

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 88-080

WASTE DISCHARGE REQUIREMENTS FOR:

STAUFFER CHEMICAL COMPANY
MARTINEZ PLANT
MARTINEZ, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. Stauffer Chemical Company, a wholly owned subsidiary of Rhone-Poulenc Incorporated, (hereinafter called the discharger) manufactures various grades of sulfuric acid from elemental sulfur and by regeneration of sulfuric acid waste sludges from area chemical complexes. The plant site is located immediately east of the south ramps leading to the Benicia bridge, at the end of Mococo Road in Martinez, Contra Costa County. A location map is included in attachment A.
2. The discharger's offices, and other facilities are located on a low lying northwest trending outcrop of bedrock which forms a low escarpment behind the office. The plant is located on an adjoining northeast trending outcrop of bedrock which drops steeply, approximately 90 feet vertically, on three sides. The eastern and northern portions of the site are historical wetlands bordered on the east by Peyton Slough and on the north by Carquinez Straits.
3. The previous site owner, Mountain Copper Company, disposed of large quantities of cinder and slag in the low lying areas surrounding the bedrock outcrops. During construction of the Benicia bridge some of the cinder was moved from the freeway right-of-way to the wetlands east of the office bedrock outcrop. The slag was from copper smelting and ore processing and the cinder was from pyrite roasting. Disposal of the two wastes ceased in the mid-1960's. The discharger purchased the property in 1968. In the early 1970's it was found that leachate from the wastes was flowing into Carquinez Straits. The discharger initially sold the wastes for cement manufacture and agricultural supplement. The discharger removed the cinder and slag to approximately three feet above sea level, however, unknown quantities of subsurface cinder and slag remain throughout the site. Due to the soft, compressible nature of the underlying sediments the cinder and slag has sunk into and displaced the sediments. Because the cinder and slag waste fill areas are in historic marsh lands, the ground water levels are close to the ground surface. Therefore, much of the cinder and slag remaining at the site is below the ground water table. The discharger operates leachate collection and removal sumps to reduce the level of leachate contaminated ground water in the two main cinder and slag waste fills. Runoff from the plant which may have contained waste constituents was discharged to the north cinder and slag waste fill area until 1985. A complete report of waste discharge for the waste fills has

not been submitted. The leachate contaminated ground water has been pumped into two ponds for evaporation. The waste fill is exempt from Federal Resource Recovery and Conservation Act regulations. The waste fill has not yet been classified under State regulations, however the leachate contaminated ground water from the fill is a hazardous waste.

4. The other waste management units at the discharger's plant are: two Class 1 evaporation ponds, and three wastewater treatment ponds. The two Class 1 evaporation ponds are used to store and evaporate leachate contaminated ground water from the cinder and slag wastes. The three wastewater treatment ponds, i.e., utility, surge and settling ponds, are part of the wastewater treatment system regulated by a NPDES permit. Of the three wastewater treatment ponds, two, utility and surge, have been shown to contain hazardous waste constituents and therefore maybe subject to the provisions of the Toxic Pits Cleanup Act. The discharger is completing additional waste characterization testing to determine if the sludge is a hazardous waste. Information on the sludge in the settling pond has not yet been provided.
5. The discharger submitted a proposed closure plan for the two evaporation ponds on February 8, 1988. The proposed closure plan was incomplete. By letter dated February 24, 1988 Board staff requested additional information on the closure plan. At a meeting on April 7, 1988, the discharger stated that the proposed closure plan is being modified to include toxicity reduction and recycling. The modified plan has not yet been submitted. Proposed closure plans for the utility, surge and settling ponds have not yet been submitted.
6. A shallow ground water monitoring system had shown the presence of waste constituents in the ground water in the vicinity of the evaporation ponds. The source of the waste constituents has not been determined, it could be from either, or both, the cinder waste or the evaporation ponds.
7. In October 1985 and November 1985, the discharger was requested pursuant to TPCA; the Calderon Act, Section 13273 of the California Water Code; and Subchapter 15 of the California Code of Regulations, Title 23, Chapter 3 (Subchapter 15), to perform a complete hydrogeologic investigation of the entire site to determine site specific geology and hydrogeology and the full lateral and vertical extent of: the cinder and slag waste fill; the leachate contaminated ground water from the cinder and slag; and any leakage from the evaporation ponds. It was requested that the investigation fulfill the informational requirements of the TPCA Hydrogeologic Assessment Report (HAR) (for hazardous waste ponds), the Calderon Act Solid Waste Assessment Test (SWAT) report (for non-hazardous waste landfills), and a Report of Waste Discharge for the waste fill areas and all of the ponds. In requesting a single investigation it was recognized that waste fill was present throughout the site, that in large portions of the site the shallow ground water was known to contain waste constituents, and that determining the source of the ground water pollution solely in the vicinity of the ponds would be difficult. Due to various delays the first phase of the site wide hydrogeologic investigation was not completed until October 1987. A second report, amending the October submittal was submitted in November 1987.

