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State of California **California Natural Resources Agency**

M e m o r a n d u m

To: Dockets

Date : October 3, 2013

Telephone: (916) 654-3940

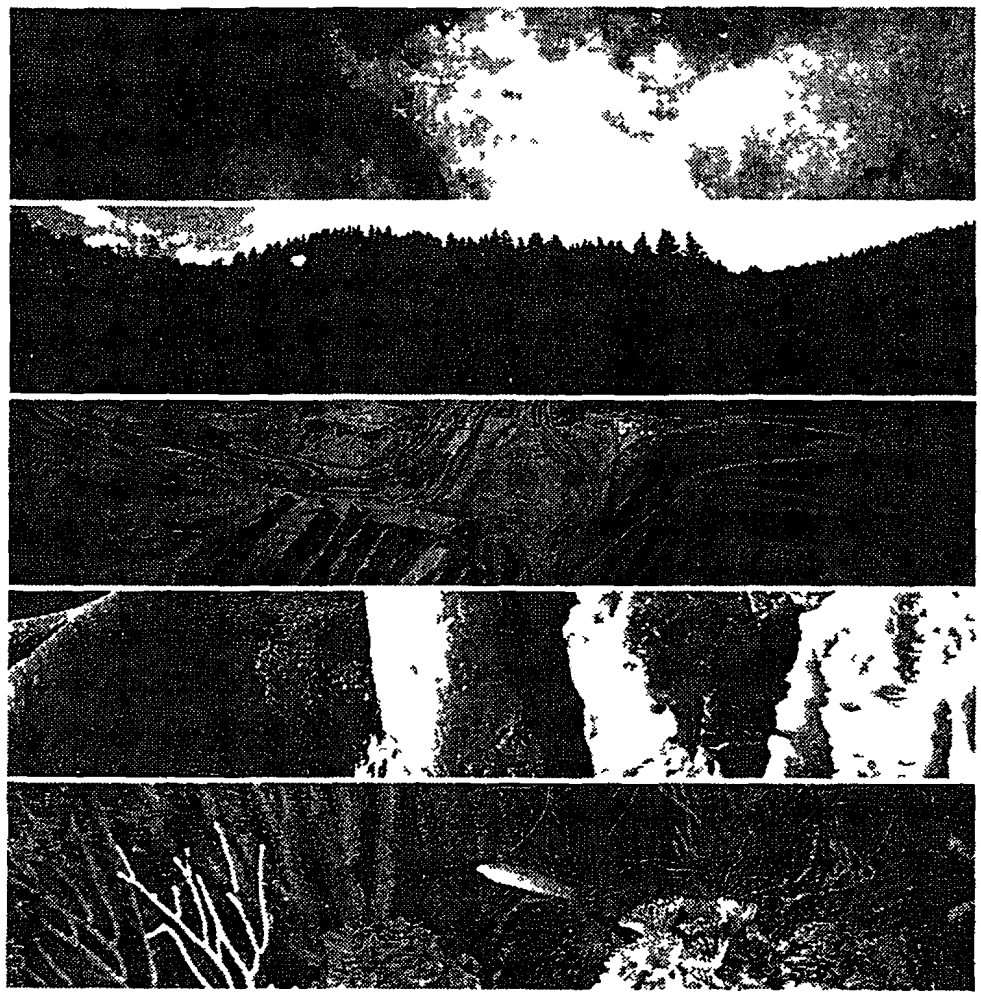
From: **California Energy Commission**
1516 Ninth Street
Sacramento CA 95814-5512

Camille Remy Obad
Compliance Project Manager

Subject: Bottle Rock Petition to Amend (79-ARC-4C)

Dockets please re-docket the 1996 Dames and Moore “Final Report Decommissioning and Cleanup Cost Estimates Bottle Rock Power Plant…November 5, 1996” to the Bottle Rock Geothermal Power Plant compliance file (79-AFC-4C). The entire report was rescanned electronically per a request from the Petitioner, and although the document was originally submitted to dockets in 2006, there is no active hyperlink to the document, and thus it is not available electronically for all interested parties (see TN#s 37891 & 37893).

Thank you.



FINAL REPORT
DECOMMISSIONING AND CLEANUP COST ESTIMATES
BOTTLE ROCK POWER PLANT
LAKE COUNTY, CALIFORNIA
FOR CRESTON FINANCIAL GROUP

Job No 30681-001-043
November 5, 1996

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September 19, 2006

VIA HAND DELIVERY

Christopher Meyer
Compliance Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re Bottle Rock Power Plant - 79-AFC- 4
Responses to Data Requests, Supplemental Information

Dear Mr Meyer

Bottle Rock Power, LLC ("BRP") filed responses to data requests on September 18, 2006 Therein, BRP indicated it would file under separate cover copies of the Dames & Moore Phase I and Phase II Environmental Site Assessments Report as identified in Data Response #1 As this report is extremely voluminous, no electronic copy will be provided Thus, accompanying this letter are five (5) copies of the report in hard copy format

As always, if you have any questions regarding this Petition to Amend, please do not hesitate to contact me at (916) 447-0700

Very truly yours,

John A McKinsey

JAM kjh

Enclosures

cc Service List (attached)

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TABLE 1 - Cost Estimates for Decommissioning Scenarios

APPENDICES

Appendix A - List of Documents and Permits Reviewed
Appendix B - Interviews Conducted with Regulators and DWR Staff
Appendix C - Copies of Permits Reviewed
Appendix D - Detailed Cost Estimate Back-up
Appendix E - Phase I Environmental Site Assessment Report
Appendix F - Phase II Environmental Site Characterization Report

FINAL REPORT
DECOMMISSIONING AND CLEANUP COST ESTIMATES
FOR BOTTLE ROCK POWER PLANT
LAKE COUNTY, CALIFORNIA

1.0 EXECUTIVE SUMMARY

This report presents the results of environmental investigations of potential environmental contamination related to the geothermal development of the Bottle Rock well field and Power Plant and decommissioning and site clean-up cost estimates of these facilities The Phase I and Phase II environmental investigations indicate that no significant impairment of soil or groundwater exists at the site as a result of the Bottle Rock Power Plant and well field geothermal operations Potential impacts to soil and groundwater are limited to arsenic at concentrations above background in surface materials in limited areas of the Francisco Pad (injection separator outfall) and the Coleman Pad (beneath knock-out pots) Arsenic concentrations in concrete (third floor walls of the power plant and injection sump floor) and in pipeline, turbine and vent muffler scale may effect site clean-up costs The primary regulatory requirements for plant decommissioning and site closure are California Energy Commission (CEC) Closure and Lake County Site Reclamation Plans Decommissioning and site Clean-up costs for complete and immediate plant and well field demolition and site restoration including regulatory compliance are approximately $3 09 million These costs do not include plugging and abandoning the wells, reworking wells or repairing or rehabilitating wells, wellheads, the gathering system or the power plant and associated facilities for potential operation If the power plant can be sold as an operating unit, the recovery from the site closure is the sale value of the power plant (estimated at $3 5 million) less the site clean-up and decommissioning costs ($3 09 million) could net $0 41 million If the well field is returned to operation an additional $0 65 million (excluding potential costs of restarting the well field) for site restoration of the well field, pads and access roads could be saved for a potential net of $1 06 million

2.0 INTRODUCTION

This report presents the findings of Dames & Moore's Decommissioning and Cleanup Cost Estimate for the Bottle Rock Power Plant and Steam Fields (the site) located on High Valley Road in the town of Cobb, Lake County, California This project was performed in accordance with our proposal to Creston Financial Group (Creston) dated January 25, 1995

This is the third of three reports prepared in connection with evaluating potential environmental concerns and liabilities and estimating future decommissioning site-cleanup costs for closure of the Bottle Rock power plant and steam fields

This project has several objectives The first objective is to present the results of investigations of potential environmental contamination related to the Bottle Rock well field and power plant operations that may be relevant to future potential environmental liabilities, site clean-up requirements, and site remediation and restoration costs The first two reports (the Phase I Environmental Site Assessment dated August 31, 1995, and the Phase II Site Investigation (Draft) dated January 12, 1996) presented the results of our evaluation of the soil and groundwater and facility contamination at the site This report constitutes the final report for the project It includes brief summaries of the results of the environmental investigation and presents our evaluation of the regulatory compliance requirements for decommissioning and closure of the site Based on this evaluation of activities required to comply with these regulatory requirements, the results of our site investigations, and recent experience in other Geysers areas, Dames & Moore also presents estimated regulatory compliance, site-cleanup and deconstruction costs The actual decommissioning and site-cleanup costs may vary as clean-up and restoration criteria become established during the actual decommissioning regulatory process

2.1 SITE DESCRIPTION AND BACKGROUND

Located in the Lake County portion of The Geysers Known Geothermal Resources Area (KGRA), the Bottle Rock Power Plant and Steam Field were developed during the early 1980's The site consists of two parcels, the privately owned, Francisco leasehold of 360 acres and the federally owned, Binkley leasehold All geothermal development to date has occurred on the Francisco leasehold. The federal Binkley leasehold has not yet been developed and will only be discussed briefly in this report. Several residences, accessed by paved or dirt roads, are located on the Binkley leasehold.

Originally, the steam field was owned and developed by MCR (formerly McCulloch) Geothermal with the power plant owned and developed by the California Department of Water Resources (DWR) The power plant came on line in 1985 at full design capacity of 55 MW (net) In 1987, DWR acquired the steam field from MCR. Production generation levels declined and by 1990 the power plant was shut down with all operations suspended The steam wells had bridge plugs installed to eliminate air emissions while allowing for future use According to DWR, the power plant and well fields are being maintained in a state of readiness sufficient to resume operations with adequate notice.

Site development includes a 55-megawatt capacity power plant and its associated chemical abatement systems, a hydrogen sulfide abatement system, a water treatment facility, cooling towers, and an electrical switching yard outside the power plant building The steam field is comprised of 16 geothermal production and injection wells located on three different well pads, drilling sumps, and a steam gathering system. The gathering system includes steam pipelines, condensate lines and removal equipment (e g , knockout pots), reinjection lines, associated valves and supports, and an electronic control system.

With the exception of the reinjection wells, the wells have not operated for over five years and much of the steel piping that connects the well heads to the main steam line has been removed from the well pads. A steam line connects the power plant to the three well field pads Francisco, Coleman, and West Coleman. Each well pad contains several steam wells and a sump for drilling fluids Additionally, the Francisco pad has two reinjection wells for geothermal fluid wastes Asphalt-paved and gravel roads wind along the hillsides to access the well pads The former steam supplier's compound is located adjacent to the Francisco well pad This area contains a small building for offices and storage, a metal frame storage shed, and an equipment yard for the storage of pipes, valves and miscellaneous items

The power plant and well fields, currently not operating, are reportedly being maintained in a state of readiness sufficient to resume operations within six months, although actual start-up may take longer All hazardous materials were removed from the site after operations ceased, and only a number of small containers of hazardous substances remain on site The sumps were reportedly emptied of all drilling materials and the hazardous materials storage tanks were emptied and flushed (Mr Coe Hall, DWR) Two of the sumps, the Francisco and West Coleman, were rehabilitated in 1989

2.2 PURPOSE

This evaluation was initiated by Creston in connection with its potential financial interest in the property The purpose of this evaluation was to address Creston's concerns regarding potential costs of environmental cleanup related to the geothermal development, power plant decommissioning costs, and potential long term environmental liability related to geothermal development at the site

2.3 APPROACH

To address these concerns, Dames & Moore developed a scope of work to establish the environmental condition of the soil and groundwater at the site related to the geothermal development

activities as well as the environmental condition of the facilities themselves In addition, Dames & Moore evaluated the regulatory process to identify procedures required to decommission the power plant and close the site with regulatory compliance

2.3.1 Assessment of Environmental Conditions

The current environmental status of the site was assessed at both the Bottle Rock Power Plant site and the two leases that comprise the main steam field area This assessment focused on the presence of chemical contaminants related to geothermal development activities for two purposes

1) Evaluation of potential environmental impact to soil and groundwater from the geothermal activities, and

2) Evaluation of the costs of site deconstruction, potential recycling or deconstruction and disposal of the site facilities

Because extensive groundwater monitoring by DWR indicated that there has been no discernable impact to groundwater from the geothermal activities, our investigations of potential environmental impact at the site focused on the presence of potential contaminants in the soil In addition, Dames & Moore evaluated the potential presence of contaminants on the facilities such as pipelines or power plant walls These investigations were carefully focused by reviewing the extensive records of geothermal operations at the site, in particular by reviewing incidents of non-standard operations

This task was accomplished by conducting a Phase I Environmental Site Assessment (ESA) on the power plant and steam field, (Appendix E) as defined by ASTM E 1627 - 94 Standard Practice for Environmental Site Assessments Phase I Environmental Site Assessment Process This process consisted of document review, reconnaissance survey, environmental database search and agency contacts with responsible regulators

In particular, the ESA focused on identifying areas of potential impact related to nonstandard operation of the geothermal facilities such as spills or standard operational leaks in order to design a Phase II sampling investigation. The Phase II investigation addressed the specific concerns identified by the ESA in both soil and facilities The detailed media sampling program, along with the results of these Phase I and Phase II investigations are described in Sections 3 1 and 3 2 of this report. Copies of the Phase I and Phase II investigations are included as Appendices F and G

2.3.2 Decommissioning Cost Estimates

Dames & Moore understood that the decommissioning cost estimates would depend on the environmental condition of both the site and the facilities, and on the regulatory compliance requirements for decommissioning and closure Deconstruction cost estimates of the site were determined with the assistance of a licensed construction/demolition contractor and represent actual costs to perform the dismantling of the facilities These costs have been compared to in-house costs prepared by other geothermal operators of similar facilities in The Geysers, which show similar total costs.

Estimating costs associated with the regulatory compliance portion of decommissioning the facility requires identifying the regulatory procedures, since neither Lake County or the CEC have processed a "closure" Because both agencies require detailed Closure or Reclamation plans to be submitted prior to commencing closure, and the precise decommissioning and closure costs cannot be obtained until these plans are submitted and accepted by these respective agencies, the Dames & Moore team has approached this task by evaluating the most probable content of these plans This evaluation included reviewing the CEC Decision on the Bottle Rock Application for Certification (AFC), the Lake County Conditional Use Permit for the steam field and the Francisco Lease, as well as other supplemental information from CEC In addition, the activities performed by PG&E to comply with Sonoma County use permit requirements for decommissioning of Geysers Power Plant Units 1-4 were reviewed. Although the requirements of Sonoma County are different, and the CEC was not involved, the activities associated with this closure were reviewed because the closure of Units 1-4 was the only actual power plant closure and decommissioning in The Geysers The specifics are discussed in Section 4 of this report The cost estimates for preparing the required compliance Closure and Reclamation documents are based on typical consultant report preparation The long-term monitoring component of site closure was addressed, but well abandonment and associated permitting were not included in this scope of work as requested by DWR

3.0 RESULTS OF ENVIRONMENTAL SITE INVESTIGATIONS

Dames & Moore performed Phase I and Phase II Environmental Site Assessments (ESAs) to evaluate potential impact of past and current site operations on environmental conditions at the site The results provided information for assessing whether cleanup activities will be required during facility decommissioning and estimating the potential costs The following sections briefly describe the findings of the two environmental investigations and their impact on the decommissioning activities and costs.

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT

The purpose of the Phase I ESA was to review past and present land use practices, site operations and conditions, and nearby offsite land uses to evaluate the potential presence of soil and/or groundwater contamination at the site resulting from the generation, use, storage and disposal of hazardous substances In particular, the ESA focused on identifying potential areas of environmental concerns in order to design the Phase II sampling investigation The ESA included the following tasks review of available historical information and DWR documents regarding site history and plant operations, such as environmental permits, previous investigations, and records of hazardous materials use, storage, or releases, review of a database report of regulatory agency lists of sites under investigation for environmental violations within one mile of the site, interviews with local regulatory agency personnel familiar with the site, interviews with the former DWR plant manager and environmental specialist for information regarding operations, spill incidents, and environmental compliance, and performance of a reconnaissance visit to the site to observe existing site conditions

The results of the ESA indicated that environmental conditions at the facility were good and that the potential for significant soil and groundwater contamination arising from geothermal operations is low The type of contaminants associated with the reported spills and releases were typically relatively low levels of inorganic constituents such as boron, arsenic, vanadium, mercury, and zinc Most of the data reported in the annual monitoring program and the various cleanup investigations following spill incidents indicate that concentrations of these constituents in soil and groundwater are below hazardous cleanup levels While no extensive contamination appeared likely, a number of localized areas of potential concern related to sumps, stormwater runoff, hazardous materials storage, a former underground storage tank (UST), releases of geothermal steam or fluid, and contaminated equipment were identified as specific locations for sampling in the Phase II investigation The results of these investigations are discussed in the following

3.2 PHASE II ENVIRONMENTAL SAMPLING

The Phase II field investigation addressed areas of potential impact identified by the ESA At most of these locations, soil samples were collected for laboratory analysis of the constituents of concern In addition, concrete chip samples, scale samples and wipe samples were collected to evaluate potential contamination of the facilities such as the underground sump, the pipeline and equipment The following is a summary of the locations sampled

Soil Samples

Power Plant - downwind of the muffler and at the stormwater outflows

Steam Suppliers Compound - distressed vegetation, equipment yard, and former UST location
Francisco Well Pad - distressed vegetation, stormwater catchment basin and injection outflow areas
Coleman Well Pad - sump integrity, distressed vegetation, and beneath knockout pots

Facilities Sampling - piping, muffler, turbine
Power Plant - muffler, turbine, underground reinjection sump, plant walls
Well Field - pipeline and knockout pot

3.2.1 Soil Investigations

The findings of the field investigation reported that from 8 to 39 5 mg/kg arsenic and from 19 7 to 808 mg/kg chromium are present in soil at various locations at the site The concentrations of these constituents are generally within the range of background concentrations reported from The Geysers area, with a few exceptions

In two areas where steam condensate and associated scale accumulated at the surface, arsenic concentrations are above backgrounds One surface soil sample collected beneath the injection/separator outfall on the Francisco well pad and two surface soil samples collected beneath knockout pots on the Coleman well pad had concentrations of arsenic exceeding Total Threshold Limit Concentration (TTLC) for hazardous waste The nature of the metal contamination in the surface materials at these locations suggest that the extent of this contamination is limited to areas directly affected by scale and condensate emissions

These results suggest that limited amounts of the surface materials at these locations may have to be handled as hazardous materials if removed from the site

Samples collected from the six soil borings at the former UST location did not detect the presence of benzene, toluene, ethyl benzene and xylenes (BTEX) Minor concentrations of Total Petroleum Hydrocarbons as diesel, ranging from 5 7 to 14 mg/kg, were detected in three of the soil samples These results suggest that the soil remaining after removal and excavation of the UST is not significantly impacted by the material from the tank

3.2.2 Facility Investigations

The facilities sampling indicated the presence of elevated levels of arsenic ranging from 12 8 to 17 7 mg/kg and minor amounts of mercury in concrete chip samples from the injection sump and the third

floor power plant wall Arsenic and mercury were also present in scale samples from the turbine (24 9 mg/kg and 1 3 mg/kg, respectively) and from knockout pot on the Coleman pad (27 5 mg/kg) The highest concentration of arsenic reported (2820 mg/kg) was collected from scale material inside the main pipeline on the Coleman pad

3.3 IMPACT ON DECOMMISSIONING CLEANUP ACTIVITIES AND COSTS

The findings of the Phase I and Phase II investigations indicate that no significant environmental impairment of soil was present and that major site remediation or cleanup activities are not warranted for site closure. Limited and concrete samples indicated that contamination identified in soil removal at specific locations and steam cleaning of selected facilities may facilitate site closure These locations and facilities are discussed below

Arsenic concentrations above background were detected in soil samples collected beneath the knockout pots on the Coleman well pad and beneath the injection/separator outfall on the Francisco well pad Additional sampling and the limitations of transport of arsenic in this environment indicate that this soil contamination is localized in the small area beneath the pots where scale and concentrate are released, and may also be present beneath the knockout pots on other well pads Dames & Moore has recommended minimal cleanup activities including removing a limited amount of soil, up to several cubic feet per location, for off-site disposal Additional soil samples would be required to characterize the waste and to confirm that all soil exceeding cleanup levels had been removed

Results of the Phase I and Phase II also indicate a limited amount of cleanup of facility materials (concrete and pipeline scale) may be required to complete deconstruction Sampling of concrete inside the turbine building indicated the presence of elevated levels of arsenic in the concrete walls Steam cleaning of the building interior may be necessary prior to demolition in order to crush and re-use the concrete as fill at the site One week of steam cleaning has been included in the cost estimate of cleanup activities. The rinse water would be reinjected eliminating any additional waste or disposal costs The necessity for this steam cleaning will be established during the development of a site closure plan.

