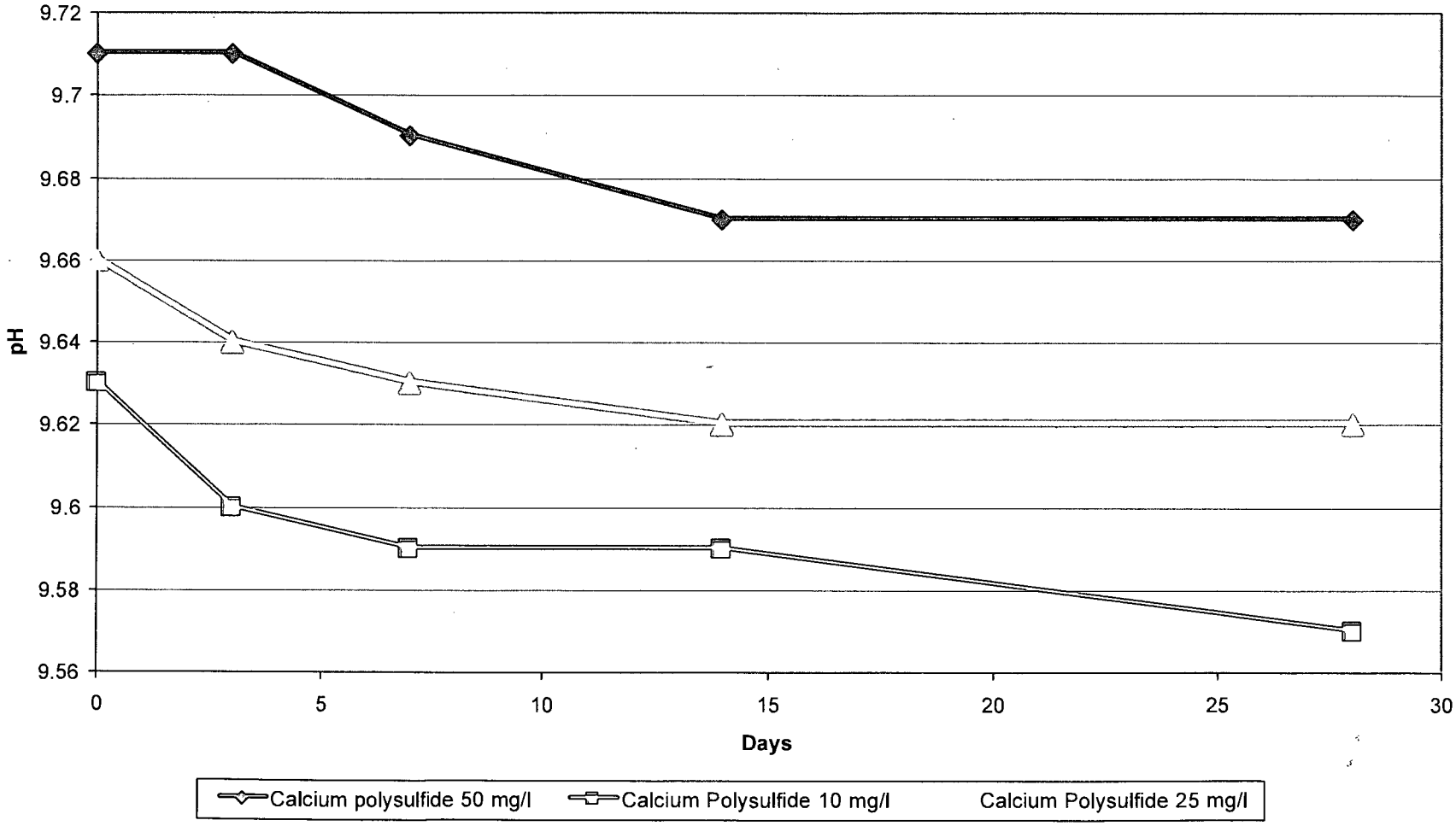


Figure 14
Calcium Polysulfide Test Group
pH versus Time



APPENDIX B
MSDS SHEETS

In-Situ Pilot Study Work Plan
for the Eunice North Gas Plant

Chevron Environmental Management Company
89CH.49526.07
May 21, 2007

MSDS Number: **S2954** * * * * * *Effective Date:* ***05/23/06*** * * * * * *Supercedes:* ***09/12/03***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM BICARBONATE

1. Product Identification

Synonyms: Sodium hydrogen carbonate; sodium acid carbonate; baking soda; bicarbonate of soda
CAS No.: 144-55-8
Molecular Weight: 84.01
Chemical Formula: NaHCO3
Product Codes:
J.T. Baker: 3506, 3508, 3509, 3510
Mallinckrodt: 7285, 7396, 7397, 7412, 7749, 7903

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Bicarbonate	144-55-8	99 - 100%	No

3. Hazards Identification

Emergency Overview

As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
High concentrations of dust may cause coughing and sneezing.
Ingestion:
Extremely large oral doses may cause gastrointestinal disturbances.
Skin Contact:
No adverse effects expected.
Eye Contact:
Contact may cause mild irritation, redness, and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.
Skin Contact:
Not expected to require first aid measures.

Eye Contact:
Wash thoroughly with running water. Get medical advice if irritation develops.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

---

7. Handling and Storage

Keep in a well closed container stored under cold to warm conditions, 2 to 40 C, (36 to 104F). Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls

are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:

White crystalline powder.

Odor:

Odorless.

Solubility:

7.8g/100g water @ 18C (64F).

Density:

2.2

pH:

8.3 (0.1 molar @ 25C (77F))

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

Not applicable.

Melting Point:

60C (140F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

---

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Gaseous carbon dioxide.

Hazardous Polymerization:

Will not occur.
Incompatibilities:
Reacts with acids to form carbon dioxide. Dangerous reaction with monoammonium phosphate or a sodium-potassium alloy.
Conditions to Avoid:
Heat, moisture, incompatibles.

---

11. Toxicological Information

Investigated as a mutagen, reproductive effector. Oral rat LD50: 4220 mg/kg. Irritation data: human,skin, 30mg/3D-I mild, rabbit,eye, 100 mg/30 S, mild.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Bicarbonate (144-55-8)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Sodium Bicarbonate (144-55-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Bicarbonate (144-55-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Bicarbonate (144-55-8)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	TSCA- 8(d)
Sodium Bicarbonate (144-55-8)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: No Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.
Label Precautions:
None.
Label First Aid:
Not applicable.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
****
Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****
****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Comet Chemical Company Ltd.

3463 Thomas Street Innisfil ,ON L9S 3W4
Tel: (705) 436-5580 Fax: (705) 436-7194

Materials Safety Data - ACETIC ACID, 56% Solution

	UN - 2790
Shipping Name	ACETIC ACID SOLUTION
Transport of Dangerous Goods Class	Class 8 ; Packing Group III
WHMIS Class	B 3; E
Material Use	acidifying & neutralising, solvent, food additive

1. HAZARDOUS INGREDIENTS

	CAS NUMBER	%	TWAEV (ppm)	LD_{50} ORAL	(mg/kg) SKIN	LC_{50} ppm INHALATION
Acetic Acid	64-19-7	56%	10	3310	1110	5620

2. PHYSICAL CHARACTERISTICS

Odour & Appearance	clear, colourless, liquid with very pungent vinegar odour
Odour Threshold	0.1 ppm - well below TWAEV
Vapour Pressure	17 mmHg (20°C)
Vapour Density (air = 1)	2
Boiling Point	102°C
Freezing Point	-24°C
Specific Gravity	1.062 (20°C)
Water Solubility	complete
pH	1 - highly acid

3. FLAMMABILITY & REACTIVITY

Flash Point	85°C	*(56% acetic acid)*
Autoignition Temperature	465°C	*(glacial acetic acid)*
Flammable Limits	4% - 16%	*(glacial acetic acid)*
Hazardous Combustion Products	carbon monoxide, nitrogen oxides, smoke, irritating fumes	
Firefighting Precautions	foam, dry chemical, water fog, water spray to cool, firefighters must wear SCBA	
Sensitivity to Static Discharge	not sensitive	
Sensitivity to Mechanical Impact	not sensitive	
Chemical Stability	stable; will not polymerize	
Reactive With	strong oxidising agents; vigorous heat producing reaction with alkalies	
Dangerous Decomposition Products	none apart from "Hazardous Combustion Products"	

4. TOXICOLOGY

EFFECTS OF ACUTE EXPOSURE

Skin Contact	causes burns and pain
Skin Absorption	yes; but extensive skin "burns" resulting from contact threaten health more than absorption of the substance into the blood would
Eye Contact	highly irritating; permanent damage likely
Inhalation	irritating; may cause choking, coughing and laboured breathing; absorption by inhalation may change the pH of the blood causing loss of consciousness
Ingestion	pain and burning; gradually dissolves tissues on contact causing severe damage, eventually perforating the digestive tract and resulting in haemorrhage

EFFECTS OF CHRONIC EXPOSURE

General	brown or yellow stains; irritation and dermatitis
Sensitising	no
Carcinogenic	experimental mutagen by RTECS criteria; no effects documented in humans
Reproductive Effect	reproductive toxin by RTECS criteria; no effects documented in humans
Synergistic With	not known
Estimated LD_{50}	6900 mg/kg (oral, rat); 2000 mg/kg (skin, rabbit)
Estimated LC_{50}	10,000 ppm (inhalation, mouse)

5. PROTECTIVE EQUIPMENT

Hands	butyl rubber, "Viton", "Saranex" or "Responder" gloves

NOTE: Various other protective materials may also resist 56% acetic acid well.

