NEW MEXICO ENVIRONMENT DEPARTMENT

HAZARDOUS WASTE PROGRAM

COMPREHENSIVE GROUNDWATER MONITORING EVALUATION REPORT (CME)

INSPECTION COVER SHEET

EPA I.D. NUMBER: NMD089416416

NAME OF FACILITY: Giant Refining Company - Bloomfield (GRCB)

MAILING ADDRESS: P.O. Box 159, Bloomfield, New Mexico 87413

LOCATION: 1 mile south of Bloomfield, NM on Highway 44, NE 1/4 of Section 27 of Township 29N, Range 11W

TELEPHONE: (505) 632-8013

TYPE OF FACILITY: Petroleum Refinery

DATE OF INSPECTION: May 22-23, 1997

INSPECTION PARTICIPANTS:

NAME	AGENCY/COMPANY/POSITION	TELEPHONE
Stephen Pullen	NMED HRMB	
Carl Will	NMED HRMB	
Lynn Shelton	GRCB	
Elvin Chavez	Assiggai Laboratories	
Scott Pratt	Assiggai Laboratories	

TYPE OF EVALUATION:
(Check one)

Oversight:	Federal:
Lead: X	Commercial TSD:
Other:	Other:

FIELD INTERVIEW PREPARED BY: Steve Pullen DATE: May 23, 1997

OFFICE REPORT PREPARED BY: Steve Pullen DATE: July 22, 1997

CONCURRED BY: DATE:

RED GREEN 1997

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INSPECTION SUMMARY

PURPOSE:

The reasons for conducting this CME were:

1. To observe and verify the appropriateness of the sampling procedures of the staff during their sampling of the groundwater monitoring well system.

2. To obtain split samples from the monitoring wells associated with the Oily Water Ponds to verify analytical accuracy.

3. To focus on the subsurface migration of contaminants to the San Juan River.

GENERAL COMMENTS:

A Comprehensive Groundwater Monitoring Evaluation (CME) was conducted at the Giant Refining Company Bloomfield (GRCB) facility in New Mexico by the New Mexico Environment Department (NMED) on May 22-23, 1997. The evaluation of the RCRA Groundwater Monitoring Program included a facility record review, a review of the groundwater sample collection procedures, split sampling, and a hydrogeololgic assessment.

Overall the sampling techniques were good. Personnel followed proper procedures for the sampling of groundwater monitoring wells.

RCRA REGULATORY STATUS:

Giant Refinery Company - Bloomfield (GRB) is currently operating under two regulatory mandates that involve groundwater monitoring. The first and most comprehensive requirement is an EPA issued RCRA § 3008(h) Administrative order on Consent issued December 31, 1992. The second is a Discharge Permit issued be the Oil Conservation Division of the Energy, New Mexico's Minerals and Naturals Resources Department. Currently GRB does not have a RCRA Operating Permit and is considered to be in Interim Status.

On November 19, 1980, a Gary-Williams Energy Corporation subsidiary, Bloomfield Refining Company, filed a Part A Permit application indicating that the facility treated and stored listed hazardous wastes in surface impoundments. In April 1982, a revised Part A was submitted to EPA which claimed generator status only and suggested that the TSD status for the facility be dropped. EPA did not accept the revised application. Because of a disagreement regarding which units required a permit, in 1985, the EPA entered into Consent and Administrative Orders regarding the wastewater treatment impoundments and the K051 wastes. In 1992, the EPA entered another Consent Order with Bloomfield Refining to conduct Interim Measures, a RCRA Facility Investigation (RFI), Corrective Measures Study (CMS) and Corrective Measures Implementation (CMI).

In October 1995, Giant Refining Company purchased the facility and submitted a revised Part A application to NMED.

The wastes identified in the Part A application are API separator sludge (K051), slop oil emulsion solids (K049), and heat exchanger bundle cleaning sludge (K050).

An EPA RCRA Facility Assessment Evaluation (RFA) conducted June 27, 1987, identified thirteen (13) Solid Waste Management Units (SWMUs) at the facility, five (5) of which were considered to be RCRA-regulated SWMUs and are listed below:

- South Oily Water Pond (SOWP);

- North Oily Water Pond (NOWP);
- Evaporation Ponds (2);
- Landfill; and
- Landfill Runoff Ponds.

Prior to 1982, Plateau Inc. operated two waste water treatment surface impoundments immediately downstream of an API separator. During 1982, Plateau cleaned the two surface impoundments in order to install a synthetic liner. The sludge from these impoundments was disposed of in an on-site landfill. The company entered into a Compliance Order with EPA Region 6 in 1985 by which it agreed to close the on-site landfill, and the facility commenced closure of the landfill in 1989. Contaminated soil from the landfill was segregated and became the subject of a delisting petition that was approved by EPA in May 1996.