Elevated levels of arsenic present in the scale material inside the pipelines at the West Coleman pad does not present any additional costs for decommissioning, according to pipeline removal specialists Reclamation and recycling processes for steel can obviate the need for treatment prior to recycling If subsequent evaluation indicates that cleaning the Coleman pad pipelines would be appropriate, they can be flushed and/or steam cleaned and the rinsate injected at no additional cost If the pipelines are to be reused in place (Scenario 4) without cleaning, however, workover of the wells and parts of the

pipeline could pose a health and safety issue to workers exposed to the scale material, or it may increase disposal costs if corroded spools need to be replaced These potential costs should be considered when reviewing well startup activities

4.0 PERMIT REVIEW AND REGULATORY REQUIREMENTS

Decommissioning of the Bottle Rock Power Plant and Steam field would begin with the regulatory process The regulatory process provides the framework for developing site-specific clean-up and restoration plans, obtaining necessary public concurrence with these plans, and appropriate government authorization. To evaluate what this regulatory process would include, existing permits and authorizations were carefully reviewed The regulators responsible for the permit authorities were contacted to clarify the requirements pertaining to decommissioning contained in the permits The Francisco Lease section addressing lease termination was reviewed, and the High Valley Road Negative Declaration, Traffic Control Plan, and easement contracts were reviewed Review of the California Division of Oil, Gas and Geothermal Resources (CDOGGR) well abandonment requirements are not included in this report, since well abandonment was not included in the scope of work.

4.1 AGENCY PERMITS, DOCUMENTS AND AUTHORIZATIONS REVIEWED

• California Energy Commission (CEC)

The decommissioning process of any CEC-approved power plant has yet to occur If a decision is made to commence the decommissioning of the Bottle Rock facility soon, it will be the first in the state, and therefore there are no established CEC precedents for decommissioning The power plant was permitted by the CEC Decision Application for Certification (AFC) process dated November 1980 There is limited discussion regarding decommissioning in the AFC Decision However, correspondence with the Compliance Manager and the Office Manager for the Siting Office clarified the CEC position

• California Regional Water Quality Control Board - Central Valley Region

This agency has jurisdiction for the sumps, erosion control, and spills, preventing surface run off into the streams The Waste Discharge Requirement Orders contain language for sump closure There are two sets of Requirements, one for the Binkley lease (Order No 89-129), which has never been utilized, and one for the Francisco leasehold (Order No 76-202) The power plant did not require authorizations from the CRWQCB-CVR.

• Lake County Planning Department

Lake County has jurisdiction over the surface lands excluding the power plant site The steam field, road, and former steam suppliers compound were permitted by the Lake County Planning Commission's issuance of Conditional Use Permits (CUPs) The permit for the steam field, #85-27 was originally issued (as #85-17) February 19, 1980, and amended on June 26, 1986 It included language regarding well abandonment

• Francisco Lease

A portion of the lease addresses the condition of the site upon termination of the lease

• High Valley Road Information

The Negative Declaration, Traffic Plan, easements, etc were reviewed Also, Mary Jadiker was contacted, a resident requiring access from High Valley Road, because she also was a sitting member of the Lake County Planning Commission when the CUP was approved

4.2 SUMMARY OF DECOMMISSIONING REGULATORY REQUIREMENTS

The first requirement in the regulatory process of decommissioning and site closure would include preparation and submittal of a detailed draft Closure Plan (CEC) at least one year in advance and a Reclamation Plan (Lake County Planning Department) The process of preparing these plans would require consulting other regulatory agencies with permitting authority Much of the material generated for the CEC Closure Plan will be applicable for the Lake County Reclamation plan, specifically the biologic monitoring, erosion control and revegetation programs could be used in both plans.

The following permitting authorities with jurisdiction and regulatory requirements for decommissioning are highlighted below and discussed in detail in the following sections

• The California Energy Commission - Requires a Closure Plan specifying site clean-up and containing elements for ongoing monitoring of the site for an undetermined period of time

• California Regional Water Quality Control Board - Central Valley Region - Requires that sumps are closed according to permit requirements followed by an inspection

• Lake County Planning Department - Requires that a Reclamation Plan containing revegetation, grading, drainage and maintenance criteria.

• Lake County Building Department - Requires a grading permit to perform regrading

• Lake County Air Quality Management District - If the power plant is demolished on site, a permit for fugitive dust emissions from the concrete dust during crushing, etc may be required

• High Valley Road - There is not a specific regulatory requirement addressing High Valley Road, however, property owners which have signed right-of-way agreements with DWR could request that CEC or Lake County address the future road maintenance, access and traffic control measures It may be appropriate to address these issues in direct discussion with residents and property owners along High Valley Road at the time of decommissioning

• Francisco Lease - A portion of the lease addresses the condition of the site upon termination of the lease.

4.2.1 State Agency Requirements

The following state agencies have jurisdiction for specific aspects of decommissioning the facilities

The California Energy Commission

The CEC Decision on the Department of Water Resources' AFC for the Bottle Rock Geothermal Project 79-AFC-4, Page 7 of the Biological Resources, Finding 39 states

> The Applicant will submit a detailed decommissioning plan to CEC for review and approval one year prior to power plant operation termination This plan will describe in detail the measures required to either restore the leasehold to its pregeothermal development condition or explain why restoration is not being considered and describe any alternative plans that are being considered with regard to biological resources

Also included in the Decision are the following requirements for the decommissioning plan

- One year prior to deactivation, DWR will include in the decommissioning plan a biological resources element identifying mitigation and compensation measures

(Biology Condition 5-2) DWR will submit the biological resources element of the decommissioning plan to the CEC and the California Department of Fish and Game for a determination of adequacy and acceptability

- At least six months prior to decommissioning of the power plant, DWR shall prepare site restoration plans and submit them to the CEC for review and approval (Soils Condition 8-4)

- DWR shall prepare and submit a reclamation plan to the CEC staff, at least six months prior to decommissioning, to restore the site to its original condition as nearly as practicable (Civil Engineering Condition 9-5)

  Verification At least six months prior to decommissioning of the facility, DWR shall submit its reclamation plan to the CEC for review and approval

Correspondence from Norman Wilson, Office Manager, Siting Office, CEC, dated September 21, 1995 and received by the Dames & Moore team (and subsequently forwarded to Mr Coe Hall, DWR), specifies that the draft closure plan will be submitted to the Commissions' Compliance Project Manager (CPM) for review and comment A copy of this correspondence is included in Appendix C

Mr Wilson describes a potential four point process

1 The filing of the draft Closure Plan, which would have to include assurances that all grading and erosion control measures would be accomplished according to the provisions of the California Building Code and not be done during the rainy season He also states that requirements for ongoing monitoring following closure are not specifically defined in CEC conditions of certification CEC expects that biological impacts associated with the closure would have to be addressed as well an proposed mitigation and ongoing monitoring Revegetation should be fully described

2 The potential public interest in the project closure would probably include a public workshop to inform the local residents and allow their input to the draft closure plan CEC's review of the Plan will include coordination with Lake County and other appropriate agencies

3 The DWR will submit a final draft Closure Plan to the CPM incorporating comments received in writing and during the public workshop(s)

4 The CPM will present the Final Draft Closure Plan to the CEC for approval at a Commission Business Meeting

No additional detail is available from CEC at this time regarding the decommissioning or closure process

California Regional Water Quality Control Board - Central Valley Region

There are no Waste Discharge Requirements for the Bottle Rock power plant The well field is only subject to Waste Discharge Requirements for the drilling sumps There are two sets of Requirements, one for the Binkley lease (Order No 89-129), which has never been utilized, and one for the Francisco leasehold (Order No 76-202) These requirements address closure of the sumps The permit states

> Upon completion of the drilling operation, the sumps will be partially dried by evaporation and/or liquid removal If the contents of sumps prove to be nonhazardous, they may be mixed with native soils and buried The disposal areas will then be graded and replanted to prevent erosion

Typically, the sumps are closed at the end of drilling operations and inspected by the Area Engineer for compliance. However, sumps at the Bottle Rock Facility have remained open, and two of the three have been rehabilitated (the Francisco and West Coleman) They could be used for future rehabilitation of the wells. The sumps currently collect rain water which is then piped to the injection well for disposal.

Mr Paul Marshall, Area Engineer (CRWQCB-CVR) stated that there are no Waste Discharge Requirements for the Bottle Rock power plant and therefore no closure requirements However, erosion control to protect the local waterways would be subject to their jurisdiction

4.2.2 Local Agency Requirements

Lake County Planning Department

The original Conditional Use Permit for the steam field included requirements for the abandonment of the wells. In a follow-up discussion with the Lake County regulators, it has been determined that to "decommission" the facilities, a Reclamation Plan must be prepared and submitted to the Lake County Planning Director for closure and reclamation of the steam field This is viewed as an administrative decision, and does not require input from the public It shall require the permit holder to

- Abandon the wells according to California Division of Oil and Gas and Geothermal Resource regulations,
- Refill sump and grade pad to reasonably restore a natural ground contour unless an alternative is approved by the Planning Department, in consultation with the property owner;
- Revegetate the pad, sump, and all graded areas with native grasses and wood vegetation that can be tolerantly sustained in accord with recommendations of the revegetation consultant, or the procedure in condition A-1,
- Include plans for revegetation, grading, drainage and maintenance in the Reclamation Plan.

If ownership of the project is transferred from DWR to Creston, and operations are resumed, updated versions of the existing plans for drainage control, spill contingencies, etc , will need to be submitted to the Planning Department and other agencies

Lake County Building Department

A Grading permit must be obtained to rework the well pads, unneeded roads and the power plant site This can be applied for simultaneously with the submission of the Reclamation Plan to the Planning Department.

Lake County Air Quality Management District

At this time there are no air emissions from the project, other that possible leakage of hydrogen sulfide at one of the wells discussed in the Phase I ESA. The permits for operating the power plant and steam field are still in place Mr Robert Reynolds, the Air Quality Management District Officer, has stated that the potential decommissioning of the facility may require a permit for fugitive dust emissions, if it were to include removal of the concrete power plant building (particularly onsite concrete crushing)

4.2.3 Lease

Francisco Geothermal Lease and Agreement

The lease stipulates the condition of the site upon "termination of the lease" as follows

> "Lessee shall within six (6) months thereafter, remove all personal property which Lessee shall have brought upon the lands affected by such termination or upon the drill site of such abandoned well, shall fill all sumps, remove all foundations and so nearly as practicable restore the areas affected by such termination or abandonment to the condition in which they were prior to the commencement of its operations hereunder; "

Taken literally, this would be extremely difficult and expensive to implement Some negotiations with the property owners at the time of actual decommissioning may be required to see if there is any interest in the power plant building or graded well pad sites

4.2.4 High Valley Road

Requirements for future road maintenance, access and traffic control measures associated with High Valley Road may have to be resolved during the decommissioning process This is a private road, approximately 1 2 miles (1 9 km) in length from the intersection of Bottle Rock Road west into the Francisco geothermal leasehold There are approximately 14 different property owners Prior to construction of the power plant, easements were acquired by DWR from the property owner to widen the road from 12 feet into a two lane road, 20 feet wide Minor alignment changes were also made to improve the design for heavy truck traffic associated with construction and development of the power plant

The road size, maintenance and accessibility were significant issues during the initial development of both the steam field and the power plant Lake County required that a Traffic Control Plan be included as part of the conditions of the Use Permit This plan addressed issues associated with development, construction and operations of the project, but not related to the closure or decommissioning of the facility

When the facility is decommissioned, assignment of responsibilities for the road and gate may need discussion with the residents and property owners These issues, if unresolved, could affect approvals for site closure from the CEC and Lake County Currently the road is maintained by DWR

4.3 CONCLUSIONS

The regulatory process for decommissioning the Bottle Rock facility will not be as cumbersome or expensive as it was to originally permit the facility It appears to be a relatively direct process The primary activities include

- Closure Plan preparation and submittal to the CEC for approval
- Reclamation Plan preparation and submittal to Lake County for approval
- Sump closures and permits related to site closure activities (e g grading permit)
- Establish procedures for future maintenance and operations of High Valley Road and associated facilities

The primary variables will be

- How much monitoring will be required and for how long?

  Both Lake County and CEC require monitoring programs to assess the results of the closure We recommended that DWR take a pro-active approach and propose a reasonable monitoring program to address erosion control, drainage, revegetation and other biologic concerns which would be submitted to both agencies DWR is currently operating a soil and biological monitoring program, which may provide a basis for a post-closure monitoring program

- What are the Francisco lease owners interests upon lease termination?

  The Francisco lease owners may be interested in having the wall pads remain uncontoured, having the access roads to the pads left, or keeping the buildings, either the former steam

supplier complex or the power plant building It is recommended that the Lease owners be contacted prior to preparation of the Closure and Reclamation Plans to discuss these issues

- Addressing concerns of the High Valley Road property owners regarding road access and long-term maintenance

Since DWR acquired easements with no expiration dates, and widened and straightened the private road, responsibilities for road access and maintenance after decommissioning have not been established The property owners may have concerns regarding these issues and they will have the opportunity to make their concerns public during the CEC public workshop If these concerns are not addressed, acceptance of either the Lake County Reclamation Plan or the CEC Closure Plans could be delayed Therefore, we recommend discussing these issues with the property owners and residents prior to the CEC public workshop

- The length of time it will take to process the Closure and Reclamation Plans

There are no time limits specified in the CEC documents or Lake County Use Permit Submittal of the CEC Closure Plan is required one year prior to decommissioning but is not explicit about how long the process will take to review the Plan and conduct the workshop, etc It is recommended that the applicant request a schedule during preparation of the Closure and Reclamation Plans

5.0 CURRENT DECOMMISSIONING COST ESTIMATES

In addition to the process of regulatory compliance, decommissioning of the DWR Bottle Rock geothermal wellfield, power plant and associated facilities will involve some site restoration and remediation including dismantling of the pipeline, dismantling of the power plant, site restoration, and/or well abandonment and regulatory compliance With the exception of well abandonments, scope and cost estimates for these construction and regulatory activities and the assumptions on which they are based are presented in this section and the approach described in Section 2 4 2 Details of these estimates are presented in Appendix D Cost estimates are presented for various decommissioning scenarios and schedules The various scenarios have been developed in discussions with Creston and cover a variety of potential scenarios for future use of these facilities These scenarios include the following

1 Immediate dismantling of the wellfield (except well abandonment), power plant, and associated structures, regrading and revegetating the roads and pads, recycling all

potentially valuable materials as scrap or used machinery, and appropriate environmental compliance and site closure permitting and reporting

2 The same as Scenario 1, but fifteen years from now and assuming no additional environmental impact requiring clean-up The potential cost depends upon the future rate of inflation

3 Similar to Scenario 1, but with the sale of the working parts of the power plant as a unit for reuse rather than as salvage materials

4 Dismantling of the power plant only with the sale of the working parts of the power plant as a unit for reuse The wellfield would remain, assuming potential reuse of the steam and wells elsewhere

5 1 WELLFIELD COSTS

The activities and costs associated with the closure of the wellfield are described below The decommissioning of the wellfield is a component of three of the potential scenarios, the fourth scenario envisions operating the steamfield and sale of steam to an off-site power generation facility

The costs provided below do not include any costs for well abandonment and closure as required by the California Division of Oil, Gas and Geothermal Resources These costs include plugging and abandoning wells and associated permitting In scenarios re-using the wellfield or powerplant, costs of reworking wells, or repairing or rehabilitating wells, wellheads, or the gathering system are not included

5.1.1 Pipeline Costs

The costs included in the removal of the steam gathering system include the removal and disposal of the production and injection pipelines, pipeline support, pipe insulation, and associated hardware The wellfield comprises 6880 feet of production pipeline and 6160 feet of injection pipeline Approximately half of the injection pipeline is underground, and this estimate includes the excavation and removal of the underground line The estimate is calculated on the basis that the recycling value of the pipeline and associated hardware, which are recycled by the pipeline removal contractor are equivalent to the removal cost for the pipeline The subgrade portions of the pipeline are removed to a depth of 45", and the insulation must be removed as trash

5.1.2 Grading and Recontouring Well Pads and Well Pad Access Roads

As discussed above, a Reclamation Plan approved by the Lake County Planning Director appears to be required prior to closure and reclamation of the steam field This plan will specify actual site restoration requirements, and these requirements can only be estimated until the plan is approved Reclamation described by the plan includes refilling the sumps and grading the pads to remove sharp demarcations of slope and to provide appropriate drainage of stormwater runoff This cost estimate is based on a grading plan which is not intended to restore the site to its original condition prior to construction of the well pads, rather it is designed to minimize disturbance and soil erosion at the site while reducing the outlines of former pad features It is the opinion of Mr Bogener of DWR and the Dames & Moore team based on these investigations that this is the grading scenario most likely to be approved by Lake County The cost to grade and recontour the Francisco, Coleman, and West Coleman well pads is based on the portion of the pad area requiring re-grading (3 6 acres) and a cost of $3,500 per acre, for a total of $12,600 Any long term maintenance potentially required is not included in this cost figure

Prior to grading, Dames & Moore has recommended excavation, and loading into drums for off-site disposal of "several cubic feet" of soil from two areas with arsenic concentrations above TTLC (see Section 3 3 above) Estimated cost for disposal is $2,000 Excavation and loading soil into drums can be performed as part of grading for no significant additional cost

The cost of restoration of the well pad access roads include regrading and the removal and disposal of the current asphalt surfacing The cost of grading and restoration at $3,500 per acre (as above) for the 5 87 acres of access roads is approximately $20,650 The cost of removal and on-site hauling to the crusher and crushing of the asphalt is approximately $299,588 The roads will then be revegetated If roads are left in place for various landowner's uses, these costs could be reduced

5.1.3 Revegetation

As part of the Reclamation Plan discussed above, the well pads, sumps, and all graded areas must be revegetated with native vegetation that can be tolerably sustained, based on the recommendation of a revegetation consultant. The available estimates for revegetation vary widely, ranging from $2,500 to more than $15,000 per acre, based upon the type of species replanted and the density In general, woody shrubs and tree seedlings are more expensive to introduce and maintain than grasses Because much of the surrounding area was originally covered by native grasses prior to the management and suppression fires, the replanting of native grasses may be considered appropriate revegetation of the site Seeds from trees surrounding the well pads will disperse over time onto the site and continue

the revegetation process Based on this investigation, the Dames & Moore team believes that a revegetation plan using native grasses will be acceptable to the Lake County Planning Director The estimate of revegetation presented is based upon this proposed scheme of revegetation using only native grasses The approximate cost is estimated to be $8,000 per acre, for 13 34 acres of graded well pads and access roads, totaling $106,960

5.2 POWER PLANT COSTS

The individual elements of the various reuse scenarios for the power plant are discussed below

5.2.1 Dismantling of Power Plant

All of the scenarios include the dismantling of the power plant at some point in time, with the sale or recycling of all potentially valuable materials The above ground portion of this project involves the demolition, transportation and disposal of the cooling towers and power plant building, with removal of mechanical and electrical equipment and miscellaneous construction The turbine building will be steam cleaned to remove arsenic contamination prior to demolition and the rinsate reinjected The below ground restoration includes decontamination cleaning (with reinjection of rinsate) and excavation of sumps and underground lines The area will be filled with crushed concrete debris from the demolition of the power plant building

5.2 2 Resale/Salvage of Power Plant Equipment

Salvageable equipment for resale include the transformers, turbine and affiliated power plant systems, cooling tower fans, miscellaneous pump panels and electric motors In addition, nonferrous metals will be recycled on a per pound or per ton basis Scenario 1 and Scenario 2 include individual costs for this equipment if sold for recycling or salvage value Scenario 3 and Scenario 4 assume that the power plant equipment can be sold as a unit for reuse at another location The value of the power plant sold as a unit would probably be higher than as separate parts

5.2.3 Regrade Site and Access Road

The power plant sumps will be filled with crushed building demolition debris and the pad and access road will be graded and revegetated As discussed above, cost estimates assume that grading will be designed to minimize disturbance and to generally smooth out the sharp edges of the existing pad features

The main access, High Valley Road, was installed by DWR after obtaining easements from the local landowners, and DWR is responsible for maintenance of the road and gate Should the DWR transfer ownership of the easements to Creston, it is uncertain what the fate of High Valley Road would be upon facility decommissioning, because the easements have no expiration date Future discussions with the landowners will be important

5.2.4 Revegetation

The graded power plant pad and access road will be revegetated with native grasses The per acre cost estimate is also approximately $8,000, totaling $40,000 for the 5-acre power plant pad

5.3 REGULATORY COMPLIANCE COSTS

Cost estimates associated with the regulatory compliance portion of decommissioning are based on descriptions of the required processes provided by the regulators Since neither Lake County or California Energy Commission (CEC) have processed a "closure" before, there were no examples available for comparison.