Eyes	chemical goggles AND a face shield are highly recommended
Respirator	not required if ventilation is adequate (see TWAEV, (1) above), or use organic vapour cartridge
Clothing	impermeable (above) apron , boots, long sleeves are required

6. ENVIRONMENT

Leak Precaution	dyke to control spillage and prevent environmental contamination
Handling Spill	ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on a suitable sorbent (dry sand, earth) and store in closed containers for disposal
Waste Disposal	may be incinerated in approved facility; acetic acid is readily biodegradeable and may be flushed to sewer **if diluted by at least 1:50**; may be neutralised (with soda ash), diluted by at least 1:10 and flushed to sewer

7. STORAGE & HANDLING

Store and use in a cool dry environment. Although fire is not a principal hazard, keep away from sources of ignition, heat and oxidising agents. Vapour inhalation may alter blood pH causing loss of consciousness. Use with adequate mechanical ventilation. Do not cut, drill, weld or grind on or near this container. Avoid all contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

8. FIRST AID

SKIN:	Wash with soap and plenty of water. Remove contaminated clothing and do not reuse until thoroughly cleaned or laundered.
EYES:	Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is any irritation.
INHALATION:	Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.
INGESTION:	Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, keep victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

NOTE: Inadvertent inhalation of vomited material may seriously damage the lungs. The risk and danger of this is greater than the risk of poisoning through absorption of this product. The stomach should be emptied under medical supervision, after the installation of an airway to protect the lungs.

Emergency telephone numbers	- weekdays from 8:00 - 5:00	(705) 436-5580
	at all other times	(800) 567-7455 (Philip Environmental)

Prepared for Comet Chemical Co. Ltd., by ***Nicholas Morgan, August 2002, Revised August 2005***

The information herein is given in good faith but no warranty, expressed or implied is made.

PLEASE ENSURE THAT THIS **MSDS** *IS GIVEN TO AND* **EXPLAINED** *TO THE PERSON USING THIS PRODUCT.*

Tessenderlo KERLEY

Material Safety Data Sheet

Calcium polysulfide solution

MSDS Number 6100 (Revised: 1/14/05) 6 Pages

Section 1: CHEMICAL PRODUCT and COMPANY IDENTIFICATION

1.1 Product Name ..... **Calcium polysulfide solution**
Chemical Family ..... Inorganic salt solution
Synonyms ..... Calcium polysulfide, CaPS, calcium sulfide, lime sulphur
Formula ..... CaS_x

1.2 Manufacturer ..... Tessenderlo Kerley Inc.
2255 N. 44th Street, Suite 300
Phoenix, Arizona 85008-3279
Information .... (602) 889-8300

1.3 Emergency Contact ..... (800) 877-1737 (Tessenderlo Kerley)
(800) 424-9300 (CHEMTREC)

Section 2: COMPOSITION, INFORMATION ON INGREDIENTS

2.1 Chemical Ingredients (% by wt.)

Calcium polysulfide	CAS #:1344-81-6	24 - 29%
Water	CAS #:7732-18-5	71 - 76%

(See Section 8 for exposure guidelines)

Section 3: HAZARDS IDENTIFICATION

NFPA: Health - 2 Flammability - 0 Reactivity - 1

EMERGENCY OVERVIEW

Warning:
Avoid inhalation of product fumes (hydrogen sulfide) near openings on storage container. Release of the product to the environment may cause the evolution of highly toxic hydrogen sulfide vapors. Product solution is alkaline and may cause irritation to the skin. Eye contact will cause eye irritation and possible corneal damage. Ingestion will result in irritation of tissues and the release of hydrogen sulfide in the gastrointestinal tract.

Section 3: HAZARDS IDENTIFICATION (Cont.)

3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes by product mist or solution will cause irritation and a burning sensation. Eye contact may result in severe corneal injury.

SKIN CONTACT: Contact with product mist or solution will cause skin irritation and may result in corrosion of the skin.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion of product solution will cause irritation and corrosion of the gastrointestinal tract to include nausea, vomiting and diarrhea. Contact with stomach acid will cause highly toxic hydrogen sulfide to evolve.

INHALATION: Inhalation of product vapors (hydrogen sulfide) may cause dizziness and unconsciousness possibly resulting in serious falls from elevated positions..

CHRONIC EFFECTS/CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA.

Section 4: FIRST AID MEASURES

4.1 EYES: Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to insure thorough flushing of the entire area of the eye and lids. Obtain immediate medical attention.

4.2 SKIN: Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain immediate medical attention.

4.3 INGESTION: DO NOT INDUCE VOMITING. If victim is conscious, immediately give large quantities of water. If vomiting does occur, continue to give fluids. Obtain immediate medical attention.

4.4 INHALATION: Remove victim from contaminated atmosphere. If breathing is labored, administer oxygen. If breathing has ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain immediate medical attention.

Section 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

FLASH POINT: Not flammable (See Section 5.4) **METHOD USED:** NA

5.2 FLAMMABLE LIMITS H_2S **LFL**: 4% **UFL**: 44%

5.3 EXTINGUISHING MEDIA: Water spray or foam or as appropriate for combustibles involved in fire.

Section 5: FIRE FIGHTING MEASURES (Cont.)

5.4 FIRE & EXPLOSIVE HAZARDS: When heated or diluted, hydrogen sulfide vapors will evolve. This gas may form explosive mixtures with air. (See Section 5.2) Keep containers/storage vessels in fire area cooled with water spray.

5.5 FIRE FIGHTING EQUIPMENT: Because of the possible presence of toxic gases and the irritating nature of the product, wear self-contained breathing apparatus, positive pressure, (MSHA/NIOSH approved or equivalent) and full protective gear.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1 *Small releases*: Confine and absorb small releases on sand, earth or other inert absorbent. Released material may contain residual sulfides. Spray with weak (~5%) hydrogen peroxide to oxidize sulfides.

6.2 Large releases: Confine area to qualified personnel. Wear proper protective equipment. Shut off release if safe to do so. Dike spill area to prevent runoff into sewers, drains (possible toxic or explosive mixtures) or surface waterways (potential aquatic toxicity). Spray product vapors with fine water spray or mist. Recover as much of the solution as possible. Treat remaining material as a small release (above).

Section 7: HANDLING and STORAGE

7.1 Handling: Handle in enclosed containers to avoid breathing product. Avoid contact with skin and eyes. Dilute only in enclosed containers. Use in a well ventilated area. Wash thoroughly after handling.

7.2 Storage: Store in well ventilated areas in enclosed containers. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame. Store tote, drums and small containers out of direct sunlight at moderate temperatures [<90°F (32°C)]. (See Section 10.4 for materials of construction)

Section 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: Wear self-contained breathing apparatus, positive pressure, MSHA/NIOSH (approved or equivalent).

8.2 SKIN PROTECTION: Gloves, boots, and chemical suit should be worn to prevent liquid contact. Wash contaminated clothing prior to reuse. Contaminated shoes cannot be cleaned and should be discarded

8.3 EYE PROTECTION: Chemical goggles and a full face shield.

8.4 EXPOSURE GUIDELINES:

	OSHA		ACGIH	
	TWA	STEL	TLV	STEL
Hydrogen sulfide	20 ppm (ceiling)		10 ppm (ceiling)	

8.5 ENGINEERING CONTROLS: Use adequate exhaust ventilation to prevent inhalation of product vapors. Maintain eyewash/safety shower in areas where chemical is handled.

Section 9: PHYSICAL and CHEMICAL PROPERTIES

9.1 APPEARANCE:	Ruby red liquid
9.2 ODOR:	Strong order of rotten eggs
9.3 BOILING POINT:	Not determined
9.4 VAPOR PRESSURE:	Not determined (Believed to be minimal)
9.5 VAPOR DENSITY:	Not determined
9.6 SOLUBILITY IN WATER:	Dissolves with precipitation of elemental sulfur.
9.7 SPECIFIC GRAVITY:	1.20 - 1.27 (10.0 - 10.6 lbs/gal)
9.8 FREEZING POINT:	Not determined
9.9 pH:	10.0 - 11.7
9.10 VOLATILE:	Not applicable

Section 10: STABILITY and REACTIVITY

10.1 STABILITY: This is a stable material

10.2 HAZARDOUS POLYMERIZATION: Will not occur.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS: Heating this product will evolve hydrogen sulfide vapors. Continued heating will also cause oxides of sulfur to be released.

