

**SONOMA COUNTY LF ORDER No. 96-039  
WASTE DISCHARGE REQUIREMENTS**

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**ORDER No. 96-039  
WASTE DISCHARGE REQUIREMENTS**

**SONOMA COUNTY LANDFILL,  
SONOMA, SONOMA COUNTY**

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

**DISCHARGER & SITE IDENTIFICATION**

1. The Sonoma County Landfill (Sonoma LF) is owned and maintained by the County of Sonoma, the site's legal owner, hereinafter referred to as the discharger. The project site as shown on Attachment A, which is incorporated herein and made a part of this Order, is located adjacent to Highway 116, nine miles east of Petaluma and five miles southwest of Sonoma in Section 27, Township 5 North, Range 6 West.
2. The 1990 Solid Waste Assessment Report (SWAT) evaluation for the Sonoma LF indicated traces of low level organic constituents in leachate and groundwater wells within the landfill and suggested that groundwater inflow from below is a major source of leachate at the site. The landfill stopped receiving wastes on April 8, 1985, and was capped in 1986. The landfill is currently classified as a closed, inactive Class III landfill.

**PURPOSE OF UPDATE ORDER**

3. In August 14, 1995, Sonoma LF submitted a request for revised Waste Discharge Requirements (WDRs) for the site, in accordance with the requirements of the California Code of Regulations (CCR), Title 23, Chapter 15, Article 5. The proposed revisions to the WDRs include the following:
  - Installation of a low permeability barrier upgradient of the landfill;
  - Installation of Liquid extraction system;
  - Installation of Corrective Action program.

The primary objectives of this order are to incorporate the corrective action mechanisms

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proposed by the County of Sonoma and to revise the groundwater, surface water and leachate monitoring programs to bring the site into compliance with the appropriate regulations of Articles 5 and 8, Title 23, Division 3, Chapter 15 of the California Code of Regulations.

**SITE DESCRIPTION**

4. The landfill is a closed unlined Class III solid waste disposal site located adjacent to Highway 116 approximately nine miles east of Petaluma and five miles southeast of Sonoma. The landfill occupies approximately 28 acres of a 40.44 acre parcel owned by the County and comprises a disposal area, a Class II surface impoundment (leachate pond), two evaporation ponds and a waste transfer station. Land use in the vicinity of the site is predominantly agriculture. Land south of the landfill has been used as a quarry and borrow area.

**SITE HISTORY**

5. Prior to 1952, the site was used for cattle grazing. Between 1952 and 1965, the site was operated as an open pit burn dump regulated by the California Division of Forestry. From 1965 until closure in 1986, the site was operated as sanitary landfill. Approximately 360,000 tons of municipal refuse were disposed of at the site, as well as an undetermined quantity of ash from open burning of municipal refuse conducted prior to the mid-1960s. The refuse covers an area of approximately 28 acres to a maximum estimated depth of 90 feet. Disposal activity was discontinued on April 8, 1985 upon opening of the Sonoma Transfer Station adjacent to the site.
6. On April 17, 1979, the Board adopted Order No. 79-44 establishing Waste Discharge Requirements for the Sonoma LF. On July 27, 1981, the discharger was issued Cleanup and Abatement Order No. 81-004 for violation of Order No. 79-44. Order No. 81-004 required the discharger to construct leachate control facilities. On July 17, 1985 Order No. 81-004 was amended by the adoption of Order No. 85-89 establishing Closure Requirements for the Sonoma LF. This Order rescinds Order No. 85-89 in accordance with the California Code of Regulations, Title 23, Chapter 15, Article 5.
7. Surface and subsurface water diversion systems and a leachate containment pond are presently in place at the facility. These structures are not adequate to prevent polluted water from being discharged to waters of the State.

**WASTES AND THEIR CLASSIFICATION**

8. The disposal operation was restricted to household wastes, grass cuttings, tree trimmings, demolition wastes and solid industrial debris.

## GEOLOGY

9. The surface and subsurface geology of the site has been evaluated based on field mapping, literature review and review of geologic log from well borings.
10. STRATIGRAPHY - The materials present at the landfill site can be subdivided into three units:
  - landfill debris;
  - recent alluvium;
  - Sonoma Volcanics.

The maximum thickness of the landfill debris is estimated to be 90 feet. Recent alluvium is composed of a one-to-two-foot veneer of fine-grained soil and approximately 10 feet of alluvial deposits. The alluvial deposits are restricted to the creek channel east of the landfill. West of the creek, the site is underlain by homoclinal well-fractured tuffaceous sandstone, conglomerate, siltstone, claystone, and volcanic flow rock (Sonoma Volcanics) of the Pliocene age. The upper 30 to 50 feet of the rock encountered was reportedly highly weathered, but well indurated volcanic flow rock occurred below a depth of 50 feet. The bedrock material underlying the site exhibits low hydraulic conductivity values of  $10^{-5}$  to  $10^{-7}$  cm/sec.

11. STRUCTURE - The units underlying the landfill site strike northwest and dip 30 to 50 degrees to the northeast. An inferred north-northwest trending, steeply dipping fault is located along the creek on the eastern border of the landfill. This fault separates homoclinal strata west of the creek from folded strata to the east. Units encountered east of the fault are predominantly sandstone, siltstone and claystone. The axes of the folds trend northwest. The Rodgers Creek fault zone is located approximately one mile west of the site. The Rodgers Creek fault is considered active based on the observed fault segments defined by recent geomorphic features, including linear troughs, drainage and benches, closed depressions, right laterally deflected drainages and associated active tonal features.

## SURFACE WATER AND GROUNDWATER

12. SURFACE WATER - The major surface water feature at the site is the unnamed creek, a seasonal stream, located along the east boundary of the landfill. The landfill was located along an original cross-site drainage which was tributary to the current drainage along the east boundary of the site. Surface water runoff is diverted around the fill by surface grading to peripheral trenches. Leachate from the landfill is controlled from entering the unnamed creek

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by a toe-berm barrier, constructed along the east side of the site and by leachate pumping to on-site evaporation ponds.