8. A SWAT report was submitted separately on June 30, 1987. Section 13273(c) of the Water Code states that submittal of a SWAT report may be waived if other evidence shows the migration of hazardous waste into State waters. The leachate contaminated shallow ground water that is recovered and disposed in the evaporation ponds is a hazardous waste.
9. Staff reviewed the October 1987 report and November 1987 amendment discussed in Finding 7, above. In a memorandum dated January 15, 1988, Board staff found that the hydrogeologic investigation completed to date is not adequate. These deficiencies can be summarized as:
 - a. An inadequate number of monitoring wells were constructed.
 - b. Some wells were not screened in permeable zones.
 - c. The lateral and vertical extent of all cinder and slag areas was not defined.
 - d. The vertical and horizontal migration of waste constituents due to interconnection of ground waters, permeable zones, possible faults, or bedding planes was not adequately investigated.
 - e. Spacing of monitoring wells and piezometers over most of the site was excessive.
 - f. Site geology and hydrogeologic information was incomplete and inadequate.
10. A HAR for the two evaporation ponds was submitted on December 30, 1987. The HAR was incomplete since it did not adequately define the site hydrogeology or geology, determine the extent of the waste constituents in the ground water, include a sampling and analysis plan, adequately determine groundwater flow in bedrock or unconsolidated sediments, or furnish all logs and completion data of the piezometers, soil borings and monitoring wells. In addition, the flood zone map and the inventory of wells within a one mile radius of the site were inadequate.
11. Section 13227 of the Water Code requires the Board to review closure plans submitted pursuant to Section 25246 of the Health and Safety Code for hazardous waste facilities in order to assure adequate protection of water quality. The Board may condition its approval of these closure plans. Regulations which implement the Health and Safety Code, set a closure standard (Section 67211, Title 22) that includes minimization of waste constituents to State waters. The Board finds that substantial compliance with the siting and construction standards contained in Subchapter 15 of Title 23 constitutes adequate minimization of waste migration of sites being closed.
12. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for Carquinez Straits and contiguous surface and ground waters.
13. The ground water under the site is not a potential source of drinking water. The actual or potential beneficial uses of the groundwater underlying and adjacent to the facility have not been determined.

14. The existing beneficial uses of Carquinez Straits and its tributary, Peyton Slough, include:
 - a. Estuarine habitat
 - b. Fish spawning
 - c. Fish migration
 - d. Preservation of rare and endangered species
 - e. Wildlife habitat
 - f. Commercial and sports fishing
 - g. Water contact and non-contact recreation
 - h. Navigation
 - i. Industrial service supply
15. The action to issue waste discharge requirements for continued operation of existing waste management units and for closure of waste management units is exempt from the California Environmental Quality Act (Public Resources Section 2100 et. seq.) in accordance with Section 15301 of the California Code of Regulations.
16. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
17. The Board, in a public hearing on May 18, 1988, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, that the discharger and any other persons that own the land or operate these units shall meet the applicable provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and shall comply with the following (unless otherwise noted, any references to Sections and Articles refer to the California Code of Regulations Title 23, Subchapter 15):

A. Prohibitions

1. The discharge, storage, or treatment of waste, or materials which may impact the beneficial uses of the ground and surface water, shall not be allowed to create a condition of pollution or nuisance as defined in Sections 13050 (1) and (m), respectively, of the California Water Code.
2. Significant migration of pollutants through subsurface transport to waters of the State is prohibited.
3. There shall be no discharges of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.
4. There shall be no discharge to any surface impoundment except as described in Finding 4.

B. Specifications

The following specifications apply as set forth in the provisions.

1. General Specifications

- a. During waste disposal, handling, or treatment, no wastes shall be placed in a position where they can be carried into waters of the State.
- b. The containment structures for the units shall have a foundation or base capable of providing support for the structures and capable of withstanding hydraulic pressure gradients to prevent failure due to settlement, compression, or uplift.
- c. The units shall be operated to ensure that wastes will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater.
- d. The units shall prevent migration of wastes to adjacent geologic materials, groundwater, or surface water, throughout the operation, closure, and post-closure periods.
- e. The containment structures shall be designed by, and constructed directly under the supervision of and certified by, a registered civil engineer or a certified engineering geologist. The discharger shall receive written approval of the construction by the Executive Officer before use of the facility commences.
- f. The materials used for containment structures shall have appropriate chemical and physical properties to ensure that such structures do not fail to contain waste because of pressure gradients (including hydraulic head and external hydrogeologic forces), physical contact with the waste or leachate, chemical reactions with soil and rock, climatic conditions, the stress of installation, and the stress of daily operations.
- g. Permeabilities specified for final cover shall be relative to water. Liner permeabilities shall be determined relative to the fluids, including waste and leachate, to be contained.
- h. Permeabilities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice.
- i. Earthen materials used in containment structures shall meet the specifications given in Section 2541(d) of Subchapter 15.
- j. Class I and Class II landfills and surface impoundments shall install a leachate collection and removal system. The system shall be installed directly above underlying containment features for landfills, or installed between liners for surface impoundments. The leachate collection and removal system shall be designed, constructed, maintained, and operated to collect twice the maximum

anticipated daily volume of leachate from the waste management unit. The depth of fluid in the collection sump shall be kept at the minimum needed to ensure efficient pump operation.

- k. Leachate collection and removal systems shall be designed and operated to function without clogging through the scheduled closure of the waste management unit and during the post-closure maintenance period. The systems shall be tested at least annually to demonstrate proper operation. The results of the test shall be compared with earlier tests made under comparable conditions.
- l. Leachate collection and removal system shall consist of a permeable subdrain layer which covers the bottom of the waste management unit and extends as far up the sides as possible (i.e., blanket-type). The collection and removal system shall be of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and by any equipment used at the waste management unit.
- m. The waste management units shall be designed to withstand the maximum credible earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion, or gas.
- n. The integrity of containment structures shall be maintained at all times.

2. Class I Siting Specifications

- a. Class I disposal units shall be located where natural geologic features provide optimum conditions for isolation of wastes from waters of the State.
- b. Class I disposal units shall be immediately underlain by natural geologic materials which have a permeability (primary and secondary) of not more than 1×10^{-7} cm/sec, and which are of sufficient thickness to prevent vertical movement of fluid, including waste and leachate, from the unit to waters of the state for as long as the wastes pose a threat to water quality.
- c. Class I disposal units shall have natural or artificial barriers to be used to prevent lateral movement of waste, leachate, and fluids.
- d. Cutoff walls are required where there is potential for lateral movement of fluid, including waste or leachate. Cutoff walls shall meet the specifications contained in Section 2545(b).
- e. Class I disposal units shall be located outside of floodplains subject to inundation by floods with a 100-year return period, unless such units are designed, constructed, operated, and maintained to prevent inundation or washout due to floods of the 100 year return period.

