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A CLOSURE PLAN
FOR THE
API WASTEWATER PONDS, LANDFILL, AND LANDFILL POND AT THE BLOOMFIELD REFINERY

Needs more detail
- sampling & analysis
- cost estimate.
Why is the "landfill pond" in here?
Sump?

PREPARED FOR

BLOOMFIELD REFINING COMPANY

BY

ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
2901 NORTH INTERREGIONAL, AUSTIN, TEXAS 78722 • 512/477-9901
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Engineering-Science, Inc.
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August 1985

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CLOSURE PLAN
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INTRODUCTION

This closure plan has been prepared to ensure that the API wastewater ponds, landfill, and landfill pond will be closed in an environmentally acceptable manner which will minimize or eliminate the need for further maintenance and control and eliminate the post-closure escape of potentially hazardous constituents.

The subjects addressed in the plan include:

(a) general facility information, including an estimate of the quantity of waste material involved;

(b) closure activities, including sampling and analytical techniques;

(c) documentation and recordkeeping of closure activities; and

(d) an estimate of closure costs.

No post-closure provisions are included in this closure plan since all wastes and contaminated soils will be removed at closure.

GENERAL FACILITY INFORMATION

The Bloomfield refinery, currently owned and operated by Bloomfield Refining Company, is located in the northwest corner of the State of New Mexico. The Bloomfield refinery was reportedly constructed in the late 1950s and operated approximately 5 years before being sold to Suburban Propane Corporation in the early 1960s. Plateau, Inc., a subsidiary of Suburban Propane, operated the refinery prior to its sale to the current owner in the fall of 1984. The refinery processes a combination of low sulfur crudes and petroleum which are transported to the refinery by pipeline and truck. Major refinery products include gasoline and diesel fuel, although fuel gas, heavy burner fuel, propane, butane, and other petroleum products are produced in smaller quantities.

The refinery is situated on a bluff adjacent to the San Juan River, south and slightly east of the town of Bloomfield. Although the refinery owns land on both sides of the San Juan River, all process units and storage areas are located south of the river. Approximate refinery property boundaries are shown on the plot plan presented as Figure 1. The plot plan indicates the locations of the process and tank storage areas, surface waters, and elements of the wastewater treatment system. The areas addressed by the closure plan (API wastewater ponds, landfill, and landfill pond) are also indicated. These areas are discussed in the following paragraphs.