13. **GROUNDWATER** - Groundwater flow beneath the site is toward the southeast. Regional groundwater flow is to the southeast, consistent with general rock structure characteristics. There are numerous springs and seepage areas noted within the Sonoma Volcanics west and upslope of the disposal area. The recent alluvium is damp to very moist and retains negligible amounts of water. Shallow groundwater encounters have been interpreted by past studies as representing flow within the more granular layers of the Sonoma Volcanics, controlled largely by areal rock layering and fractures. A total of 16 existing water wells were identified within a 1-mile radius of the landfill. Most of these wells are indicated to have been drilled to depths ranging from 100 to 600 feet, penetrating Sonoma Volcanics materials. Static water levels vary from a depth of 20 to 60 feet with some wells reportably having artesian flow. Yields are in the range of 5 to 20 gpm.
14. **GROUNDWATER DEGRADATION** - The area having the greatest risk for potential groundwater degradation is the Sonoma Volcanics.
15. **BASIN PLAN** - The Regional Board adopted a revised Water Quality Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resource Control Board and the Office of the Administrative Law on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.
16. **BENEFICIAL USES** - Beneficial uses of the Sonoma Creek include:
  - a. Fish migration and spawning;
  - b. Contact and non-contact water recreation;
  - c. Wildlife habitat;
  - d. Preservation of rare and endangered species;
  - e. Warm and cold fresh water habitat.
17. The present and potential beneficial uses of the groundwater are as follows:

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- a. Domestic and municipal water supply;
  - b. Industrial process supply.
18. The discharger submitted the reports identified below which propose to install a grout curtain, extraction system, corrective action monitoring program, and plans to maintain the closed landfill in accordance with the requirements of Chapter 15. These reports are incorporated into this Order:
- i. Revised Report of Waste Discharge for the Closed Sonoma Landfill. (3E Engineering July 1995)
  - ii. Report Proposed Water Quality Monitoring Program and Response Plan (The Mark Group, Inc. 1994)
  - iii. Slope Stability Evaluation (Kleinfelder 1988)

**SLOPE STABILITY (Refer to Attachment D, Slope Stability Analyses Summary)**

19. As part of the geotechnical evaluation and design for the landfill, the discharger evaluated the static and seismic stability of permanently exposed cut slopes, the toe berm and the final landfill slopes. A summary of the parameters used to evaluate slope stability is shown in attachment D.
20. **STATIC SLOPE STABILITY** - The static stability of the permanently exposed cut slopes, the toe berm and the final landfill slopes were analyzed using the following computer program:
- **STABR** - STABR, first developed by Guy LeFebvre at the UC Berkeley, in 1971 and modified by K. Wong in 1983. The program analyzes the stability of slopes with circular slip surfaces using limit equilibrium methods. STABR was used to analyze slopes using Bishop's simplified Method of analysis (Bishop, 1955).

The results indicate that the final slope has a minimum factor of Safety of approximately 1.7 and that the exterior slopes of the Sonoma Landfill are adequately stable. The strength parameters and soil properties used are friction angle, cohesion and total unit weight. Board staff has reviewed the strength parameters and soil properties used by the discharger in the stability analysis and finds that they appear reasonable.

21. **PSEUDO-STATIC STABILITY** - A Pseudo-static stability analysis was performed to determine the yield acceleration for the slope as a function of the assumed value of shear

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strength parameters. The yield acceleration is defined as that pseudo-static coefficient corresponding to a factor of Safety equal to 1.0. The results of the yield acceleration values for Sonoma Landfill vary between 0.1g and 0.6g. The critical yield acceleration for the worst case slope is between 0.1g and 0.2g, analyzed for the slope section C-C', shown in attachment C.

22. **DYNAMIC STABILITY - Ground Response and Deformation Analysis:** Chapter 15 requires that "Class III waste management units be designed to withstand the maximum probable earthquake without damage to the foundation or to the structures that control leachate, erosion or gas". Kleinfelder estimated maximum probable bedrock acceleration expected at the site due to earthquakes emanating from any of the nearby faults (i.e Healdsburg, Rogers Creek, San Andreas and Hayward). The results indicate that the maximum average rock acceleration anticipated to occur at the site is 0.65g due to a magnitude 7.0 earthquake on the Rogers Creek fault and that the Sonoma Landfill shall withstand the maximum probable earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion or gas. The results of dynamic analysis also indicated that while maximum rock accelerations associated with the design earthquake of 0.65g exceeds the yield accelerations calculated for the worst case slope for section C-C' in attachment D, cumulative displacements induced in the slope should not exceed three inches, therefore, the deformation of this magnitude should have little or no effect on the landfill cover and is not anticipated to affect the integrity of the pond liner. Board finds that the seismic slope stability analysis is acceptable.

**DESIGN OF WASTE MANAGEMENT UNIT**

23. Sonoma LF is underlain by recent alluvium and the Sonoma Volcanics. The landfill has no liner system. It has a leachate sump below the base of the fill in the original natural drainageway. A leachate extraction well, surface and subsurface water diversion systems and a lined leachate evaporation pond are also in place at the landfill. The current leachate collection system is not adequate to prevent polluted water from being discharged to waters of the State. The discharger proposes installation of a low permeability barrier and additional extraction wells as an acceptable means of containing contaminated groundwater onsite ( see Specifications 18, 19 & 20).
24. The refuse fill reaches a maximum depth of 90 feet. The 4-foot thick final cover system placed over the landfill in 1986 consists of three discrete layers: an approximately 2-foot thick foundation soil layer immediately overlying the refuse fill, a minimum 1-foot thick of low permeability clay (permeability less than  $1 \times 10^{-6}$  cm/sec) covering the foundation soil, and a 1-foot thick layer of topsoil covering the clay. The Sonoma landfill has no landfill gas collection system at the disposal site and has no reported history of settlement or cracking.

## MONITORING PROGRAM

25. The discharger is required to perform semi-annual monitoring as stated in the Corrective Action Monitoring Program, Parts A & B for the following monitoring network:
- 5 groundwater monitoring wells (P-9A, MW-2, MW-4, MW-7 & MW8) and a leachate well (LW-6).
  - 3 surface water points (SW-1, SW-2 & SW-3).
  - 19 additional points for liquid elevation measurements (LW-1, LW-2, LW-3, LP#1, LP#2, MW1, MW-3, RMW-3, MW-5, MW-6, P-1, P-2, P-3, P-4, P-5, P-6, P-7, P-8 & P-9).
26. Federal Regulations [40 Code of Federal Regulations (CFR) Parts 122, 123 and 124 ] requires specific categories of industrial activities, including landfills, to obtain a NPDES for storm water discharges. The State Water Resources Control Board has issued a General Permit for Storm Water Discharges Associated with Industrial Activities (NPDES Permit No. CAS000001). This facility is subject to these requirements until such time as normal vegetative growth is observed over the entire site. Pursuant to the Stormwater Discharge Program, this landfill is required to submit a Notice of Intent for coverage under the General Permit; to prepare and implement a monitoring program; and to submit an annual report. Compliance with the monitoring and reporting requirements of this Order are intended to assure compliance with the General Permit. Following observation of normal vegetative growth over the entire landfill, the discharger may submit a notice of termination to the State Water Resources Control Board. At such time the Executive Officer may suspend the requirements of the General Permit.
27. Unsaturated zone monitoring program is conducted where technically feasible, to satisfy the requirements of Article 5, Section 2550.7.
28. The discharger is required to analyze for the monitoring parameters as presented in Table A of the Corrective Action Monitoring Program for the Sonoma LF.