10.4 INCOMPATIBILITY: Strong oxidizers such as nitrates, nitrites or chlorates can cause explosive mixtures if heated to dryness. Acids, acidic materials or dilution with water will cause the release of hydrogen sulfide, a highly toxic gas.

Section 11: TOXICOLOGICAL INFORMATION

11.1 ORAL: Data not available

11.2 DERMAL: Data not available

11.3 INHALATION: INH-Rat LC_{50}: 3.6 mg/L (4 Hr. Exposure)

11.4 CHRONIC/CARCINOGENICITY: No evidence available

11.5 TERATOLOGY: Data not available

11.6 REPRODUCTION: Data not available

11.7 MUTAGENICITY: Data not available

Section 12: ECOLOGICAL INFORMATION

No data available.

Section 13: DISPOSAL CONSIDERATIONS

If released to the environment for other than its intended purpose, this product should be checked to see it meets the criteria of a reactive sulfides D003, Reactive waste.

Section 14: TRANSPORT INFORMATION

14.1 DOT Shipping Name:	Calcium Polysulfide solution
14.2 DOT Hazard Class:	NA
14.3 UN/NA Number:	NA
14.4 Packing Group:	NA
14.5 DOT Placard:	NA
14.6 DOT Label(s):	NA
14.7 IMO Shipping Name:	Not Determined
14.8 RQ (Reportable Quantity):	NA
14.9 RR STCC Number:	Not Determined

Section 15: REGULATORY INFORMATION

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III:

a. **EHS** (Extremely Hazardous Substance) List: No

b. Section 311/312, (Tier I,II) Categories:

Immediate (acute)	Yes
Fire	No
Sudden release	No
Reactivity	Yes
Delayed (chronic)	No

c. Section 313 (Toxic Release Reporting-Form R): No

Chemical Name	CAS Number	Concentration

d. **TPQ** (Threshold Planning Quantity): No

15.3 CERCLA/SUPERFUND: RQ (Reportable Quantity) No

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

Section 15: REGULATORY INFORMATION (Cont.)

15.5 RCRA (Resource Conservation and Recovery Act) Status:	Possible D003 (See Section 13)
15.6 WHMIS (Canada) Hazard Classification:	NA
15.7 DOT Hazardous Material: (See Section 14)	No
15.8 CAA Hazardous Air Pollutant (HAP)	No

Section 16: OTHER INFORMATION

REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993, by Technical Services-Tessenderlo Kerley, Inc.

Address updated, 4/30/99
Section 8.3, Eye Protection revised and logo revised, 4/29/02
Revised Section 2.1, Ingredients, 3, Hazard Identification, 9,Physical characteristics, 11, Toxicological Information, 14, Transportation, 1/14/05

APPENDIX C
GROUNDWATER SAMPLING FIELD DATA SHEETS

In-Situ Pilot Study Work Plan
for the Eunice North Gas Plant

Chevron Environmental Management Company
89CH.49526.07
May 21, 2007

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = -- (_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = -- (_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = -- (_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PROJECT NUMBER: _____ DATE: _____ WELL NO. _____

FACILITY NAME: _____ TEMPERATURE: _____ °F or °C

FIELD PERSONNEL: _____ WEATHER: _____

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: _____ FT. or IN.

B. Thickness of Free Product, if present: _____ Inches _____ FT. or IN.

C. Total Depth of well (TD) from top of casing/piezometer: _____ FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): _____ FT. or IN.

E. **Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:**

	3 Well Vols.	5 Well Vols.		
2" Diameter =	0.5 gals/ft	0.82 gals/ft	x feet of water_____ =	_____PV (Gal)
4" Diameter =	2.0 gals/ft	3.25 gals/ft	x feet of water_____ =	_____PV (Gal)
6" Diameter =	4.4 gals/ft	7.35 gals/ft	x feet of water_____ =	_____PV (Gal)

PURGING METHOD: _____ DURATION: _____

OBSERVATIONS:

Cum. PV (Gal)	Time	Turbidity	DO	ORP	pH	Temp.	Conduct.	SWL

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: _____

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative

COMMENTS:

_____

_____

Casing Capacities:
2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
Original Water Column: _____ x 0.80 = --(_____)
Collect sample when Depth to Water measures
Less than or equal to:

Signature: _____

APPENDIX D
GROUNDWATER FIELD LOG

In-Situ Pilot Study Work Plan
for the Eunice North Gas Plant

Chevron Environmental Management Company
89CH.49526.07
May 21, 2007

Pilot Study Groundwater Field Log
Eunice North Gas Plant

Well ID	Date	Time	Depth to Water (feet)	Conductivity (mS/cm)	ORP (mV)	pH	DO (mg/L)	Temperature (Degree C)
IW023								
IW023								
IW023								
IW023								
IW023								
IW023								
IW023								
IW023								
IW023								
IW023								
Well ID	**Date**	**Time**	**Depth to Water (feet)**	**Conductivity (mS/cm)**	**ORP (mV)**	**pH**	**DO (mg/L)**	**Temperature (Degree C)**
IW024								
IW024								
IW024								
IW024								
IW024								
IW024								
IW024								
IW024								
IW024								
IW024								
Well ID	**Date**	**Time**	**Depth to Water (feet)**	**Conductivity (mS/cm)**	**ORP (mV)**	**pH**	**DO (mg/L)**	**Temperature (Degree C)**
IW026								
IW026								
IW026								
IW026								
IW026								
IW026								
IW026								
IW026								
IW026								
IW026								
Well ID	**Date**	**Time**	**Depth to Water (feet)**	**Conductivity (mS/cm)**	**ORP (mV)**	**pH**	**DO (mg/L)**	**Temperature (Degree C)**
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								
MW090SA								

APPENDIX E
CALCIUM POLYSULFIDE FIELD TITRATION

In-Situ Pilot Study Work Plan
for the Eunice North Gas Plant

Chevron Environmental Management Company
89CH.49526.07
May 21, 2007

Calcium Polysulfide (CaS_xS) Field Titration

Prepare NaOCl Titrant

Weigh out 5.7 grams of 6% NaOCl (Clorox bleach) and dilute it in a volumetric flask to one liter to produce a 340 mg/l NaOCl solution.

Testing of a Groundwater Sample

Put 100 milliliters of groundwater into a beaker with a N,N-diethyl-P-phenylenediamine (DPD) indicator, preferably a DPD No. 1 Free Chlorine Test Tablet manufactured by Bio-Lab, Inc. of Decatur, Georgia. DPD has the molecular formula $C_{10}H_{16}N_2$. Place the tablet into the groundwater sample and swirl the sample until the DPD tablet dissolves. Titrate the groundwater sample using the NaOCl titrant until the color changes to yellow. If the water is yellow before titrating (from high concentrations of CaS_xS), then the sample will turn from yellow, to white, and then back to yellow. The sample may begin to pick up a grey color before it turns yellow. The titration should continue through this phase until a yellow color develops. The titration works by the hypochlorite (ClO^-) reacting with available polysulfide ions as shown in the reaction below:

$$CaS_xS + NaOCl + H_2O \rightarrow CaS_x + S^0 + Na^+ + Cl^- + 2OH^-$$

After the CaS_xS is reacted, the ClO^- will react with sulfide complexes of DPD to produce a yellow color which shows that all of the CaS_xS has been consumed.

$$\underset{\text{DPD}}{2\,C_{10}H_{16}N_2} + S^{-2} + ClO^- \rightarrow \underset{\text{Yellow Color}}{(C_{10}H_{15}N_2Cl)_2S} + OH^-$$

If the CaS_xS concentrations are below 10 ppm, then the water may start out with a clear to cloudy appearance before the titration, and it may develop into a light reddish-orange color instead of a yellow color at the titration point. This occurs because not all of the DPD is reacted with sulfide ions, so the hypochlorite reacts directly with the DPD and produces a red color. The mixture of red and yellow color indicators makes the color slightly reddish-orange. This is considered the titration point at low concentrations.

Each milliliter of titrant using this method is equivalent to 10 ppm CaS_xS in the water sample. Adding too much of the titrant will make the yellow color disappear as DPD is oxidized by excess ClO^-, so do not over-titrate the sample.

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 5/22/96

or cash received on _____ in the amount of $ 1717.50

from Texaco

for Eunice II 2 GP GW004

(Facility Name) (OCP No.)