- f. Class I disposal units shall have a 200-foot set back from any known Holocene fault.
 - g. Class I disposal units shall be located outside areas of potential rapid geologic change.
 - h. New Class I disposal units shall be located outside areas subject to tsunamis, seiches, and surges. Other units may be located in such areas if containment structures are designed, constructed, operated, and maintained to preclude failure due to such events.
3. Class I Construction Specifications
- a. Class I waste management units shall comply with Construction Standards pursuant to Article 4.
 - b. Class I units must have a liner. A clay liner, a minimum of 2 feet thick shall be installed at a relative compaction of at least 90 percent. A synthetic liner shall be at least 40 mils where used in combination with a clay liner. Liners shall cover all natural geologic material at the waste management unit likely to come into contact with waste or leachate.
 - c. The waste management units shall have precipitation and drainage control facilities meeting the applicable specifications contained in Section 2546. These facilities shall be designed and operated to accommodate the probable maximum precipitation.
4. Class II Siting Specifications
- a. Class II waste management units shall be located where site characteristics and containment structures isolate waste from waters of the state.
 - b. Natural or artificial barriers shall be used to prevent lateral movement of fluid, including waste and leachate.
 - c. Class II waste management units shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period.
 - d. Class II waste management units may be located within 200 feet of a known Holocene fault, provided that containment structures are capable of withstanding ground accelerations associated with the maximum credible earthquake.
 - e. Class II waste management units may be located within areas of potential rapid geologic change if containment structures are designed, constructed and maintained to preclude failure.
 - f. Class II waste management units may be located in areas subject to tsunamis, seiches, and surges if designed, constructed, and maintained to preclude failure due to such events.

5. Class II Construction Specifications

- a. Class II units must have a liner. A clay liner, a minimum of 2 feet thick shall be installed at a relative compaction of at least 90 percent. A synthetic liner shall be at least 40 mils where used in combination with a clay liner. Liners shall cover all natural geologic material at the waste management unit likely to come into contact with waste or leachate.
- b. A Class II surface impoundment may have a single clay liner with a permeability of 1×10^{-6} cm/sec or less if the liner is removed or replaced before the last 25 percent (minimum 1 foot thickness) of the liner is penetrated by fluid, including waste or leachate. The method used to determine seepage velocity shall be included with the calculations of liner penetration.
- c. Cutoff walls are required where there is potential for lateral movement of fluid, including waste or leachate, and the permeability of natural geologic materials is used for waste containment in lieu of a liner. Cutoff walls shall meet the specifications contained in Section 2545(b).
- d. The waste management units shall have precipitation and drainage control facilities meeting the applicable specifications contained in Section 2546. These facilities shall be designed and operated to accommodate the 1000-year, 24-hour precipitation.

6. Specifications for Surface Impoundments

- a. Surface impoundments shall have sufficient freeboard to accommodate seasonal precipitation and precipitation conditions specified for each class of waste management unit, but in no case less than 2 feet (measured vertically), and shall be designed and constructed to prevent overtopping as a result of wind conditions likely to accompany such precipitation conditions.
- b. An operation plan shall be submitted to the Board which will provide operation levels and waste input quantities permitted each month based on anticipated precipitation and on past precipitation conditions for the year.
- c. Direct pipeline discharge to surface impoundments shall be either equipped with devices or shall have fail-safe operating procedures to prevent overflowing. Discharges shall be stopped in the event of any containment system failure which causes a threat to water quality.
- d. Surface impoundments shall be designed and constructed to prevent scouring of containment structures at points of discharge into the impoundments and by wave action at the waterline.
- e. All visible portions of synthetic liners shall be inspected weekly until all free liquid is removed from the surface impoundment as part of closure. If, during the active life of the impoundment,

the waste are removed and the bottom of the impoundment cleaned down to the liner, an inspection shall be made of the bottom of the liner prior to refilling the impoundment.

7. General Closure Specifications

- a. Closure of all waste management units shall be in compliance with the requirements of Article 8.
- b. Classified waste management units shall be closed according to a Board approved closure and post-closure maintenance plan which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls in Article 4 and the monitoring program requirements in Article 5.
- c. The post closure maintenance period shall extend as long as the wastes pose a threat to water quality.
- d. Closure shall be under the direct supervision of a registered civil engineer or a certified engineering geologist.
- e. Closed waste management units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.
- f. Vegetation for closed waste management units shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the final cover.

8. Landfill Closure Specifications

- a. Closed landfills shall be provided with not less than two feet of appropriate materials as a foundation layer for the final cover. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice.
- b. Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the foundation layer and compacted to attain a permeability equal to the permeability of any bottom liner system, underlying natural geologic materials or 1×10^{-6} cm/sec, whichever is less.
- c. Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the material described in Specification B.8.b; the rooting depth of any vegetation planted on the cover shall not exceed the depth to the layer described in Specification B.8.b.

- d. The cover shall be designed and constructed to function with the minimum maintenance possible.
- e. Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least three percent. Lesser slopes may be allowed if an effective system is provided for diverting surface drainage from covered wastes. Areas with slopes greater than 10 percent, surface drainage courses, and areas subject to erosion by water and wind shall be protected or designed and constructed to prevent such erosion.
- f. Throughout the post-closure maintenance period, the discharger shall maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors; continue to operate the leachate collection and removal system as long as leachate is generated and detected; maintain monitoring systems and monitor the groundwater, surface water, and the unsaturated zone in accordance with applicable requirements of Article 5, prevent erosion and related damage of the final cover due to drainage and protect and maintain surveyed monuments.