## CALIFORNIA ENVIRONMENTAL QUALITY ACT.

29. This site is exempted from the provision of the California Environmental Quality Act (CEQA) pursuant to Section 15308, Title 14 of the California Code of Regulation. However, any subsequent development of the closed landfill may not be exempted from CEQA.

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30. The Board notified the discharger and interested agencies and persons of its intent to issue waste discharge requirements for the discharger and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
31. The Board, in public meeting heard and considered all comments pertaining to the discharge.

**IT IS HEREBY ORDERED** that The County of Sonoma, their agents, successors and assigns shall meet the applicable provisions contained in Title 23, Division 3, Chapter 15 of the California Code of Regulations and Division 7 of the California Water Code and shall comply with the following:

**A. PROHIBITIONS**

1. Waste shall not be in contact with ponded water from any source whatsoever.
2. New waste shall not be deposited or stored at this site.
3. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes during the life of the site.
4. Leachate from waste and ponded water containing leachate or in contact with solid wastes shall not be discharged to waters of the State or of the United States.
5. The discharger, or any future owner or operator of the site, shall not cause the following conditions to exist in waters of the State at any place outside the waste management facility:
  - a. Surface Waters
    1. Floating, suspended, or deposited macroscopic particulate matter or foam.
    2. Bottom deposits or aquatic growths.
    3. Alteration of temperature, turbidity, or apparent color beyond natural background levels.
    4. Visible, floating, suspended or deposited oil or other products of petroleum origin.

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5. Toxic or other deleterious substances to be present in concentrations or quantities which may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of this unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

b. Groundwater

The groundwater outside the landfill boundary shall not be impacted as a result of the solid waste degradation.

**B. SPECIFICATIONS**

1. All reports pursuant to this order shall be prepared under the supervision of a registered civil engineer, California registered geologist or certified engineering geologist.
2. The site shall be protected from any washout or erosion of wastes or covering material and from inundation which could occur as a result of a 100 year 24 hour precipitation event, or as the result of flooding with a return frequency of 100 years.
3. Full-scale spray irrigation system of extracted liquid may be permitted provided it is appropriate, technically feasible and approved by the Executive Officer.
4. The leachate control facility shall be maintained and remain operational as long as leachate is present and poses a threat to water quality.
5. The discharger shall assure that the foundation of the site, the solid waste fill, and the structures which control leachate, surface drainage, erosion and gas are constructed and maintained to withstand conditions generated during the maximum probable earthquake.
6. The facility's Leachate Collection and Removal System (LCRS) must prevent leachate migration offsite. The LCRS shall be inspected monthly or less, as necessary and any accumulated fluid shall be removed.
7. The exterior surfaces (cap) shall be graded to promote lateral runoff of precipitation and to ensure that ponding does not occur.
8. The discharger shall analyze the samples from the groundwater wells (P-9A, MW-2, MW-4, MW-7 & MW-8) on a semi-annual basis for parameters listed in Table A of

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the Corrective Action Monitoring Program.

9. The discharger shall report in writing to the Regional Board, on a semi-annual basis, the effectiveness of the corrective action program.
10. In the event of a release of a constituent of concern beyond the Point of Compliance, the discharger shall within 90 days of making the determination, submit an amended report of waste discharge to make appropriate changes to the corrective action program. The Point of Compliance is the vertical surface located at the hydraulically downgradient limit of a waste management unit that extends through the uppermost aquifer underlying the unit.
11. The discharger shall install any reasonable additional groundwater and leachate monitoring devices required to fulfill the terms of any Corrective Action Program issued by the Executive officer.
12. Landfill gases shall be adequately vented, removed from the landfill, or otherwise controlled to minimize the danger of explosion, adverse health effects, nuisance conditions, or the impairment of beneficial uses of water due to migration through the vadose (unsaturated) zone.
13. The discharger shall maintain all devices or designed features, installed in accordance with this order such that they continue to operate as intended without interruption as provided for by the performance standards adopted by the California Integrated Waste Management Board.
14. The discharger shall provide a minimum of two surveyed permanent monuments near the landfill from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period. These monuments shall be installed by a licensed land surveyor or registered civil engineer.
15. The Regional Board shall be notified immediately of any failure occurring in the waste management unit. Any failure which threatens the integrity of containment features or the landfill shall be promptly corrected after approval of the method and schedule by the Executive officer.
16. The discharger shall comply with all applicable provisions of Chapter 15 that are not specifically referred to in this Order.
17. The discharger shall maintain the facility so as to prevent a statistically significant

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increase in water quality parameters at points of compliance as provided in Section 2550.5.

18. The discharger shall install a low permeability barrier upgradient of the fill area, and downgradient of the existing groundwater diversion trench, to divert clean groundwater away from the fill and away from the downgradient extraction system for polluted groundwater.
19. The discharger shall install a downgradient wellpoint system for extraction of potentially polluted groundwater.
20. Extracted leachate shall be stored in existing lined on-site evaporation pond. The leachate shall be transported by truck or pipeline to a water pollution control plant or other treatment plant for final disposal, unless on-site spray irrigation is approved by the Executive Officer.

**C PROVISIONS**

1. The discharger shall comply with all Prohibitions, Specifications and Provisions of this Order.
2. The discharger shall submit semi-annual monitoring reports by April 30 for the winter/spring reporting period and October 30 for the summer/fall reporting period of each year in accordance with the attached Corrective Action Monitoring Program. Sample collection shall be between a six months interval. By April 30 of each year the discharger shall also submit an annual report to the Board covering the previous calendar year as described in Part A of the Corrective Action Monitoring Program.  
**REPORT DUE DATE: SEMI-ANNUAL Reports -APRIL 30 AND  
OCTOBER 30 OF EACH YEAR  
ANNUAL REPORTS - APRIL 30 OF EACH YEAR**
3. The discharger shall submit a detailed Post Earthquake Inspection and Corrective Action Plan acceptable to the Executive officer to be implemented in the event of any earthquake generating ground shaking of Richter Magnitude 7 or greater at or within 30 miles of the landfill. The report shall describe the containment features, and groundwater monitoring and leachate control facilities potentially impacted by the static and seismic deformations of the landfill. The plan shall provide for reporting results of the post earthquake inspection to the Board within 72 hours of the occurrence of the earthquake. Immediately after an earthquake event causing damage to the landfill structures, the corrective action plan shall be implemented and this Board shall be notified of any damage. The report shall be due within

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three months of adoption of this Order.

