

GW - 1

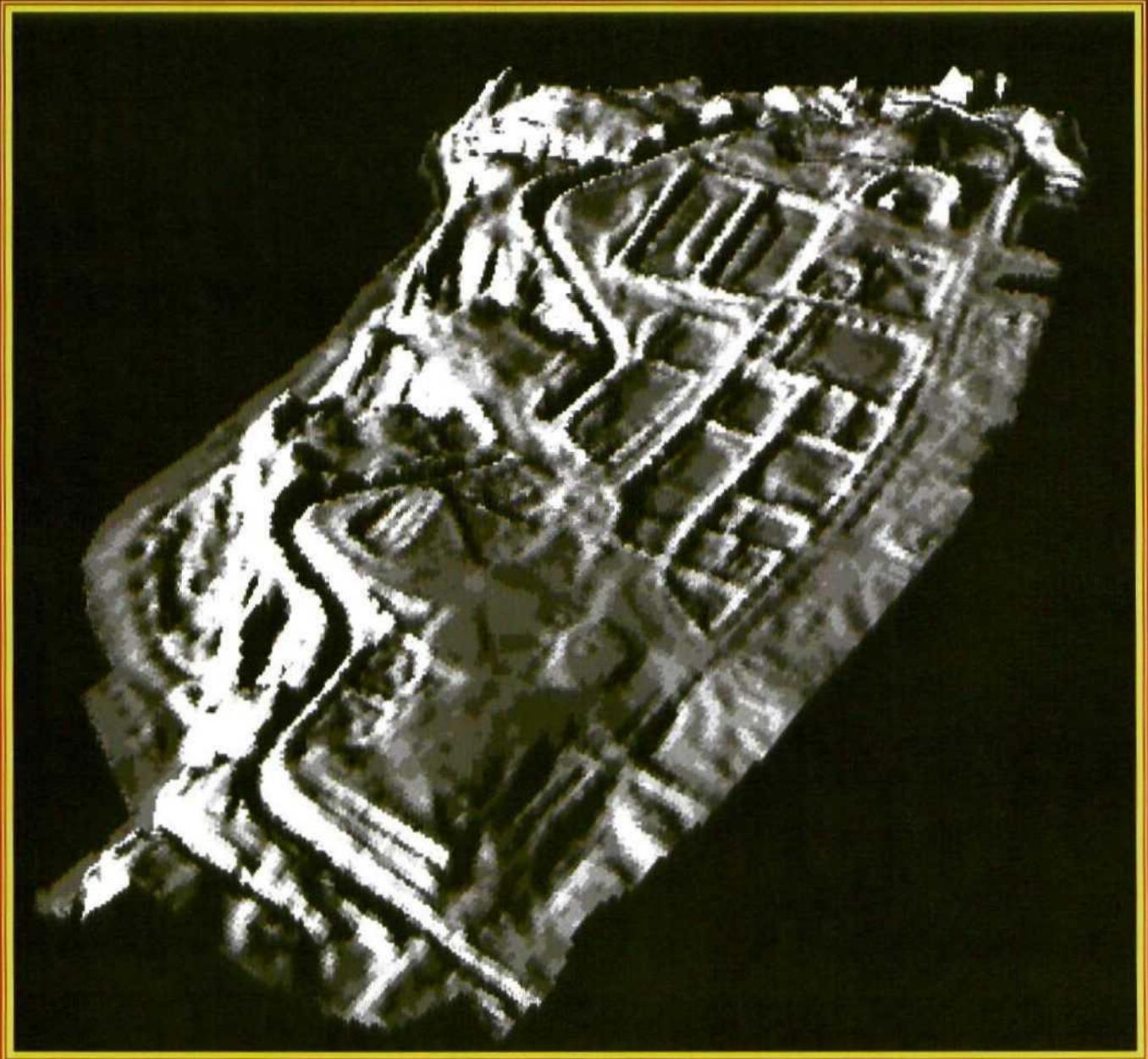
REPORTS

YEAR(S):

2004

Giant Refining Company

Northern Boundary Barrier



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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.

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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.

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- Defined the surface of the Nacimiento Formation.

Facility Site Plan



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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.

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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



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Stratigraphic Section



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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



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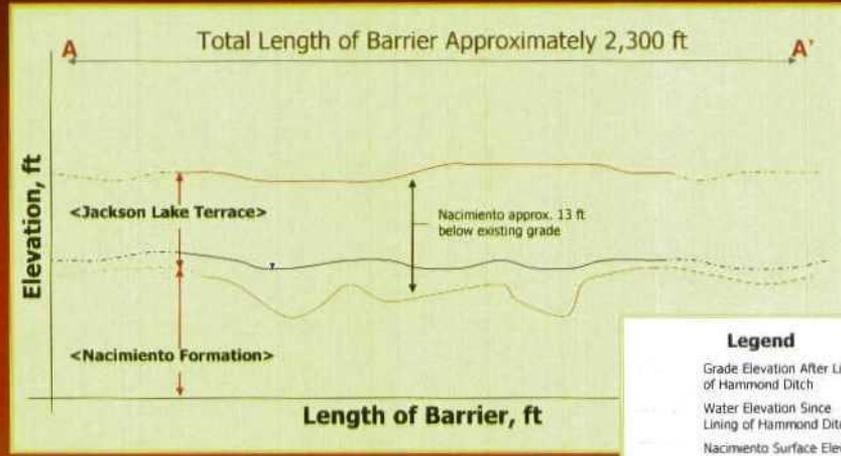
Nacimiento Formation Divide



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Cross-Section of Proposed Barrier Alignment



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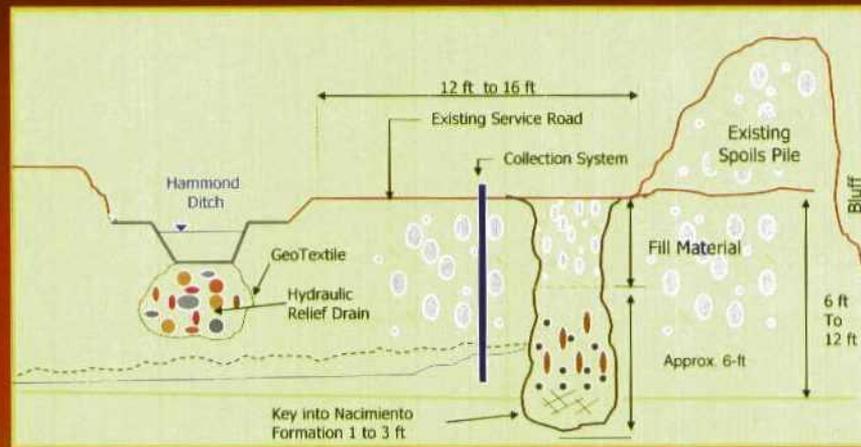
Action Plan

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

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Hydraulic Barrier Schematic



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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

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Questions?

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