5.3.1 Cost Descriptions

Both the Lake County Planning Department and CEC require detailed Closure or Reclamation plans to be submitted prior to commencing decommissioning The Dames & Moore team reviewed the language in the CEC Commission Decision on the Bottle Rock Power Plant AFC, the Lake County Conditional Use Permit for the steam field, the Francisco Lease (steam field and power plant), as well as other supplemental correspondence from CEC to determine the required scope of work The regulatory procedures are discussed in greater detail in Section 4 of this report

Much of the material generated for the CEC Closure Plan will be applicable for use in the Lake County Reclamation Plan, particularly the required biologic monitoring, erosion control and revegetation programs. Reusing this material will probably reduce the cost of the Reclamation Plan

Ongoing monitoring of the site discussed in recent CEC correspondence with the Dames & Moore team would require additional expenditures However, the type and duration of monitoring (CEC suggested monitoring should "last no more than two or three years") are undetermined We anticipate that monitoring costs will be approximately $10,000 annually

The cost estimates for preparing the required compliance Closure and Reclamation documents are based on typical time and materials fees for consultants working on focused environmental reports It is assumed that both Plans would be prepared concurrently by the same Consultant This would result in a cost savings, due to the similarity of data required for each plan

Discussions with property owners of High Valley Road regarding site closure may lead to additional expenditures. Although the original road issues were handled primarily at the County level, they may also play a part in the CEC process Since the CEC is planning on holding at least one public workshop in Lake County to discuss issues of concern to the public, the High Valley Road property owners will most likely participate If their concerns are not addressed prior to the Commission business meeting, the Commission may consider requiring a public hearing process, which would take more time and therefore more expense No cost estimates have been included in this report regarding the long term maintenance or access of High Valley Road

Well abandonment permit fees from the Division of Oil, Gas and Geothermal Resources were not included because the scope of work did not include well abandonment costs

5.3.2 Cost Estimates

California Energy Commission Closure Plan - $25,000 - $35,000

In addition to preparation of a detailed Closure Plan, with erosion control, revegetation and biological monitoring programs, approval requires at least one public workshop in Lake County If there are no unresolved or controversial issues brought up by the public, approval by the Commission will follow at their regular business meeting in Sacramento As discussed previously, the High Valley Road property owners may have issues to be resolved regarding long term maintenance and access These concerns could result in additional undetermined costs associated with reaching an agreement The cost estimates presented, include time and materials estimates for consultant preparation of the Plan and attendance at one workshop in Lake County and one CEC Business Meeting in Sacramento It is also assumed that both Plans would be prepared concurrently by the same Consultant, resulting in a cost savings No cost estimates have been included regarding the long term maintenance or access of High Valley Road No legal fees are included

CEC Required Biological Monitoring Costs - $10,000 per year, based on annual costs from DWR (no more than three years)

Lake County Reclamation Plan - $25,000-$30,000 A detailed plan must be prepared for the well pads, access roads, steam field offices, sumps, and pipeline removal It must include revegetation, grading, drainage and maintenance Approval consists of an administrative decision The cost estimates presented, include time and materials estimates for consultant preparation of the Plan and one meeting with the Planning Director in Lake County It is also assumed that both Plans would be prepared concurrently by the same consultant, resulting in a cost savings No cost estimates have been included regarding the long term maintenance or access of High Valley Road These estimated costs also do not include any legal fees

It is important to note that the Lake County Conditional Use Permit (CUP) 85-27 for the Bottle Rock Steam field, Public Health and Safety, Condition 16 required the following (emphasis added)

> A financial assurance agreement, certificate of deposit or bond, will be required to be provided and maintained by the permit holder to insure cleanup in case of spills, landslides, mishaps and site **reclamation upon abandonment.** Said financial agreement shall make available up to $360,000 (to be adjusted every two years in accordance with the San Francisco Area Consumer Price Index) for this purpose and shall be payable to the County of Lake and require County approval to terminate

It is not known what type of financial instrument was provided by DWR when they acquired the steam field portion of the lease, and the CUP It is assumed that the financial instrument is still in place It is possible that Lake County will not release the financial instrument, if the High Valley Road property owners have outstanding concerns

Lake County Grading Permit - $1,177 50 for up to 150,000 cubic yards

Permit Filing Fees

- CEC Bob Brand, Compliance Manager, said he was not aware of any fees associated with Closure He thought the fees paid for Certification would still cover Closure

- Lake County Planning Department It is also thought that the fees paid for the original Conditional Use Permit will suffice for the Reclamation Plan or Condition 16

5.4 DECOMMISSIONING AND CLEANUP COSTS FOR EACH USE SCENARIO

The four potential scenarios and the associated costs for each are discussed in the following subsections These scenarios have been derived from discussions with Creston regarding possible alternatives for future uses of the site

5.4.1 Scenario 1

Scenario 1 considers that neither the power plant nor the wellfield will operate again, therefore, the entire site will be immediately dismantled and closed according to regulatory guidelines According to this plan, the power plant building and cooling towers will be demolished, all pipelines removed, and any material that can be recycled will be salvaged The plant and well pads will be graded and revegetated as discussed above

The total cost for this deconstruction, site restoration and decommissioning of the Bottle Rock Geothermal Power Plant is $2,989,402 plus approximately $66,178 for regulatory compliance costs and $30,000 for environmental monitoring, for a total of $3,085,580

5.4.2 Scenario 2

This scenario envisions the start-up and operation of the well field and power plant for up to 15 years No additional environmental problems are envisioned from continued operation under the current strict operation and maintenance procedures, barring any unforeseeable catastrophic event Assuming the costs for decommissioning would be similar to current costs, plus a factor of 3 percent for future rate of inflation, total site closure and decommissioning costs would be approximately $4 83 million

5.4.3 Scenario 3

In this alternative, the power plant unit is sold as a whole for use elsewhere, rather than the sale of individual equipment for salvage value Because the well field and power plant buildings and the plant pads must still be remediated, the site restored, decommissioned and the site closed, this does not significantly alter the cost of site-cleanup or decommissioning cost estimates, but provides for a potential recovery cost. Assuming the power plant can be sold for $3 5 million, the net recovery from site closure is the sale value of the power plant ($3 5 million) less the total cost from scenarios 1 ($3 09 million) or net $0 41 million The sale value was estimated based on an informal survey of geothermal power plant engineers and development managers

5.4.4 Scenario 4

This scenario assumes that the geothermal wells can be brought back on-line and that the steam can be sold to a nearby power plant and that power plant is sold as a unit The non-essential power plant would be demolished and the site restored as outlined, but the steamfield would remain active The decommissioning of the steam fields would then become the responsibility of the party purchasing the steam, and decommissioning costs are limited to the power plant (the sale value of the power plant ($3 5 million), less the power plant demolition and restoration costs ($2 3 million) plus regulatory compliance ($96,178) for a net of $1 06 million

6.0 CONCLUSIONS AND RECOMMENDATIONS

As a result of these investigations, Dames & Moore presents the following conclusions and recommendations regarding the environmental condition and decommissioning and site closure

1 The Phase I and Phase II environmental investigations indicate that no significant impairment of soil or groundwater exists as a result of the Bottle Rock Power Plant and well field geothermal operations Current potential impacts to soil and groundwater are limited to

- Arsenic at concentrations above background in discolored surface materials where injection fluid flows from the injection separator, across the Francisco pad and toward the sump, and

- Arsenic at concentrations above background in stained and discolored surface materials immediately beneath knock-out pots on the Coleman Pad

The extent of this contamination is most likely limited to the extent of the discoloration of surface materials.

2 Results of Phase I and Phase II investigations regarding contaminant concentrations in facility materials that may affect site clean-up indicated the presence of

- Arsenic concentrations (up to 18 mg/kg) in concrete chip samples from the injection sump basins and the inner third floor walls of the power plant,

- Arsenic (up to 2,820 mg/kg inside the main steam pipeline at the Coleman Pad) and mercury (up to 4 5 mg/kg in from vent muffler scale) in scale from inside turbine

housing the vent muffler and the pipeline on the Coleman Pad Metal concentrations in scale from other locations such as the power plant vent muffler and knock-out pots were significantly lower indicating that not all scale formed in the facilities by geothermal condensate contains elevated metal concentrations

3 Results of hydrocarbon analyses of soil samples collected from the former UST location at the steam suppliers compound suggest that there is no significant impact from the UST in soil remaining after the excavation

4 The primary regulatory requirements for power plant decommissioning and closure requiring significant effort include

- CEC closure plan specifying site clean-up and on-going environmental monitoring,
- Lake County Site Reclamation Plan specifying plans for regrading, revegetation, drainage and maintenance,
- Unspecified requirements by land owners and local agencies regarding High Valley Road.

Estimated costs for regulatory compliance during site closure and decommissioning are approximately $100,000 This estimate assumes that the CEC and Lake County plans will be prepared together; and it does not consider additional costs related to High Valley Road, nor involvement (unanticipated at this time) of regulatory agencies not discussed in Section 4 0

5 Decommissioning costs for complete and immediate plant and well field deconstruction and site reclamation including regulatory decommissioning and site closure are approximately $3 09 million. Estimated costs for other alternatives including the following

- The same scenario in 15 years at 3 percent inflation will cost approximately $4 8 million.
- If the essential and significant portions of the power plant are sold as an operating unit rather than for salvage value (estimated value $3 5 million), estimated recovery from site closure would approximately be $0 041 million

- If the well field is reworked and not restored, decommissioned, or cleaned up, estimated site restoration and clean-up costs would be approximately $3 09 million If significant parts of the power plant can be sold as an operating unit ($3 5 million estimated value) under this scenario and excluding any benefit from steam sales, the net benefit could be $1 06 million

Recommendations

Dames & Moore provides the following recommendations for streamlining and minimizing costs of remediation and site closure of the Bottle Rock geothermal facilities

1 Remove limited amounts of soil in the immediate vicinity of soil discoloration at the injection separator footfall on the Francisco Pad and beneath knock-out pots

2 Remediate metal concentrations on interior concrete walls on the third floor of the power plant and in the injection sump by a process such as steam cleaning prior to deconstruction and crushing.

3 Consider flushing production piping on the Coleman pad and injection the flush water prior to either reworking or removal of this piping

TABLE 1 SUMMARY OF COST ESTIMATES FOR DECOMMISSIONING SCENARIOS			
POWER PLANT	**Scenario 1 / 2[1]**	**Scenario 3**	**Scenario 4**
Mobilization and Management	$279,309	$279,309	$279,309
Above Ground Demolition			
Cooling Towers	$149,625	$149,625	$149,625
Power plant building	$807,344	$807,344	$807,344
Turbine Building Cleaning	$10,000	$10,000	$10,000
Concrete Walks & Paving	$47,414	$47,414	$47,414
Concrete Crushing	$96,453	$96,453	$96,453
ABG SUBTOTAL	$1,110,836	$1,110,836	$1,110,836
Below Ground Restoration			
Power Plant Building	$507,315	$507,315	$507,315
Cooling Tower	$147,393	$147,393	$147,393
BG SUBTOTAL	$654,708	$654,708	$654,708
DEMOLITION SUBTOTAL	**$1,765,544**	**$1,765,544**	**$1,765,544**
Site Restoration			
Grading	$257,198	$257,198	$257,198
Revegetation	$40,000	$40,000	$40,000
RESTORATION SUBTOTAL	**$297,198**	**$297,198**	**$297,198**
Salvage/Sale Values (included above)			
Sale of Power Plant for Reuse	$0	($3,500,000)	($3,500,000)
SALVAGE SUBTOTAL	**$0**	**($3,500,000)**	**($3,500,000)**
POWER PLANT TOTAL	$2,342,051	($1,157,949)	($1,157,949)
WELL FIELD			
Mobilization and Management	$83,566	$83,566	
Pipeline Removal			
Above Grade	$96,882	$96,882	$0
Below Grade	$27,105	$27,105	$0
PIPELINE REMOVAL SUBTOTAL	**$123,987**	**$123,987**	**$0**
Pad Restoration			
Pad Grading	$12,600	$12,600	$0
Pad Revegetation	$59,760	$59,760	$0
Off-site Disposal	$2,000	$2,000	$0
PAD RESTORATION SUBTOTAL	**$74,360**	**$74,360**	**$0**

TABLE 1 SUMMARY OF COST ESTIMATES FOR DECOMMISSIONING SCENARIOS			
POWER PLANT	**Scenario 1 / 2[1]**	**Scenario 3**	**Scenario 4**
Road Restoration			
Asphalt Removal (Stomp/Load/Haul)	$74,531	$74,531	$0
Asphalt Recycling	$225,057	$225,057	$0
Road Grading	$20,650	$20,650	$0
Revegetation	$47,200	$47,200	$0
ROAD RESTORATION SUBTOTAL	**$367,438**	**$367,438**	**$0**
Steam Suppliers Compound			
Miscellaneous Equipment Removal	$0	$0	$0
WELLFIELD TOTAL	**$649,351**	**$649,351**	**$0**
REGULATORY COMPLIANCE COSTS			
CEC Closure Plan	$35,000	$35,000	$35,000
Lake County Reclamation Plan	$30,000	$30,000	$30,000
Lake County Grading Permit	$1,178	$1,178	$1,178
CEC Biological Monitoring (3 years)	$30,000	$30,000	$30,000
REGULATORY COMPLIANCE SUBTOTAL	**$96,178**	**$96,178**	**$96,178**
DECOMMISSIONING PROJECT TOTAL	**$3,087,580**	**($412,420)**	**($1,061,771)**

1 Scenario 2 = Scenario 1 + 3%/year inflation rate × 15 years = $4,829,700

APPENDIX A

LIST OF DOCUMENTS AND PERMITS REVIEWED

APPENDIX A

LIST OF DOCUMENTS AND PERMITS REVIEWED

The following documents and permits have been reviewed

California Regional Water Quality Control Board, Central Valley Region

- Waste Discharge Requirements for Francisco Geothermal Steamfield and Property Owners Francisco, Coleman, West Coleman
- Waste Discharge Requirements for Binkley Geothermal Project

Lake County

- Lake County Conditional Use Permit 86-27 (formerly 85-17)
- Lake County Conditional Use Permit 87-92 (Binkley)
- Lake County Staff Report, June 23, 1987 Re Approval of MCR Geothermal Corp Revised Traffic Control and Road Maintenance Plan, Consistent with Condition M.13, of Use Permit 85-27 Attachments
  - 1 Traffic Control and Road Maintenance Plan approved by Planning Commission 2/13/87
  - 2 Proposed Revisions to the Traffic Control and Road Maintenance Plan dated 5/87
  - 3 Comments from affected property owners and interested agencies
  - 4 Conditions from Use Permit 85-27 related to traffic control
  - 5 June 16, 1987 final pre-hearing Traffic Control and Road Maintenance Plan
- Lake County Staff Report dated November 10, 1988 for Certification of Final EIR for DWR Binkley Geothermal Project

California Energy Commission (CEC)

- CEC Commission Decision on the DWR Application for Certification for the Bottle Rock Geothermal Project 79-AFC-4
- CEC's most recent permit language for plant "Closure" pertaining to a power plant approved in Campbell in 1994 The language in the original Record of Decision

issued for the Bottle Rock facility discussed the filing of a Decommissioning (now named a Closure) Plan with the Commission one year prior to closure

- California Energy Commission's order approving Modified and Reduced Environmental Monitoring during the suspension of operations
- Correspondence September 21, 1995 from Norm Wilson, Chief Siting Division, regarding closure activities

Miscellaneous

- Portions of the Francisco Geothermal Lease and Agreement dated February 25, 1975, pertaining to termination of the lease or abandonment of wells
- PG&E Geysers Units 1-4 Site Characterization Work Plan, Site Plan and appendices
- Department of Water Resources Negative Declaration - High Valley Road, January 16, 1981
- Records of Right of Way/Easements for High Valley Road

APPENDIX B

INTERVIEWS CONDUCTED WITH REGULATORS AND DWR STAFF

APPENDIX B

INTERVIEWS CONDUCTED WITH REGULATORS AND DWR STAFF

- Jeri Scott, CFC Energy Facilities Siting & Environmental Protection Division, Compliance Manager for DWR project
- Mr Norman Wilson, CEC Division Chief, Energy Facilities Siting & Environmental Protection Division
- Mr Robert Brand, CEC Energy Facilities Siting & Environmental Protection Division
- Mr Paul Marshall, Area Engineer California Regional Water Quality Control Board - Central Valley Region
- Mr Mark Dellinger, Lake County, Former Geothermal Coordinator/Planning
- Mr Steve Zalusky, Lake County Zoning Enforcement Officer
- Mr Ray Ruminski, Supervising Environmental Health Specialist, Lake County Environmental Health Department
- Mr Manuel Ramirez, Hazardous Materials Specialist, Lake County Environmental Health Department
- Mr Robert Reynolds, District Officer, Lake County Air Quality Management District
- Mr Ross Kemper, Air Quality Specialist, Lake County Air Quality Management District
- Mr Coe Hall, DWR (Re road easements, maintenance and gate ownership after permanent plant closure
- Mr Dean Cooley, PG&E (Re Units 1-4)
- Ms Sigrid Swedenborg, Sonoma County Geothermal Coordinator (Re PG& E Units 1-4)

<u>DWR Staff Interviewed</u>

- Mr Glen Gordon, Former Plant Superintendent
- Mr Dave Bogener, Environmental Specialist IV

APPENDIX C

COPIES OF PERMITS REVIEWED

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO 89-067

WASTE DISCHARGE REQUIREMENTS
FOR
CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The Board, on 26 April 1985, adopted Order No. 85-086 regulating discharges from Geothermal Operations of MCR Geothermal Corporation.

2. This is an update of existing waste discharge requirements.

3. On 30 June 1988, the California Department of Water Resources acquired all interests in the Francisco Geothermal Steamfield from MCR Geothermal Corporation.

4. The geothermal operation property is owned by entities shown on Attachment A are part of this Order.

5. Hereafter, Department of Water Resources and entities shown on Attachment A, are jointly referred to as Discharger.

6. The Discharger proposes to engage in geothermal well drilling and exploration, road construction, transportation of steam to power plants, and disposal of waste condensates.

7. The geothermal operations will be conducted on lands located in all or portions of Sections 5 and 6, T11N, R8W, MDB&M, as shown on Attachment B, a part of this Order.

8. The Discharger proposes to construct sumps, whose locations are described in Attachment C, a part of this Order.

9. Wastes produced during the site preparation and during the drilling operations consist of silt, soil, rock cuttings, drilling muds with additives, oils, condensate, and associated wastewater.

10. The Discharger proposes to discharge bentonite drilling mud with additives that include. bicarbonate of soda, caustic soda, lignite, graphite, cottonseed hulls, flocculants, sodium polyacrylate, sodium sulfate, cement, oil and water to disposal sumps. Upon completion of the drilling operation, the sumps will be partially dried by evaporation and/or liquid removal. If the contents of sumps prove to be nonhazardous, they may be mixed with native soils and buried. The disposal areas will then be graded and replanted to prevent erosion

11. The Discharger proposes to place a minimum of two-foot compacted clay or soil cement liners in the disposal sumps to physically separate the waste materials from any surface or ground waters. The Discharger proposes to grade the tops of the sump dikes to prevent runoff induced erosion of downhill faces of the dikes.

12. Condensates produced during steamfield operation and/or geothermal power generation will be metered and reinjected into the subsurface strata, at a depth sufficient to prevent mingling of the condensates and usable ground water. Discharge, storage, and/or treatment of 'hazardous' or 'designated wastes' generated from geothermal activities other than drilling operations, will be in facilities designed and operated in accordance with the California Code of Regulations (CCR) Title 23, Chapter 3, Subchapter 15 (Subchapter 15).

13 Condensates produced during well drilling and development operations may be discharged to disposal sumps.

14. Discharges of drilling mud and cuttings from well drilling operations are exempt from Subchapter 15, pursuant to Section 2511(g), provided the following conditions are met·

    a. All such discharges are to on-site sumps and do not contain halogenated solvents

    b At the end of drilling operations, the Discharger shall either:

        1) remove all waste from the sump, or

        2) remove all free liquid from the sump and cover the solid and semi-solid waste, provided representative sampling of the sump contents after liquid removal shows residual solid waste to be nonhazardous.

15. The Discharger has obtained approval from the County of Lake for the use of the drilling waste mud sump sites listed in Attachment C.

16. A final Environmental Impact Report has been approved by the County of Lake for the geothermal operations, in accordance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq).

17. The Regional Board has reviewed the final Environmental Impact Report and determined that potential adverse water quality impacts are:

    a. Siltation from roads, drill pads, and mud sumps.

    b Loss of drilling fluid to ground or surface waters.

    c. Release of petroleum products or domestic sewage to surface drainage courses

Compliance with the following Discharge Specifications will mitigate or avoid the adverse impacts listed above:

B.4. All drilling fluid sumps will be lined with two feet of compacted clay with a permeability not to exceed $1x10^{-6}$ cm/sec.

B.6. Wastewater shall not be in contact with two-foot liners for more than eight months.

B 10. A minimum freeboard of three feet shall be maintained in all drilling mud sumps.

B 12. All petroleum products shall be stored so that spills are directed into the drilling mud sumps.

B 21. Wastes produced during road, pad, and sump construction shall be placed where they cannot enter surface waters.

B 22. Drilling mud sumps shall be protected from washout, erosion, or inundation.

B 24. All earthen fill shall be compacted to minimize sloughing. Exposed soil shall be revegetated to prevent erosion.

B 25. During drilling operations, a berm shall be constructed around the pad to prevent spills from entering surface waters.

B 27. Modification of surface drainage patterns shall not cause accelerated erosion.

B 33. Sanitary facilities shall be provided at each drill site.

18. The final Environmental Impact Report indicates that no ground water aquifers have been found in the Franciscan Formation that underlie the Francisco Leasehold. Since there is a lack of ground water resource, any leakage through sump liners would not be expected to pose a threat to ground water. However, a threat to surface water may exist.

19. Surface water drainage of the geothermal development area is to High Valley Creek, thence to Kelsey Creek, which is tributary to Clear Lake.

20. The beneficial uses of High Valley and Kelsey Creeks include domestic, industrial, and agricultural supply; recreation; esthetic enjoyment; and preservation and enhancement of fish, wildlife and other aquatic resources. The beneficial uses of Clear Lake include domestic, municipal, industrial, and agricultural supply; recreation; esthetic enjoyment; navigation; power generation, and preservation and enhancement of fish, wildlife, and other aquatic resources.