**REPORT DUE DATE: 6 MONTHS OF ADOPTION OF THIS ORDER**

4. The discharger shall submit Facility Construction Details acceptable to the Executive Officer pursuant to the specifications of this Order. The Details should provide workplans and specifications for construction of a low permeability barrier and leachate extraction wells and should include Quality Assurance and Quality Control Procedures, (QA/QC), for all aspects of construction and installation.

**REPORT DUE DATE: 3 MONTHS PRIOR TO ANTICIPATED  
CONSTRUCTION DATE**

5. All reports pursuant to these Provisions shall be prepared under the supervision of a registered civil engineer or certified engineering geologist.
6. The discharger shall submit a Contingency Plan to be instituted in the event of a surface leak or spill from the leachate facilities. The discharger shall give immediate notification to the San Francisco Bay Regional Water Quality Control Board, the Local Enforcement Agency (LEA), and the California Department of Toxic Substances Control.

**REPORT DUE DATE: 6 MONTHS OF ADOPTION OF THIS ORDER**

7. The discharger shall file with the Regional Board, Corrective Action Monitoring Reports performed according to any Corrective Action Monitoring Program issued by the Executive Officer.
8. The discharger shall immediately notify the Board of any flooding, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

**REPORT DUE DATE: IMMEDIATE**

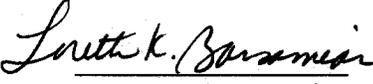
9. The discharger shall maintain a copy of this Order at the site so as to be available at all times to site operating personnel.
10. This Board considers the property owner and site operator or any future owners of this property to have continuing responsibility for correcting any problems which arise in the future as a result of the waste discharged or related operations.
11. The discharger shall permit the Regional Board or its authorized representative, upon presentation of credentials:

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- a. Immediate entry upon the premises on which wastes are located or in which any required records are kept.
  - b. Access to copy any records required to be kept under the terms and conditions of this order.
  - c. Inspection of any treatment equipment, monitoring equipment, or monitoring methods required by this order or by any other California State Agency.
  - d. Sampling of any discharge or groundwater governed by this order.
12. The discharger shall prepare, implement and submit a Storm Water Pollution Prevention Plan in accordance with requirements specified in State Water Resources Control Board General Permit for Storm Water Discharges Associated with Industrial Activities (NPDES Permit No. CAS000001).
  13. Copies of all correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications and Provisions of this Order, shall also be provided to the Environmental Health Services Division of Sonoma County.
  14. These requirements do not authorize 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 wastes.
  15. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. (Refer to Standard Provisions, referenced above). The request must contain the requesting entity's full legal name, the address and telephone number of the persons responsible for contact with the Board and statement. The statement shall comply with the signatory paragraph described in Standard Provisions and state that the new owner or operator assumes full responsibility for this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.
  16. This Order is subject to Board review and updating, as necessary, to comply with changing State and Federal laws, regulations, policies, or guidelines; changes in the Board's Basin Plan; or changes in the discharge characteristics.

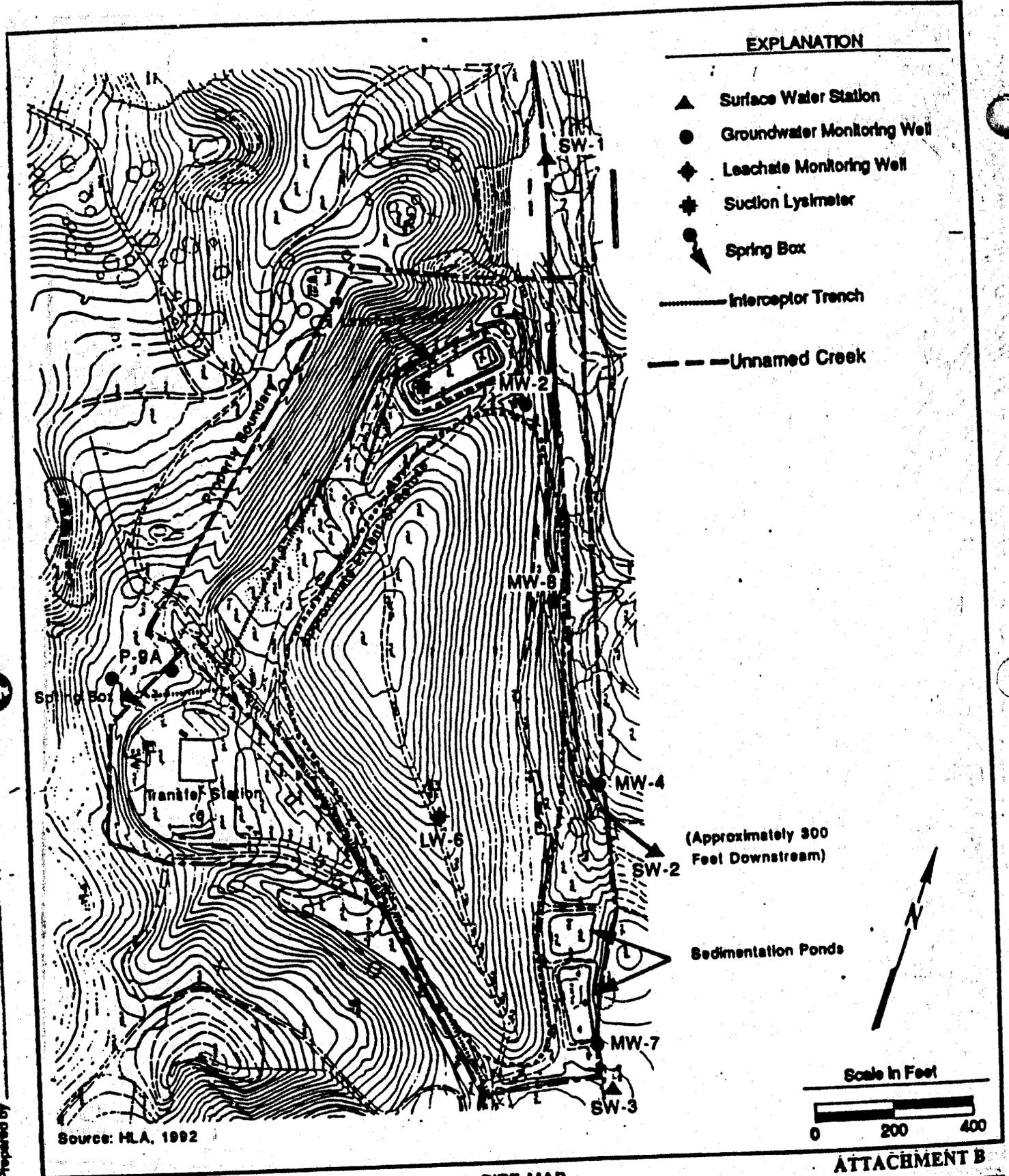
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I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 20, 1996.