Submitted by: _____ Date: _____

Submitted to ASD by: R Chavez Date: 6/3/96

Received in ASD by: Diane Salazar Date: 6-21-96

Filing Fee X New Facility ___ Renewal X

Modification ___ Other _____

(specify)

Organization Code 521.07 Applicable FY 96

To be deposited in the Water Quality Management Fund.

Full Payment X or Annual Increment ___

TEXACO

CHECK NUMBER

No. [redacted]

TEXACO EXPLORATION AND PRODUCTION INC.

PRODUCING DEPARTMENT - UNITED STATES

DENVER, COLORADO

FORM PO-226

35-60

1130

May 22, 1996 19__

PAY One Thousand Seven Hundred Seventeen and 50/100----------$ 1,717.50

TO THE ORDER OF NMED-Water Quality Management, 2040 S. Pacheco, Santa Fe, NM 87505

Texaco Exploration and Production Inc.

DENVER DIV. HOBBS AREA

ACCOUNT NO. 00101821628

WORKING FUND ACCOUNT

TEXAS COMMERCE BANK, N.A.

P.O. BOX 2558

HOUSTON, TEXAS 77252

John Ayers

[redacted]

ChevronTexaco Exploration & Production Co.
North America Upstream
Permian Business Unit
15 Smith Road
Midland, Texas 79705
Tel 432 687 7318
Fax 432 687 7660
stoner@chevrontexaco.com

Scott L. Toner
Environmental Specialist

ChevronTexaco

July 15, 2003

Mr. Roger Anderson
Environmental Bureau Chief
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Discharge Permit Renewal (GW-4)
Eunice North Gas Plant Remediation
Lea County, New Mexico

Dear Mr. Anderson:

Attached is an original signed copy of the conditions of approval for the subject permit renewal, and a check in the amount of $2,600.00 (No. 0021664925) for the flat fee that is owed for this permit renewal. If there is anything else that we can do, or if you have any questions, please call me at (432) 687-7318.

Sincerely,

Scott Toner

SLT/

Attachments

Cc: Hank McConnell, ARCADIS (w/o attachments)

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 7/14/03

or cash received on _____ in the amount of $ 2600.00

from CHEVRON TEXACO

for EUNICE N GAS PLANT REMEDIATION GW-4
(Facility Name) (OP No.)

Submitted by: WAYNE PRICE for B. OLSON. Date: 7/17/03

Submitted to ASD by: _____ Date: "

Received in ASD by: _____ Date: _____

Filing Fee ___ New Facility X Renewal ___

Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY 2004

To be deposited in the Water Quality Management Fund.

Full Payment ✓ or Annual Increment ___

ChevronTexaco

ChevronTexaco Expl. & Prod. Co.
A Division of Chevron U.S.A. Inc.
P.O. Box 9034
Concord, CA 94524

CHECK NO. [redacted]

07/14/2003

PAY TO ORDER OF

STATE OF NEW MEXICO
WATER QUALITY MANAGEMENT FUND
C/O OIL CONSERVATION DIVISION
2040 S PACHECO
SANTA FE, NM 87505

*****$2,600.00
NOT VALID AFTER 1 YEAR

Two thousand six hundred and 00/100 Dollars

Mark E. Humphrey
AUTHORIZED SIGNATURE

WELLS FARGO BANK MONTANA, N.A.

[redacted]

ATTACHMENT TO PERMIT RENEWAL APPROVAL
DISCHARGE PERMIT GW-004

ChevronTexaco Exploration & Production Co.
Eunice North Gas Plant Remediation

DISCHARGE PERMIT RENEWAL APPROVAL CONDITIONS
June 25, 2003

1. Payment of Discharge Permit Fees: The $100.00 filing fee has been received by the OCD. The flat fee for abatement of ground water and vadose zone contamination has not been received by the OCD. The flat fee may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due upon receipt of this approval. OCD requires that ChevronTexaco pay the required flat fee by July 25, 2003. If ChevronTexaco chooses to make annual payments then OCD will require documentation of payment to be included in the annual report.

2. Commitments: ChevronTexaco will abide by all commitments submitted in the discharge permit renewal applications dated June 18, 2003, August 27, 2002, August 19, 2002 and December 13, 2000, and these conditions for approval.

3. Drum Storage: All drums containing materials other than fresh water must be stored on an impermeable pad with curbing. All empty drums should be stored on their sides with the bungs in place and lined up on a horizontal plane. Chemicals in other containers such as sacks or buckets must also be stored on an impermeable pad with curbing.

4. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device incorporated into the design.

5. Above Ground Tanks: All above ground tanks which contain fluids other than fresh water must be bermed to contain a volume of one-third more than the total volume of the largest tank or of all interconnected tanks. All new facilities or modifications to existing facilities must place the tank on an impermeable type pad within the berm.

6. Above Ground Saddle Tanks: Above ground saddle tanks must have impermeable pad and curb type containment unless they contain fresh water or fluids that are gases at atmospheric temperature and pressure.

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their contents and other emergency information necessary if the tank were to rupture, spill, or ignite. OCD allows master plans to be used that identifies all tanks, location, size and contents with a numbering system marked on the tanks which corresponds to plot plans contained in the plan.

8. Below Grade Tanks/Sumps/Pits/Ponds: All below grade tanks, sumps, pits and ponds must be approved by the OCD prior to installation or upon modification and must incorporate secondary containment and leak-detection into the design. All below grade tanks, sumps and pits must be tested annually, except systems that have secondary containment with leak detection. These systems with leak detection shall have a monthly inspection of the leak detection to determine if the primary containment is leaking. Results of tests and inspections shall be maintained at the facility covered by this discharge plan and available for OCD inspection. Any system found to be leaking shall be reported pursuant to Item # 12. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure and/or visual inspection of cleaned out tanks and/or sumps, or other OCD approved methods. The OCD will be notified at least 72 hours prior to all testing.

9. Below-grade Wastewater Lines: All below-grade fluid recovery gathering lines between recovery wells and water treatment facilities must be tested to demonstrate mechanical integrity prior to operation and every five (5) years thereafter. Results of such tests shall be maintained at the facility covered by this discharge plan and available for OCD inspection. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing.

10. Class V Wells: No Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes will be approved for construction and/or operation unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD regulated facilities which inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department.

11. Housekeeping: All systems designed for spill collection/prevention, and leak detection will be inspected monthly to ensure proper operation and to prevent over topping or system failure. All open to atmosphere spill collection devices will be emptied of fluids, other than rainwater, within 48 hours of discovery. Enclosed secondary containment devices shall be emptied of all fluids within 48 hours to ensure that the primary device is not leaking. A record of inspection will be retained on site for a period of five years.

12. Spill Reporting: All spills/releases shall be reported pursuant to 19.15.3.116 NMAC and 20.6.2.1203 NMAC to the OCD Artesia District Office.

13. Waste Disposal: All wastes will be disposed of at an OCD approved facility. Only oilfield exempt wastes shall be disposed of down Class II injection wells. Non-exempt oilfield wastes that are non-hazardous may be disposed of at an OCD approved facility upon proper waste determination per 40 CFR Part 261. Any waste stream that is not listed in the discharge permit will be approved by OCD on a case-by-case basis.

    Rule 712 Waste: Pursuant to Rule 712, disposal of certain non-domestic waste is allowed at solid waste facilities permitted by the New Mexico Environment Department as long as the waste stream is identified in the discharge permit, and existing process knowledge of the waste stream does not change without notification to the Oil Conservation Division.

14. OCD Inspections: Additional requirements may be placed on the facility based upon results of OCD inspections.

15. Storm Water Plan: ChevronTexaco shall maintain stormwater runoff controls. As a result of operations if any water contaminant that exceeds the WQCC standards listed in 20.6.2.3101 NMAC is discharged in any stormwater run-off then ChevronTexaco shall notify the OCD within 24 hours, modify the permit within 15 days and submit for OCD approval. ChevronTexaco shall also take immediate corrective actions pursuant to Item 12 of these conditions.

16. Vadose Zone and Water Pollution: The previously submitted investigation(s) and remediation permits were submitted pursuant to the discharge permit and all future discoveries of contamination will be addressed through the discharge permit process.

17. Ground Water Remediation: As an interim action prior to finalizing the remediation system plans, ChevronTexaco shall implement a free product removal system for ground water monitoring wells with free phase petroleum products.

    A report on the Chromate Remediation Pilot Project shall be submitted to the OCD by February 1, 2004. The report shall contain a summary of all project activities and a comprehensive work plan for remediation of contaminated ground water.