21. The Board, on 25 July 1975, adopted a Water Quality Control Plan for the Sacramento River Basin (5A) which contains water quality objectives for all waters of the Basin These requirements are consistent with that Plan

22. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharges.

23 The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order No. 85-086 be rescinded and the California Department of Water Resources and property owners, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following.

A. Discharge Prohibitions:

1. The direct discharge of wastes of any nature to surface waters or surface water drainage courses is prohibited.

2 There shall be no disposal of drilling mud, oil, wastewater, and other associated wastes, except in sumps listed in Attachment C of this Order, or in sumps which are designed and constructed to meet or exceed the criteria prescribed by the Executive Officer.

3 There shall be no disposal, storage, treatment, or transport of wastes into facilities which are not described within this Order or which are not properly permitted by a Regional Board

B. Discharge Specifications (Land Disposal):

1. Neither the treatment nor disposal of waste shall cause a nuisance or pollution as defined by the California Water Code.

2. Sumps shall not be used before the Discharger certifies to this Board that the sumps meet the Discharge Prohibition A.2 and the Discharge Specification B 4.

3. The discharge of 'designated' and 'hazardous' wastes to mud sumps shall be limited to the materials listed below:

a petroleum fractions

b bentonite drilling mud and additives

c drill cuttings and dewatered solids (cake)

d. steam condensate, during the course of well drilling and well development only

4. The mud sumps shall be lined with at least two feet of compacted clay or soil cement having a permeability of $1x10^{-6}$ cm/sec (1 foot/year) or slower, and shall be designed by a Registered Civil Engineer to withstand both static and dynamic loads imposed by a maximum credible seismic event.

5. Tanks may be used in place of conventional mud sumps provided they are designed by a Registered Engineer to withstand static and dynamic loads imposed by a maximum credible seismic event. Open top tanks shall not be buried deeper than their height (the tank top shall not be lower than the finished grade of the pad).

6. Wastewater shall not be in contact with sump liners for more than the times listed below.

   a. Two-foot liners, eight months;

   b. Three-foot liners, twelve months.

7. Sumps used for periods longer than those noted in Discharge Specification B 6 must comply with a. or b. listed below:

   a. File a new Report of Waste Discharge for the sump as a long-term storage facility (Subchapter 15 would apply).

   b. Provide sufficient information to the Executive Officer to prove that sump fluids leaking through the liner will not affect the beneficial uses of surface and ground water.

8. Buried tanks used for drilling operations shall not remain in the ground for more than twelve months. All tanks shall be maintained in good working order.

9. Sumps designed and used to contain the materials listed in B.3. above shall not be used for the storage, treatment, or disposal of any other wastes.

10. A minimum freeboard of three feet shall be maintained in the conventional mud sumps. A minimum freeboard of one foot shall be maintained in all open top tanks

11. There shall be no seepage or overflow from the conventional mud sumps or tanks.

12. All petroleum products, hydraulic fluids, drilling mud, and additives shall be used and stored in such a manner that any spills are contained or directed into the mud sump. Where tanks are used in place of mud sumps, spills shall be collected immediately and returned to the tanks.

13. Dry cuttings and drilling waste (40%-50% solids) may be stored on-site during drilling operations provided they are protected from an inundation, which could occur as a result of floods having a predicted frequency of once in 25 years, and from direct precipitation.

14. Drill pads and sump liners shall be protected from erosion caused by discharges from solids control tanks and mufflers.

15. Upon completion of well drilling operations, drilling wastes shall be removed from the sumps unless the Discharger demonstrates that the contents of the sump do not contain soluble toxic constituents which exceed the following limits:

Constituent	mg/l of Extract*
Arsenic	5
Cadmium	1.0
Chromium III	25
Chromium VI	5
Nickel	20
Mercury	0.2
Zinc	250
Boron	100

* Data for sump contents shall be obtained using the CCR, Title 22, Section 66670, Waste Extraction Test (WET). The Chromium VI analysis must be done on extract prepared with the use of deionized water.

16. At the end of drilling operations, the Discharger shall:

    a remove all waste from the sump, or

    b remove all free liquids from the sump and if representative samples do not exceed the limits of B.15, the solid residue may be mixed with native soil, compacted, and buried. The sump shall be completely filled and capped with soil containing no waste, compacted and the surface graded to prevent ponding.

17 Dry cuttings that do not exceed the limits of B.15 may be buried on-site provided they are placed in a sump meeting or exceeding the requirements of B 4 and are compacted The sump shall be completely filled and capped with soil containing no waste, compacted and the surface graded to prevent ponding.

18. Any waste removed from mud sumps or cuttings stored on-site shall be discharged only to a properly permitted disposal site.

19. The Discharger shall remove and relocate any wastes which are discharged in violation of these requirements.

20. The discharge shall not cause degradation of any usable ground water

21. Wastes produced during drill site preparation, road construction, road maintenance, and site maintenance shall be placed where they cannot reasonably be expected to be carried into the waters of High Valley Creek and Kelsey Creek or tributaries thereof.

22. The mud sumps shall be protected from any washout or erosion of waste or covering material, and from inundation, which could occur as a result of floods having a predicted frequency of once in 100 years.

23. Mud tanks shall be protected from any washout or erosion and from inundation, which could occur as a result of floods having a predicted frequency of one in 100 years.

24. All earthen fills shall be compacted to minimize sloughing. Subdrains shall be installed under fills, where necessary, to prevent hydrostatic sloughing. Exposed soil shall be revegetated by natural or artificial means as necessary to prevent sheet, rill, and/or gully erosion.

25. During drilling operations, a 1.5 foot high compacted berm shall be constructed around the edge of the pad to prevent spills from entering surface waters.

26. Waste confinement barriers shall be protected and maintained to ensure their effectiveness.

27. The modification of surface drainage patterns shall not cause accelerated erosion.

28. The exterior surfaces of the mud sumps shall be graded to promote lateral runoff of precipitation and to prevent erosion

29. Within 90 days after the completion of all waste discharges to any sump, the sump shall be buried in accordance with Specification B.16, graded, and the area revegetated to prevent erosion.

30. If a sump cannot be closed within the time period noted in Discharge Specification B.29, the Discharger shall provide sufficient information to the Board to prove the sump cannot be closed and how it will be protected. A time schedule for sump closure must be provided by the Discharger and shall be subject to approval by the Executive Officer.

31. Within 90 days after completion of all waste discharges, all cuttings and drilling waste stored on-site shall be processed according to B.16 or B.17.

32. If dry cuttings and drilling waste cannot be removed from a drill pad within the time period noted in Discharge Specification B.31, the Discharger shall provide sufficient information to the Board to prove the material cannot be removed and how it will be protected. A time schedule for removal must be provided by the Discharger and shall be subject to approval by the Executive Officer.

33. Sanitary facilities shall be provided at each drill site.

C. Provisions:

1. The Discharger shall maintain a copy of this Order at each site and shall be available at all times to site operating personnel.

2. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements", dated 1 September 1985, which are part of this Order.

3 The Discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of the waste discharge For the purpose of these requirements, this includes any proposed change in the boundaries of the project area as defined in Finding No. 7 of this Order, the construction of new sumps, or the reconstruction of previously used sumps.

4. The Board considers the property owner of the disposal sump sites as identified in Finding No. 4 of this Order, to have a continuing responsibility for correcting any problem which may arise in the future as a result of a waste discharge or water applied to the property during subsequent use of the land for other purposes.

5. The Discharger shall comply with the attached Monitoring and Reporting Program No. 89-067.

6. Within 90 days of the effective date of this Order, the Discharger shall file with the Regional Board a technical report on the preventive (fail-safe) and contingency (cleanup) plans for controlling accidental discharges and minimizing the effects of such events. The report shall include:

   a. Identification of possible sources of accidental loss of petroleum products, or any other materials used in the drilling operation, and steam condensate.

   b. Describe facilities and procedures to be used in preventive and contingency plans.

WASTE DISCHARGE REQUIREMENTS
CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

I, WILLIAM H. CROOKS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 28 April 1989.

WILLIAM H CROOKS, Executive Officer

Revised 4/11/89 DID·gs

Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 89-067
FOR
CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

A. Certification, Prior to Discharge

The Discharger shall submit a written certification to the Executive Officer after construction or reconstruction of a mud sump and prior to any discharge The certification shall include the following information:

1. The permeability of the mud sump lining.

2. The thickness of the mud sump lining.

B. Progress Reports

The Discharger shall notify the Executive Officer, in writing, no later than five days after the following events:

1. First waste discharge to the mud sump or tanks.

2. Completion of the well or wells scheduled to be drilled adjacent to the mud sump and completion of all discharges to the waste sump or tanks.

3. Completion of the final sump closing activities and/or removal of cuttings from the site.

C Circulation Losses

The Discharger shall immediately notify the Regional Board of any circulation loss during the construction of a well at depths less than 300 feet.

1. Location of the well.

2. Depth of the well.

3. Amount of drilling mud lost

4 Method of correction.

D. Waste Transfers

The Discharger shall record all transfers of waste from any mud sump or cuttings from the drill pad. The record shall include the type and amount of waste removed and the location of the new disposal site. This information shall be submitted to the Board monthly, on or before the 15th day of the following month.

EFFLUENT MONITORING

1. The Discharger shall record the volume of waste material removed to an approved disposal site and report those data to the Regional Board monthly, on or before the 15th day of the following month, until completion of final sump closing.

2. The Discharger shall report the constituents of the mud used for each well including all additives.

3. The Discharger shall analyze condensate and other wastewater for the constituents listed below. Samples shall be taken from the sedimentation basin of the associated power plant, if the power plant and/or injection wells are within the area covered by this Order. The Discharger shall also submit the name (number) and location of all injection wells within the area covered by this Order.

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Electrical Conductivity	μmhos/cm	Grab	Quarterly
Arsenic	mg/l	Grab	Annually
Boron	mg/l	Grab	Annually
Chloride	mg/l	Grab	Annually
Sulfate	mg/l	Grab	Annually
Nitrate	mg/l	Grab	Annually
Volume	bbls/mo	--	Annually
Hardness	mg/l*	Grab	Annually

* As $CaCO_3$

RECEIVING WATER MONITORING

The Discharger shall monitor ground and/or surface water associated with each well site as specified below. Samples shall be analyzed for at least the following constituents:

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Electrical Conductivity	µmhos/cm	Grab	Quarterly
Boron	mg/l	Grab	Quarterly
Chloride	mg/l	Grab	Quarterly
Sulfate	mg/l	Grab	Quarterly
Nitrate	mg/l	Grab	Quarterly
pH	pH Units	Grab	Quarterly
Arsenic (total)	mg/l	Grab	Quarterly
Hardness*	mg/l	Grab	Quarterly

* as $CaCO_3$

Samples shall be taken immediately upstream and downstream, where applicable, of each drill site, under the following conditions

1. At least one month prior to the start of drill pad or sump construction; and

2. At least one month prior to the start of drilling operations.

A map showing the location and description of the stream sampling points shall be submitted prior to the start of sampling for each project. The project may include data collected prior to the development of roads or well sites.

Sampling shall continue for two quarters after the following activities:

1. The completion of construction of drill pads and sumps; and

2. The closure of sumps or the removal of cuttings from a drill pad

The Discharger may be required to conduct additional sampling if conditions make it necessary

ACCIDENTAL SPILL MONITORING AND REPORTING

In the event of an accidental spill of petroleum product, waste, or condensate to a surface stream, the Discharger shall implement the following monitoring program:

Constituents	Sampling Location	Units	Type of Sample
Electrical Conductivity	001, 002, 003	µmhos/cm	Grab
Boron	001, 002, 003	mg/l	Grab
Chloride	001, 002, 003	mg/l	Grab
pH	001, 002, 003	pH Units	Grab
Turbidity	002, 003	NTU	Grab
Settleable Matter	002, 003	ml/l	Grab
Oil and Grease	002, 003	mg/l	Grab
Flow of Receiving Water	002, 003	gal/min	---
Spill Volume	001	gal est	---
Hardness	001, 002, 003	mg/l*	Grab

* As $CaCO_3$

Sampling Location 001 shall be at the source of the spill and shall be representative of the material spilled It shall be sampled as soon after the spill as possible.

Sampling Location 002 shall be in the affected surface water stream at a point upstream from the area influenced by the spill and shall be sampled once as soon after the spill as possible.

Sampling Location 003 shall be in the affected surface stream within the zone influenced by the spill and shall be relocated as the influenced zone proceeds downstream. It shall be sampled as soon after the spill as possible. Additional sampling may be required by the Executive Officer.

Immediate notification of the spill shall be made to the Office of Emergency Services (800) 424-8802 and to the Regional Board (916) 361-5600.

DATA REPORTING

The Discharger shall implement the above monitoring program on the effective date of this Order. Quarterly monitoring reports, except where specified monthly, shall be submitted to the Regional Board by the 15th day of the month following the end of the calendar quarter.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible.

William H. Crooks

WILLIAM H. CROOKS, Executive Officer

28 April 1989

(Date)

Revised 4/11/89:DID gs

INFORMATION SHEET

CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

On 26 April 1985, the Board adopted Order No. 85-086 regulating Geothermal Operations of MCR Geothermal Corporation On 30 June 1988, the Department of Water Resources acquired all interests in the Francisco Geothermal Steamfield from MCR Geothermal Corporation. This is an update of an existing Board Order. The area is 3.5 miles northwest of the community of Cobb in southwestern Lake County.

Potential adverse impacts on water quality identified by the Regional Board include

1. Siltation from road, drill pad, and mud sump construction.

2. Loss of drilling fluid and drill cuttings to ground or surface waters.

3 Release of petroleum products or domestic sewage to surface drainage courses.

Mitigation measures include:

1. All fills will be compacted to minimize slumping. Subdrains will be installed under fills, where necessary. Exposed soil will be revegetated by natural or artificial means, if necessary.

2. All drilling fluid sumps will be lined with at least two feet of clay having a permeability not to exceed $1x10^{-6}$ cm/sec (one foot/year). The sumps will also be designed by a Registered Civil Engineer to withstand both static and dynamic load imposed by a maximum credible seismic event.

3. When steel tanks are used in place of drilling fluid sumps, a compacted berm shall be constructed around the tank area to prevent spills from entering surface waters

4. During drilling operation, a compacted berm shall be constructed around the edge of the pad to prevent spills from entering surface drainage courses.

Upon completion of drilling operation, the sumps will be dewatered by solar evaporation, mechanical, or chemical methods.

Nonhazardous sump materials may be mixed with native soil and buried in on-site sumps. Sump surfaces will be compacted, sloped to drain, graded and revegetated. Nonhazadous dry drill cuttings may also be buried in on-site sumps.

INFORMATION SHEET
CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

California Code of Regulations, Title 23, Chapter 3, Subchapter 15, has exempted geothermal discharges to on-site sumps provided the solids contained in the sumps are either removed or tested for 'hazardous waste' after the completion of drilling operations. However, using Subchapter 15 as a guideline, it is the intent of these requirements to ensure the sump's liner is not penetrated by the sump's fluid content, thereby protecting ground and surface water supplies.

Sumps having two feet of compacted clay liner shall contain drilling fluid for a maximum of eight months. Sumps having three feet of compacted clay liner shall contain drilling fluid for a maximum of 12 months. Tanks that are buried shall not remain in the ground for more than 12 months.

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ATTACHMENT A

CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

Property Owners	Lease Sump Designation
F. V. and J. Coleman Partnership	Francisco Coleman West Coleman

Contacts for Partnership:

1. Margaret Hodges
   141 So. Franklin St.
   Napa, CA 94558
   (707) 224-1294

2. Vera Borick
   6051 E. Pine St.
   Lodi, CA 95240
   (209) 369-9062

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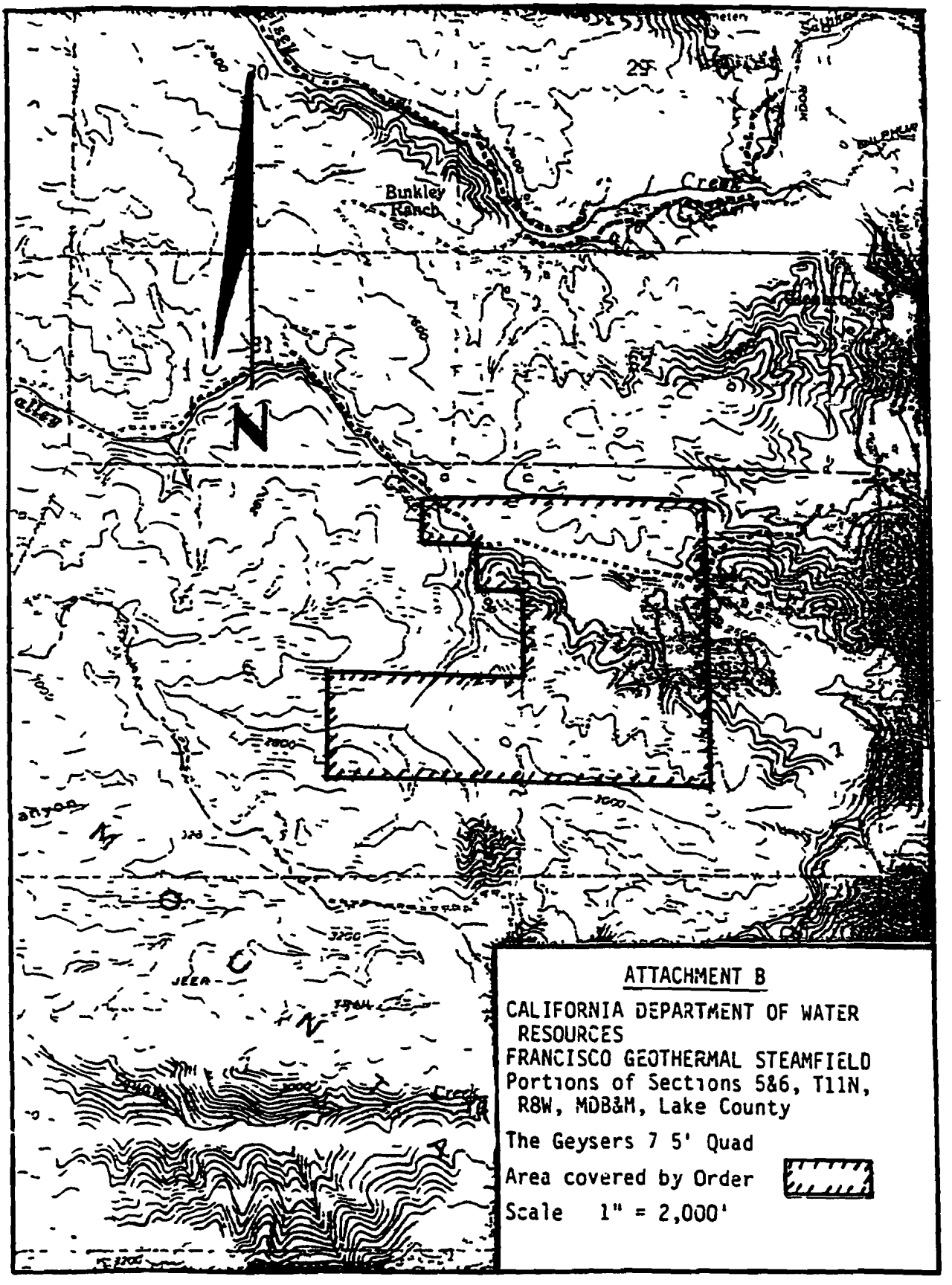

ATTACHMENT B

CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
Portions of Sections 5&6, T11N, R8W, MDB&M, Lake County

The Geysers 7 5' Quad

Area covered by Order

Scale 1" = 2,000'

ATTACHMENT C

CALIFORNIA DEPARTMENT OF WATER RESOURCES
FRANCISCO GEOTHERMAL STEAMFIELD
AND PROPERTY OWNERS
LAKE COUNTY

Sump Designation	Location
Francisco	1830'± north, and 910'± east of the 1/4 Section corner between Sections 5 and 6, T11N, R8W, MDB&M, Lake County, California
Coleman	405'± north, and 1195'± east of the 1/4 Section corner between Sections 5 and 6, T11N, R8W, MDB&M, Lake County, California
West Coleman	550'± south and 615'± west of the 1/4 Section corner between Sections 5 and 6, T11N, R8W, MDB&M

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 89-129

WASTE DISCHARGE REQUIREMENTS
FOR
CALIFORNIA DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT
AND
PROPERTY OWNERS
LAKE COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The California Department of Water Resources submitted a Report of Waste Discharge, dated 21 January 1988, for discharge from a geothermal operation.

2. The geothermal operation property is owned by entities shown on Attachment A, a part of this Order.

3. Hereafter, Department of Water Resources and entities shown on Attachment A, are jointly referred to as Discharger

4. The Discharger proposes to engage in geothermal well drilling and exploration, road construction, transportation of steam to power plants, and disposal of waste condensates.

5. The geothermal operations will be conducted on lands located in all or portions of Sections 31 and 32, T12N, R8W, and Section 6, T11N, R8W, MDB&M, as shown on Attachment B, a part of this Order.

6. The Discharger proposes to construct sumps, whose locations are described in Attachment C, a part of this Order.

7. Wastes produced during the site preparation and during the drilling operations consist of silt, soil, rock cuttings, drilling muds with additives, oils, condensate, and associated wastewater.