  
Loretta K. Barsamian  
Executive Officer

Attachments: A. Site Location Map  
B. Facility Map  
C. Boring Location Map  
D. Summary of Slope Stability Analyses  
E. Detection Monitoring Program





SITE MAP

ATTACHMENT B

PROJECT NO.

91-1170301.94

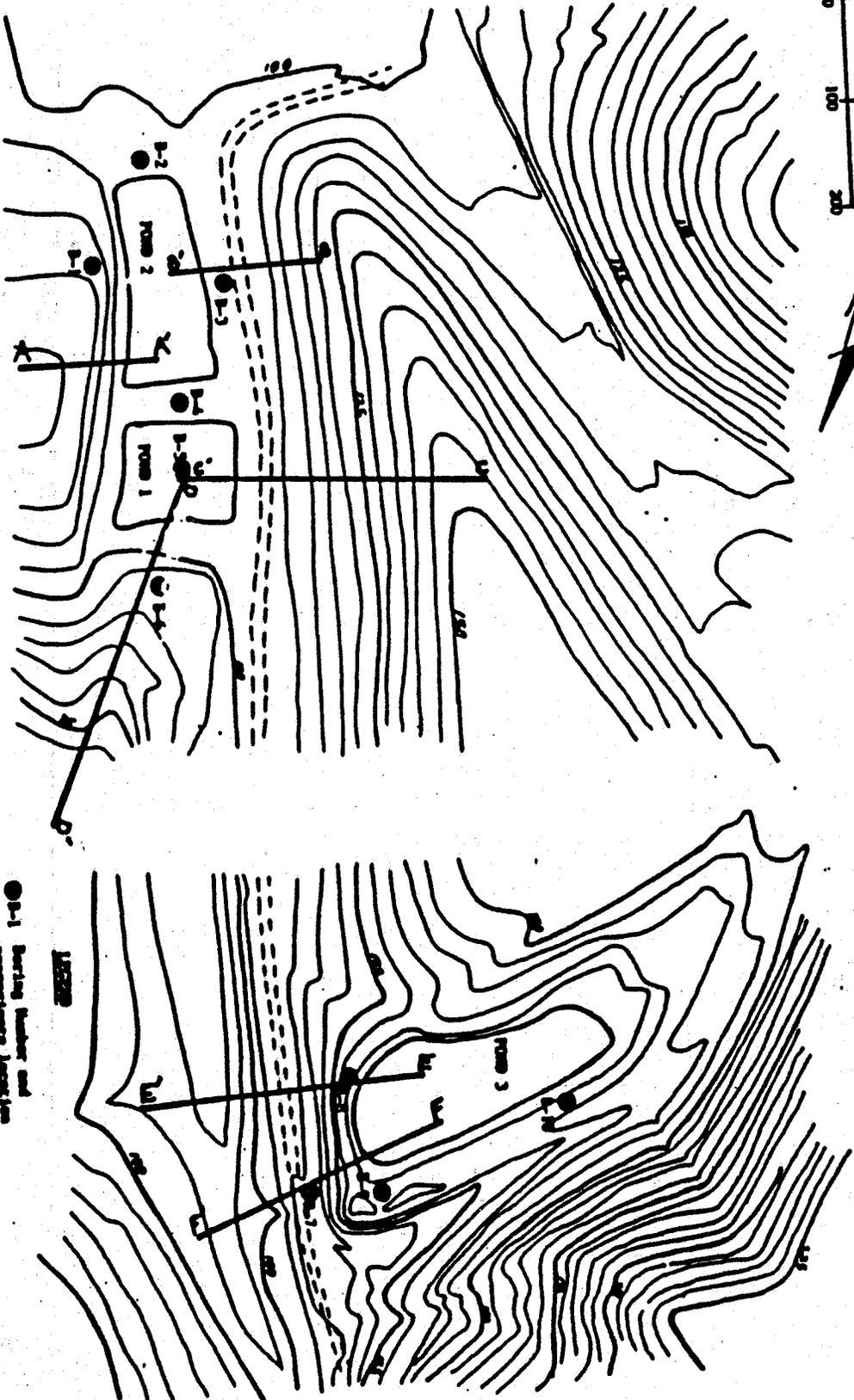
DRAWING NO.

2-2

Proposed Water Quality Monitoring  
Program and Response Plan  
Sonoma Disposal Site  
Sonoma County, California

Prepared by

SCALE  
Feet



● B-1 Boring Number and appearance location  
A-A' Cross section location

LEGEND

**K** KLEINFELDER

**CROSS-SECTION LOCATIONS**

**ATTACHMENT C  
SONOMA SITE LEACHATE PONDS  
SLOPE STABILITY ANALYSIS**

CONTRACT NO. 70-111 (FRANCA)