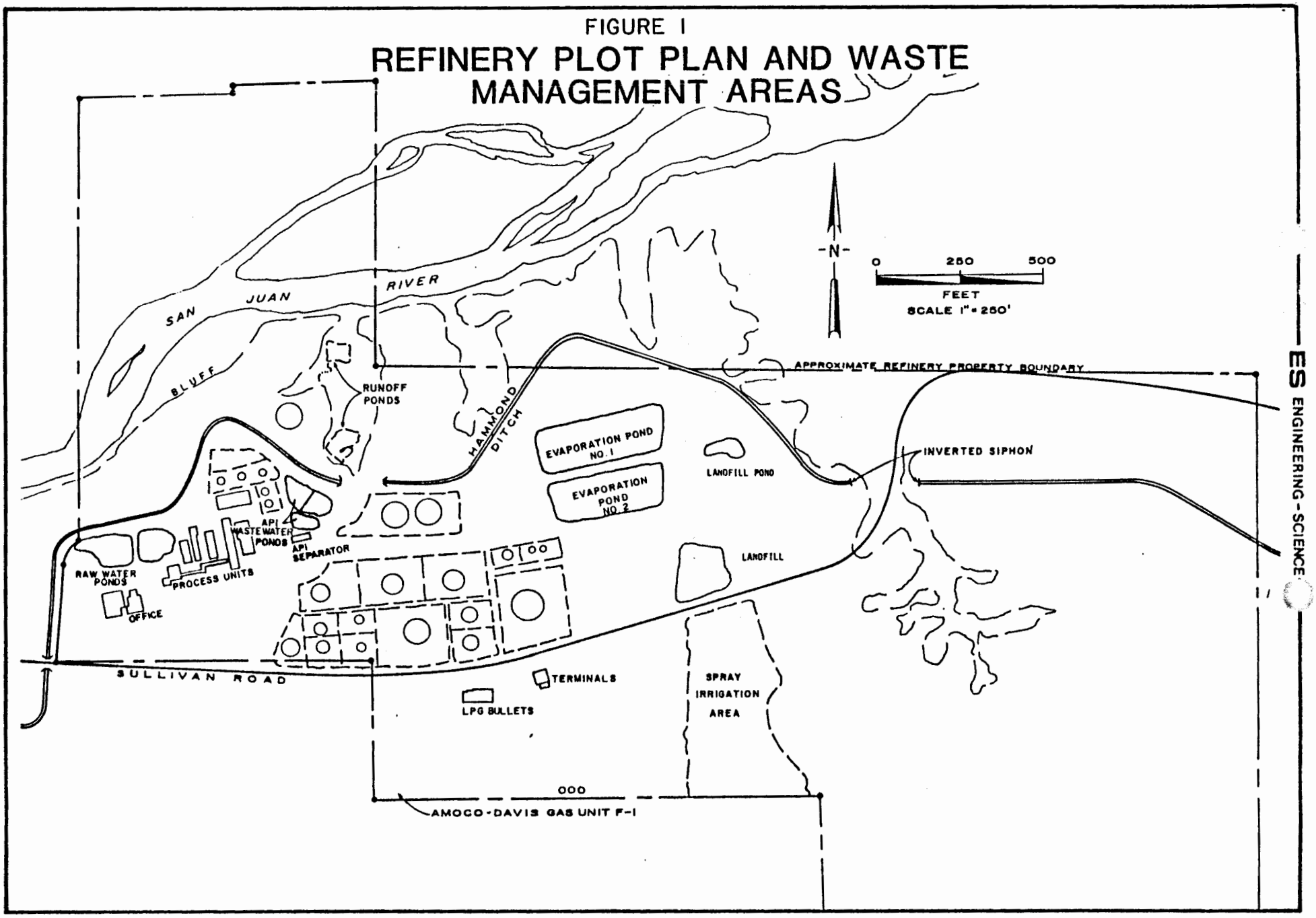
Refinery process wastewater is treated for primary oil removal in an API separator located east of the major refinery process units. Following the API separator, wastewater flows to two API wastewater ponds located north of the API separator and south of the Hammond Ditch. The north API wastewater pond is divided by a berm into two sections. In 1983, these ponds were lined with a 100-mil high-density polyethylene liner by Permanent Lining Systems of Odessa, Texas. A french drain collection system consisting of 4-inch PVC perforated pipe also was installed at this time to collect any leakage through the pond liner in a common observation well or sump.

Prior to the installation of the pond liners, residual solids from the API wastewater ponds were removed and tested for the EP-toxicity characteristic based on leachable lead and chromium concentrations. The samples also were tested for total lead and chromium concentrations. The solids were found to be nonhazardous and were disposed of on-site in a depression located southeast of the solar evaporation ponds and north of the spray irrigation area and Sullivan Road.

The area designated by EPA as the "landfill pond" is a natural depression resulting from blockage of an existing arroyo during construction of the Hammond Ditch. The landfill pond is located approximately 200 feet due east of the solar evaporation ponds and northeast of the landfill. Water in the landfill pond is believed to originate primarily in the Hammond Ditch, which is located just north and east of the area. The solar evaporation pond may also contribute to the water in the pond.

FIGURE 1

REFINERY PLOT PLAN AND WASTE MANAGEMENT AREAS



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CLOSURE ACTIVITIES

Bloomfield Refining Company is considering closure of the API wastewater ponds, landfill, and landfill pond to eliminate areas which could represent potential sources adding to existing subsurface contamination at the refinery according to the EPA. Following review and approval of the closure plan by EPA, Bloomfield Refining Company proposes to complete closure within a 6-month time frame. Upon completion of closure, Bloomfield Refining Company will submit to the Regional Administrator certification that the facilities have been closed out in accordance with the approved plan.

API Wastewater Ponds

Although all visible contaminated soil was removed from the API wastewater ponds when the pond liners were installed, there is a possibility that some residual contamination remains. Therefore, the subsurface soils beneath the pond liners will be tested for residual contamination. A total of six samples will be collected by penetrating the liner at six equally spaced locations in each pond and collecting a single sample in each location with a clean auger or split spoon sampler. The six samples will be composited into a single composite sample for each pond. The composite sample will be analyzed for the characteristic of EP-toxicity due to leachable metals as well as total lead and chromium concentrations using the analytical methods referenced in Table 1. If the sample exhibits the characteristic of EP-toxicity or contains total lead or chromium concentrations greater than 500 mg/kg, the pond liner will be removed and additional soil will be excavated until the remaining soil passes these closure criteria.

analyze each sample, not the composite.