9. Surface Impoundment Closure Specifications

- a. For Class II surface impoundments, all free liquid remaining in a surface impoundment at the time of closure shall be removed and discharged at an approved waste management unit. All residual solids shall be treated to eliminate free liquid.
- b. For Class II surface impoundments, following the removal and treatment of liquid waste, the impoundment shall be closed in one of two ways, as approved by the Board:
 - 1. All residual wastes, including sludges, precipitates, settled solids, and liner materials contaminated by wastes, shall be completely removed from the impoundment and discharged to an approved waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any natural geologic materials beneath or adjacent to the closed surface impoundment that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such contaminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of Article 8.
 - 2. All residual wastes, including sludges, precipitates, settled solids, and liner materials, shall be compacted, and the waste management unit shall be closed as a landfill pursuant to Section 2581 of Article 8, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4. The moisture content of

the residual wastes, including sludges, shall not exceed the moisture-holding capacity of the waste either before or after closure. Surface impoundments which contain only decomposable wastes at closure may be closed as land treatment facilities according to Section 2584 of Article 8.

- c. For Class I surface impoundments remove all liquid wastes. Following removal and proper disposal of liquid wastes, all residual wastes and contaminated liners and soils shall be removed or it shall be demonstrated by the discharger that removal is not feasible. If wastes, contaminated liners or soils, are left in place the surface impoundment shall be closed in a manner that minimizes the potential for migration of waste constituents, their degradation products, or leachate to State waters. Compliance with Articles 3 and 4 of Subchapter 15 to the extent feasible and necessary shall be deemed adequate containment for minimization of potential migration. Engineered alternatives that provide equivalent protection of water quality may be used as substitutes for requirements contained in Articles 3 and 4.

10. Groundwater Monitoring Specifications

- a. A groundwater quality monitoring program which is capable of detecting leaks from waste management units into waters of the state, during the active life, the closure and post-closure monitoring periods shall be implemented. This program shall comply with all applicable sections of Article 5.
- b. Water quality protection standards will be established by the Board according to the conditions outlined in Section 2552. These standards shall be generated upon submittal of an approved groundwater quality monitoring program and based upon one year of background groundwater quality monitoring data collected at each waste management unit.
- c. Points of compliance will be established by the Board according to Section 2553 upon submittal of an approved groundwater quality monitoring program.
- d. The compliance period for groundwater monitoring shall extend until the waste no longer poses a threat to water quality.
- e. The design and construction of the groundwater monitoring system shall comply with the specifications outlined in Section 2555(b) through (d) of Article 5.
- f. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area of the waste management unit and comply with Section 2555 (e) through (g) of Article 5.
- g. Statistical procedures as outlined in Section 2555(h) shall be used to determine whether the water quality protection standards have been exceeded at any unit.

- h. A detection monitoring program, as required in Section 2556, shall be implemented at each waste management unit, or group of contiguous waste management units, except at any area of the site where the discharger knows or suspects that water quality impairment has occurred.
 - i. A verification monitoring program, as required in Section 2556 and 2557, shall be implemented at any area of the site where the discharger knows or suspects that water quality impairment has occurred, or upon determination that a statistically significant increase in indicator parameters or waste constituents has occurred during detection monitoring at a waste management unit or group of units.
 - j. A corrective action program, as required in Section 2557 and 2558, shall be implemented upon completion of the verification monitoring program.
 - k. Unsaturated zone monitoring, as required in Section 2559, shall be conducted where feasible.
11. Specifications for Exemptions to the Requirements of Subchapter 15
- a. The discharger may request the Board to grant exemptions to the construction or prescriptive standards of Subchapter 15 if both the following conditions are met: (1) the construction or prescriptive standard is not feasible because it is unreasonably burdensome and will cost substantially more than alternatives, or is impractical and will not promote attainment of applicable performance standards; and (2) there is a specific engineered alternative that is consistent with the performance goal addressed by the particular construction or prescriptive standards, and affords equivalent protection against water quality impairment.
12. Specifications for Inactive Waste Management Units
- a. A groundwater monitoring program must be developed and implemented at each inactive waste management unit in accordance with Article 5.
 - b. A corrective action program must be developed and implemented at each inactive waste management unit. The corrective action program shall take into account the results of the groundwater monitoring program for the site. If the corrective action program proposes to leave wastes in place, the program shall implement the applicable closure provisions of Subchapter 15 to the extent feasible and necessary. For corrective action at surface impoundments that contain hazardous wastes where the corrective action program proposes to leave the wastes in place, the program shall implement Specification B.9.c