**ATTACHMENT D**

**SLOPE STABILITY ANALYSIS RESULTS SONOMA COUNTY LANDFILL**

Section	Location	Loading Condition	Minimum factor of Safety	Failure Plane
A-A' Thin soil horizon over claystone (C=1200psf)	Natural Slope East of Pond 2	Static	4.5	Thru Toe of Slope
		Pseudo-Static 0.7g	1.2	Thru Toe of Slope
B-B' Fill soils C=200psf, φ=35° Over refuse C=0, φ=20°	Levee Embankment West of Pond 2	Static	2.4	Thru Toe of Slope
			2.9	Tangent to Elevation 89.5
		Pseudo-Static 0.4g	1.1	Thru Toe of Slope
		0.5g	0.9	Thru Toe of Slope
		0.5g	0.9	Tangent to Elevation 86
C-C' Inactive Landfill C=0, φ=26.5° Levee C=100-500psf φ=8° -16° Refuse C=100psf, φ=20°	Landfill Embankment West of Pond 1 across Levee and into Pond 1	Static	1.7	Thru Toe at Levee
			2.3	Tangent to Elevation 82
		Pseudo-Static 0.1g	1.2	Thru Toe of Levee
		0.2g	<1	Thru Toe of Levee
		0.2g	1.2	Tangent to Elevation 82
		0.3g	1.0	
		0.4g	<1	
D-D' Interbedded fill soils C=200-1500psf φ=0-35° Refuse C=100psf, φ=20° Claystone C=3000psf, φ=0	Levee and Slope North end of Pond	Static	3.5	Tangent to Elevation 65
		Pseudo-Static 0.3g	1.2	Tangent to Elevation 65
		0.4g	<1	Tangent to Elevation 20
		0.6g	1.1	Tangent to Elevation 20
		0.7g	<1	Tangent to Elevation 93
		0.7g	1.4	
E-E' (existing) Interbedded fill soils C=250-4000psf φ=0-20° Native soils C=500-1500psf, φ=0-20° Claystone C=4000psf, φ=0	East Levee Pond 3 Southern Line	Static	2.7	Tangent to Elevation 123
		Pseudo-Static 0.5g	1.2	Tangent to Elevation 123
		0.6g	1.0	
		0.7g	<1	
		0.7g	1.2	Thru Toe of Slope at Creek

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E-E' (reconstructed) Interbedded fill soils C=250-4000psf $\phi=0-20^\circ$ Native soils C=500-1500psf, $\phi=0-20^\circ$ Claystone C =4000psf, $\phi=0$	East Levee Pond 3 Southern Line	Static Pseudo-Static 0.6g 0.7g	3.1 1.1 1.1	Tangent to Elevation 98 Thru Toe of Slope at Creek
F-F" (existing) Interbedded fill soils C=100-4000psf $\phi=20-30^\circ$ Native soils C=200-500psf, $\phi=0-32^\circ$ Claystone C =4000psf, $\phi=0$	East Levee Pond 3 Northern Line	Static Pseudo-Static 0.7g 0.7g 0.7g	5.8 1.6 1.5 1.3	Thru Toe of Slope at Creek Thru Toe of Slope at Creek
F-F" (reconstructed) Interbedded fill soils C=100-4000psf $\phi=20-30^\circ$ Native soils C=200-500psf, $\phi=0-32^\circ$ Claystone C =4000psf, $\phi=0$	East Levee Pond 3 Northern Line	Static Pseudo-Static 0.5g 0.6g 0.7g 0.7g	3.2 1.1 <1 1.0 1.1	Tangent to Elevation 96 Tangent to Elevation 96 Thru Toe of Slope at Creek

MINIMUM ACCEPTABLE FACTOR OF SAFETY

LOADING CONDITION	MINIMUM FACTOR OF SAFETY
Long term	1.5
Temporary	1.2 - 1.3
Simulated earthquake	1.0 - 1.1

SEISMIC DESIGN PARAMETERS

Faults or Seismic Source	Distance to site(miles)	Maximum Credible Earthquake Magnitude	Maximum Average rock Acceleration(g)
Healdsburg	22	6.75	0.15-0.2
Rodgers Creek	<1	7.0	0.6-0.65
San Andreas Fault	22	8.3	0.3-0.4
Hayward	19	6.25	0.2-0.25

C = Cohesion (psf);  $\phi$  = Frictional angle (degrees)

ATTACHMENT D

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**CORRECTIVE ACTION MONITORING PROGRAM**

**FOR**

**SONOMA COUNTY LANDFILL  
CLASS III SOLID WASTE DISPOSAL SITE  
SONOMA, SONOMA COUNTY**

**ORDER NO. 96-039**

**CONSISTS OF**

**PART A**

**AND**

**PART B**

## PART A

### A. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No.73-16. This Corrective Action Monitoring Program is issued in accordance with Chapter 15, Article 5.

The principal purposes of a corrective action monitoring program are: (1) to document compliance with waste discharge requirements and prohibitions established by the Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of standards of performance, and toxicity standards, (4) to assist the discharger in complying with the requirements of Article 5, Chapter 15 as revised July 1, 1991.

### B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the most recent version of EPA Standard Methods and in accordance with an approved sampling and analysis plan.

Water and waste analysis shall be performed by a laboratory approved for these analyses by the State of California. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

### C. DEFINITION OF TERMS

1. A grab sample is a discrete sample collected at any time.
2. Receiving waters refers to any surface water which actually or potentially receives surface or groundwaters which pass over, through, or under waste materials or contaminated soils. In this case the groundwater beneath and adjacent to the landfill areas, the surface runoff from the site, Spring Branch are considered receiving waters.
3. Standard observations refer to:
  - a. Receiving Waters
    - 1) Floating and suspended materials of waste origin: presence or absence,

- source, and size of affected area.
- 2) Discoloration and turbidity: description of color, source, and size of affected area.
- 3) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
- 4) Evidence of beneficial use: presence of water associated wildlife.
- 5) Flow rate.
- 6) Weather conditions: wind direction and estimated velocity, total precipitation during the previous five days and on the day of observation.

b. Perimeter of the waste management unit.

- 1) Evidence of liquid leaving or entering the waste management unit, estimated size of affected area and flow rate. (Show affected area on map)
- 2) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
- 3) Evidence of erosion and/or daylighted refuse.

c. The waste management unit.

- 1) Evidence of ponded water at any point on the waste management facility.
- 2) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
- 3) Evidence of erosion and/or daylighted refuse.
- 4) Standard Analysis (SA) and measurements are listed on Table A (attached)

D. SAMPLING, ANALYSIS, AND OBSERVATIONS

The discharger is required to perform sampling, analyses, and observations in the following media:

- 1. Groundwater per Section 2550.7(b) and
- 2. Surface water per Section 2550.7(c)

and per the general requirements specified in Section 2550.7(e) of Article 5, Chapter 15. The Regional Board is requiring semi-annual sampling for this Corrective Action Monitoring Program.

E. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the discharger or laboratory, and shall be retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board.

Such records shall show the following for each sample:

1. Identity of sample and sample station number.
2. Date and time of sampling.
3. Date and time that analyses are started and completed, and name of the personnel performing the analyses.
4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used.
5. Calculation of results.
6. Results of analyses, and detection limits for each analysis.

**F. REPORTS TO BE FILED WITH THE BOARD**

1. Written corrective action monitoring reports shall be filed by the 30th day of April and October of each year. In addition an annual report shall be filed as indicated in F.3 below. The reports shall be comprised of the following:

a. Letter of Transmittal

A letter transmitting the essential points in each report should accompany each report. Such a letter shall include a discussion of any requirement violations found during the last report period, and actions taken or planned for correcting the violations. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last report period this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by a principal executive officer at the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

- b. Each monitoring report shall include a compliance evaluation summary. The summary shall contain:

- 1) A graphic description of the velocity and direction of groundwater flow under/around the waste management unit, based upon the past and present water level elevations and pertinent visual observations.