18. Ground Water Investigation Report and Monitoring:

    ChevronTexaco shall submit a comprehensive soil and ground water investigation report to the OCD by September 25, 2003. The report shall contain:

    a. A description of all soil and ground water investigation and monitoring activities.

    b. An inventory of all water wells within one mile of the site.

    c. Geologic/lithologic logs and well construction logs for each monitor well.

d. A water table potentiometric contour map showing the location of pipelines, excavations, spills, discharge areas, monitoring wells, recovery wells, and any other pertinent site features, as well as, the direction and magnitude of the hydraulic gradient.

e. Isopleth maps for contaminants of concern.

f. Summary tables of all past and present ground water quality monitoring results including copies of all laboratory analytical data sheets and associated QA/QC data that were not previously submitted to the OCD.

g. The disposition of all wastes generated.

h. A long term ground water monitoring plan.

19. Transfer of Discharge permit: The OCD will be notified prior to any transfer of ownership, control, or possession of a facility with an approved discharge permit. A written commitment to comply with the terms and conditions of the previously approved discharge permit must be submitted by the purchaser and approved by the OCD prior to transfer.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure permit will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Certification: **ChevronTexaco** by the officer whose signature appears below, accepts this and agrees to comply with all terms and conditions contained herein. **ChevronTexaco** further acknowledges that these conditions and requirements may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **ChevronTexaco Exploration & Production Co.**

Scott Toner
Company Representative- print name

Scott Toner Date 7/1/03
Company Representative- Sign

Title Environmental Specialist

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 11/14/05,

or cash received on X in the amount of $ 100 00

from SECOR INTERNATIONAL INC

for CHEVRON EUNICE GAS PLANT (GW-004)
(Facility Name)

Submitted by: GLENN VON GONTEN Date: 11/14/2005
(DP No.)

Submitted to ASD by: _____ Date: _____

Received in ASD by: _____ Date: _____

Filing Fee ✓ New Facility ___ Renewal ✓

Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY 2006

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

[redacted]

SECOR
INTERNATIONAL INCORPORATED

Tax ID 33-0385098
PO Box 230
Redmond, WA 98073
425.372.1600

CHECK DATE
November 3, 2005

Guaranty Bank
300 Capitol Mall, Suite 1550
Sacramento, CA 95814
88-7068/3149

PAY One Hundred and 00/100 Dollars

AMOUNT $100.00

TO New Mexico Water Quality Mgt Fund
Attn: Glenn Von Gonten
1220 south St Francis Drive
Santa Fe NM 87505

James S Cain
AUTHORIZED SIGNATURE

[redacted]

Security Check features included. Details on back.

NEW MEXICO ENVIRONMENT DEPARTMENT
REVENUE TRANSMITTAL FORM

	Description	FUND	CES	DFA ORG	DFA ACCT	ED ORG	ED ACCT	AMOUNT	
1	CY Reimbursement Project _____ Tax ___	064	01						1
5	Gross Receipt Tax	064	01		2329	900000	2329134		2
3	Air Quality Title V	092	13	1300	1696	900000	4169134		3
4	PRP Prepayments	248	14	1400	9696	900000	4969014		4
2	Climax Chemical Co.	248	14	1400	9696	900000	4969015		5
6	Circle K Reimbursements	248	14	1400	9696	900000	4969248		6
7	Hazardous Waste Permits	339	27	2700	1696	900000	4169027		7
8	Hazardous Waste Annual Generator Fees	339	27	2700	1696	900000	4169339		8
0	Water Quality - Oil Conservation Division	341	29		2329	900000	2329029	100 00	10
1	Water Quality - GW Discharge Permit	341	29	2900	1696	900000	4169029		11
2	Air Quality Permits	631	31	2500	1696	900000	4169031		12
3	Payments under Protest	651	33		2919	900000	2919033		13
4	Xerox Copies	652	34		2349	900000	2349001		*14
5	Ground Water Penalties	652	34		2349	900000	2349002		15
6	Witness Fees	652	34		2349	900000	2439003		16
7	Air Quality Penalties	652	34		2349	900000	2349004		17
8	OSHA Penalties	652	34		2349	900000	2349005		18
9	Prior Year Reimbursement	652	34		2349	900000	2349006		19
0	Surface Water Quality Certification	652	34		2349	900000	2349009		20
1	Jury Duty	652	34		2349	900000	2349012		21
2	CY Reimbursements (I.e. telephone)	652	34		2349	900000	2349014		22
3	UST Owner's List	783	24	2500	9696	900000	4969201		*23
4	Hazardous Waste Notifiers List	783	24	2500	9696	900000	4969202		*24
5	UST Maps	783	24	2500	9696	900000	4969203		*25
6	UST Owner's Update	783	24	2500	9696	900000	4969205		*26
8	Hazardous Waste Regulations	783	24	2500	9696	900000	4969207		*28
9	Radiologic Tech. Regulations	783	24	2500	9696	900000	4969208		*29
0	Superfund CERLIS List	783	24	2500	9696	900000	4969211		*30
1	Solid Waste Permit Fees	783	24	2500	9696	900000	4969213		31
2	Smoking School	783	24	2500	9696	900000	4969214		32
3	SWQB - NPS Publications	783	24	2500	9696	900000	4969222		*33
4	Radiation Licensing Regulation	783	24	2500	9696	900000	4969228		*34
5	Sale of Equipment	783	24	2500	9696	900000	4969301		*35
6	Sale of Automobile	783	24	2500	9696	900000	4969302		*36
7	Lust Recoveries	783	24	2500	9696	900000	4969614		**37
8	Lust Repayments	783	24	2500	9696	900000	4969615		**38
9	Surface Water Publication	783	24	2500	9696	900000	4969801		39
0	Exxon Reese Drive Ruidoso - CAF	783	24	2500	9696	900000	4969242		40
1	Emerg. Hazardous Waste Penalties NOV	957	32	9600	1696	900000	4164032		41
2	Radiologic Tech. Certification	987	05	0500	1696	900000	4169005		42
4	Ust Permit Fees	989	20	3100	1696	900000	4169020		44
5	UST Tank Installers Fees	989	20	3100	1696	900000	4169021		45
6	Food Permit Fees	991	26	2600	1696	900000	4169026		46
3	Other								43

Gross Receipt Tax Required ** Site Name & Project Code Required TOTAL _____

ntact Person: ED MARTIN Phone: 476-3492 Date: 11/14/2005

ceived in ASD By: _____ Date: _____ RT #: _____ ST #: _____

FSB025
Revised 07/07/00

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

June 25, 2003

Mr. Scott L. Toner
ChevronTexaco Exploration & Production Co.
15 Smith Road
Midland, Texas 77705

RE: DISCHARGE PERMIT RENEWAL (GW-4)
EUNICE NORTH GAS PLANT REMEDIATION
LEA COUNTY, NEW MEXICO

Dear Mr. Toner:

The groundwater discharge permit renewal for the ChevronTexaco Exploration & Production Co. (ChevronTexaco) Eunice North Gas Plant Remediation located in the NE/4, SE/4 of Section 28, Township 21 South, Range 37 East, Lea County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office by July 25, 2003.**

The original discharge permit was approved on March 16, 1981. The discharge permit renewal is for abatement of ground water and vadose zone contamination related to the facility. The discharge permit renewal consists of the following ChevronTexaco documents:

- June 18, 2003 "CHROMATE REMEDIATION PILOT STUDY WORK PLAN, CHEVRONTEXACO, EUNICE, NEW MEXICO".
- February 21, 2003 e-mail titled "CHEVRON TEXACO NORTH EUNICE SUMP WORK PLAN".
- August 27, 2002 "ADDENDUM TO DISCHARGE PLAN (GW-004)".
- August 19, 2002 "TEXACO #2 (NORTH) GAS PLANT – NORTH SUMP EXCAVATION".
- December 13, 2000 "TEXACO EUNICE GROUNDWATER REMEDIATION WORK PLAN".

The discharge permit is renewed pursuant to 20.6.2.3109.C NMAC. Please note 20.6.2.3109.G NMAC, which provides for possible future amendment of the permit. Please be advised that

approval of this permit renewal does not relieve ChevronTexaco of responsibility should operations result in pollution of surface water, ground water or the environment. In addition, OCD approval does not relieve ChevronTexaco of responsibility for compliance with any other governmental authority's rules and regulations. Please be advised that all exposed pits, including lined pits and open top tanks (exceeding 16 feet in diameter) shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that 20.6.2.3104 NMAC requires that "when a permit has been approved, discharges must be consistent with the terms and conditions of the permit." Pursuant to 20.6.2.3107.C NMAC, ChevronTexaco is required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Please be aware that the discharge permit approval will expire March 16, 2006 and an application for renewal should be submitted in ample time before that date. Pursuant to 20.6.2.3106.F NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved.