In December 1993 NMED approved the closure for the landfill pond mentioned above.

In December 1995 GRB submitted a Corrective Measures Study (CMS) Report to EPA in accordance with the Administrative Order on Consent. The report outlines numerous remedial options, including potential solutions for the release to the river. EPA is withholding approval of the CMS pending GRB's complete delineation of groundwater contamination southwest of the facility on Bureau of Land Management (BLM) property. At the time of this report GRB has completed the field investigation and is in the process of preparing a report.

GRB submitted a revised Part B Permit application to the Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department (NMED) in January 1996. To date this applications has not been processed by the NMED and the facility is considered to be in interim status.

The sampling procedures evaluated in this CME are those in the Part B Permit application's Groundwater Sampling and Analysis Plan (SAP), dated July 22, 1992. This plan states that on September 25, 1990, the NOWP and the SOWP became regulated units because of the TC rule for benzene concentrations.

A Corrective Measures Study (CMS) dated December 1995 was submitted to EPA. At the time of this report EPA has denied the CMS and is waiting for additional field investigation southwest of the facility to be reported. Verbal communication with Mr. Greg Lyssy suggests that EPA encourages NMED to process the operating permit application at which time the Administrative Order will be "rolled" into the permit.

San Juan River situation

A major focus of this report is the petroleum constituent release to the San Juan River from the GRCB facility and efforts to delineate and mitigate that contamination.

The GRB facility is situated on a bluff approximately 90 feet above and immediately south of the San Juan River. On the bluff and between the river and the process area of the facility is the Hammond Ditch. The ditch is an unlined man-made channel for irrigation water supply and borders all but the southern site of the process area of the facility.

The site is underlain by Quaternary Jackson Lake Terrace deposits comprised of 10 to 15 feet of course-grained fluvial outwash deposits blanketed by wind-blown loess. These unconsolidated course grained (sands grading to cobbles) unconformably overly the Naciemento deposits. Perched, shallow groundwater in the Quaternary deposits is encountered between 6 and 40 feet below ground surface, generally increasing in depth from west to east across the site.

A 1994 Interim Measures Report identifies a phase separate hydrocarbon (PSH) plume in the northeast portion of the facility with the thickest concentration, approximately five and one half (5.5) feet, centered at Recovery Well (RW) 18, approximately 150 feet west of the oily water ponds and approximately 450 feet from the bluff. RW-18 was sampled during the CME but the thickness of the PSH was not measured because the recovery system was functioning. Two (2) additions recovery wells, RW-22 and RW-23, are located to preclude PSH from migrating north along the upper surface of the Nacimiento formation to the bluff. The fact that the recovery system has moved the PSH plume closer to the bluff needs to be evaluated.

NMED received notice of a petroleum sheen on the San Juan River on December 30, 1996 in a Monthly Progress Report to EPA. The Report states that a sheen "appears to be a seep from the Jackson Lake Terrace plume". GRB initiated an investigation and recovery operation associated with the seep immediately.

The existence of the seep has been known for a considerable time as evidenced by earlier correspondence. EPA's 1992 Administrative Order states "During May and June, 1983, EPA personnel conducted inspections that revealed significant seepage of groundwater from the contact of the cobble bed and the Nacimiento formation at the face of the bluff above the San Juan river." Samples collected in May, 1984 showed elevated levels of organic and inorganic contamination released from the facility to the river (see Table I, attached)

It had been assumed that the presence of the Hammond Ditch, a irrigation ditch situated between the main facility and the San

Juan River bluff, had precluded the migration of the Jackson Lake Terrace plume by forming a hydraulic barrier between the plume and the bluff. This hypothesis must be confirmed. The ditch carries water only during the irrigation season and when dry the monitoring and recovery wells in the vicinity are dry. (Interim Measures Report, March 1994)

As part of the interim measure, an air sparge system was installed north of the Hammond Ditch to mitigate the seeps. The report states, "The system has not been effective because of insufficient water depth. When the Hammond Ditch flow was stopped, the sparge well became dry ...". The report implies that groundwater will return to the area when irrigation resumed in April. The report also states that the facility maintains water in the ditch to preclude migration of contaminants. This discrepancy needs clarification.