SONOMA COUNTY LE  
CORRECTIVE ACTION MONITORING PROGRAM

- 2) The method and time of water level measurement, the type of pump used for purging, pump placement in the well; method of purging, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity during purging, calibration of the field equipment, results of the pH, temperature conductivity and turbidity testing, well recovery time, and method of disposing of the purge water.
  - 3) Type of pump used, pump placement for sampling, a detailed description of the sampling procedure; number and description of equipment, field and travel blanks; number and description of duplicate samples; type of sample containers and preservatives used, the date and time of sampling, the name and qualifications of the person actually taking the samples, and any other observations.
- c. A map or aerial photograph shall accompany each report showing observation and monitoring station locations.
  - d. Laboratory statements of results of analyses specified in Part B must be included in each report. The director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board.
- 1) The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer prior to use.
  - 2) In addition to the results of the analyses, laboratory quality assurance/quality control (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and analytical detection limits; the recovery rates; an explanation for any recovery rate that is less than 80%; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.
- e. An evaluation of the effectiveness of the leachate monitoring or control facilities, which includes an evaluation of leachate buildup within the disposal units, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods utilized.
  - f. A summary and certification of completion of all standard observations for the waste management unit, the perimeter of the waste management unit, and the receiving waters.

## 2. CONTINGENCY REPORTING

- a. A report shall be made by telephone of any seepage from the disposal area immediately after it is discovered. A written report shall be filed with the Board within five days thereafter. This report shall contain the following information:
  - 1) a map showing the location(s) of discharge;
  - 2) approximate flow rate;
  - 3) nature of effects; i.e. all pertinent observations and analyses; and
  - 4) corrective measures underway or proposed.
- b. A report shall be made in writing to the Board within seven days of determining that a statistically significant difference occurred between a down gradient sample and California and Federal Drinking Water Standards (Maximum Contaminant Levels, MCLs). Notification shall indicate what MCLs has/have been exceeded. The discharger shall immediately resample at the compliance point where this difference has been found and re-analyze.
- c. If resampling and analysis confirms the earlier finding of a statistically significant difference between monitoring results and MCLs the discharger must submit to the Board an amended Report of Waste Discharge to make appropriate changes to the corrective action program (CAP) as specified in Section 2550.10(h)(j) of Chapter 15.
- d. Within 90 days of determining statistically significant evidence of a release, submit to the regional board an engineering feasibility study for a Corrective Action Program (CAP) necessary to meet the requirements of Section 2550.10. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern.

## 3. REPORTING

By April 30 of each year the discharger shall submit an annual report to the Board covering the previous calendar year. The annual report may incorporate the second semi-annual report of the previous year. The annual report shall contain:

- a. Tabular and graphical summaries of the monitoring data obtained during the previous year; the report should be accompanied by a 5<sup>1</sup>/<sub>4</sub>" computer data disk, MS-DOS ASCII format, tabulating the year's data.
- b. A comprehensive discussion of the compliance record, and the corrective actions taken or planned which may be needed to bring the discharger into full compliance

with the waste discharge requirements.

- c. A map showing the area, if any, in which filling has been completed during the previous calendar year.
- d. A written summary of the groundwater analyses indicating any change in the quality of the groundwater.
- e. An evaluation of the effectiveness of the leachate monitoring/ control facilities, which includes an evaluation of leachate buildup within the disposal units, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods utilized.

4. WELL LOGS

A boring log and a monitoring well construction log shall be submitted for each new sampling well established for this monitoring program, as well as a report of inspection or certification that each well has been constructed in accordance with the construction standards of the Department of Water Resources. These shall be submitted within 30 days after well installation.

Part B

1. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

A. ON-SITE OBSERVATIONS - Report Semi-annual

STATION	DESCRIPTION	OBSERVATIONS	FREQUENCY
V-1 thru V-'n'	Located on the waste disposal area as delineated by a 500 foot grid network.	Standard observations for the waste management unit.	Monthly/qrtly
P-1 thru P-'n' (perimeter)	Located at equidistant intervals not exceeding 1000 feet around the perimeter of the waste management unit.	Standard observations for the perimeter.	Monthly/qrtly
L-1 thru L-'n'	At each point of discharge. Include a map indicating locations of discharge(s)	Standard test as outlined in Table A. Grab sample taken from seeps with flow rates exceeding 5 gpm.	Semi-annual

B. GROUNDWATER and SURFACE WATER MONITORING - Report Semi-annual

Groundwater and surface water shall be monitored as outlined below and in Table A (Attached) and shown on Figure A (Attached).

**Monitoring Points:**

Surface Water	SW2,SW3(downstream), SW1(upstream)
Groundwater wells	P-9A,MW-4,MW-7,MW-8, MW-2,
Debris zone(Leachate)	LW-6
Groundwater elevation measurement points	LW-1,LW-2,LW-3,LP#1,LP#2,MW-1,MW-3, RMW-3,MW-5,MW-6,P-1,P-2,P-3,P-4,P-5,P-6,P-7,P-8& P-9

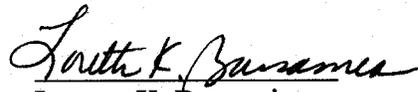
**C. FACILITIES MONITORING**

The Discharger shall inspect all facilities to ensure proper and safe operation once per quarter and report semi-annually. The facilities to be monitored shall include, but not be limited to:

- a. Water diversion systems;
- b. Leachate Management facilities and secondary containment.