8. The Discharger proposes to discharge bentonite drilling mud with additives that include bicarbonate of soda, caustic soda, lignite, graphite, cottonseed hulls, flocculants, sodium polyacrylate, sodium sulfate, cement, oil and water to disposal sumps. Upon completion of the drilling operation, the sumps will be partially dried by evaporation and/or liquid removal. If the contents of sumps prove to be nonhazardous, they may be mixed with native soils and buried. The disposal areas will then be graded and replanted to prevent erosion.

9. The Discharger proposes to place a minimum of two-foot compacted clay or soil cement liners in the disposal sumps to physically separate the waste materials from any surface or ground waters. The Discharger proposes to grade the tops of the sump dikes to prevent runoff induced erosion of downhill faces of the dikes.

10. Condensates produced during steamfield operation and/or geothermal power generation will be metered and reinjected into the subsurface strata, at a depth sufficient to prevent mingling of the condensates and usable ground water. Discharge, storage, and/or treatment of 'hazardous' or 'designated wastes' generated from geothermal activities other than drilling operations, will be in facilities designed and operated in accordance with the California Code of Regulations (CCR) Title 23, Chapter 3, Subchapter 15 (Subchapter 15).

11. Condensates produced during well drilling and development operations may be discharged to disposal sumps.

12. Discharges of drilling mud and cuttings from well drilling operations are exempt from Subchapter 15, pursuant to Section 2511(g), provided the following conditions are met.

    a. All such discharges are to on-site sumps and do not contain halogenated solvents.

    b. At the end of drilling operations, the Discharger shall either:

        1) remove all waste from the sump, or

        2) remove all free liquid from the sump and cover the solid and semi-solid waste, provided representative sampling of the sump contents after liquid removal shows residual solid waste to be nonhazardous

13. The Discharger has obtained approval from the County of Lake for the use of the drilling waste mud sump sites listed in Attachment C.

14 A final Environmental Impact Report has been approved by the County of Lake for the geothermal operations, in accordance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq.).

15 The Regional Board has reviewed the final Environmental Impact Report and determined that potential adverse water quality impacts are:

    a. Siltation from roads, drill pads, and mud sumps.

    b Loss of drilling fluid to ground or surface waters

    c Release of petroleum products or domestic sewage to surface drainage courses

Compliance with the following Discharge Specifications will mitigate or avoid the adverse impacts listed above

B 4 All drilling fluid sumps will be lined with two feet of compacted clay with a permeability not to exceed 1×10^{-6} cm/sec.

B.6. Wastewater shall not be in contact with two-foot liners for more than eight months.

B 10. A minimum freeboard of three feet shall be maintained in all drilling mud sumps.

B 12 All petroleum products shall be stored so that spills are directed into the drilling mud sumps.

B 21. Wastes produced during road, pad, and sump construction shall be placed where they cannot enter surface waters.

B.22. Drilling mud sumps shall be protected from washout, erosion, or inundation.

B 24. All earthen fills shall be compacted to minimize sloughing. Exposed soil shall be revegetated to prevent erosion

B 25. During drilling operations, a berm shall be constructed around the pad to prevent spills from entering surface waters.

B 27. Modification of surface drainage patterns shall not cause accelerated erosion

B 33. Sanitary facilities shall be provided at each drill site.

16. The final Environmental Impact Report indicates that "no major ground water aquifers of significant yield exist in this area". Since there is a lack of ground water resource, any leakage through sump liners would not be expected to pose a threat to ground water. However, a threat to surface water may exist.

17. Surface water drainage of the geothermal development area is to High Valley Creek and Kelsey Creek, which are tributary to Clear Lake.

18. The beneficial uses of High Valley and Kelsey Creek include domestic, industrial, and agricultural supply, recreation; esthetic enjoyment; and preservation and enhancement of fish, wildlife and other aquatic resources. The beneficial uses of Clear Lake include domestic, municipal, industrial, and agricultural supply; recreation, esthetic enjoyment, navigation, power generation; and preservation and enhancement of fish, wildlife, and other aquatic resources.

19. The Board, on 25 July 1975, adopted a Water Quality Control Plan for the Sacramento River Basin (5A) which contains water quality objectives for all waters of the Basin These requirements are consistent with that Plan.

20. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharges.

21. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the California Department of Water Resources and property owners, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions.

1. The direct discharge of wastes of any nature to surface waters or surface water drainage courses is prohibited.

2. There shall be no disposal of drilling mud, oil, wastewater, and other associated wastes, except in sumps listed in Attachment C of this Order, or in sumps which are designed and constructed to meet or exceed the criteria prescribed by the Executive Officer.

3. There shall be no disposal, storage, treatment, or transport of wastes into facilities which are not described within this Order or which are not properly permitted by a Regional Board.

B. Discharge Specifications (Land Disposal):

1. Neither the treatment nor disposal of waste shall cause a nuisance or pollution as defined by the California Water Code

2. Sumps shall not be used before the Discharger certifies to this Board that the sumps meet Discharge Prohibition A 2 and Discharge Specification B.4

3. The discharge of 'designated' and 'hazardous' wastes to mud sumps shall be limited to the materials listed below

   a petroleum fractions

   b bentonite drilling mud and additives

   c drill cuttings and dewatered solids (cake)

   d. steam condensate, during the course of well drilling and well development only

4. The mud sumps shall be lined with at least two feet of compacted clay or soil cement having a permeability of 1×10^{-6} cm/sec (1 foot/year) or slower, and shall be designed by a Registered Civil Engineer to withstand both static and dynamic loads imposed by a maximum credible seismic event

5. Tanks may be used in place of conventional mud sumps provided they are designed by a Registered Engineer to withstand static and dynamic loads imposed by a maximum credible seismic event. Open top tanks shall not be buried deeper than their height (the tank top shall not be lower than the finished grade of the pad).

6. Wastewater shall not be in contact with sump liners for more than the times listed below.

   a Two-foot liners, eight months;

   b. Three-foot liners, twelve months.

7. Sumps used for periods longer than those noted in Discharge Specification B.6 must comply with a or b. listed below·

   a. File a new Report of Waste Discharge for the sump as a long-term storage facility (Subchapter 15 would apply).

   b. Provide sufficient information to the Executive Officer to prove that sump fluids leaking through the liner will not affect the beneficial uses of surface and ground water.

8. Buried tanks used for drilling operations shall not remain in the ground for more than twelve months. All tanks shall be maintained in good working order.

9. Sumps designed and used to contain the materials listed in B.3 above shall not be used for the storage, treatment, or disposal of any other wastes.

10. A minimum freeboard of three feet shall be maintained in conventional mud sumps. A minimum freeboard of one foot shall be maintained in all open top tanks.

11. There shall be no seepage or overflow from the conventional mud sumps or tanks.

12 All petroleum products, hydraulic fluids, drilling mud, and additives shall be used and stored in such a manner that any spills are contained or directed into the mud sump Where tanks are used in place of mud sumps, spills shall be collected immediately and returned to the tanks.

13. Dry cuttings and drilling waste (40%-50% solids) may be stored on-site during drilling operations provided they are protected from an inundation, which could occur as a result of floods having a predicted frequency of once in 25 years and from direct precipitation.

14 Drill pads and sump liners shall be protected from erosion caused by discharges from solids control tanks and mufflers.

15 Upon completion of well drilling operations, drilling wastes shall be removed from the sumps unless the Discharger demonstrates that the contents of the sump do not contain soluble toxic constituents which exceed the following limits:

Constituent	mg/l of Extract*
Arsenic	5
Cadmium	1.0
Chromium III	25
Chromium VI	5
Nickel	20
Mercury	0.2
Zinc	250
Boron	100

* Data for sump contents shall be obtained using the CCR, Title 22, Section 66700, Waste Extraction Test (WET). The Chromium VI analysis must be done on extract prepared with the use of deionized water.

16. At the end of drilling operations, the Discharger shall:

    a. remove all waste from the sump, or

    b remove all free liquids from the sump and if representative samples do not exceed the limits of B.15, the solid residue may be mixed with native soil, compacted, and buried. The sump shall be completely filled and capped with soil containing no waste, compacted and the surface graded to prevent ponding

17. Dry cuttings that do not exceed the limits of B 15 may be buried on-site provided they are placed in a sump meeting or exceeding the requirements of B.4 and are compacted. The sump shall be completely filled and capped with soil containing no waste, compacted and the surface graded to prevent ponding

18. Any waste removed from mud sumps or cuttings stored on-site shall be discharged only to a properly permitted disposal site.

19. The Discharger shall remove and relocate any wastes which are discharged in violation of these requirements.

20. The discharge shall not cause degradation of any usable ground water.

21. Wastes produced during drill site preparation, road construction, road maintenance, and site maintenance shall be placed where they cannot reasonably be expected to be carried into the waters of High Valley Creek and Kelsey Creek or tributaries thereof.

22 The mud sumps shall be protected from any washout or erosion of waste or covering material, and from inundation, which could occur as a result of floods having a predicted frequency of once in 100 years

23. Mud tanks shall be protected from any washout or erosion and from inundation, which could occur as a result of floods having a predicted frequency of one in 100 years

24. All earthen fills shall be compacted to minimize sloughing. Subdrains shall be installed under fills, where necessary, to prevent hydrostatic sloughing Exposed soil shall be revegetated by natural or artificial means as necessary to prevent sheet, rill, and/or gully erosion.

25. During drilling operations, a 1.5 foot high compacted berm shall be constructed around the edge of the pad to prevent spills from entering surface waters.

26. Waste confinement barriers shall be protected and maintained to ensure their effectiveness.

27. The modification of surface drainage patterns shall not cause accelerated erosion.

28. The exterior surfaces of the mud sumps shall be graded to promote lateral runoff of precipitation and to prevent erosion.

29. Within 90 days after the completion of all waste discharges to any sump, the sump shall be buried in accordance with Specification B.16, graded, and the area revegetated to prevent erosion.

30. If a sump cannot be closed within the time period noted in Discharge Specification B.29, the Discharger shall provide sufficient information to the Board to prove the sump cannot be closed and how it will be protected A time schedule for sump closure must be provided by the Discharger and shall be subject to approval by the Executive Officer.

31. Within 90 days after completion of all waste discharges, all cuttings and drilling waste stored on-site shall be processed according to B 16 or B 17.

32. If dry cuttings and drilling waste cannot be removed from a drill pad within the time period noted in Discharge Specification B.31, the Discharger shall provide sufficient information to the Board to prove the material cannot be removed and how it will be protected A time schedule for removal must be provided by the Discharger and shall be subject to approval by the Executive Officer.

33. Sanitary facilities shall be provided at each drill site.

C. **Provisions:**

1. The Discharger shall maintain a copy of this Order at each site and shall be available at all times to site operating personnel.

2. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements", dated 1 September 1985, which are part of this Order.

3. The Discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of the waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries of the project area as defined in Finding No. 5 of this Order, the construction of new sumps, or the reconstruction of previously used sumps.

4 The Board considers the property owner of the disposal sump sites as identified in Finding No 3 of this Order, to have a continuing responsibility for correcting any problem which may arise in the future as a result of a waste discharge or water applied to the property during subsequent use of the land for other purposes.

5. The Discharger shall comply with the attached Monitoring and Reporting Program No 89-129.

6 Within 90 days of the effective date of this Order, the Discharger shall file with the Regional Board a technical report on the preventive (fail-safe) and contingency (cleanup) plans for controlling accidental discharges and minimizing the effects of such events. The report shall include:

   a Identification of possible sources of accidental loss of petroleum products, or any other materials used in the drilling operation, and steam condensate.

   b Describe facilities and procedures to be used in preventive and contingency plans

I, WILLIAM H CROOKS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 11 August 1989.

William H. Crooks

WILLIAM H. CROOKS, Executive Officer

5/09/89 DID·gs

Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO 89-129
FOR
CALIFORNIA DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT
AND PROPERTY OWNER
LAKE COUNTY

A. Certification, Prior to Discharge

The Discharger shall submit a written certification to the Executive Officer after construction or reconstruction of a mud sump and prior to any discharge. The certification shall include the following information:

1. The permeability of the mud sump lining.

2. The thickness of the mud sump lining.

B. Progress Reports

The Discharger shall notify the Executive Officer, in writing, no later than five Days after the following events:

1. First waste discharge to the mud sump or tanks.

2. Completion of the well or wells scheduled to be drilled adjacent to the mud sump and completion of all discharges to the waste sump or tanks.

3. Completion of the final sump closing activities and/or removal of cuttings from the site.

C. Circulation Losses

The Discharger shall immediately notify the Regional Board of any circulation loss during the construction of a well at depths less than 300 feet.

1. Location of the well.

2. Depth of the well.

3. Amount of drilling mud lost.

4. Method of correction

D Waste Transfers

The Discharger shall record all transfers of waste from any mud sump or cuttings from the drill pad. The record shall include the type and amount of waste removed and the location of the new disposal site. This information shall be submitted to the Board monthly, on or before the 15th day of the following month.

EFFLUENT MONITORING

1. The Discharger shall record the volume of waste material removed to an approved disposal site and report those data to the Regional Board monthly, until completion of final sump closing

2. The Discharger shall report the constituents of the mud used for each well including all additives.

3. The Discharger shall analyze condensate and other wastewater for the constituents listed below. Samples shall be taken from the sedimentation basin of the associated power plant, if the power plant and/or injection wells are located within the area covered by this Order. The Discharger shall also submit the name (number) and location of all injection wells within the area covered by this Order.

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Electrical Conductivity	µmhos/cm	Grab	Quarterly
Arsenic	mg/l	Grab	Annually
Boron	mg/l	Grab	Annually
Chloride	mg/l	Grab	Annually
Sulfate	mg/l	Grab	Annually
Nitrate	mg/l	Grab	Annually
Volume	bbls/mo	--	Annually
Hardness	mg/l*	Grab	Annually

* As $CaCO_3$

RECEIVING WATER MONITORING

The Discharger shall monitor ground and/or surface water associated with each well site as specified below. Samples shall be analyzed for at least the following constituents.

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Electrical Conductivity	µmhos/cm	Grab	Quarterly
Boron	mg/l	Grab	Quarterly
Chloride	mg/l	Grab	Quarterly
Sulfate	mg/l	Grab	Quarterly

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Nitrate	mg/l	Grab	Quarterly
pH	pH Units	Grab	Quarterly
Arsenic (total)	mg/l	Grab	Quarterly
Hardness*	mg/l	Grab	Quarterly

* as $CaCO_3$

Samples shall be taken immediately upstream and downstream, where applicable, of each drill site, under the following conditions:

1. At least one month prior to the start of drill pad or sump construction; and

2. At least one month prior to the start of drilling operations.

A map showing the location and description of the stream sampling points shall be submitted prior to the start of sampling for each project. The project may include data collected prior to the development of roads or well sites.

Sampling shall continue for two quarters after the following activities:

1. The completion of construction of drill pads and sumps; and

2. The closure of sumps or the removal of cuttings from a drill pad.

The Discharger may be required to conduct additional sampling if conditions make it necessary.

SPRING AND WELL MONITORING

The Discharger shall monitor the springs and/or wells listed below:

Name	Location
1. Lovall well	150'± north and 1700'± west of the southeast corner of Section 30, T12N, R8W, MDB&M
2. Main spring	450'± north and 1300'± west of the southeast corner of Section 30, T12N, R8W, MDB&M
3. Fidge well	850'± north and 1600'± east of the southwest corner of Section 32, T12N, R8W, MDB&M

	Name	Location
4.	Jadiker spring	1550± north and 2400± west of the southeast corner of Section 31, T12N, R8W, MDB&M
5.	Lee spring	100'± north and 400'± west of the southeast corner of Section 30, T12N, R8W, MDB&M

Samples shall be analyzed for at least the following constituents:

Constituents	Units	Type of Sample
General		
Electrical Conductivity	µmhos/cm	Grab
Temperature	°F	Grab
Alkalinity	mg/l as $CaCO_3$	Grab
Turbidity	NTU	Grab
Flow or height of water	Gal/min, or feet	----
pH	pH Units	Grab
Dissolved Minerals		
Hardness	mg/l as $CaCO_3$	Grab
Calcium	mg/l	Grab
Magnesium	mg/l	Grab
Sodium	mg/l	Grab
Sulfate	mg/l	Grab
Chloride	mg/l	Grab
Boron	mg/l	Grab
Dissolved Metals		
Arsenic	mg/l	Grab
Cadmium	mg/l	Grab
Chromium total	mg/l	Grab
Copper	mg/l	Grab
Lead	mg/l	Grab
Nickel	mg/l	Grab

Constituents	Units	Type of Sample
Manganese	mg/l	Grab
Mercury	mg/l	Grab
Zinc	mg/l	Grab

Samples shall be collected according to the following schedule:

	Condition	Frequency
1.	No construction, well drilling, or development, except as noted in items 2 & 4 below	April, July, and October
2.	Twelve months prior to construction, well drilling, or development	Monthly
3.	During construction, well drilling, or development	Monthly
4.	Twelve months post-construction, well drilling, or development	Monthly

Analytical results shall be submitted to the Board 30 days after samples are collected, unless other arrangements are previously made with the Board.

The Discharger may be required to conduct additional sampling if conditions make it necessary.

ACCIDENTAL SPILL MONITORING AND REPORTING

In the event of an accidental spill of petroleum product, waste, or condensate to a surface stream, the Discharger shall implement the following monitoring program:

Constituents	Sampling Location	Units	Type of Sample
Electrical Conductivity	001, 002, 003	µmhos/cm	Grab
Boron	001, 002, 003	mg/l	Grab
Chloride	001, 002, 003	mg/l	Grab
pH	001, 002, 003	pH Units	Grab
Turbidity	002, 003	NTU	Grab

Constituents	Sampling Location	Units	Type of Sample
Settleable Matter	002, 003	ml/l	Grab
Oil and Grease	002, 003	mg/l	Grab
Flow of Receiving Water	002, 003	gal/min	---
Spill Volume	001	gal est	---
Hardness	002, 003	mg/l*	Grab

* As $CaCO_3$

Sampling Location 001 shall be at the source of the spill and shall be representative of the material spilled. It shall be sampled as soon after the spill as possible.

Sampling Location 002 shall be in the affected surface water stream at a point upstream from the area influenced by the spill and shall be sampled once as soon after the spill as possible.

Sampling Location 003 shall be in the affected surface stream within the zone influenced by the spill and shall be relocated as the influenced zone proceeds downstream It shall be sampled as soon after the spill as possible Additional sampling may be required by the Executive Officer.

Immediate notification of the spill shall be made to the Office of Emergency Services (800) 424-8802 and to the Regional Board (916) 361-5600.

DATA REPORTING

The Discharger shall implement the above monitoring program on the effective date of this Order Quarterly monitoring reports, except where otherwise specified, shall be submitted to the Regional Board by the 15th day of the month following the end of the calendar quarter.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible.

Ordered by William H. Crooks

WILLIAM H. CROOKS, Executive Officer

11 August 1989

(Date)

5/20/89:DID.gs

INFORMATION SHEET

CALIFORNIA DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT
AND PROPERTY OWNER
LAKE COUNTY

On 21 January 1988, the California Department of Water Resources submitted a Report of Waste Discharge for the Binkley Geothermal Project. The leasehold is in the southwestern portion of Lake County approximately 3.5 miles northwest of the community of Cobb. Surface water drainage is to High Valley Creek, and Kelsey Creek, which is tributary to Clear Lake.

Potential adverse impacts on water quality identified by the Regional Board include:

1. Siltation from road, drill pad, and mud sump construction.

2. Loss of drilling fluid and drill cuttings to ground or surface waters.

3. Release of petroleum products or domestic sewage to surface drainage courses.

Mitigation measures include: —

1. All fills will be compacted to minimize slumping. Subdrains will be installed under fills, where necessary. Exposed soil will be revegetated by natural or artificial means, if necessary.

2. All drilling fluid sumps will be lined with at least two feet of clay having a permeability not to exceed $1x10^{-6}$ cm/sec (one foot/year). The sumps will also be designed by a Registered Civil Engineer to withstand both static and dynamic load imposed by a maximum credible seismic event

3. When steel tanks are used in place of drilling fluid sumps, a compacted berm shall be constructed around the tank area to prevent spills from entering surface waters.

4. During drilling operation, a compacted berm shall be constructed around the edge of the pad to prevent spills from entering surface drainage courses.

Upon completion of drilling operation, the sumps will be dewatered by solar evaporation, mechanical, or chemical methods.

Nonhazardous sump materials may be mixed with native soil and buried in on-site sumps. Sump surfaces will be compacted, sloped to drain, graded and revegetated. Nonhazardous dry drill cuttings may also be buried in on-site sumps.

Sumps having two feet of compacted clay liner shall contain drilling fluid for a maximum of eight months. Sumps having three feet of compacted clay liner shall contain drilling fluid for a maximum of 12 months. Tanks that are buried shall not remain in the ground for more than 12 months.

California Code of Regulations, Title 23, Chapter 3, Subchapter 15, has exempted geothermal discharges to on-site sumps provided the solids contained in the sumps are either removed or tested for 'hazardous waste' after the completion of drilling operations. However, using Subchapter 15 as a guideline, it is the intent of these requirements to ensure the sump's liner is not penetrated by the sump's fluid content, thereby protecting ground and surface waters.