The discharge permit modification for the ChevronTexaco Eunice North Gas Plant Remediation is subject to discharge permit fees pursuant to 20.6.2.3114 NMAC. Every billable facility submitting a discharge permit will be assessed a fee equal to the filing fee of $100.00 plus a flat fee of $2,600.00 for abatement of ground water and vadose zone contamination. The OCD has received the $100.00 filing fee, but not the $2,600.00 flat fee.

Please make all checks payable to: Water Quality Management Fund
C/o: Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505.

If you have any questions, please contact Bill Olson of my staff at (505) 476-3491. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit renewal review.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/wco

Attachment

xc: Chris Williams, OCD Hobbs District Supervisor
Hank W. McConnell, Arcadis

ATTACHMENT TO PERMIT RENEWAL APPROVAL
DISCHARGE PERMIT GW-004

ChevronTexaco Exploration & Production Co.
Eunice North Gas Plant Remediation

DISCHARGE PERMIT RENEWAL APPROVAL CONDITIONS
June 25, 2003

1. Payment of Discharge Permit Fees: The $100.00 filing fee has been received by the OCD. The flat fee for abatement of ground water and vadose zone contamination has not been received by the OCD. The flat fee may be paid in a single payment due at the time of approval, or in equal annual installments over the duration of the discharge plan, with the first payment due upon receipt of this approval. OCD requires that ChevronTexaco pay the required flat fee by July 25, 2003. If ChevronTexaco chooses to make annual payments then OCD will require documentation of payment to be included in the annual report.

2. Commitments: ChevronTexaco will abide by all commitments submitted in the discharge permit renewal applications dated June 18, 2003, August 27, 2002, August 19, 2002 and December 13, 2000, and these conditions for approval.

3. Drum Storage: All drums containing materials other than fresh water must be stored on an impermeable pad with curbing. All empty drums should be stored on their sides with the bungs in place and lined up on a horizontal plane. Chemicals in other containers such as sacks or buckets must also be stored on an impermeable pad with curbing.

4. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device incorporated into the design.

5. Above Ground Tanks: All above ground tanks which contain fluids other than fresh water must be bermed to contain a volume of one-third more than the total volume of the largest tank or of all interconnected tanks. All new facilities or modifications to existing facilities must place the tank on an impermeable type pad within the berm.

6. Above Ground Saddle Tanks: Above ground saddle tanks must have impermeable pad and curb type containment unless they contain fresh water or fluids that are gases at atmospheric temperature and pressure.

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their contents and other emergency information necessary if the tank were to rupture, spill, or ignite. OCD allows master plans to be used that identifies all tanks, location, size and contents with a numbering system marked on the tanks which corresponds to plot plans contained in the plan.

8. Below Grade Tanks/Sumps/Pits/Ponds: All below grade tanks, sumps, pits and ponds must be approved by the OCD prior to installation or upon modification and must incorporate secondary containment and leak-detection into the design. All below grade tanks, sumps and pits must be tested annually, except systems that have secondary containment with leak detection. These systems with leak detection shall have a monthly inspection of the leak detection to determine if the primary containment is leaking. Results of tests and inspections shall be maintained at the facility covered by this discharge plan and available for OCD inspection. Any system found to be leaking shall be reported pursuant to Item # 12. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure and/or visual inspection of cleaned out tanks and/or sumps, or other OCD approved methods. The OCD will be notified at least 72 hours prior to all testing.

9. Below-grade Wastewater Lines: All below-grade fluid recovery gathering lines between recovery wells and water treatment facilities must be tested to demonstrate mechanical integrity prior to operation and every five (5) years thereafter. Results of such tests shall be maintained at the facility covered by this discharge plan and available for OCD inspection. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing.

10. Class V Wells: No Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes will be approved for construction and/or operation unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD regulated facilities which inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department.

11. Housekeeping: All systems designed for spill collection/prevention, and leak detection will be inspected monthly to ensure proper operation and to prevent over topping or system failure. All open to atmosphere spill collection devices will be emptied of fluids, other than rainwater, within 48 hours of discovery. Enclosed secondary containment devices shall be emptied of all fluids within 48 hours to ensure that the primary device is not leaking. A record of inspection will be retained on site for a period of five years.

12. Spill Reporting: All spills/releases shall be reported pursuant to 19.15.3.116 NMAC and 20.6.2.1203 NMAC to the OCD Artesia District Office.

13. Waste Disposal: All wastes will be disposed of at an OCD approved facility. Only oilfield exempt wastes shall be disposed of down Class II injection wells. Non-exempt oilfield wastes that are non-hazardous may be disposed of at an OCD approved facility upon proper waste determination per 40 CFR Part 261. Any waste stream that is not listed in the discharge permit will be approved by OCD on a case-by-case basis.

    Rule 712 Waste: Pursuant to Rule 712, disposal of certain non-domestic waste is allowed at solid waste facilities permitted by the New Mexico Environment Department as long as the waste stream is identified in the discharge permit, and existing process knowledge of the waste stream does not change without notification to the Oil Conservation Division.

14. OCD Inspections: Additional requirements may be placed on the facility based upon results of OCD inspections.

15. Storm Water Plan: ChevronTexaco shall maintain stormwater runoff controls. As a result of operations if any water contaminant that exceeds the WQCC standards listed in 20.6.2.3101 NMAC is discharged in any stormwater run-off then ChevronTexaco shall notify the OCD within 24 hours, modify the permit within 15 days and submit for OCD approval. ChevronTexaco shall also take immediate corrective actions pursuant to Item 12 of these conditions.

16. Vadose Zone and Water Pollution: The previously submitted investigation(s) and remediation permits were submitted pursuant to the discharge permit and all future discoveries of contamination will be addressed through the discharge permit process.

17. Ground Water Remediation: As an interim action prior to finalizing the remediation system plans, ChevronTexaco shall implement a free product removal system for ground water monitoring wells with free phase petroleum products.

    A report on the Chromate Remediation Pilot Project shall be submitted to the OCD by February 1, 2004. The report shall contain a summary of all project activities and a comprehensive work plan for remediation of contaminated ground water.

18. Ground Water Investigation Report and Monitoring:

    ChevronTexaco shall submit a comprehensive soil and ground water investigation report to the OCD by September 25, 2003. The report shall contain:

    a. A description of all soil and ground water investigation and monitoring activities.

    b. An inventory of all water wells within one mile of the site.

    c. Geologic/lithologic logs and well construction logs for each monitor well.

d. A water table potentiometric contour map showing the location of pipelines, excavations, spills, discharge areas, monitoring wells, recovery wells, and any other pertinent site features, as well as, the direction and magnitude of the hydraulic gradient.

e. Isopleth maps for contaminants of concern.

f. Summary tables of all past and present ground water quality monitoring results including copies of all laboratory analytical data sheets and associated QA/QC data that were not previously submitted to the OCD.

g. The disposition of all wastes generated.

h. A long term ground water monitoring plan.

19. Transfer of Discharge permit: The OCD will be notified prior to any transfer of ownership, control, or possession of a facility with an approved discharge permit. A written commitment to comply with the terms and conditions of the previously approved discharge permit must be submitted by the purchaser and approved by the OCD prior to transfer.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure permit will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Certification: **ChevronTexaco** by the officer whose signature appears below, accepts this and agrees to comply with all terms and conditions contained herein. **ChevronTexaco** further acknowledges that these conditions and requirements may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **ChevronTexaco Exploration & Production Co.**

_____
Company Representative- print name

_____Date_____
Company Representative- Sign

Title_____

Texaco Exploration and Production Inc
P O Box 1929
Eunice NM 88231 1929

Date: May 17, 1996

CERTIFIED MAIL
RETURN RECEIPT

William J. LeMay
Energy Minerals and Natural Resources Dept.
Oil Conservation Division
2040 S. Pacheco
Santa Fe. New Mexico, 87505

RE: Discharge Plan Renewal GW-004
Eunice #2 (North) Gas Plant
Lea County, New Mexico

Attached is a signed copy of the conditions of approval on renewal of the Eunice North Gas Plants Discharge Plan. As per my telephone conservation with Chris Eustice on 5-17-96 clarification on the following issues were addressed:

Item #3: Soil testing around the "Waste Water and Slop Oil Area" will consist of votatiles, semi-volatiles and eight RCRA metals.

Item # 4: The North plant flare does not contain an inactive sump/pit. This sump/pit is located at the South plant emergency flare area. This reference will be changed to the South plant conditions of approval.

Item # 5: The water sample from the well located at the North facility will be obtained by pumping the water from the well rather than bailing. Also the metals testing will of consist of the eight RCRA metals.

Item # 13: The tank inspection requirement will only apply to tanks sitting on the ground. If the tank is on any type of stand off the ground, leaks should be noted and the tank will be repaired.

On behalf of Texaco and the Eunice Plants, I wish to thank the OCD for their cooperation during this discharge plan review.

