

**GW - 1**

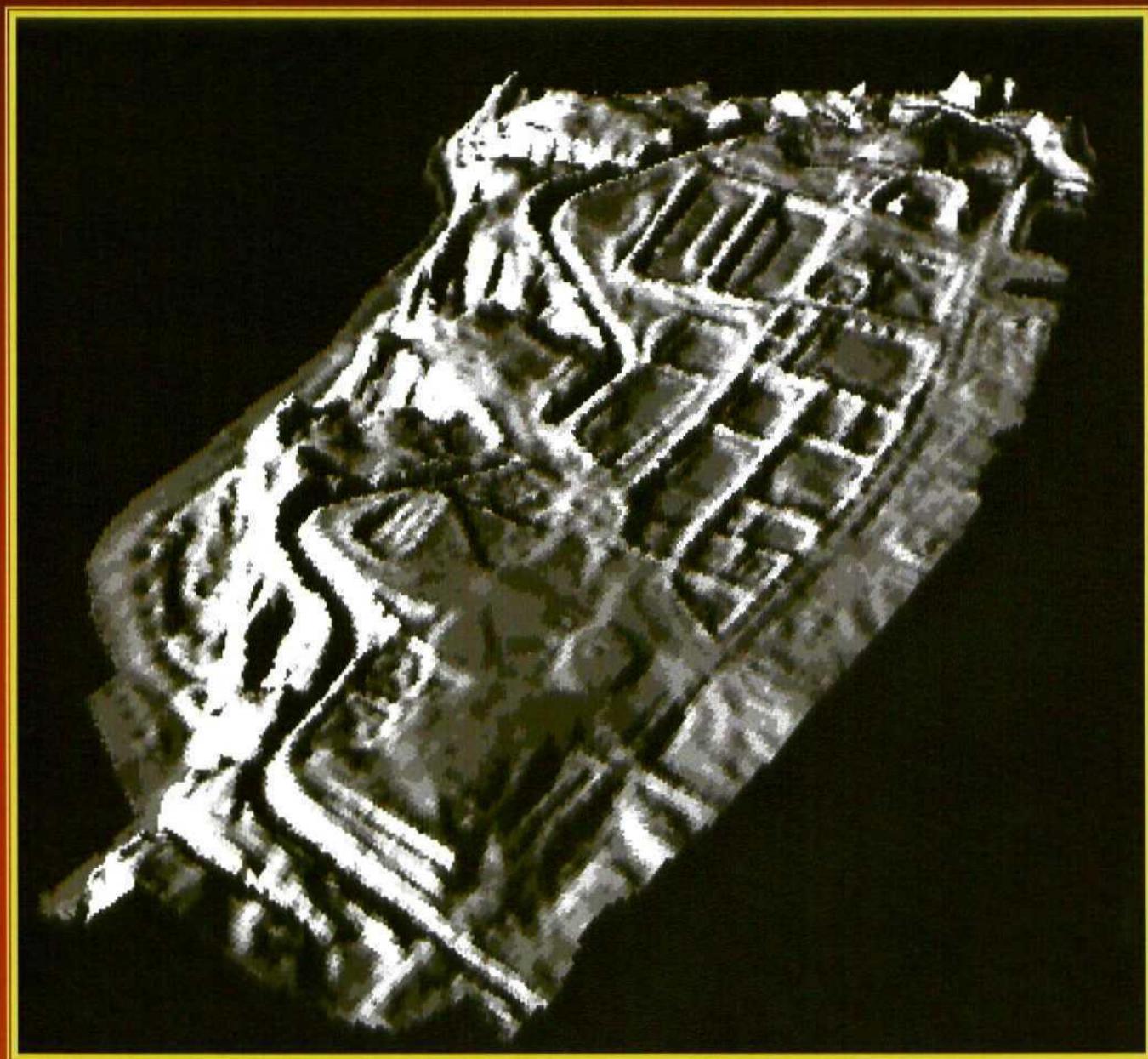
**REPORTS**

**YEAR(S):**

**2005**

# Giant Refining Company

## Northern Boundary Barrier



**GIANT**

REFINING  
COMPANY

**MALCOLM  
PIRNIE**

## Overview

- **River Terrace Remediation Project**

- Developed 3-D conceptual model of the facility representing the depressions and characteristics of the Nacimiento Formation.
- Installed barrier wall along west side of the river terrace.

- **Relining of the Hammond Ditch By Bureau of Reclamation**

- Preliminary soils investigation along Hammond Ditch identified petroleum hydrocarbon contaminant.
- Relining the ditch included installation of a hydraulic relief collection system.

**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Overview

- **Reduce Source Water to Shallow Soils**

- Repaired facility sewer system.
- Decommissioned freshwater ponds.

- **Expand Recovery System**

- Installed a total of 13 recovery wells – 4 added in 2003.
- Converted MW 45 to a recovery well.
- Western outfall emergency action

- **Supplemental Soil Investigation Along Northern Boundary**

- Drilled 19 soil borings between November 2003 and July 2004.
- Up-dated geologic conceptual model.
- Defined the surface of the Nacimiento Formation.