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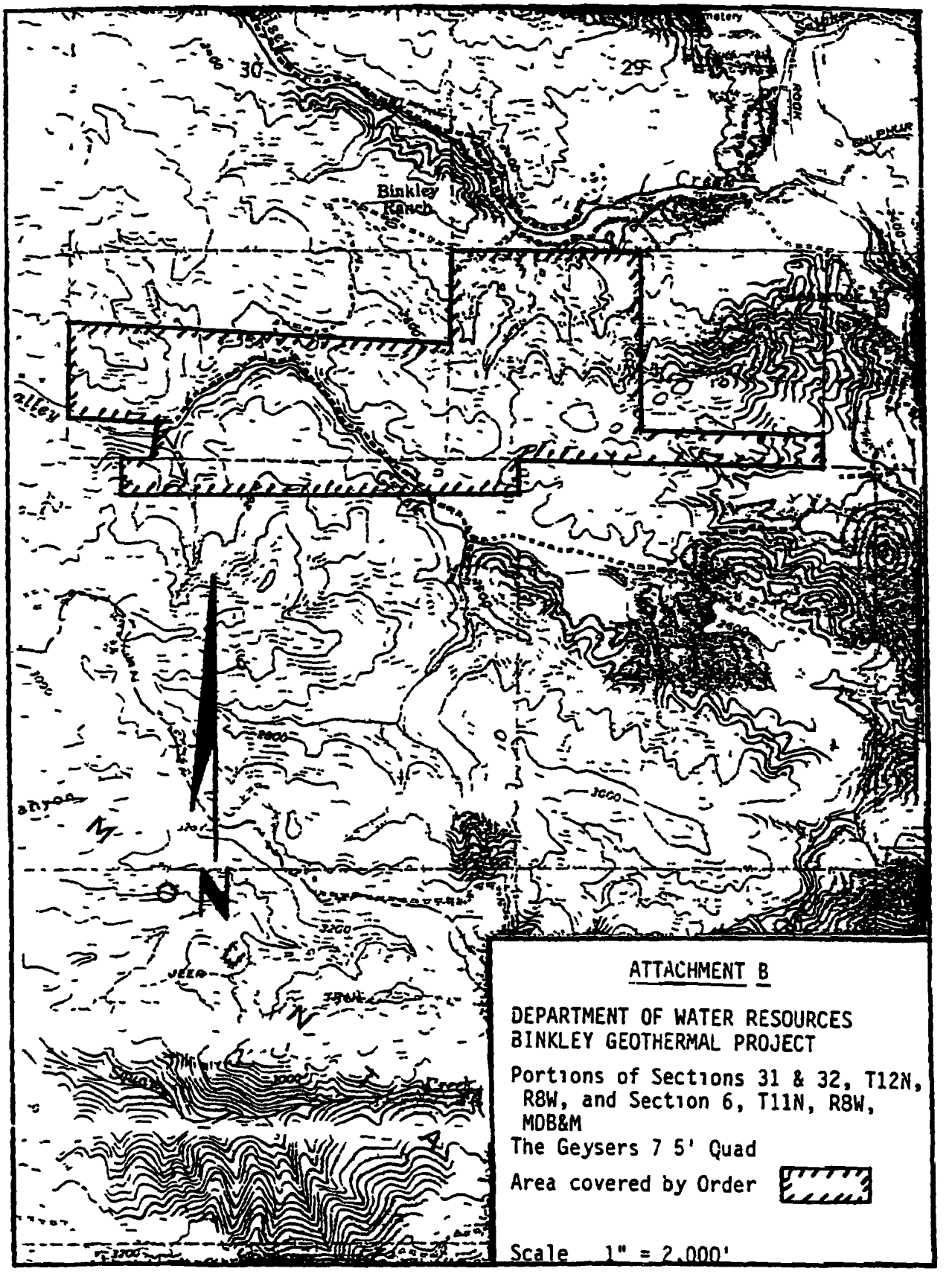
ATTACHMENT A

CALIFORNIA DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT
AND PROPERTY OWNER
LAKE COUNTY

Property Owner	Lease Sump Designation
Ms. Mary Jadiker Operations Officer Binkley Family Trust P. O Box 28 Cobb, CA 95426	Binkley No. 1

5/09/89 DID gs



ATTACHMENT B

DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT

Portions of Sections 31 & 32, T12N, R8W, and Section 6, T11N, R8W, MDB&M

The Geysers 7 5' Quad

Area covered by Order

Scale 1" = 2,000'

ATTACHMENT C

DEPARTMENT OF WATER RESOURCES
BINKLEY GEOTHERMAL PROJECT
AND PROPERTY OWNER
LAKE COUNTY

Sump Designation	Location
Binkley No. 1	832'± north and 704'± west of the southeast corner of Section 31, T12N, R8W, MDB&M

5/09/89:DID:gs

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON Governor

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO CA 95814-5512

September 21, 1995

Ms Paula Blaydes
Blaydes & Associates
1275 Fourth Street #214
Santa Rosa, CA 95404

Dear Ms Blaydes

DWR BOTTLEROCK GEOTHERMAL POWER PLANT (79-AFC-4C)-FACILITY CLOSURE INFORMATION

This letter is in response to your inquiry regarding the Energy Commission process for facility closure and a rough idea of what kind of ongoing monitoring, if any, would be required

Our process for facility closure will be administered by Commission staff with Commission approval of the final closure plan We envision the process as follows

1 At least 12 months prior to commencing closure activities, DWR shall file a draft closure plan (alternatively called a decommissioning plan, site restoration plan, or reclamation plan in the Bottlerock Decision) to the Commissions's Compliance Project Manager (CPM) for review and comment

Items that would have to be addressed in the closure plan would include assurance that all grading and erosion control measures were accomplished according to the provisions of the California Building Code and that any grading and recontouring would be done in a manner to minimize environmental impact (e g work should not be done during the rainy season) Biological impacts associated with the closure would have to be addressed as well as specific proposed mitigation and ongoing monitoring Revegetation should be fully described with seeding method, areas to be treated and seed varieties to be used

Requirements for ongoing monitoring following closure are not specifically defined in our conditions of certification which address facility closure, but any required ongoing monitoring should not go on for more than two or three years following closure This would allow plenty of time to establish that the mitigation measures implemented were reasonably successful The closure plan shall also identify, generally, who will be doing the monitoring

2 Because there is a potential for local interest in the closure, we will conduct a public workshop to inform the local residents and to allow their input to the draft closure plan Our review of the plan will also include coordination with Lake County and other appropriate agencies

Ms Paula Blaydes
Blaydes & Associates
September 21, 1995

3 DWR will submit a final draft closure plan to the CPM, incorporating comments received in writing and during the public workshop(s)

4 The CPM will then present the final draft closure plan to the Commission for approval at a Commission Business Meeting

In your letter, you said that you couldn't find much information in the original Commission Decision for the plant regarding facility closure I found three conditions of certification that address the subject and am including them here for your information.

Biology Condition 5-2; One year prior to deactivation, DWR will include in the decommissioning plan a biological resources element identifying mitigation and compensation measures
Verification DWR will submit the biological resources element of the decommissioning plan to the CEC and the CDFG for a determination of adequacy and acceptability

Soils Condition 8-4; Prior to decommissioning of the power plant, DWR shall prepare site restoration plans
Verification At least six months prior to scheduled decommissioning, DWR shall submit site restoration plans to the CEC for review and approval

Civil Engineering Condition 9-5: DWR shall prepare and submit a reclamation plan to the CEC staff to restore the site to its original condition as nearly as practicable
Verification At least six months prior to decommissioning of the facility, DWR shall submit its reclamation plan to the CEC for review and approval

Thank you for the inquiry Should you have further questions, please contact Bob Brand, Compliance Project Manager at (916) 654-3864

Sincerely,

Norman A Wilson

NORMAN A WILSON
Office Manager, Siting Office
California Energy Commission
1516 Ninth Street, MS 15
Sacramento, CA 95814

STATE OF CALIFORNIA--THE RESOURCES AGENCY PETE WILSON, Governor

CALIFORNIA ENERGY COMMISSION
5 NINTH STREET
SACRAMENTO CA 95814-5512

ORDER NO. 93-0426-02

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

In the Matter of:	Docket No. 79-AFC-4 (P800-80-013)
Department of Water Resources Bottle Rock Geothermal Power Plant	Order Approving Modified and Reduced Environmental Monitoring During the Suspension of Operations

The Department of Water Resources (DWR) has submitted a request to the California Energy Commission (CEC) to temporarily amend the environmental monitoring requirements in the November 5, 1980 Commission Decision for the DWR Bottle Rock Geothermal Power Plant (Bottle Rock). The amendment will temporarily reduce and/or modify the environmental monitoring requirements contained in the Conditions of Certification (Conditions).

The Bottle Rock facility, certified with an expected generating capacity of 55 megawatts, has rarely attained an output of 40 megawatts during nearly six years of operation Therefore, DWR has decided to suspend all operations, up to five years, to determine whether it is economically feasible to resume operations.

STAFF RECOMMENDATION

Staff has analyzed the amendment request and based on its analysis, recommends that the Commission adopt this order. No potential new or additional unmitigated significant impacts are anticipated as a result of the reduced and/or modified environmental monitoring requirements.

Based upon staff's analysis and recommendation, the Commission finds

- The proposed modifications and reductions in environmental monitoring are consistent with the intent of the Conditions adopted in the Bottle Rock Commission Decision;
- The proposed modifications and reductions in environmental monitoring do not appear to harm the public or the interest of any previous parties to the certification proceeding,
- DWR, Department of Fish and Game, Lake County Planning Department, Central Valley Regional Water Quality Control Board and the Lake County Air Quality Management District are in agreement with the proposed modifications and reductions in monitoring,

- The proposed modifications and reductions are based on information that was not available to the parties prior to Commission certification;
- DWR has submitted a satisfactory plan to maintain the power plant during the suspension; and
- There will be no new or additional environmental impacts associated with the proposed modifications and reductions in monitoring.

CONCLUSION AND ORDER

The California Energy Commission (CEC) hereby adopts staff's recommendations and findings as its own, and based upon DWR's request to reduce and/or modify environmental monitoring during the temporary suspension of operations at its Bottle Rock facility, orders that the Conditions as contained in the November 5, 1980 Commission Decision for Bottle Rock be temporarily amended as set forth herein.

The General Provisions listed in the Commission Decision shall remain in force.

DWR shall notify the CEC Compliance Project Manager (CEC CPM) three months prior to resuming operations pursuant to the Conditions in effect prior to the date of this Order. Staff will review said Conditions to assure that no new circumstances have arisen which may affect public health or safety. The public will be notified when DWR notifies the CEC CPM that they intend to resume operations.

The operator shall provide a statement acknowledging that they have read and reviewed the Conditions, that they understand the Conditions, and that they agree to abide by those duties and obligations as described.

DWR shall also notify the CEC CPM one year prior to facility closure to ensure that an approved Facility Closure Plan is in place.

The suspension period is herein defined as five years from the date of the Commission Order approving the amendment to modify the Conditions for Bottle Rock. If DWR wishes to request an extension, they must notify the CEC CPM six months prior to the end of the suspension period.

The following specific Conditions apply during the temporary suspension of operations at Bottle Rock:

Air Quality

Suspend original Conditions 1-1 through 1-6. Issue Conditions 1-7 and 1-8.

1-7. DWR shall participate in Geysers' Air Monitoring Program (GAMP) III for the life of the program.

Verification: DWR shall submit in the Annual Compliance Report a statement describing DWR's participation in GAMP.

1-8. During the suspension period, DWR shall maintain all existing Authorities to Construct (ATCs) and Permits to Operate (PTOs) required under Lake County Air Quality Management District (LCAQMD) regulations.

Verification: DWR shall submit in the Annual Compliance Report to the CEC CPM appropriate confirmation from the LCAQMD that all ATCs and PTOs are current and active under the terms and Conditions of LCAQMD Rules and Regulations.

DWR shall also include in this report a statement regarding any complaints and actions of resolution for air quality for the DWR Bottle Rock facility.

For the duration of the suspension and any time when the plant is operating, DWR shall submit an Annual Compliance Report for each calendar year no later than February 15th, of the year following the reporting year

Public Health

Suspend original Conditions 2-1 through 2-9. No new Conditions issued.

Socioeconomic/Aesthetics

Suspend original Condition 3-1 Original Condition 3-2 shall remain in effect.

Cultural Resources

Suspend original Conditions 4-1 through 4-4. Modify Condition 4-5 to read as follows·

4-5. DWR shall ensure that the existing fence on the north side of site CA-LAK-609 is maintained.

Verification: A statement verifying compliance shall be provided in each Annual Compliance Report filed with the CEC CPM.

Biological Resources

5.B - Requirements

Original Condition 5.1.a. through 5.1.h. are suspended, original Condition 5.2 remains in effect. The new Conditions, 5-3.a. through 5-3.i. and 5-4, as set forth below, shall substitute for the original Conditions 5.1.a. through 5.1.h. and for the requirements contained in the original Biological Resources Mitigation and Implementation Plan.

5-3.a. The DWR shall continue annual soil/duff monitoring and leaf tissue analysis to determine boron levels until the DWR and CEC CPM determine that no further contamination or cumulative impacts remain.

Verification: The DWR shall submit to the CEC CPM by December 15, 1993, and of each subsequent year, an annual monitoring report which contains the results and a discussion of the year's monitoring and verifies compliance with the condition.

5-3.b. The DWR shall continue surface water sampling at the following 5 sites Kelsey Creek immediately upstream of the confluence with Alder Creek; Kelsey Creek 500 feet downstream of its confluence with High Valley Creek; Alder Creek immediately upstream of its confluence with Kelsey Creek; High Valley Creek immediately upstream of its confluence with Kelsey Creek; and Kelsey Creek near Kelseyville.

Sampling shall be conducted four times a year, in January, April, July, and October.

Protocol: Each surface water sample shall be analyzed for boron, sodium, sulfate, calcium-magnesium hardness, Ph, alkalinity, settleable solids, non-filterable residue, turbidity and specific electrical conductivity.

Additionally, during April, July and October, the DWR will collect and identify bottom-dwelling organisms from at least one square meter of stream-bed at each site and make special trace metal determinations for copper, iron, manganese, lead and zinc.

Verification: The DWR shall submit to the CEC CPM by December 15, 1993 and each subsequent year, an annual

monitoring report which contains the results and a discussion of the year's monitoring and verifies compliance with the condition.

5-3.c. The DWR shall continue groundwater sampling at the following five sites: Nance Spring, Union Oil Spring, Coleman Well, Jadiker Spring and Francisco well.

Sampling shall be conducted four times a year, in January, April, July and October.

Protocol: Each groundwater sample shall be analyzed for boron, sodium, sulfate, calcium-magnesium hardness, pH, alkalinity, non-filterable residue, specific electrical conductivity, copper, iron, manganese, lead and zinc.

Verification: The DWR shall submit to the CEC CPM by December 15, 1993, and each subsequent year, an annual monitoring report which contains the results and a discussion of the year's monitoring and verifies compliance with the condition.

5-3.d. The DWR shall maintain the nest boxes and wildlife water basins in working condition. Wildlife use of these habitat improvement projects will be monitored annually using the same methodology that has been used in the past. (See 5-3.1. below)

Verification: The DWR shall submit to the CEC CPM by December 15, 1993, and each subsequent year, an annual monitoring report which contains the results and a discussion of the year's monitoring and verifies compliance with the condition.

5-3.e. Deer pellet group counts shall be sampled by the DWR every 6 months, using the same methodology as in past sampling. (See 5-3.1. below)

Verification: The DWR shall submit to the CEC CPM by December 15, 1993, and each subsequent year, a report which contains the results and a discussion of the monitoring and verifies compliance with the condition.

5-3.f. Vegetation (quantity and species composition) monitoring shall be continued by the DWR on the two 25 acre study plots twice in the next ten years

Protocol: Once during the first five year interval and once during the second five year interval. The same methodology will be used as in the past for monitoring of these plots. (See 5-3.1. below)

Verification The DWR shall submit a report to the CEC CPM by December 15th of the year of the monitoring action, which contains the results and a discussion of the monitoring and verifies compliance with the condition.

5-3.g. Bird monitoring in the black oak and chaparral study areas shall be conducted three times in the next 10 years by the DWR. This monitoring will use the same methodology (See 5-3.i. below) as past monitoring of these study areas. Monitoring will be spread over the ten year period.

Verification: The DWR shall submit to the CEC CPM by December 15th of the year of the monitoring action, a report which contains the results and a discussion of the monitoring and verifies compliance with the condition.

5-3.h. DWR shall monitor erosion on an on-going basis during the rainy season. Inspections shall include all cut and fill slopes and other disturbed areas. Erosion problems shall be immediately repaired.

If temporary repairs are necessary during the rainy season, DWR shall complete permanent repairs to those erosion problems by October 10th of each year.

Verification: The DWR shall submit to the CEC CPM by August 15th of each year an annual report which includes results of erosion monitoring when erosion problems are discovered. This report will describe the problems discussed and action taken to correct the problems.

During years when no erosion problems occur, and no corrective action is required, a brief discussion may be included and submitted in the December 15th annual report.

5-3.i. A Biological Resources Monitoring and Mitigation Report (BRMMR) shall be prepared to provide the results of the previous year's monitoring. This report will be submitted by December 15th each year The 1993 report will collate and summarize all methodologies used to satisfy conditions 5-3.a through 5-3 h

Verification The DWR shall submit to the CEC CPM by December 15, 1993, and of each subsequent year, annual BRMMR which verifies compliance with the Biological Resource Conditions.

Upon reasonable notice the CEC CPM, Lake County staff, the Regional Water Quality Control Board staff, and the California Department of Fish and Game (CDFG) staff, shall be granted access for inspections.

5-3.3. If any specific mitigation measure or monitoring program is determined to be ineffective, or if the CEC staff receives any submittal, complaints, or other information from the DWR, other agencies, or the public, that indicates one or more significant impacts are occurring on the leasehold subject to CEC jurisdiction, DWR and the CEC staff shall meet to determine what further measures shall be taken to correct or reverse these impacts.

Verification: The DWR in consultation with CEC will take action to correct the problem. If the problem cannot be resolved by staff, the compliance monitoring dispute resolution process will be utilized.

5-4. Monitoring of wildlife use of the revegetated cut and fill slopes shall be initiated and conducted by the DWR three times, spread throughout the next 10 years. This effort will include: birds; deer; reptiles; small mammals; and rabbits/hares. DWR shall develop a methodology and a proposed schedule for these monitoring studies.

Verification: DWR shall submit the methodology and a proposed schedule for these monitoring studies to the CEC CPM for acceptability, 60 days prior to the start of monitoring during the first monitoring year.

The CEC CPM will respond as to the acceptability of the methodology and the monitoring schedule within 30 days of receipt of the submittal.

Filing of the subsequent three reports and all status reports will be included in the December 15 annual BRMMR (5-3.1.).

Water Quality/Water Resources

Issue Conditions 6-5 and 6-6. Modify Conditions 6-1 through 6-4 to read as follows:

6-1. DWR shall, during the period of suspension, utilize no new surface water as the source for any maintenance or other necessary activity without first notifying and obtaining the required authorization from the appropriate federal, state, county or local agencies.

Verification 90 days prior to proposed use of surface water, DWR shall file statements with the CEC CPM, the Water Resources Control Board, the Central Valley Regional Water Quality Control Board (CVRWQCB), and all other agencies having regulating jurisdiction over such water

use, identifying the source(s), estimated amounts of use, and the method of obtaining such water.

Additionally, DWR shall provide the CEC CPM copies of all agency responses and permits necessary for surface water use requests.

6-2. DWR shall maintain on file the Spill Contingency and Containment Plan (SCCP) originally required by the CVRWQCB.

Verification: DWR shall notify the CEC CPM of the file location of the SCCP. DWR shall comply with all applicable monitoring conditions described in CVRWQCB's Waste Discharge Requirement Order No. 76-202 and any amendments thereto.

6-3. DWR shall adequately maintain the previously constructed impermeable spill collection-containment system to preclude discharges of toxic-hazardous waste and materials from the power plant pad.

Verification: DWR shall submit annually to the CVRWQCB and to the CEC CPM, via the Annual Compliance Report, a record of maintenance and corrective measures to the spill containment system.

6-4. DWR shall during the period of suspension, maintain and operate the domestic waste water septic tank, holding tank, pumps and control system as originally designed to discharge the limited amounts of effluent into the steam suppliers condensate reinjection system.

Verification: DWR shall submit annually to the CVRWQCB and to the CEC CPM via the Annual Compliance Report, a record of maintenance and operation of the domestic waste water disposal system.

6-5. DWR shall maintain quarterly records of the volume of water pumped from the on-site supply well.

Verification: DWR shall maintain on site for the CEC CPM to review upon request, supply records of water pumpage from the on-site water well.

6-6. To minimize the effects of contaminated storm water runoff discharges from the paved plant site areas to surface waters, DWR shall discharge all such waters to the condensate reinjection well(s), limited only by the capacity of the existing sump pumps or the capacity of the reinjection well(s) to accept such discharges.

Note During high rainfall periods when the runoff from the paved plant area is discharging to the High Valley Creek watershed, the impacts of such discharges will be minimized due to the diluting effects of runoff from the remainder of the watershed.

Verification: DWR shall submit annually to the CEC CPM a record of maintenance and operation of the drainage sump pump discharge to the injection well(s).

Geotechnical/Seismic Hazards

Suspend original Conditions 7-1 through 7-3. No new Conditions issued.