Sincerely,

Rodney Bailey

Rodney Bailey
Eunice complex

ATTACHMENT TO THE DISCHARGE PLAN GW-004 APPROVAL
TEXACO EXPLORATION AND PRODUCTION, INC.
EUNICE #2 (NORTH) GAS PLANT
DISCHARGE PLAN REQUIREMENTS
(May 1, 1996)

1. Fee Payment: The $50 filing fee and the $1,667.50 flat fee shall be paid upon receipt of this letter.

2. Junk Yard Area: This area was noted during inspection for having numerous piles of waste being stored on the ground. **Texaco will submit a work plan for identifying and disposing of the waste piles.** NOTE. All non-exempt wastes must be characterized for hazardous constituents and characteristics and submitted to the OCD for approval prior to disposal.

   An old "trash collection pit" is also present in the junk yard area. **Texaco will submit a work plan to close this pit within 60 days from receipt of this approval.**

3. Waste Water and Slop Oil Area: This area was noted during inspection for having numerous tank over flows and drips. **Texaco will provide a work plan and schedule to investigate the extent of contamination associated with the continuous drips and leaks at the slop tanks within 60 days from receipt of this approval.**

4. Flare Area: This area was noted during inspection as having an inactive sump/pit associated with liquids recovery going to the flare. **Texaco will submit to the OCD a closure plan and schedule to investigate the extent of contamination around this sump/pit within 60 days from receipt of this approval.**

5. Water Sample: **Texaco will sample the water well located at the facility for major cations/anions, purgable aromatic and halogenated volatile organics, polynuclear aromatic hydrocarbons and heavy metals.** The analytical results will be submitted to the OCD Santa Fe Office within 120 days from receipt of this approval.

6. Compressor Building: This area was discussed during the inspection as being investigated for subsurface contamination and the future installation of a ground water monitor well. **Texaco will submit to the OCD a work plan and past result(s) for any work associated with investigating the extent of contamination around the building within 60 days from receipt of this approval.**

7. Texaco Commitments: Texaco will abide by all the commitments submitted in the discharge plan application dated February 14, 1996.

8. Drum Storage: All drums containing materials other than fresh water must be stored on pad and curb type containment. **All empty drums will be stored on their sides with the bungs in place and lined up on a horizontal plane.** Chemical(s) stored in any other containers such as buckets and sacks must be stored on pad and curb type containment.

   NOTE: During the facility inspection it was noted that empty drums are stored all around the Junk Yard Area. Texaco needs to properly store and/or dispose of all empty drums.

9. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device (i.e. drip pan) incorporated into the design.

10. Above Ground Tanks: All above ground tanks which contain fluids other than freshwater must be bermed to contain a volume of one and one-third (1-1/3) more than the total volume of the largest tank within the berm or of all interconnected tanks. **All new or replacement tanks will be placed on an impermeable liner.**

11. Saddle Tanks: All saddle tanks will be placed on pad and curb type containment unless they contain fresh water or liquids that are gases at atmospheric temperature and pressure.

12. Tank Labeling: All tanks must be clearly labeled to identify their contents and other emergency information necessary if the tank(s) were to rupture, spill and/or ignite.

13. Tank Inspection: All tanks will be cleaned out and visually inspected prior to renewal of the discharge plan.

14. Below Grade Tanks/Sumps: All pre-existing sumps and below grade tanks must demonstrate integrity on an annual basis. Integrity tests include pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. **All testing will be documented and recorded for a period of five (5) years and the records made available to the OCD inspectors upon request.** All below grade tanks, sumps and pits must be approved by the OCD prior to installation and must incorporate secondary containment and leak detection into the design.

15. Underground Process/Wastewater Lines: **All underground process/wastewater pipelines must be tested to demonstrate their mechanical integrity at present and then every five years there after. All testing will be documented and recorded for a period of five (5) years and the records made available to the OCD inspectors upon request.** Permittee may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD.

16. Spill Reporting: All spills and/or leaks will be reported to the OCD District Office pursuant to WQCC Rule 1203 and OCD Rule 116.

17. Housekeeping: All systems designed for spill collection/prevention will be inspected daily to ensure proper operation, prevent overtopping and/or system failure.

18. Transfer of Discharge Plan: The OCD will be notified prior to the transfer of ownership, control or possession of a facility with an approved discharge plan. A written commitment to comply with the terms and conditions of the previously approved discharge plan must be submitted by the purchaser and approved by the OCD prior to transfer.

19. OCD Inspections: Additional requirements may be placed on the facility based upon results from OCD inspections.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure plan will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Conditions Accepted by:

Company Representative

5/17/96
Date

OPERATING UNIT MANAGER
Title

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

May 1, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.P-269-269-389

Mr. Rodney Bailey
Texaco Exploration and Production, Inc.
PO Box 1929
Eunice, New Mexico 88231-1929

RE: Discharge Plan Renewal GW-004
Eunice #2 (North) Gas Plant
Lea County, New Mexico

Dear Mr. Bailey:

The Ground Water Discharge Plan (GW-004) for Texaco Exploration and Production, Inc.'s (Texaco) Eunice #2 (North) Gas Plant located in the NE/4 SE/4 of Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico, is hereby approved under the conditions contained in the enclosed attachment. The ground water discharge plan consists of the original discharge plan as approved March 16, 1981, and renewed on May 23, 1986 and May 24, 1991, and the renewal application dated February 14, 1996. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office** within five working days of receipt of this letter.

The discharge plan was submitted pursuant to Section 3106 of the New Mexico Water Quality Control Commission Regulations. It is approved pursuant to Section 3109.A. Please note Sections 3109.E and 3109.F. which provide for possible future amendments or modifications of the plan. Please be advised the approval of this plan does not relieve Texaco of liability should their operation result in pollution of surface water, ground water or the environment.

Please be advised that all exposed pits, including lined pits and open tanks (tanks exceeding 16 feet in diameter), shall be screened, netted or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3104 of the regulations require "When a facility has been approved, discharges must be consistent with the terms and conditions of the plan". Pursuant to Section 3107.C. Texaco is required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3109.G.4., this plan is for a period of five (5) years. This approval will expire on March 16, 2001, and Texaco should submit an application in ample time before this date.

The discharge plan application for the Texaco Eunice #2 (North) Gas Plant is subject to WQCC Regulation 3114 discharge plan fee. Every billable facility submitting a discharge plan renewal will be assessed a fee equal to the filing fee of fifty ($50) dollars plus the flat fee of one thousand six hundred sixty-seven dollars and fifty cents ($1,667.50) for renewal approval of gas processing plant discharge plans.

The Oil Conservation Division (OCD) has not received Texaco's fifty dollar ($50.00) filing fee. The flat fee for an approved discharge plan may be paid in a single payment at the time of approval, or in equal installments over the duration of the plan, with the first payment due at the time of approval. **The filing fee and the flat fee (total payment or the first installment) are due upon receipt of this letter.**

Please make all checks payable to: **NMED - Water Quality Management** and send to the OCD Santa Fe Office.

On behalf of the staff of the OCD, I wish to thank Texaco for their cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/cee
Attachment

cc: OCD Hobbs Office

ATTACHMENT TO THE DISCHARGE PLAN GW-004 APPROVAL
TEXACO EXPLORATION AND PRODUCTION, INC.
EUNICE #2 (NORTH) GAS PLANT
DISCHARGE PLAN REQUIREMENTS
(May 1, 1996)

1. Fee Payment: The $50 filing fee and the $1,667.50 flat fee shall be paid upon receipt of this letter.

2. Junk Yard Area: This area was noted during inspection for having numerous piles of waste being stored on the ground. **Texaco will submit a work plan for identifying and disposing of the waste piles.** NOTE. All non-exempt wastes must be characterized for hazardous constituents and characteristics and submitted to the OCD for approval prior to disposal.

   An old "trash collection pit" is also present in the junk yard area. **Texaco will submit a work plan to close this pit within 60 days from receipt of this approval.**

3. Waste Water and Slop Oil Area: This area was noted during inspection for having numerous tank over flows and drips. **Texaco will provide a work plan and schedule to investigate the extent of contamination associated with the continuous drips and leaks at the slop tanks within 60 days from receipt of this approval.**

4. Flare Area: This area was noted during inspection as having an inactive sump/pit associated with liquids recovery going to the flare. **Texaco will submit to the OCD a closure plan and schedule to investigate the extent of contamination around this sump/pit within 60 days from receipt of this approval.**

5. Water Sample: **Texaco will sample the water well located at the facility for major cations/anions, purgable aromatic and halogenated volatile organics, polynuclear aromatic hydrocarbons and heavy metals.** The analytical results will be submitted to the OCD Santa Fe Office within 120 days from receipt of this approval.