I, Loretta K. Barsamian, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

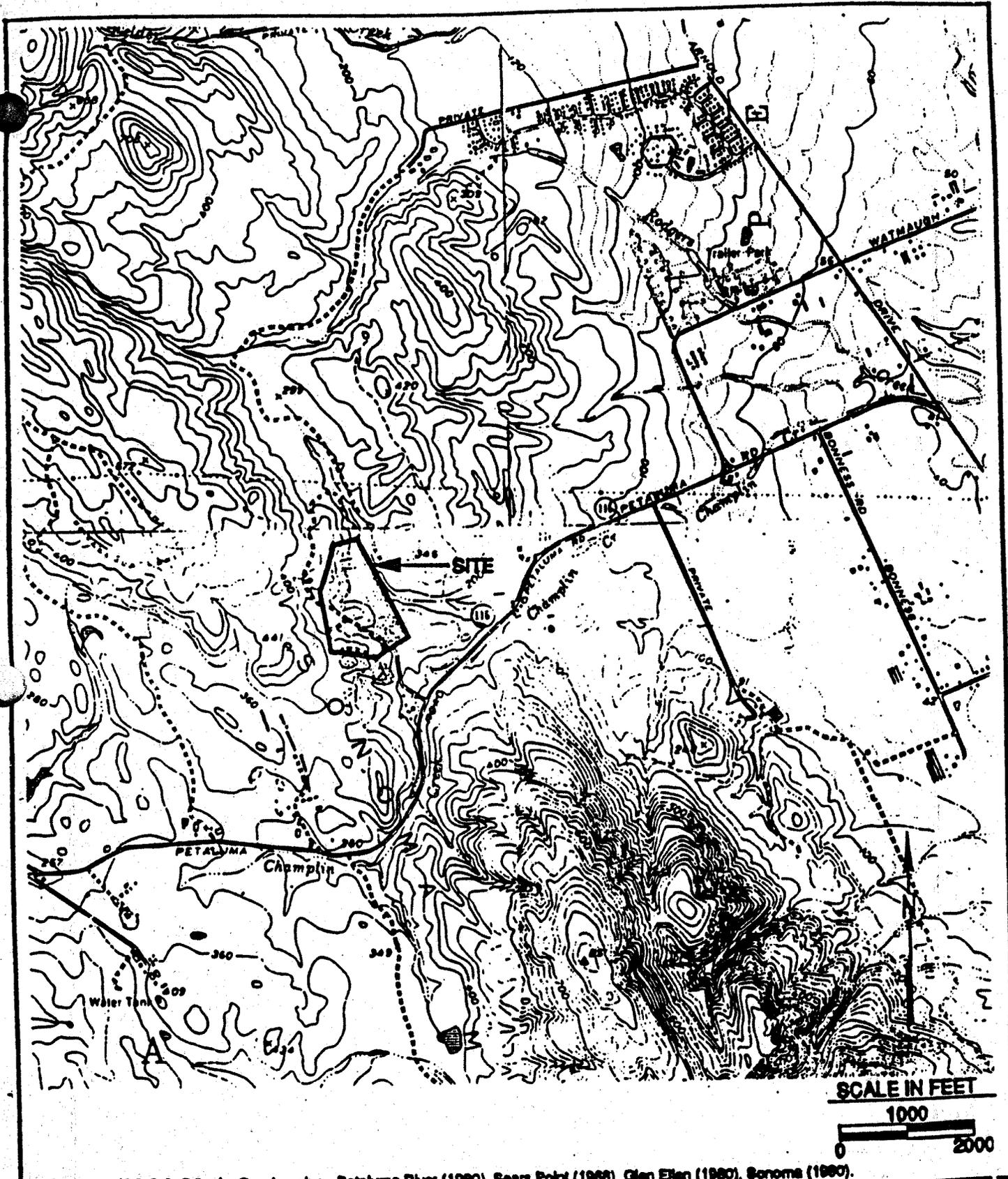
- 1. Has been developed in accordance with the procedures set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Board's Order No. 96-039.
- 2. Is effective on the date shown below.
- 3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer.

  
 Loretta K. Barsamian  
 Executive Officer

Date Ordered: March 20, 1996

Attachment: A - Site Map  
 Table A - Schedule for Sampling, Measurement, and Analysis

DATE 7/27/94  
REVIEWED BY  
PREPARED BY JMH



Map Source: U.S.G.S. 7.5 min. Quadrangles - Petaluma River (1980), Sears Point (1988), Glen Elen (1980), Sonoma (1980).

SITE LOCATION MAP

ATTACHMENT A



Proposed Water Quality Monitoring  
Program and Response Plan  
Sonoma Disposal Site  
Sonoma County, California

PROJECT NO.  
91-1170301.94

DRAWING NO.  
2-1

SONOMA COUNTY LF ORDER No. 96-039  
WASTE DISCHARGE REQUIREMENTS

Table A - Discharge Monnitoring Plan, List of Analytical Parameters

Parameters	Method	Frequency	Reference
Water level measurements	Field	Semi-annual	1
Temperature	Field	Semi-annual	1
Alkalinity, bicarbonate(d)	310.1	Semi-annual	2
Sulfate(c)	300.1	Semi-annual	2
Chemical oxygen demand	410.2	Semi-annual	2
Total nitrogen(the sum of Nitrate Nitrogen and Kjeldahl Nitrogen) (d)(c)	351.2	Semi-annual	3
Total organic carbon	415.1	Semi-annual	2
Total dissolved solids	160.2	Semi-annual	2
Electrical conductivity	9050	Semi-annual	3
Benzene (b)	8020	Semi-annual	3
Chlorobenzene (b)	8010	Semi-annual	3
1,4 Dichlorobenzene (b)	8010	Semi-annual	3
Dichlorodifluoromethane (b)	8010	Semi-annual	3
cis-1,2-Dichloroethene(b)	8010	Semi-annual	3
Ethylbenzene (b)	8020	Semi-annual	3
Toluene (b)	8020	Semi-annual	3
Vinyl chloride (b)	8010	Semi-annual	3
Trichloroethene (b)	8020	Semi-annual	3
Bis(2-ethylhexyl)phthalate(b,d)	8270	Once in 5yr	3
2,4 Dimethylphenol(b,d)	8040	Once in 5yr	3
Organochlorine Pesticides & PCBs	8080	Once in 5yr(b)(d)	3
Arsenic	7060	Semi-annual	3
Barium (b,c)	6010	Semi-annual	3
Cobalt (b)	6010	Semi-annual	3
Cadmium	6010	Semi-annual	3
Chromium	6010	Semi-annual	3
Potassium	6010	Semi-annual	3
Magnesium	6010	Semi-annual	3

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Copper	6010	Semi-annual	3
Lead	6010	Semi-annual(d)	3
Selenium	7740	Semi-annual	3
Iron	6010	Semi-annual	3
pH	9040	Semi-annual	3
Leachate level and extraction rate measurements	Field	See Note 4	1

1. Not Applicable

2. Methods for Chemical Analysis of Water and Wastes, EPA600/4/79/029, revised March 1983.

3. EPA SW-846

Frequency and Sample Type:

(b) groundwater samples only

(c) surface water samples only

(d) constituents of concern

4. The leachate extraction rates shall be recorded weekly and reported as follows:

- total weekly flow (gallons per week);
- total quarterly flow (gallons);
- total number of days the system was shutdown during the quarter;
- average pumping rate in gallons per minute (gallons per minute);
- total cumulative flow since system start up (gallons).