Soils

Suspend original Conditions 8-1, 8-2, and 8-3. Original Condition 8-4 shall remain in effect. Condition 5-3.h. in the Biological Resources Section, addresses soil erosion issues.

Civil Engineering

Suspend original Conditions 9-1 through 9-4. Original Condition 9-5 remains in effect. No new Conditions issued.

Structural Engineering

Suspend original Conditions 10-1 through 10-6. No new Conditions issued

Solid Waste Management

Suspend original Conditions 11-2, 11-4, and 11-6. Conditions 11-1, 11-3 and 11-5 remain in effect.

Safety

Suspend original Conditions 12-1 through 12-7. Modify original Conditions 12-8, 12-9 and add new Condition 12-10 to read as follows:

12-8. DWR shall continue to abide by an approved accident prevention program in accordance with the provisions of Section 3203 et seq. of Title 8, CCR (These sections

include chemical handling & storage and provisions for hazardous materials and airborne contaminant exposure based on Section 5155, Title 8, CCR.)

Verification: DWR shall notify the CEC CPM of any changes to the approved accident prevention program and provide verification of California Occupational Safety and Health Administration's (Cal/OSHA) approval of said changes.

12-9. DWR shall request California Department of Occupational Safety and Health Administration (Cal/DOSHA) to conduct on-site safety inspections during the suspension of operations immediately following any complaint.

Verification: During the suspension, DWR shall notify the CEC CPM in writing if the event of a violation that could involve DOSHA action, and the necessary corrective action.

12-10. During the suspension period, DWR shall remove from the plant site, all chemicals, solvents and lubricants, except those essential to maintain the plant, and those only in reasonably required quantities.

Verification: Within 90 days of the Commission Order Approving Modified and Reduced Environmental Monitoring, DWR shall submit the following to the CEC CPM:

1) a list of all hazardous chemicals and the quantities that are to remain on site during the suspension period, and

2) the signature of the responsible Plant Manager certifying compliance with this condition.

Within 90 days of receipt of the list and the Plant Manager's verification, the CEC staff will conduct a site visit.

Noise

Suspend original Conditions 16-2 and 16-3, modify Condition 16-1 to read as follows

16-1. DWR shall comply with Lake County's noise ordinance, which is 55 dBA Ld and 45 dBA Ln at any point beyond the property line of the source. In the event the Lake County Air Quality Management District (LCAQMD) or DWR receives public complaints of any noise, DWR and the LCAQMD (if requested by the complainant) agree to promptly conduct an investigation to determine the extent of the problem. DWR shall take reasonable measures to resolve the complaints.

Protocol: Within 10 days of a request by the LCAQMD or the CEC, DWR shall conduct noise surveys at the sensitive receptors registering complaints and at the facility property line nearest the complaining receptors. Surveys shall be conducted, when possible, under circumstances similar to those when the complaints were perceived. The survey should be reported in terms of L_{eq} and L_x at levels x=10, 50, and 90.

Verification: DWR shall promptly forward to the LCAQMD the survey results, the mitigation measures applied to resolve the problem and the results of these efforts. LCAQMD shall advise the CEC of any continuing noncompliance conditions.

Date: April 26, 1993

Energy Resources Conservation and Development Commission

CHARLES R. IMBRECHT, Chairman

JUL 2 . 1987

BOTTLE ROCK PLANT " GENERAL FI.

E.S. 636.00

MCR GEOTHERMAL CORPORATION

P.O. BOX 310

COBB, CA. 95426

(707) 928-5277

TRAFFIC CONTROL AND ROAD MAINTENANCE PLAN FOR HIGH VALLEY ROAD

REVISED: JUNE, 1987

LAKE COUNTY PLANNING DEPARTMENT
APPROVED
Date 6/25/87
By P.C.
A.P # 13-002-03, 04, 05
PLOT PLAN

1.0 INTRODUCTION

MCR Geothermal Corporation (herein abbreviated as MGC) is the operator for the Francisco Steam Field which supplies steam to the California Department of Water Resources Bottle Rock Power Plant (herein abbreviated DWR). Both the steam field and the power plant are located in the Sections 5 & 6, Township 11 North, Range 8 West, Mount Diablo Base and Meridian.

The MGC control building and field offices are located on High Valley Road approximately one mile southwesterly of its intersection with Bottle Rock Road in Lake County, California.

Access to the leasehold and steamfield is from the intersection of High Valley Road and Bottle Rock Road.

Field operators for MGC and DWR are on duty 24 hours a day and are based in the control building and power plant. Normal business hours are Monday through Friday, 8:00 a.m. to 4:30 p.m.

24 hour telephone numbers are: MGC (707) 928-5277
DWR (707) 928-5225

2.0 BACKGROUND

DWR has completed all construction activities and the power plant and steam field are now operational. MCR drilling operations have currently ceased, but steam field expansion and additional drilling will occur in the future. Traffic to support the operations is limited to employees, suppliers and waste product removal. MGC estimates that employees and contractors will average 50-60 vehicle trips per day and of that 1-5 can be described as large vehicle traffic (1 ton or larger).

During construction of the steam field and power plant facilities, a guard service was utilized to restrict the traffic coming to and from the lease. As proposed this service would end with conclusion of construction at the power plant and that a key card gate system (existing) would remain to restrict unauthorized traffic. The following modified key card system will be installed.

3.0 USE OF HIGH VALLEY ROAD
Traffic Plan Description
Key Card/Phone System

MGC will upgrade the existing gate to include remote opening capabilities. This system will allow residents, MGC & DWR to open the gate from their home or office using a touch tone phone. Residents and property owners without touch tone phones will have to make other arrangements to allow visitors through the gate. All residents and property owners have been issued key cards which will provide 24 hour access both into and out of the road. Lost cards will be replaced at a cost of $5.00 each.

The County Health, Planning, Sheriff and Fire Departments and LCAQMD will all be issued a key card. It should be noted that gates are of the "breakaway" type for quick access during an emergency.

MGC and DWR full time employees will be issued key cards. All suppliers and contractors will be required to have the gate opened by MGC/DWR personnel. MGC and DWR personnel will keep logs of all visitors to the lease on log sheets similar to existing security log sheets. All trucks hauling waste from the leasehold will be inspected by MGC or DWR personnel at a specifically located site identified with road signs, prior to leaving the leasehold. An inspection form will be completed and signed by inspecting person. All logs will be available for inspection by county personnel.

Speed checks will be performed by MGC or DWR management personnel on a routine basis. A log is kept on "Speed Checks" and will be available to county agencies upon request. It should be noted that the speed limit on High Valley Road was set at 25 MPH per RIGHT-OF-WAY agreement of property owners on High Valley Road, and the Lake County Planning Commission decided to restrict that speed limit to a greater degree and posted several 15 MPH speed limit signs on this road. A log shall be kept on accidents reported to MGC, occurring on High Valley Road, and shall be available to the County upon request. This is the standard procedure now in use throughout the Geysers. Notification is also executed through a joint effort with Geothermal Geysers Association. A map showing locations of the leasehold and property owners will be displayed at the gate.

ADDITIONAL FEATURES AND OPERATIONAL REQUIREMENTS

1. The key card/phone system shall be monitored for its effectiveness and compliance with use permit 85-27. After a six (6) month period the success of the system will be evaluated by staff and may be referred to the Planning Commission for final determination. After the first year, all subsequent Planning Commission reviews shall be made on an as needed basis.

2. Until the key card/phone system has been installed and determined to be operational by Planning Department staff, MGC shall provide a staffed guard gate. The guard gate shall also be staffed 7:00 a.m. to 7:00 p.m. daily during construction activities and continuously during drilling activities. In cases of power outage, mechanical failure, or emergency the gate shall remain open to allow residents and emergency response agencies egress and ingress. In the event the gate must remain open for more than 24 hours, MGC shall provide staffing at guard gate from 7:00 a.m. to 7:00 p.m. daily.

3. It is understood that MGC will provide an automated logging device at the main gate for incoming traffic using the key card system. Copies of this log shall be made available to department staff upon request.

4. Locked Gates Within MGC Leasehold: The two gates located on roads to Coleman, West Coleman pads and the DWR Power Plant are approved provided that all appropriate regulatory and emergency response agencies are supplied with keys. (See attached leasehold map).

MGC/DWR subcontractors and suppliers are required to submit an application for entry rights to High Valley Road to service the power plant and/or steam field operations. Upon completion of the application the applicants are listed on a computer readout sheet (L) which is retained by MCR. The computer readout sheet (L) is updated monthly or as necessary. Short-term contractors are allowed to enter by request and are given DAY PASSES (D/P) to be displayed in vehicles.

Since the construction of the guard gate and the 24-hour security service, MGC has implemented "speed checks" on High Valley Road to deter speeding. Upon completion of the speed report, notification is sent out to DWR and all sub-contractors for MGC and DWR. A log is kept on "speed checks" and shall be available to the county (Planning Department and the Noise Control Officer) upon request. It should be noted that the speed limit on High Valley Road was set at 25 MPH per RIGHT-OF-WAY agreement with property owners on High Valley Road, and the Planning Commission elected to restrict that speed limit to 15 MPH and posted several 15 MPH speed limit signs on this road. A log shall be kept on accidents reported to MGC, occurring on High Valley Road, and shall be available to the County upon request. All requests should be directed to the Operations Manager located at the Control Building at the Francisco lease.

The MGC logging procedures record traffic flow of contractors, suppliers, drilling employees and other miscellaneous traffic on a daily log sheet. These logs are reviewed weekly to ensure that carpooling is used when appropriate and shall be available to the county upon request.

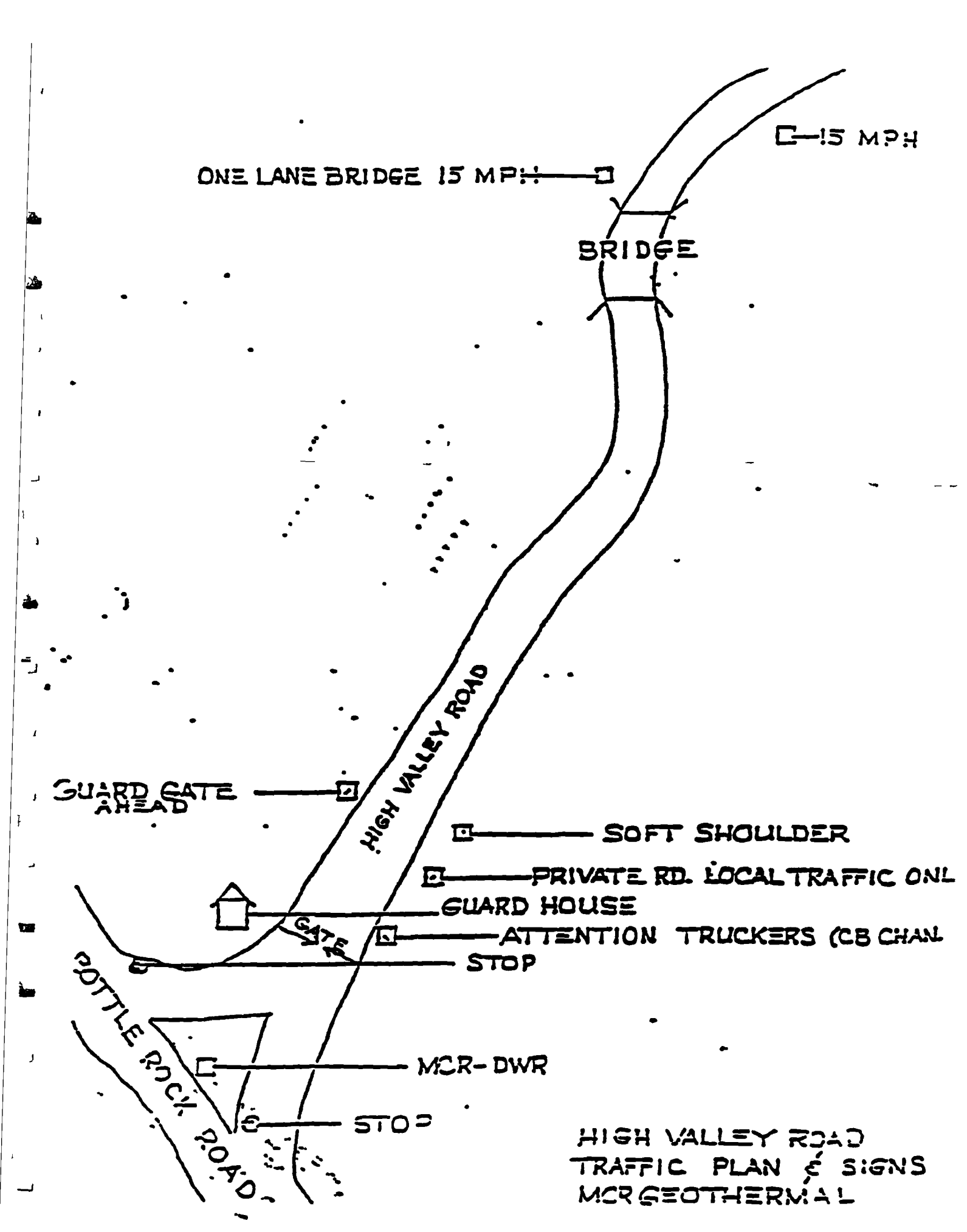
In addition, a log book showing transportation of "MGC waste" leaving the MGC lease will be available at the Control Building (707)928-5277 for MGC operators on duty (24 hours) and shall be available to the County upon request. All trucks/large vehicles, which are listed with MGC as suppliers and/or transporters of chemicals or waste streams, shall be diligently inspected for leakage by the security guards at the gate.

Coordination of heavy truck traffic on Geysers Roads (Sulphur Creek, Hwy. 175, and Bottle Rock Road) is achieved through correspondence directed to suppliers and sub-contractors notifying them of school bus hours on these roads. MGC shall prohibit heavy truck traffic to and from the leasehold to the greatest extent practical, during bussing hours. This is the standard procedure now in use throughout the Geysers. The hours of large truck traffic shall be restricted to the hours from 7:00 a.m. to 7:00 p.m., except when setting casing and in cases of verified emergencies. Notification is also executed through a joint effort with Geothermal Geysers Association.

4.0 ROAD MAINTENANCE

To accommodate the increased traffic, High Valley Road has been substantially improved and has been paved. Many parts of the road have been widened. Several turnouts, mirrors and signs have been added to reduce potential hazards, including signs instructing truck drivers to monitor a certain frequency on the C.B. radios to monitor traffic on High Valley Road. In addition, MGC uses a two-way radio communication system in order to help coordinate unusual heavy traffic flow. (See attached map of High Valley Road for Placement of Signs).

MGC is responsible for the repair and maintenance (which includes periodic liter removal) of High Valley Road. During the spring of each year, MGC reviews road conditions and makes repairs as needed. During winter storms, MGC provides services (graders, sand, etc.) to remove snow and ice from High Valley Road and snow berms from private drive-ways to insure safe driving conditions for all vehicles. The hauling of hazardous or toxic materials on High Valley Road during severe snow and ice conditions shall be prohibited, unless the road has been plowed and sanded.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MCR-DWR
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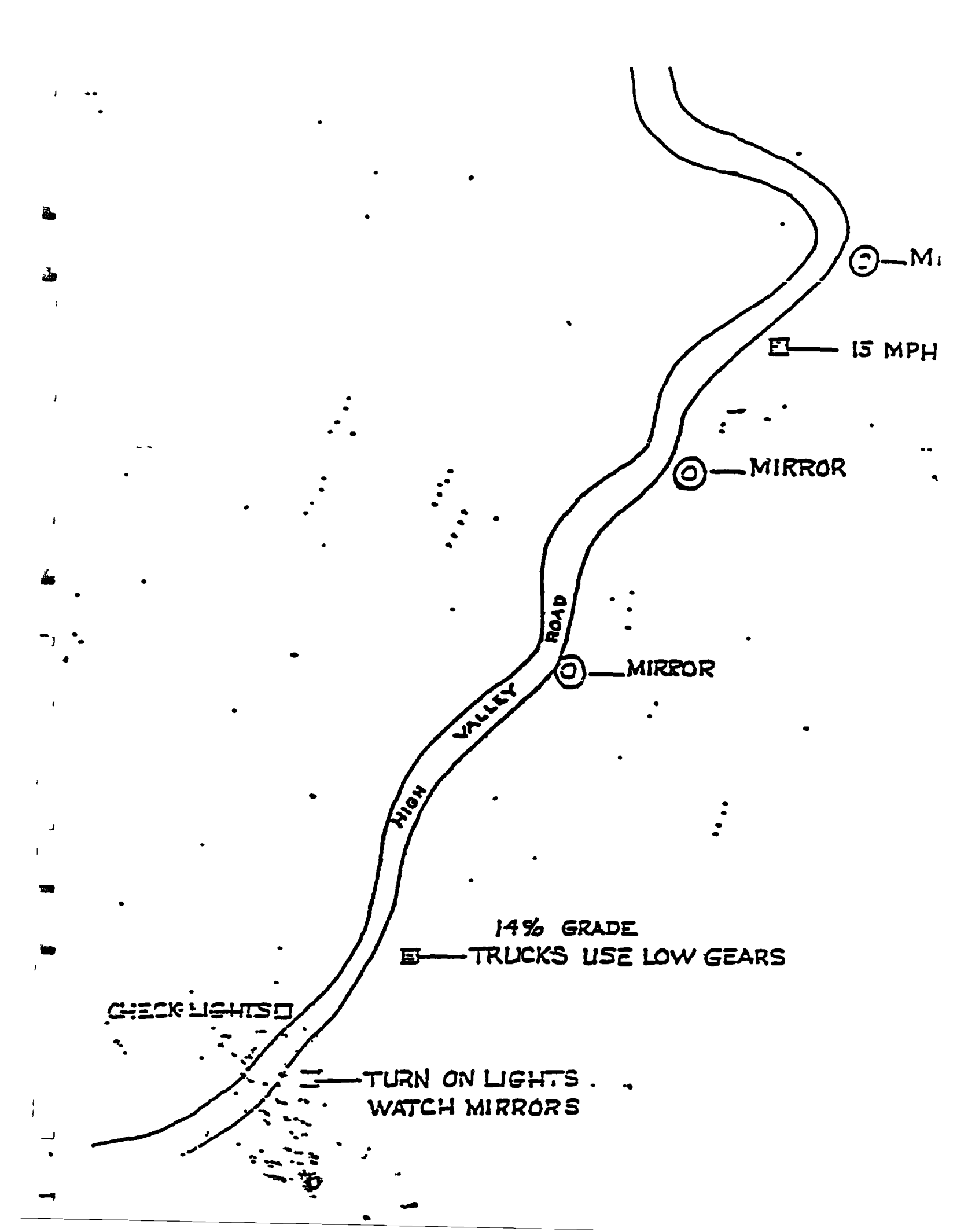
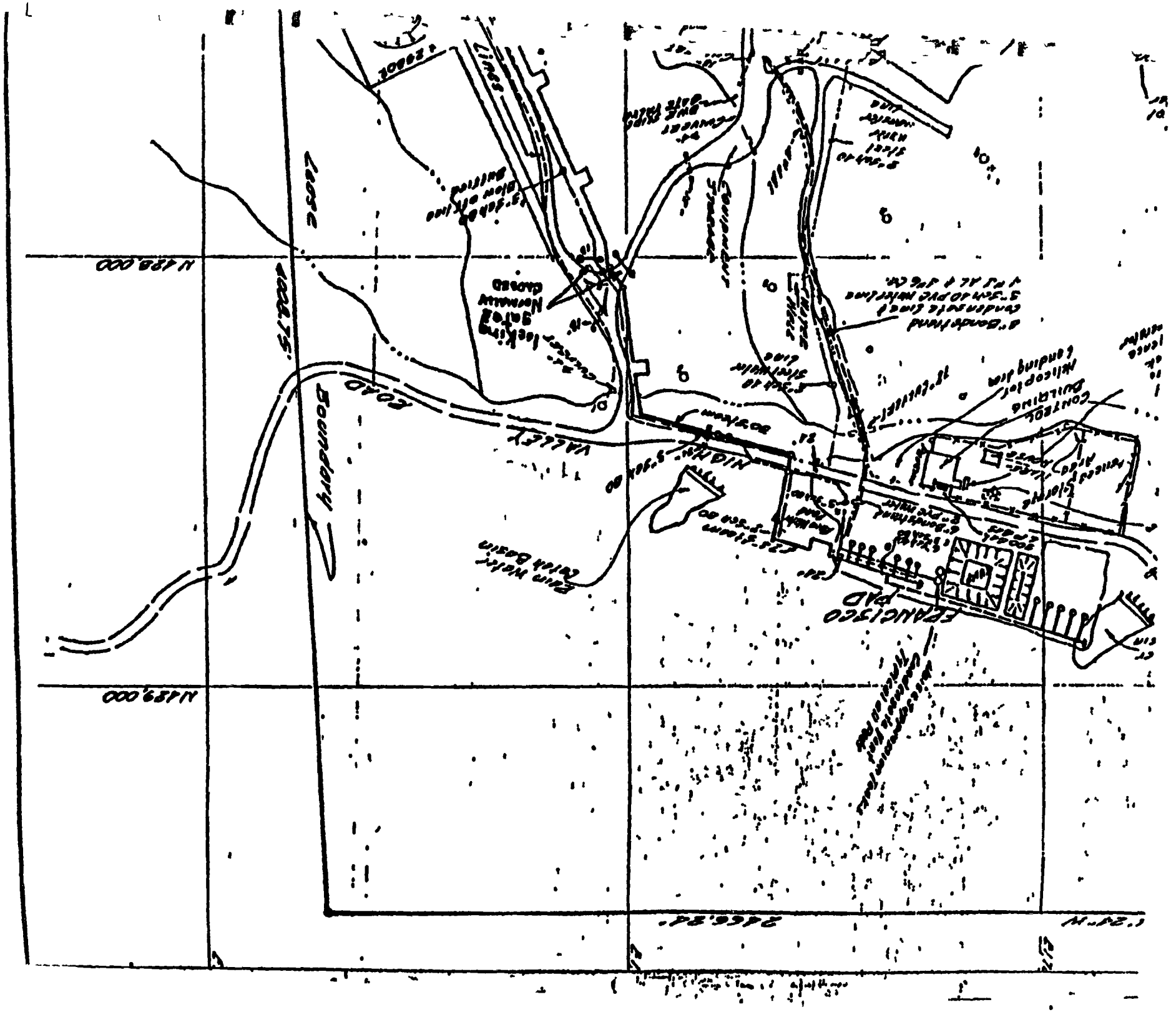
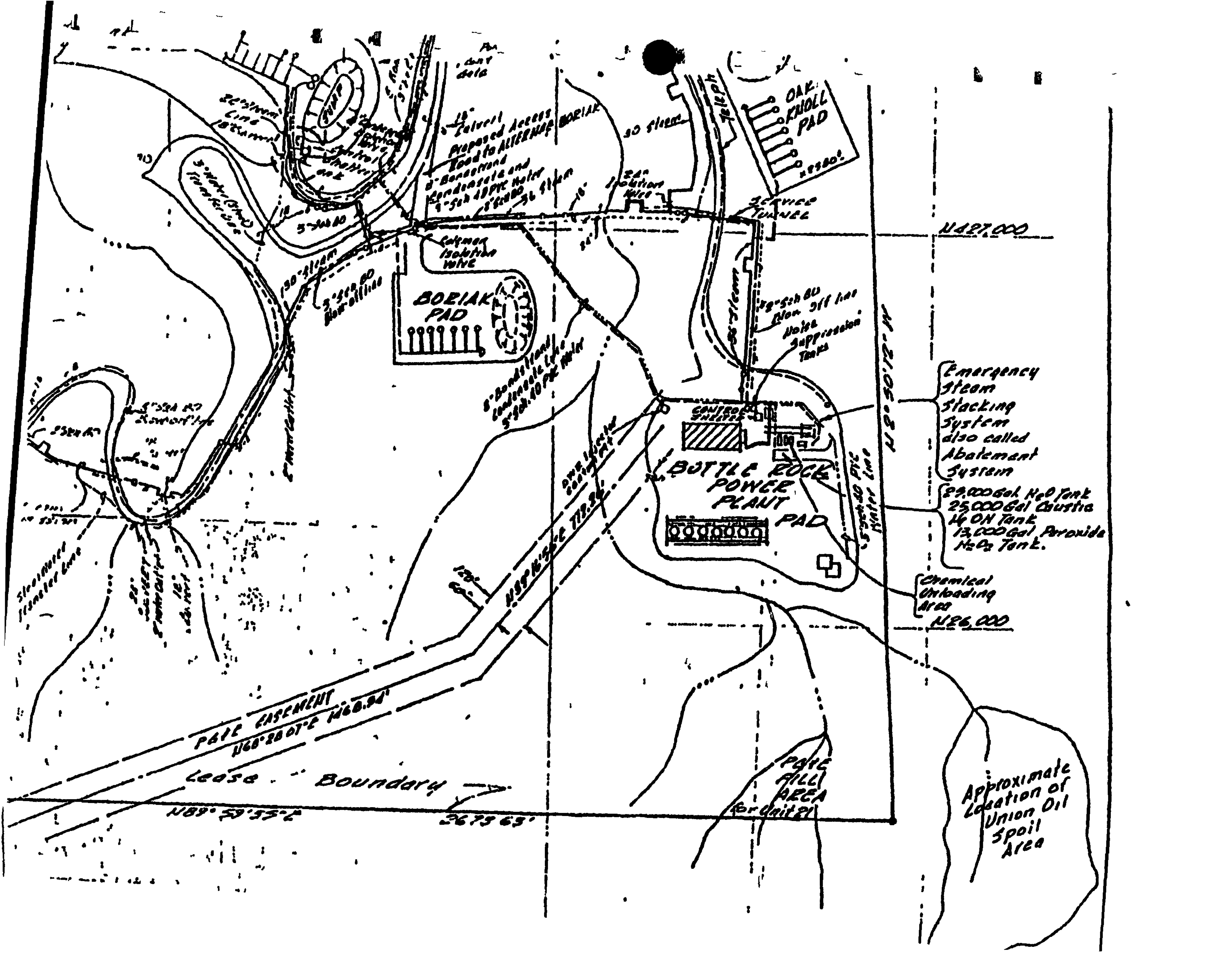
TRAFFIC PLAN & SIGNS
MCR GEOTHERMAL