Following the testing of soil samples and the removal of any contaminated soil as required, the excavation will be backfilled as appropriate and the pond liner will be replaced or repaired. If the excavation damages the leachate collection system, it also will be replaced or repaired. All contaminated soil and waste material will be disposed at a permitted offsite waste management facility using required manifesting procedures.

TABLE 1

ANALYTICAL PROCEDURES FOR PROPOSED SOIL SAMPLES

Parameter	Analytical Method
Extraction Procedure (EP) Toxicity Test Method for Metals	Method 1310 (SW-846)
Total Chromium	Method 7190 (SW-846)
Total Lead	Method 7420 (SW-846)

All analyses will be done in accordance with "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Second Edition, July 1982.

Landfill

During closure, all visible waste material and obviously contaminated soil will be removed from the landfill area and disposed of at a permitted off-site waste management facility using required manifesting procedures. The resulting excavation will be divided into four approximately equal areas for subsequent soil testing. Six equally spaced grab samples will be collected with clean trowels or scoops at the soil surface and grab samples will be composited into a single composite sample. This sample will be analyzed for both EP-Toxicity due to leachable metals and total lead and chromium concentrations using the analytical methods referenced in Table 1. If the composite sample exhibits the characteristic of EP-Toxicity or contains total lead or chromium concentrations greater than 500 mg/kg, an additional 12 inches of soil will be removed from that quadrant and disposed at a permitted off-site disposal facility. The quadrant will be retested using the same sample collection procedure described above, and the process will be repeated until the sample is no longer characteristically hazardous by EP-Toxicity and contains less than 500 mg/kg total lead or chromium. The excavation will be backfilled with clean fill, and regraded to approximate the original ground contours.

analyze separately

Landfill Pond

The landfill pond will be closed out in a manner similar to the landfill. All visible contamination will be removed and disposed at a permitted off-site waste management facility using required manifesting procedures. Six equally spaced samples will be collected at the surface with clean scoops or trowels in each of four approximately equal areas in the resulting excavation. These samples will be composited into a single sample for each quadrant, and will be analzyed for both EP-Toxicity due to leachable metals and for total lead and chromium concentrations using the analytical methods referenced in Table 1. If the composite sample exhibits the EP-Toxicity characteristic or contains total lead or chromium concentrations of greater than 500 mg/kg, additional soil will be removed until the remaining soil passes these closure criteria. At that point, the excavation will be backfilled with clean fill and regraded to the natural ground surface in the area.

how is the water going to be removed?

Chain of Custody Procedures

All samples will be preserved appropriately and delivered to the laboratory within EPA-recommended holding times. Normally, the samples will be iced and placed in an insulated cooler for shipment. The chain of custody record will serve to document that no unauthorized handling of the samples occurred enroute to the laboratory. It also contains a record of parameters requested for analysis. Relevant information about each sample container will be written on the form. Preservation methods also will be indicated. The form will be signed and dated by the individual who actually collected the sample. The names of any commercial delivery services used also will appear on the chain of custody record.

Rationale for Selecting Proposed Closure Criteria

Refinery wastes which are listed as hazardous wastes under RCRA §261.32 have been so designated on the basis of their chromium or lead contents. Therefore, proposed closure criteria for the API wastewater ponds, landfill, and landfill pond are based on the residual concentrations of total lead and chromium as well as leachable concentrations of these metals as determined by the EP-Toxicity test procedure.

Typical concentrations of heavy metals in soils are available from several sources. A summary of typical lead and chromium soil concentrations is presented in Table 2. The references used to develop this table represent a compendium of data from many fields of research and provide a substantial data base in support of the proposed closure criteria. The ranges in Table 2 indicate substantial variability in natural concentrations of these metals in soils.

EPA has previously developed criteria for maximum metals concentrations based on plant and animal health and toxicity. These data have been presented in an EPA publication entitled Hazardous Waste Land Treatment (SW-874) and are reproduced here as Table 3. This table was developed from a study by the National Academy of Science and National Academy of Engineering (1972) concerning acceptable metal concentrations in soil as a result of irrigation, from sewage sludge loading rates by Dowdy, et.al. (1976), and from other literature sources. As stated in the document, "the final column in [the table] is compiled from the literature review in this

TABLE 2

RANGE OF METALS CONCENTRATIONS IN SOIL

Data Source	Lead (ppm)	Chromium (ppm)
Geological Survey Professional Paper 574-D, 1971	<10 - 700	1 - 1,500
Geochemistry in Mineral Exploration, 1962	2 - 200	5 - 1,000
Chemistry of the Soil, 2nd Edition, 1964	<20 - 80	5 - 3,000
Geochemistry of Rare and Dispersed Chemical Elements in Soils, 1959	2 - 20	25 - 2,000