C. Provisions

1. The discharger shall comply with Prohibitions A.1. through A.4. and B.1.a. immediately upon adoption of this Order, and shall comply with Specifications B.1.b. through B.1.n., B.2., B.3., B.4., B.5., B.6., B.7., B.8., B.9., B.10., and B.12. according to the following time schedules.
2. The discharger shall comply with Specifications B.2., B.4., B.10., and B.12. according to the following tasks and time schedules: submit by May 23, 1988 a proposal to complete the necessary site investigations so that a site wide Report of Waste Discharge can be submitted. The proposal must address the entire site, and provide the information required by Article 9 of Subchapter 15, the Toxic Pits Cleanup Act, and TPCA implementation guidelines. The site investigations proposal shall include the following:
 - a. Submittal of Missing Data Submit a large scale site map showing the exact locations of all monitoring wells, and soil borings; boring logs and construction information for monitoring wells numbers 15, 16, 18, and 23; the results of the shallow electromagnetic survey; a legible, annotated flood zone map; and other information requested in the January 15, 1988 staff report.
 - b. Characterize Waste Fill and Soil Pollution Submit a detailed plan acceptable to the Executive Officer to define the horizontal and vertical extent of all solid waste fills and soil pollution on-site. All borings shall be completed as described in Provision C.9.
 - c. Well Assessment Submit a report, acceptable to the Executive Officer, documenting the results of the evaluation of the acceptability of the existing monitoring wells. The report shall assess the acceptability of all the existing monitoring wells for use in both monitoring of water quality and the measurement of the ground water surface and piezometric surfaces at the site. The evaluation must include justification for the acceptability or abandonment of each individual well for obtaining water level measurements and monitoring well water quality. The assessment shall take into consideration the precision of the boring logging, and appropriateness of well construction.
 - d. Hydrogeology Characterization Submit a detailed plan acceptable to the Executive Officer, to accomplish the tasks listed below:
 - 1) Clearly identify the various aquifer/aquitard zones and bed-rock contacts across the site and designate which wells are screened in the respective zones. Determine flow paths, and establish variations in gradients, relative to both water and waste constituents, in both consolidated and unconsolidated sediments; define the extent of the permeable zones. Included in this task must be a sufficient number of detailed geologic cross sections which accurately reflect the lithology and hydrogeology based on borehole or monitor well information. Discuss and provide specific data that demonstrate the integrity and continuity of

all aquitards at the site. In addition to the standard data shown on geologic sections, the following will be shown on each section:

- a) Well screen interval for all new and existing monitoring wells, piezometers, or test wells.
 - b) Filter pack interval for all new and existing monitoring wells, piezometers, or test wells.
 - c) Water entry and stabilized water level.
 - d) Water tables for the cross section.
- 2) Obtain stratigraphic, lithologic, structural and hydrogeologic information to address the potential of the bedrock at the site to act as a pathway for waste constituent migration. Included in this task shall be constructing a structural "top of rock" contour map for the site, and a definition of and method of determining what constitutes bedrock.
 - 3) Determine the potential for liquid movement through the bedrock, included in this is defining the flow direction in the bedrock, investigating apparent faulting, and determining if such faults are acting as conduits for liquid migration.
 - 4) Define vertical gradients across the site with actual depth specific data (as would be gathered from cluster piezometers). Also define vertical and horizontal hydraulic conductivities for the various hydrogeologic units beneath the site. The location (depth/ elevation) of piezometer screens is to be determined from the lithology at each location and from the depth of the screen locations for the other, or planned, piezometer installations at the site. The random placement of piezometer screens, within a single aquifer zone, is to be avoided such that accurate maps of the water surface can be prepared.
 - 5) Demonstrate, with specific data, the influence of the wetlands, Peyton Slough and Carquinez Straits on the ground water, and explain the apparent water table depression at the southern part of the site. Included in this task are (1) cross sections showing the relative water levels of surface waters and the shallow ground waters, (2) a determination of which surface waters are recharge and discharge areas for ground water, (3) the possible effects of tidal influences upon water levels at the site, (4) the potential effects of these influences on monitoring well placement, and (5) seasonal variations in ground water elevations and gradients.
 - 6) Compile, tabulate, and summarize all the available static water level data since June 1987 by individual wells. For each well and each sampling period, the information shall include:
 - a) Water levels shall be measured to the nearest 0.01 foot, msl.
 - b) The date and time the water levels were taken;
 - c) Method used to determine water levels;
 - d) Surveyed reference elevation for each well; and
 - e) Correct for density.

Water level contours shall be constructed for each sampling period and each stratigraphic horizon, on detailed current topographic base maps, and submitted with all the above information. Water level contours are to be constructed from measurements taken in all wells screened in the same stratigraphic horizon and have similar screen elevations and screen lengths. The data points and values used to construct each contour shall be shown on each map. All future reporting of water level data shall include the information listed above.

- 7) Define the seasonal variations in groundwater levels in all existing wells and present the results in the form of hydrographs. The hydrographs shall present bimonthly data over a full year. All information required by Provision 2.d.6). of this Order shall be included in this report.
- 8) Conduct aquifer tests for all identified aquifers/transmissive zones to determine the aquifer characteristics, and the degree of interconnection, if any, between the aquifer zones.
- 9) Implementation of the items for this Task must include, at a minimum, the following details:
 - a) Borings: All boreholes, whether for exploratory purposes or for monitoring well installation, are to be continuously sampled and sample recovery must exceed 75%. The following two exceptions to the continuous sampling of borings may be approved by the Executive Officer: 1) Continuous sampling may not be required in all boreholes at the site of a closely spaced cluster well group, where the deepest of the boreholes is sampled and logged continuously, and thin stringers of sand can be noted; 2) Interval sampling, at a maximum of 5-foot intervals or at a change in lithology, may be allowable below depths of 50-feet if it can be demonstrated that an acceptable level of detail can be obtained or that excessive difficulty in completing the boring, due to continuous sampling, will result. Each individual boring log must present the following specific data: 1) Name of geologist who actually performs the logging of the borehole; 2) Type of drilling equipment utilized; 3) Specific type of drilling method used; 4) Sampling devices used; 5) Sample recovery rate; 6) Water levels as appropriate; and 7) Ground surface elevation. The Board staff must be given at least 48 hours notice prior to the start of the drilling program.
 - b) Well Construction: Monitoring wells are to be selectively screened within permeable water bearing zones. Well screen lengths must be restricted to a maximum of 10-feet in length. The length of the well screens are to be sized to the zone monitored. The filter packs are not to extend more than 2-feet above the well screen; sumps below the well screen are to be avoided or sealed. The rationale for the selected well screen slot size and filter pack in non-clay or silt units, is to be provided for each monitoring well installation. The

well construction records must include detailed well development records.