A December 1996 report to the OCD contains the descriptions of three borings along the top of the bluff between the refinery and the river (north point, south point and MW24N). Lithologic logs of the Naciamento Formation suggest it is primarily argillaceous sandstone with a 3-17 foot thick shale layer that controls the movement of groundwater. Moisture in the lithologies suggest that fluid movement through the Naciamento is possible. A sample of the sandstone was collected, tested and shown to transmit fluid. The hypothesis that the Naciamiento acts as a aquiclude and prohibits migration of contaminated groundwater to the river needs further testing.

Need to understand the origin of the shallow groundwater below the facility. Water dissipates at the southern boundary. The top of the Nacimiento slopes downward from the south to the north. This implys that the water originates on the facility. Need to evaluate the OCD discharge Plan to see what they believe is happening and to see if allowable concentrations would cause a problem for RCRA units.

Recent verbal communication suggest that there may be an error in the facility survey data. This error might call into question the previously determined groundwater gradient and flow direction, as well as the influence of the Hammond Ditch. An evaluation by the facility of the survey is underway at the time of this report.

FOLLOW UP TO 1992 CME DEFICIENCIES.

A 1992 CME (attached) conducted by EPA identified the following regulatory deficiencies and technical concerns.

- The facility had insufficient down-gradient monitoring wells for the North and South Oily Water Ponds.

  In 1992, at the time of EPA's evaluation, MW-9 was the only down-gradient well. Sense then GRB has added RW-18 and MW-20 to further evaluate the groundwater associated with the regulated unit. It appears the contaminant releases from the process area to the west and the storage area to the south have had considerable hydrocarbon releases that have co-mingled with and overshadowed any possible release form the Oily Water Ponds. The groundwater monitoring network for the entire facility needs further scrutiny, particularly along the bluff to monitor for releases to the river.

- The facility did not have separate groundwater monitoring programs for the landfill and the landfill pond.

  At the time of the 1997 CME, the regulatory status of the landfill and landfill pond was questionable and thus not within the scope of the CME.

- The facility could not produce a Sampling and Analysis Plan (SAP)

  In 1997 NMED was provided with 2 SAPs, a second copy of a SAP previously provided in 1992, and a newer version dated May, 1997. It was the 1997 version that was followed and evaluated. It must be kept in mind that NMED has not approved this plan and has no documentation that EPA has approved it.

- The facility could not produce an outline of a groundwater assessment program.

  Considerable groundwater investigation and remediation has occurred sense 1992 that is documented as follows:
  - Soil Gas Survey (February 1994)
  - Soils Borings Report (March 1994)
  - Interim Measures Report (March 1994)
  - Well Installation and Groundwater Sampling Report (June 1994)
  - Uppermost Aquifer Hydraulic Testing and Modeling (July 1994)
  - Stream and Sediment Sampling Report (October 1994)

  These reports were requirements of the Administrative Order. NMED has no documentation that these reports were ever approved.

- The facility could not produce a background study nor quarterly sampling results for the identified regulated units.

Background concentrations for soils, sediments and groundwater are provided in the Human Health and Ecological Risk Assessment dated December 1995. NMED has no documentation that this assessment has been approved by a regulatory agency. Quarterly and semiannual sampling results have also been provided.

- The facility had insufficient above-ground protection of the monitoring wells.

All well had standpipes of sufficient height if necessary. The recovery wells are housed in wooden boxes that contained associated apparatus.

- The facility had insufficient road traffic protection around the monitoring wells.

The wells all had sufficient traffic protection.

- All remaining comments involved considerations that Monitoring wells MW-1 through MW-6 were improperly constructed and required abandonment.

These wells are outside the scope of the 1997 CME.

RESULTS OF CME SAMPLING:

Analytical results confirm the presence of hydrocarbon contamination below the unit.

Analytical results from the split sampling match the facility's results within an order of magnitude suggesting appropriate sampling and analytical procedures.

There are no carry over issues from the 1990 CME.

A leak detection system installed below the North and South Oily Water Ponds when the ponds were reconstructed has demonstrated the there has not been a recent release from the units. (verbal communication, Lynn Shelton, Aug. 1997)

Recommended Future Activities:

- Process the facilities RCRA permit application.

- The Hammond Ditch is thought to precluded the migration of the Jackson Lake Terrace plume by forming a hydraulic barrier between the plume and the bluff. This hypothesis must be confirmed.

- Need to understand the origin of the shallow groundwater below the facility. Evidence suggests that the water comes from both the hammond ditch and the various surface impoundments in the area. The impoundments represent a potential contaminant release source area.

- Contact the federal Bureau of Land Management (BLM) and inform them of the contamination migrating onto their property.

- The hypothesis that the Naciamiento acts as a aquiclude and prohibits migration of contaminated groundwater to the river needs further testing.