TABLE 3

SUMMARY OF SUGGESTED MAXIMUM METAL ACCUMULATIONS WHERE MATERIALS WILL BE LEFT IN PLACE AT CLOSURE[1]

Element	Sewage Sludge Loading Rates[2] (mg/kg soil)	Calculated Acceptable Soil Concentrations[3] (mg/kg soil)	(kg/15 cm-ha)	Soil Concentrations Based on Current Literature and Experience[4] (mg/kg)
As	-	500	1,100	300
Be	-	50	110	50
Cd	10	3	7	3
Co	-	500	1,100	200
Cr	-	1,000	2,200	1,000
Cu	250	250	560	250
Li	-	250	560	250
Mn	-	1,000	2,200	1,000
Mo	-	3	7	5
Ni	100	100	220	100
Pb	1,000	1,000	2,200	1,000
Se	-	3	7	5
V	-	500	1,100	500
Zn	500	500	1,100	500

[1] If materials will be removed at closure and plants will not be used as a part of the operational management plan, metals may be allowed to accumulate above these levels as long as treatability tests show that metals will be immobilized at higher levels and that other treatment processes will not be affected adversely.

[2] Dowdy et al. (1976); for use only when soil CEC>15 meq/100g, pH>6.5.

[3] National Academy of Science and National Academy of Engineering (1972) for 20-year irrigation application.

[4] See individual metal discussions for basis of these recommendations; if metal-tolerant plants will be used to establish a vegetative cover at closure, higher levels may be acceptable if treatability tests support a higher level.

document and is based on microbial and plant toxicity limits, animal health considerations, and soil chemistry..." As indicated in the table, total lead and chromium soil concentrations of 1,000 mg/kg are suggested for a wide variety of soil uses. The soil remaining after closure of the API wastewater ponds will be covered up by the pond liner, and the remaining soil in the landfill and landfill pond areas will be covered with additional, uncontaminated soil, which should minimize the impacts of direct exposure. In addition, there will be no crop production in these areas. Therefore, a closure criteria for each of these areas of a maximum chromium or lead concentration of 500 mg/kg is proposed.

Leachable heavy metals from remaining soils could impact groundwaters at lower total lead and chromium concentrations. To ensure that leachable metals in the remaining soils do not exceed acceptable levels, an EP-Toxicity test for metals will be run on each composite sample. The total metals concentrations in conjunction with the EP-Toxicity test results should provide verification that the soil is at a safe and acceptable level following closure.

CLOSURE COSTS

The total cost of instituting the closure procedures described in this closure plan is estimated to be $375,000, including contingencies. A detailed breakdown of these costs is presented in Table 4. The major costs are associated with the possible disposal of contaminated soil or waste material. For the API wastewater ponds and landfill pond, it was assumed for purposes of closure that removal and disposal of approximately 1 foot of contaminated soil would be required. Removal and disposal of an estimated 2,500 cubic yards of material from the landfill area also was assumed. Actual amounts could be higher or lower, depending on the degree of contamination of the remaining soil.

DOCUMENTATION AND RECORDKEEPING

The Facility Coordinator will maintain records of all closure activities, including the dates and nature of all work conducted during the closure process. All manifests or other documentation of off-site shipment of waste material or contaminated soil will be maintained.

TABLE 4

ITEMIZED ESTIMATED CLOSURE COSTS

Activity	Estimated Cost
API Wastewater Pond Closure	
Soil sampling and analysis	$ 1,000
Contaminated soil removal and disposal (as necessary)	50,000
Backfilling, grading, and liner replacement (as necessary)	10,000
Landfill Closure	
Soil sampling and analysis	2,000
Contaminated soil removal and disposal (as necessary)	250,000
Backfilling and grading (as necessary)	5,000
Landfill Pond Closure	
Soil sampling and analysis	2,000
Contaminated soil removal and disposal (as necessary)	18,000
Backfilling and Grading (as necessary)	10,000
Miscellaneous Costs	
Closure Certification	2,000
Contingencies (10 percent)	35,000
Total Estimated Closure Costs	$385,000

Following the successful completion of on-site closure activities, both Bloomfield Refining Company and an independent registered professional engineer will certify that the facilities have been closed in accordance with the approved closure plan. This documentation will be maintained by the Facility Coordinator, and a copy of the closure certification will be provided to EPA.

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