- e. Ground Water Pollution Characterization Submit a detailed proposal acceptable to the Executive Officer to define the horizontal and vertical extent of the ground water pollution as follows:

- 1) Establish background ground water quality levels as follows:

Submit a detailed plan acceptable to the Executive Officer, for collecting and statistically analyzing ground water quality data to establish initial background levels. The plan shall provide for determining background levels for different aquifer units, and take into account spatial and seasonal variations in groundwater quality. If existing ground water monitoring wells are to be used for establishing initial background levels, the Discharger shall provide specific hydrogeologic data to support the placements of the wells and the selection of the screened intervals. All future submittal of ground water quality data shall include all field analyses and measurements; and all field and laboratory quality control measurements, including but not limited to: detection limits; travel, field, field equipment, laboratory equipment and laboratory method blanks; the results of surrogate and spiked samples, and an explanation for any recovery rate less than 80%; and a list of which constituents were tested for each individual well.

- 2) Further assess the waste constituent migration into the ground water by submitting a detailed plan acceptable to the Executive Officer which will identify the vertical and horizontal extent of waste constituent migration. The plan shall be focused towards constituents of concern.
- 3) Submit a report acceptable to the Executive Officer documenting the results of the background ground water quality investigation with a statistical analysis of the analytical data, and the findings of the assessment characterization program, signed by a registered geologist, registered civil engineer or certified engineering geologist. All the support data shall be included and presented in a logical and easy to follow format.

- f. Sampling and Analysis Plan Submit a Ground Water Sampling and Analysis Plan acceptable to the Executive Officer. The Sampling and Analysis Plan shall include well specific sampling and analysis procedures and schedules, rationale for the proposed sampling schedule, proposed method of statistical analysis, a proposed list of waste constituents that will be analyzed at each well, and the rationale (based on waste characterization) for the proposed list.

The discharger shall submit a report acceptable to the Executive Officer documenting the findings of the site investigation program, signed by a registered civil engineer or registered geologist. The report shall include all support data, tabulated and presented in a logical and easy to follow format, and shall contain recommendations for further site evaluation if the result of this program were inconclusive. The report

shall be submitted within 180 days of approval of the site investigation proposal.

3. The discharger shall comply with Specifications B.1.d., B.10., and B.12. according to the following tasks and time schedules:
 - a. Submit a proposal which complies with Article 5 to monitor the ground water at each of the specific waste management units and site wide within 45 days of completion of the site investigation program. The proposal shall be based on the discharger's evaluation of the results of the site investigation, and shall include monitoring in all saturated zones. The proposal shall be acceptable to the Executive Officer, and shall be implemented according to a time schedule specified by the Executive Officer.
4. The discharger shall determine the waste classification of the settling, surge, and utility ponds as follows: submit by May 23, 1988 the results of pond sludge analyses for the settling pond, surge pond, and utility ponds. The analyses shall include at a minimum, chemical analysis of the settling pond sludge, and waste characterization analysis conducted in accordance with CCR Title 22, Chapter 30, Article 9 for the surge and utility ponds, and the settling pond if chemical analysis of the sludge shows the presence of hazardous waste constituents.
5. If the results of the testing conducted for Provision 3., above, show that a pond contains hazardous waste, the discharger shall comply with Specifications B.1., B.3., B.6., B.7., B.9., and B.10. for that pond as follows: submit a detailed proposed plan to meet the TPCA January 1, 1989 cease discharge deadline, and either:
 - a. a proposed conceptual closure plan for the applicable pond(s); or
 - b. a detailed proposal to retro-fit the pond(s) to meet applicable construction requirements.The proposed plan shall be submitted by July 1, 1988 and shall be acceptable to the Executive Officer.
6. If the results of the sludge testing conducted for Provision 3., above, show that a pond does not contain hazardous waste, and therefore is not subject to TPCA, then the discharger shall comply with Specifications B.1., B.5., B.6., B.7., B.9. and B.10. as follows: submit by July 1, 1988 a detailed proposal, acceptable to the Executive Officer to either:
 - a. retro-fit the applicable pond(s) to meet the siting and construction requirements of Subchapter 15 for a Class II surface impoundment; or
 - b. a proposed conceptual closure plan for the applicable pond(s) in accordance with the requirements of Subchapter 15 for Class II surface impoundments.
7. The discharger shall comply with Specifications B.1., B.2., B.3., B.6., B.7., B.9., and B.10. as follows: submit by July 1, 1988 a revised conceptual closure plan for the two evaporation ponds, acceptable to the Executive Officer. The revised plan shall discuss and evaluate various

closure alternatives including clean closure and toxicity reduction. A final detailed closure plan for the evaporation ponds must include a proposal for post-closure monitoring. The plan shall be submitted as part of the Report of Waste Discharge for the site and within 90 days of submittal of the site investigation report described in Provision 2.

8. The discharger shall comply with Specifications B.1., B.2., B.3., B.7., B.8., B.10., and B.12. as follows: submit with the results of the hydrogeologic investigation, an updated conceptual closure plan for the waste fill areas acceptable to the Executive Officer. The updated conceptual closure plan shall review closure alternatives including clean closure and toxicity reduction. A final detailed closure plan for the waste fill area shall be submitted as part of the Report of Waste Discharge for the site and within 90 days of submittal of the site investigation report described in Provision 2.
9. The discharger shall submit a complete Report of Waste Discharge, including filing fee within 90 days of submittal of the site investigation report described in Provision 2, above. Submittal of the site wide investigation report, the site wide and waste unit specific proposed ground water monitoring plans, how the various waste management units will comply with the siting, design, construction and operation and requirements of Subchapter 15, closure plans, and any other applicable requirement of Article 9 of Subchapter 15. The Report of Waste Discharge shall also include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one, for those areas within the site that will not be addressed in specific closure plans.
10. The discharger shall submit to the Board acceptable monitoring program reports containing results of work performed according to a self-monitoring program based on the results of the site investigation as prescribed by the Executive Officer.
11. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall promptly notify the Executive Officer and the Board may consider revision to this Order.
12. Status reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be provided to the Board monthly, commencing 30 days from the date of adoption of this Order, and covering the previous month. The information may be provided either as a letter report, or in a meeting with Board staff. The information shall, (1) summarize work completed during the previous month, and work projected to be completed in the current and future months, (2) identify any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles, and (3) include, in the event of non-compliance with any Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order.