- Evaluate survey data to confirm groundwater gradient and influence of the Hammond Ditch.

- Evaluate the impact of the recovery system drawing the contaminant plume nearer to the San Juan River and possibly impacting the river.

- Evaluate the 1995 Human Health and Ecological Risk Assessment. This report has critical assumptions about background concentrations, fate and transport mechanisms and risks.

CME TECHNICAL REPORT

EVALUATION OF FACILITY FIELD PROCEDURES & FACILITY LAB PROCEDURES

If appropriate: use "Y" = yes, "N" = no, "N/A" = not applicable, "U" = unknown.

A. MEASUREMENT OF WELL DEPTHS/WATER ELEVATIONS

Y 1. Are measurements of both depth to standing water and depth to the bottom of the well made and recorded before purging unless the well has a dedicated, permanently installed pump that prevents total depth measurements?

Y 2. Are all water elevations measured within a 24 hour period or less?

Y 3. Are all measurements calculated from the top of the well casing? (i.e., the water elevation and total depth are not measured from the bottom of the well)

Y 4. Are measurements for water elevations taken to the 0.01 feet?

Y 5. Are all total depth measurements recorded to the nearest 0.25 foot or less?

6. What devices are used? **Interface Probe**

Y 7. Is there a visibly marked surveyed reference point on the well casing rim which was established by a licensed surveyor?

Y 8. Is this reference point accurate to the 0.01 foot with respect to sea level?

9. Is the measuring equipment cleaned before and between well locations by washing with a non-phosphate detergent followed by a tap water rinse? **Used distilled water and propanol.**

N 10. If the well has evidenced organic contamination or inorganic contamination, are more stringent decontamination methods used such as a hexane rinse or a hydrochloric acid rinse, respectively?

11. If a plastic or polytetrafluoroethylene (PTFE) measuring tape is used, is the tape checked periodically, at least once a year, with a steel tape for calibration purposes?

Steel tape coated with teflon.

12. Does the owner/operator note in the field notebook whether there are any nearby wells that could potentially impact the water elevation measurements? **Recovery wells noted. There are no production wells in the shallow aquifer.**

13. At sites with relatively flat gradients, are the water elevations measured several times to ensure accurate measurements? **There is a relatively steep gradient but the water elevations are still measured twice.**

B. DETECTION OF IMMISCIBLE LAYERS

Y 1. Are procedures used which will detect heavy phase immiscible layers?

Y 2. Are procedures used which will detect light phase immiscible layers?

Y 3. Are procedures used to measure the thickness of the immiscible layers?

Y 4. Are the procedures used to detect high and low density phase immiscible layers adequate?

C. SAMPLING OF IMMISCIBLE LAYERS

N/A 1. Are the immiscible layers sampled separately prior to well evacuation?

N/A 2. Do the procedures used minimize mixing with water soluble phases?

N/A 3. Describe how the immiscible samples are collected:

N/A 4. Are appropriate methods used to collect the immiscible samples?

D. WELL EVACUATION

1. Are low yielding wells evacuated once to dryness? **These are not low yielding wells.**

2. Are high yielding wells evacuated so that at least three casing volumes are removed? **Yes**

3. For high yielding wells, are measurements of pH, specific conductivity, and temperature obtained before, during and after purging in order to verify that these parameters have stabilized? (Stabilization indicates that well has

been adequately purged.) **All these parameters were measured except temperature. Should consider adding temperature as a parameter to the Sampling and Analysis Plan.**

4. If **NO**, has documentation been provided that demonstrates that stabilization occurs at this well after a specific volume of water has been purged?

5. What device is used to evacuate the wells:

Three
1. bladder pump in most wells
2. air lift system in recovery wells
3. bailer in MW-20

6. During purging, was the discharge rate slower than the rate used during development? **unknown**

7. Was the purge rate slow enough to prevent recharging water rushing turbulently into the well? **unknown**

8. Was the purge water containerized until the groundwater analytical results whether the water is contaminated? **The purge water was put into the north and south oily ponds or processed in the facility's waste water treatment system.**

9. If the groundwater analyses evidence contamination, is the purge water treated on site in accordance with applicable and relevant regulations or disposed as hazardous waste? **Treated on-site as hazardous waste.**

Y 10. If any problems are encountered (e.g. equipment malfunction) are they noted in a field logbook?