6. Compressor Building: This area was discussed during the inspection as being investigated for subsurface contamination and the future installation of a ground water monitor well. **Texaco will submit to the OCD a work plan and past result(s) for any work associated with investigating the extent of contamination around the building within 60 days from receipt of this approval.**

7. Texaco Commitments: Texaco will abide by all the commitments submitted in the discharge plan application dated February 14, 1996.

8. Drum Storage: All drums containing materials other than fresh water must be stored on pad and curb type containment. **All empty drums will be stored on their sides with the bungs in place and lined up on a horizontal plane.** Chemical(s) stored in any other containers such as buckets and sacks must be stored on pad and curb type containment.

   NOTE: During the facility inspection it was noted that empty drums are stored all around the Junk Yard Area. Texaco needs to properly store and/or dispose of all empty drums.

9. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device (i.e. drip pan) incorporated into the design.

10. Above Ground Tanks: All above ground tanks which contain fluids other than freshwater must be bermed to contain a volume of one and one-third (1-1/3) more than the total volume of the largest tank within the berm or of all interconnected tanks. **All new or replacement tanks will be placed on an impermeable liner.**

11. Saddle Tanks: All saddle tanks will be placed on pad and curb type containment unless they contain fresh water or liquids that are gases at atmospheric temperature and pressure.

12. Tank Labeling: All tanks must be clearly labeled to identify their contents and other emergency information necessary if the tank(s) were to rupture, spill and/or ignite.

13. Tank Inspection: All tanks will be cleaned out and visually inspected prior to renewal of the discharge plan.

14. Below Grade Tanks/Sumps: All pre-existing sumps and below grade tanks must demonstrate integrity on an annual basis. Integrity tests include pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. **All testing will be documented and recorded for a period of five (5) years and the records made available to the OCD inspectors upon request.** All below grade tanks, sumps and pits must be approved by the OCD prior to installation and must incorporate secondary containment and leak detection into the design.

15. Underground Process/Wastewater Lines: **All underground process/wastewater pipelines must be tested to demonstrate their mechanical integrity at present and then every five years there after. All testing will be documented and recorded for a period of five (5) years and the records made available to the OCD inspectors upon request.** Permittee may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD.

16. Spill Reporting: All spills and/or leaks will be reported to the OCD District Office pursuant to WQCC Rule 1203 and OCD Rule 116.

17. Housekeeping: All systems designed for spill collection/prevention will be inspected daily to ensure proper operation, prevent overtopping and/or system failure.

18. Transfer of Discharge Plan: The OCD will be notified prior to the transfer of ownership, control or possession of a facility with an approved discharge plan. A written commitment to comply with the terms and conditions of the previously approved discharge plan must be submitted by the purchaser and approved by the OCD prior to transfer.

19. OCD Inspections: Additional requirements may be placed on the facility based upon results from OCD inspections.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure plan will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Conditions Accepted by:

_____ _____

Company Representative Date

_____

Title

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

May 24, 1991

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-327-278-140

Mr. C. Ray Russell
Environmental Coordinator
Texaco USA
P. O. Box 1650
Tulsa, Oklahoma 74102

RE: Discharge Plan GW-4
Eunice #2 Gas Processing Plant
Lea County, New Mexico

Dear Mr. Russell:

The groundwater discharge plan renewal (GW-4) for the Texaco, Inc. Eunice #2 Gas Processing Plant located in the NE/4 SE/4, Section 28, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico is hereby approved. The renewal application consists of the original discharge plan as approved March 16, 1981, and renewed on May 9, 1986, the renewal application dated January 16, 1991, and materials dated May 16, 1991, submitted as supplements to the application.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is renewed pursuant to Section 3-109.A., please note Section 3-109.F., which provides for the possible future amendments of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment which may be actionable under other laws and/or regulations.

Please be advised that all exposed pits, including lined pits and open top tanks (tanks exceeding 16 feet in diameter), shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C. you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire March 16, 1996 and you should submit an application for renewal in ample time before that date. It should be noted that all gas processing plants and oil refineries in excess of twenty-five years of age will be required to submit plans for, or the results of an underground drainage testing program as a requirement for discharge plan renewal.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/RCA/sl

cc: OCD Hobbs Office

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

50 YEARS
1935 - 1985

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

May 9, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. J. H. Anderson
Mgr., Tulsa District
Natural Gas Plant Division
P. O. Box 1650
Tulsa, Oklahoma 74102

RE: DISCHARGE PLAN GW-4
TEXACO PRODUCING INC.
EUNICE NO. 2 GAS PROCESSING PLANT

Dear Mr. Anderson:

The ground water discharge plan renewal (GW-4) for the Texaco Eunice No. 2 Gas Processing Plant located in the NE/4 of the SE/4 of Section 28, Township 21 South, Range 37 East (NMPM), Lea County, New Mexico, is hereby approved. The original discharge plan was approved on March 16, 1981 and expired March 16, 1986. The renewal application consists of the plan dated November 18, 1980 and supplements dated December 29, 1980, May 18, 1981 and March 6, 1986.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is renewed pursuant to Section 3-109.F., which provides for the possible future amendments of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

There will be no routine monitoring or reporting requirements.

Please note that Section 3-104 of the regulations requires that "when a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C., you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire March 16, 1991, and you should submit an application for renewal in ample time before that date. Testing of all underground pipes will be required before renewal of the discharge plan can be considered.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

R. L. STAMETS
Director

RLS:RCA:dp

cc: OCD, Hobbs
L. E. Knight, Texaco USA, Tulsa, Oklahoma
C. R. Adkison, Texaco, Eunice

PS Form 3811, July 1983 447-845

DOMESTIC RETURN RECEIPT

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. J. H. Anderson
Mgr., Tulsa District
Natural Gas Plant Division
P. O. Box 1650
Tulsa, Oklahoma 74102

4. Type of Service:
☐ Registered ☐ Insured
XX Certified ☐ COD
☐ Express Mail

Article Number
P 612 458 240

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

50 YEARS
1935 - 1985

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

March 14, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. J. H. Anderson
Mgr., Tulsa District
Natural Gas Plants Division
P. O. Box 1650
Tulsa, Oklahoma 74102

Re: Discharge Plans GRW-3 and GRW-4
Texaco Producing Inc.
Eunice Nos. 1 and 2 Gas Processing Plants

Dear Mr. Anderson:

We have received your letter dated March 6, 1986, requesting a 60-day extension to May 15, 1986, for the completion of the above-referenced discharge plan renewals. Renewal applications are dated February 24, 1986 for Eunice No. 1, and March 6, 1986 for Eunice No. 2.

Pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations and for good cause shown, Texaco is hereby granted an extension and approval until May 16, 1986, or until discharge plan approval, whichever is earlier, to discharge without an approved discharge plan. This extension is granted to allow completion of discharge plan review by the OCD, exchange of comments, and submittal of clarifying information, if needed. Also, public notice will be issued, and if a public hearing is needed on the proposed discharge plan, an additional extension will be granted consistent with the time frame of any public hearing.

If you have any questions or comments, please feel free to contact Dave Boyer at (505) 827-5812 or Roger Anderson at (505) 827-5885.

Sincerely,

R. L. STAMETS
Director

RLS:RCA:dp

cc: Dave Boyer
OCD - Hobbs

Texaco USA
PO Box 2194
Pampa TX 79066-2194

November 26, 1984

Mr. Phillip Baca
State of New Mexico
Oil Conservation Division
Environmental Bureau
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Discharge Plan
Eunice #2 Gas Processing Plant

Dear Phil:

Per our telephone conversation today, attached is a copy of a March 16, 1981 letter to Mr. C. R. York from Mr. Joe D. Ramey approving the discharge plan for our Eunice #2 gas processing Plant.

Should you have any questions or need additional information, please feel free to contact me at 806-665-3775, or Mr. C. R. Adkison, Plant Superintendent of the Eunice Plants at 505-394-2566 anytime.

Very truly yours,

Lewis E. Knight

Lewis E. Knight
Environmental Engineer
Pampa, Texas

kcc
Attachment
cc: J. H. Anderson
C. R. Adkison
File

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

RECEIVED
MAR 1 1981
NGP

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

March 16, 1981

Getty Oil Company
P. O. Box 3000
Tulsa, Oklahoma 74102

Attention: Mr. Charles R. York

Re: GWR-4

Gentlemen:

The discharge plan submitted for the discharge of boiler and cooling tower waters from your Eunice No. 2 Gas Plant located in Section 28, Township 21 South, Range 37 East, Lea County, New Mexico, is hereby approved.

The discharge plan was submitted pursuant to section 3-106 of the Water Quality Control Commission regulations. It is approved pursuant to section 109. Please note subsections 3-109.E and 3-109.F which provide for possible future amendment of the plan. Please also be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

cc: J.H. ANDERSON
T.L. TRAINOR
3-23-81
LLK