Draft updated water table and piezometric surface maps for all affected water bearing zones; draft cross-sectional geological maps describing the hydrogeologic setting of the site; and appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures shall be presented as they are developed.

13. All hydrogeologic plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, certified engineering geologist or registered engineer.
14. All soil and groundwater and soil samples shall be analyzed by State certified laboratories, or laboratories accepted by the Executive Officer using approved EPA methods for the type of analyses to be performed. All laboratories shall maintain quality assurance/quality control records for the Board staff review.
15. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.
16. All submittals must be made as follows: two copies to the Board; one copy to the Department of Health Services, Toxic Substance Control Division; one copy to the Contra Costa County Health Services Department; and one copy to the City of Martinez.
17. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
 - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the terms and conditions of this Order.
 - c. Inspection of any monitoring equipment or methodology implemented in response to this Order.
 - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
18. The discharger(s) shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.
19. Pursuant to Section 13273(c) of the Water Code, the requirement for submittal of a SWAT is hereby waived.
20. The Board will review this Order periodically and may revise the requirements when necessary.
21. The discharger shall remove and relocate any wastes which are discharged at this site in violation of these requirements.

22. The discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries, contours, or ownership of the disposal areas.
23. The discharger shall notify the Board if during any subsurface investigations conducted on site or on adjacent property soil contamination is identified which may potentially have an adverse impact on ground or surface waters.
24. If the discharger has commenced work under a program or plan approved by the Executive Officer and is in compliance with the schedule of work under that program or plan, then the discharger shall be deemed to be in full compliance with the program or plan even though all of the work or tasks to ultimately be performed have not been completed.
25. This discharger shall maintain a copy of this Order at this site so as to be available at all times to site operating personnel.
26. The Board considers the property owner and site operator to have a continuing responsibility for correcting any problems within their reasonable control which arise in the future as a result of this waste discharge or water applied to this property during subsequent use of the land for other purposes.
27. These requirements do not authorize the commission of any act causing injury to the property of another or of the public, do not convey any property rights, do not remove liability under federal, state or local laws, and do not authorize the discharge of waste without the appropriate federal, state, or local permits, authorizations, or determinations.
28. If the discharger is delayed, interrupted or prevented from meeting one or more of the time schedules in this Order due to circumstances beyond their reasonable control, the discharger shall promptly notify the Executive Officer. In the event of such delays, the Board will consider modification of the time schedules established in this Order.

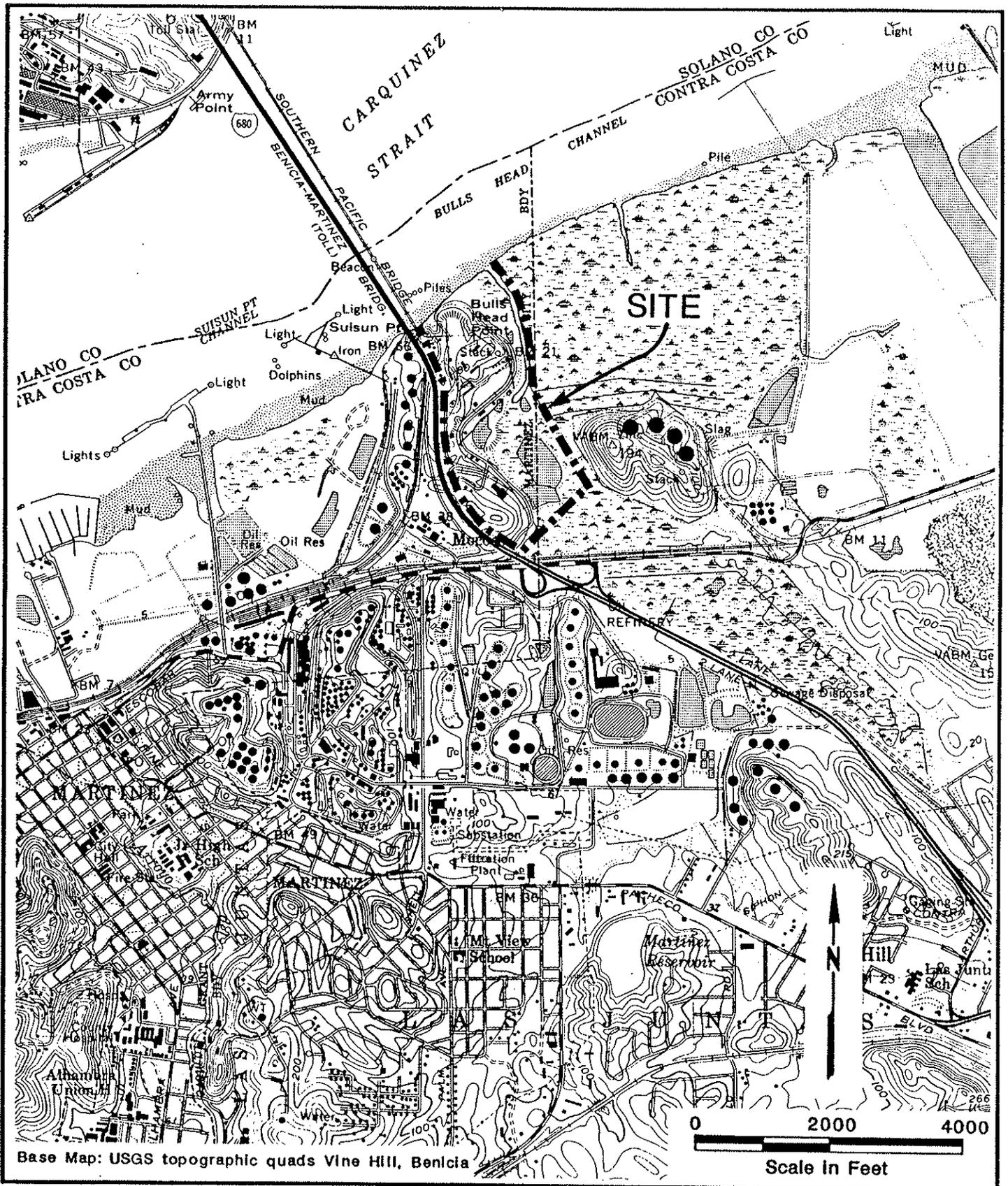
I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order of the California Regional Water Quality Control Board, San Francisco Bay Region, on May 18, 1988.