E. SAMPLE WITHDRAWAL

1. Are samples withdrawn with either fluorocarbon/resins or stainless steel sampling devices? **Yes**

2. Are sampling devices either bottom valve bailers or positive gas displacement bladder pumps? **both**

3. Are precautions used to ensure that all sampling equipment that could potentially come into contact with the sample is constructed of inert materials? **Yes**

4. Is an inert bailer cord used? **Yes**

5. If a non-inert bailer cord is used, is it discarded between sampling point**s? N/A**

6. If bladder pumps are used, are they operated in a continuous manner to prevent aeration of the sample? **Yes**

7. If bladder pumps are used, is a flow rate of 100ml/minute or less used to collect organic samples, metal samples, and any other samples which could be chemically unstable due to aeration and turbulence? **Yes**

8. If bailers are used, are they lowered slowly to prevent degassing of the water? **Yes**

9. If bailers are used, are the contents transferred to the sample container in a way that minimizes agitation and aeration? **Yes**

10. Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior in insertion into the well? **Yes**

11. If dedicated sampling equipment is not used, is all sampling equipment that could potentially come into contact with the sample, dissembled and thoroughly cleaned between samples? **The purge pump was decontaminated by pumping alconox and DI water through the pump. Purge tubing was discarded after each well. The wells were sampled from cleanest to dirtiest.**

12. If samples are for inorganic analysis, does the cleaning procedure include the following sequential steps:

    a. Nonphosphate detergent wash?

    b. Tap water rinse?

    c. Dilute acid rinse HNO3 or HCL? **There was not a acid rinse.**

    d. Distilled or deionized water rinse?

    e. Air dry before use?

13. If samples are for organic analysis, does the cleaning procedure include the following sequential steps:

    a. Nonphosphate detergent/hot water wash?

    b. Tap water rinse? **There was not a tap water rinse.**

    c. Distilled/deionized water rinse?

d. Acetone rinse?

e. Pesticide-grade hexane rinse?

F. IN-SITU OR FIELD ANALYSES

1. For low yielding wells, are official field measurements for pH, specific conductivity, and temperature obtained as soon as the well has recovered enough to yield water for a sample? **N/A**

2. For high yielding wells, are official field measurements for pH, specific conductivity, and temperature obtained as soon as the unofficial field measurements have stabilized? **Yes but for temperature.**

Y 3. Are the official field measurements for pH recorded to the 0.01 pH unit?

Y 4. Are the official field measurements for specific conductivity recorded to the nearest 10 umhos?

5. Indicate which of the following chemically unstable parameters are determined in the field:

pH? **X** Temperature?

Specific conductivity? **X**

Redox potential? Chlorine?

Dissolved oxygen? Turbidity?

Other:

Y 6. If the sample is withdrawn from the well, is the parameter measured from a split portion?

Y 7. Is monitoring equipment calibrated according to manufacturers specifications?

Y 8. Is the date, procedure, and maintenance for equipment calibration documented in the field logbook?

G. SPECIAL HANDLING CONSIDERATIONS

Y 1. Are organic samples handled without filtering?

2. Is one equipment blank prepared each day of groundwater sampling? **No equipment blank was taken.**

N/A 3. Is one unfiltered sample taken for total metals?

H. SAMPLE LABELS

Y 1. Are sample labels used?

2. Do they provide the following information:

Y a. Sample identification number?

Y b. Name of collector?

Y c. Date and time of collection?

Y d. Place of collection?

Y e. Parameter(s) requested and preservatives used?

Y 3. Do they remain legible even if wet?

N 4. Are sample seals placed on those containers to ensure samples are not altered?

Y 5. If individual bottle seals are not used, is the container for holding the bottles sealed?

I. FIELD LOGBOOK

Y Is a field logbook maintained?

If yes, does it document the following:

Y 1. Purpose of sampling (e.g., detection or assessment)?

Y 2. Location of well(s)?

Y 3. Total depth of each well?

Y 4. Static water level depth and measurement technique?

Y 5. Presence of immiscible layers and detection method?

N/A 6. If immiscible layers exist, collection method for immiscible layers?

Y 7. Well purging procedures?

Y 8. Sample withdrawal procedure?

Y 9. Dates and times of collection?

Y 10. Well sampling sequence?

Y 11. Types of sample containers and sample identification

number(s)

Y 12. Preservative(s) used?

Y 13. Field analysis data and method(s)?

N 14. typical well recharge rates?

J. CHAIN-OF-CUSTODY RECORD

Y 1. Is a chain-of-custody record included with each sample?

2. Does it document the following:

Y a. Sample number?

Y b. Signature of collector?

Y c. Date and time of collection?

Y d. Sample type?

Y e. Station location?

Y f. Number of containers?

Y g. Parameters requested?

Y h. Signatures of persons involved in chain-of-custody?

Y i. Inclusive dates of custody?