**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Facility Site Plan



**GIANT**  
INDUSTRIES, INC

**MALCOLM**  
**PIRNIE**

## Current Initiative

- **Historic Data Review**
  - Review historic analysis of shallow-zone soils and upper interval of Nacimiento Formation.
  - Summarize geologic and hydraulic information for development of construction specifications for installation of a hydraulic barrier and collection system.
- **Site Assessment of Shallow-Zone Soils**
  - Drill additional borings in late October along the west and east portions of the proposed barrier alignment to fill-in data gaps.
  - Performed hydraulic assessment and capture zone analysis of shallow-zone soils.
  - Reviewed and measured groundwater and product levels in northern boundary wells.

**GIANT**  
REFINING COMPANY

**MALCOLM**  
**PIRNIE**

## HydroGeologic Conceptual Model

- **Surficial Windblown Sands**
  - Depth: 0 to 4 feet deep near Hammond Ditch
  - Permeability: Low to Moderate
  - Saturation: Dry
- **Jackson Lake Terrace**
  - Depth: 6 to 10 feet deep near Hammond Ditch
  - Permeability: Moderate to High
  - Saturation: Dry to 1-foot depth; water bearing
  - Seeps located in erosional channels
- **Nacimiento Formation**
  - Perching unit for Jackson Lake Terrace
  - Thickness: Approximately 900 feet
  - Permeability: Low
  - Saturation: Non-water bearing
  - Well defined below facility



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Stratigraphic Section



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Monitoring Results Along Northern Boundary

- Separate Phase Hydrocarbon (SPH) not detected in 9 of 15 wells.
- Product thickness measured in 6 of 15 wells range between .05 to 1.05 ft.
- Product thickness appears over-estimated.
- Pump tests and slug tests dry-up wells, confirming minimal fluid levels on top of the Nacimiento Formation.
- Isolated seeps discharge very little water



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

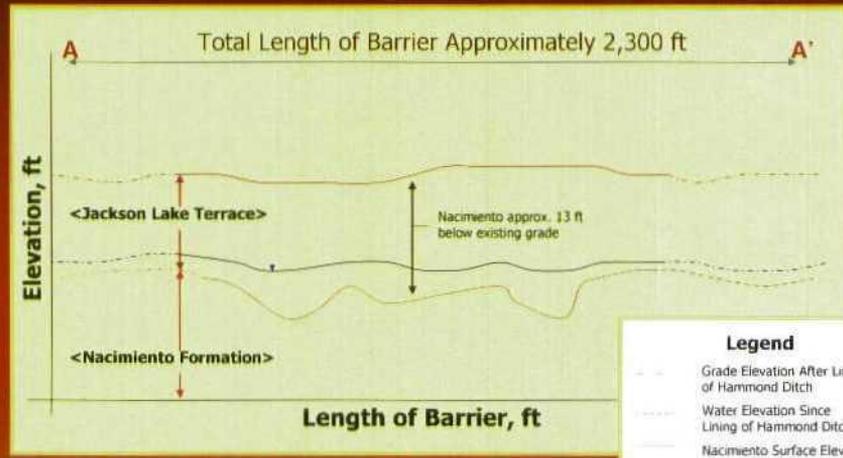
## Nacimiento Formation Divide



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Cross-Section of Proposed Barrier Alignment



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

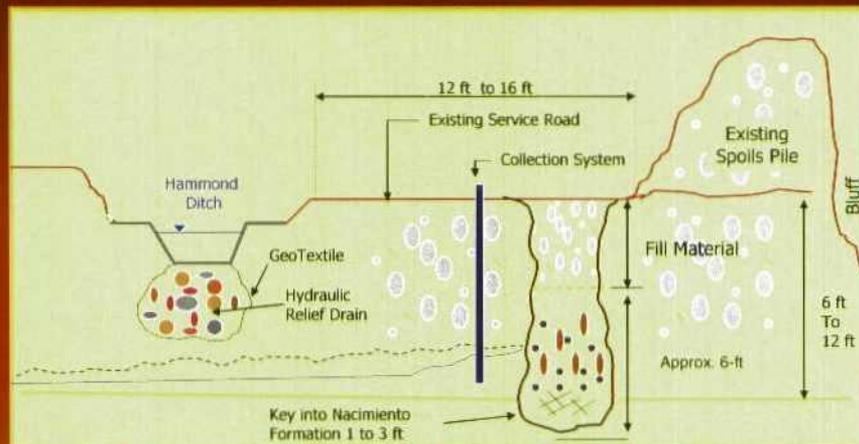
## Action Plan

- Feasibility Study
- Select Preferred Alternative
- Develop Performance Specifications
- Regulatory Review / Approval
- Selection of Contractor
- Construction Schedule

**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Hydraulic Barrier Schematic



**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

## Proposed Schedule

Activity	Completion Date
Initial Site Assessment	September 8, 2004
Draft Action Plan for Containment & Recovery System	November 1, 2004
Giant Review Action Plan	November 10, 2004
Submit Action Plan to Regulators	November 17, 2004
Construction of Containment & Recover System	TBD

**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**

Questions?

**GIANT**  
REFINING COMPANY

**MALCOLM  
PIRNIE**