for
ROGER B. JAMES
Executive Officer

Attachments:

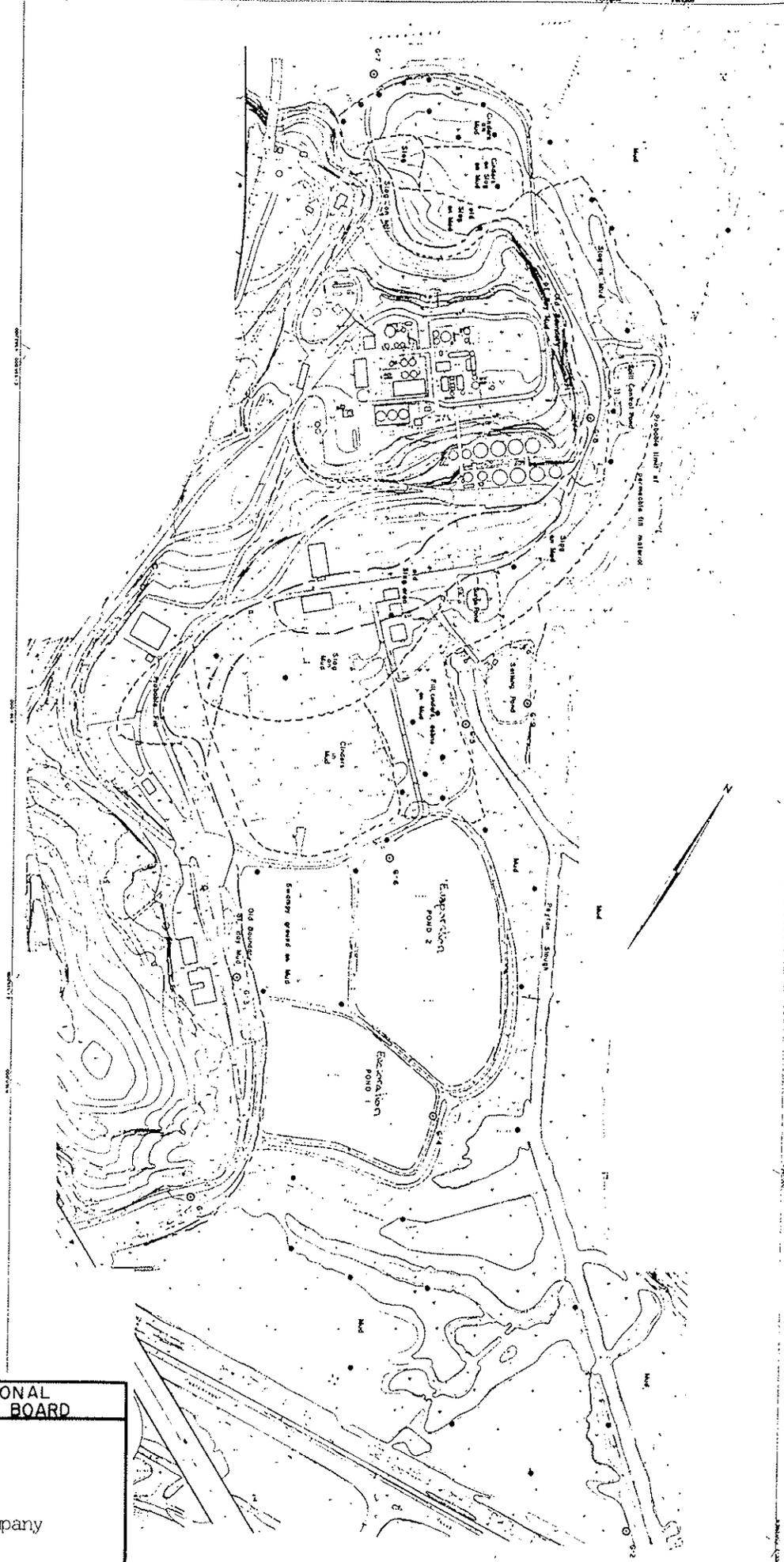
- A - Site Location Map
- B - Site Map



Base Map: USGS topographic quads Vine Hill, Benicia

Scale in Feet

SITE LOCATION MAP



SAN FRANCISCO BAY REGIONAL
WATER POLLUTION CONTROL BOARD

Attachment 2

Site Map

Stauffer Chemical Company

DRAWN BY:

DATE:

DRWG. NO.