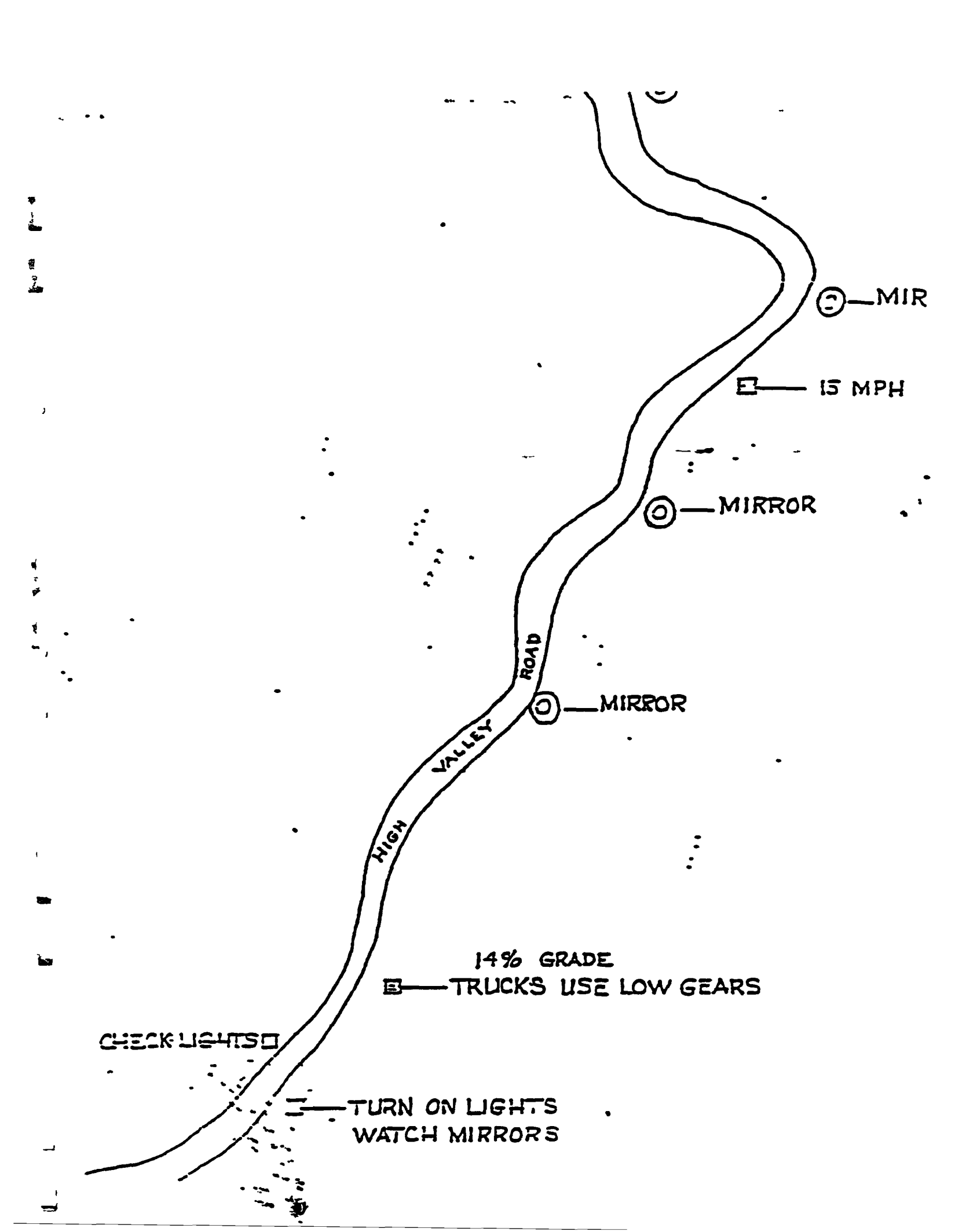

M
15 MPH
MIRROR
MIRROR
HIGH VALLEY ROAD
14% GRADE
TRUCKS USE LOW GEARS
CHECK LIGHTS
TURN ON LIGHTS
WATCH MIRRORS

LEASEHOLD MAP





OAK KNOLL PAD
BORIAK PAD
BOTTLE ROCK POWER PLANT PAD
Control Shelter
Service Tunnel
Noise Suppression Tanks
Emergency Steam Stacking System also called Abatement System
23,000 Gal. H2O Tank
25,000 Gal Caustic NaOH Tank
13,000 Gal Peroxide H2O2 Tank.
Chemical Unloading Area
N427,000
N426,000
N 2°50'12" W
PG&E EASEMENT
N68°28'07"E 1468.94'
Lease Boundary
N89°59'55"E
2673.63'
PG&E FILL AREA for Unit 21
Approximate Location of Union Oil Spoil Area
Proposed Access Road to ALTERNATE BORIAK
Calcium Isolation Valve
30" Steam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HIGH VALLEY ROAD
14% GRADE
TRUCKS USE LOW GEARS
CHECK LIGHTS
TURN ON LIGHTS
WATCH MIRRORS

COUNTY OF LAKE

AMENDED USE PERMIT 85-27

(FORMERLY USE PERMIT 85-17)

MCR ROTTI EROCK STEAMFIELD GEOTHERMAL PROJECT

Pursuant to the approval of the Lake County Board of Supervisors on February 19, 1980, and as amended by the Lake County Planning Commission on July 29, 1982, March 14, 1985 and June 26, 1986, there is hereby granted to MCR Geothermal Corporation, P O Box 310, Cobb, CA 95426, a Use Permit for the construction of a geothermal steamfield including up to forty-one (41) geothermal development wells from five (5) pads Pads and numbers of wells shall be limited to the following Francisco (9), Coleman (6), West Coleman (12), Alternate Boriak (7) and Oak Knoll (7). This permit also allows a total of forty-one (41) redrillings of well bores in new directions and/or replacement wells and unlimited rework of the 41 permitted wells. The authorized project also includes associated steam and condensate pipelines, sediment catchment basins, water monitoring facilities, access roads, spoil site (Francisco Spoil Area) and reinjection wells, along with incidental uses and activities; further described in condition D.1 through 5 of this use permit and identified in the Plan of Development in the Supplemental EIR dated December 1985 as amended to exclude Hodges, Power Pole, and Modified Boriak pad sites in accordance with the Lake County Ordinance Code. The project is located in the Cobb Valley along High Valley Road in Section 5 & 6, T11N, R8W, MDB&M, on approximately 390 acres identified as Lake County Assessors parcel numbers 013-002-03, 04 & 05, near the communities of Glenbrook and Pine Grove.

The Planning Commission, finds that the estsblishment and maintenance or operation of the use for which application is made will not, under the circumstances of this particular case, be detrimental to the health, safety, peace, morals, comfort and general welfare of persons residing or working in the neighborhood of such use, or be detrimental to the general welfare of the County.

The Planning Commission has caused to be prepared an Environmental Impact Report and Supplements on the subject of this application and has held public hearings thereon and has carefully considered this matter pursuant to the California Environmental Quality Act and the State CEQA Guidelines pertaining thereto, and pursuant to the Environmental Protection Guidelines of the County of Lake.

I. Approval is subject to the following terms and conditions:

1. The Use Permit shall be valid until June 26, 2013 However, if the corrective measures required by this modified Use Permit are not initiated within sixty (60) days of approval of the Amended Use Permit, revocation proceedings may be initiated subject to Section 21-84 of the Lake County Code. The Planning Commission may, in its discretion, approve time extensions.

2. The permittee shall permit the County of Lake or its representative(s) or designee(s) to make periodic inspections at any reasonable time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein. Applicant shall provide current access information and keys, key cards or other materials necessary for the agency staff with valid identification to gain access

3 The Planning Commission may, during public hearing, modify or revoke this Use Permit any time during its term if it is determined that the use herein permitted is creating a nuisance or a condition hazardous or detrimental to the general public or to property in the vicinity of the use

completed within 3 years as specifically provided for in the required phasing plan Inspection costs for this surfacing shall be paid in accordance with condition # 10 of this use permit

8 Applicant shall maintain files on all supplemental plans and ongoing mitigation measures required by this Use Permit An annual report summarizing the primary compliance activities during the previous year shall be submitted to the Planning Department

9 Applicant shall enter into a compliance monitoring inspection agreement with the County of Lake. Said agreement shall provide for reimbursement to the County for the actual cost of inspection and monitoring, limited to staff time, equipment repair, and mileage, for the life of the project. If an area-wide fee schedule for inspection services is adopted in the future, it shall replace this condition.

10 The permit holder agrees that the Lake County Planning Commission shall have the right to require the permit holder to participate in a Geysers area seismic monitoring program on a pro rata basis, if recommended by the Lake County General Plan.

11 Provision shall be made for adequate access by fire-fighting equipment to the site, and fire access maps shall be provided to the appropriate fire district(s).

12 Permit holder shall provide the Air Quality Management District with a plan which details the equipment and procedures which will be employed during power plant outages (stacking periods) and during maintenance venting This plan shall include proposed hours during which planned maintenance venting will occur as well as projected time which will elapse between unscheduled power plant outages and the throttling back of wells to minimum bleed. The plan shall include personnel available for unscheduled outages and projected response time of those personnel.

13 Permit holder shall, submit a revised traffic control and road maintenance plan for High Valley Road. This plan shall require car pooling and/or busing of employees whenever possible and take into account the great increase in heavy truck traffic which will accompany full field development and expansion of the Bottlerock site. The plan shall also address sign requirements and the coordination of heavy truck traffic (on Sulphur Creek Road) with the school district to reduce safety concerns to school children. The plan shall suggest mitigations which will prevent or alleviate the concomitant increase in danger due to traffic accidents and damage to the road which may occur following development. This plan shall be approved prior to issuance of a grading permit for pad, road, or pipeline construction.

14 Pipeline routes and design must be consistent with the approved plan of development, and be approved by the Planning, Public Works and Building Departments prior to construction.

15 All supplemental plans required by this permit, including but not limited to revegetation, sediment, drainage monitoring and control, scenic enhancement, phasing, continuous water monitoring, traffic control and maintenance, noise abatement, emergency fire and medical evacuation and accidental spills, shall be incorporated into the use permit once approved by the responsible department or official. Public notice of all plans and

competent jurisdiction to be invalid, such decision shall not affect the validity of the remaining portions of the use permit. The Board of Supervisors hereby declares that it would have passed this use permit and each section, subsection, sentence, clause and phrase hereof irrespective of the fact that any one of more sections, subsections, clauses or phrases are declared invalid

M. PUBLIC HEALTH AND SAFETY:

1. In the event of casing blowout or other uncontrolled venting, the permit holder shall move immediately to control the vent. No more than two (2) days shall elapse from the date of the uncontrolled vent to the date of equipment relocation to secure it.

2. Applicant shall comply with the requirements of the fire prevention practices and measures as prescribed by the California Division of Forestry and/or County of Lake An emergency response contingency plan shall be submitted for approval by the Planning Department. Fire access maps indicating streets and signing shall be provided to the appropriate fire district(s).

3. All extra-wide and slow moving vehicles shall be preceded by a flag car while on public roadways. The California Highway Patrol shall be notified of geothermal waste generated by permit holder and transported on public roads at least four (4) hours prior to occurrence of each activity.

   Prior to entering the Francisco Leasehold, the permit holder shall provide all truck drivers with a detailed map of the area in which they are traversing prior to entering the security gate. The map should include a) all dangerous curves/elevation points--highlighted in red, b) speed limits/reduced limits depicted on the map, c) safe locations for vehicle inspections, and d) a serious warning clause/penalties if drivers violate any safety procedures while travelling on private roads.

✓ The permit holder shall require that each truck driver conduct a vehicle inspection at the gate area prior to leaving the leasehold. The inspection shall include brakes, vehicle connection, wheels/tires, valves, tanks, etc and other equipment as outlined in Title 13 CAC. After loading, a material inspection for leaks in the system shall be conducted. All inspections shall be logged at the MCR guard gate for verification by agency staff.

✓ 4 The permit holder shall be responsible for repair of any direct verifiable damage to public roadways resulting from construction or operation of this project, including actions by contractors or subcontractors.

5 Sanitary and handwashing facilities shall be provided at each drill site during well drilling, in full compliance with all rules and regulations of the Lake County Health Department.

6 The permit holder shall comply with all safety requirements of Cal/OSHA, including an accident prevention program, and conduct Cal/DOHS on-site worker safety inspections during construction and operation of the steamfield.

7 The permit holder shall surface all project roads with a double chip seal surface approved by the Department of Public Works. Surfacing shall commence upon initiation of pad, road or pipeline construction and shall be

COUNTY OF LAKE

USE PERMIT 87-92
BINKLEY GEOTHERMAL STEAM SUPPLY PROJECT

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Pursuant to the approval of the Lake County Planning Commission on December 8 1988 there is hereby granted to the Department of Water Resources P O Box 942836 Sacramento CA 94236-0001 a use permit for the construction of one drill pad with sump and drilling of up to four (4) geothermal development wells This permit also allows a total of four (4) redrilling s of well bores in new directions and/or replacement wells and unlimited rework of all permitted wells The authorized project also includes sediment catchment basins water monitoring facilities use of existing access roads three (3) spoils disposal areas (north of the Chris Mahuke residence) and incidental uses and activities as identified in the project FIR dated August, 1988, in accordance with the Lake County Ordinance Code The project is located on an approximately 420 acre leasehold ±1 mile WSW/of Glenbrook in Cobb Valley in portions of Section 31 T12N, R8W M D B & M , and known as Assessor's Parcel No s 011-012-22 and 013-002-01

The Planning Commission finds that the establishment and maintenance or operation of the use for which application is made will not under the circumstances of this particular case, be detrimental to the health safety peace comfort and general welfare of persons residing or working in the neighborhood of such use or be detrimental to the general welfare of the County

The Planning Commission has caused to be prepared an Environmental Impact Report on the subject of this application and has held public hearings thereon and has carefully considered this matter pursuant to the California Environmental Quality Act and the State CEQA Guidelines pertaining thereto, and pursuant to the Environmental Protection Guidelines of the County of Lake

1 Approval is subject to the following terms and conditions

1 This use permit has been approved by the Planning Commission subject to being issued after the expiration of the mandatory appeal period and after compliance with any conditions precedent The use permit shall be valid for thirty (30) years from date of approval (December 8, 2018) however, if the use permit is not used prior to December 8 1992 it will become null and void, and the use may not proceed without the application for and approval of a new use permit The Planning Commission may in its discretion approve time extensions

2 The permit holder shall permit the County of Lake or its representative(s) or designee(s) to make periodic inspections at any reasonable time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein Permit holder shall provide current access information and keys key cards or other materials necessary for the agency staff with valid identification to gain access

3 The Planning Commission may, during public hearing modify or revoke this use permit any time during its term if it is determined that the use herein permitted is creating a nuisance or a condition hazardous or detrimental to the general public or to property in the vicinity of the use

4 Days and hours of operation for facilities shall be twenty-four (24) hours per day, seven (7) days per week except as specifically amended by conditions herein

7 The permit holder shall comply with all safety requirements of Cal/OSHA including an accident prevention program and conduct Cal/DOHS on-site worker safety inspections during construction and operation of the steamfield

8 The permit holder shall surface all regularly used permanent project roads (as indicated in Attachment #3) including the road between the intersection with High Valley Road and the drill pad with an adequate paving or chip seal surface approved by the Department of Public Works Surfacing shall commence upon initiation of pad construction and shall be completed within sixty (60) days of completion of initial well drilling Inspection costs for this surfacing shall be paid in accordance with condition B 10 of this use permit

9 The permit holder shall maintain files on all supplemental plans and ongoing mitigation measures required by this use permit An annual report summarizing the primary compliance activities during the previous year shall be submitted to the Planning Department

10 The permit holder shall enter into a compliance monitoring inspection agreement with the County of Lake Said agreement shall provide for reimbursement to the County for the actual cost of inspection and monitoring limited to staff time, equipment repair, and mileage for the life of the project If an area-wide fee schedule for inspection services is adopted in the future, it shall replace this condition

11 The permit holder agrees that the Lake County Planning Commission shall have the right to require the permit holder to participate in a Geysers area seismic monitoring program on a pro rata basis, if recommended by the Lake County General Plan

12 Permit holder shall submit a traffic control and road maintenance plan for High Valley Road and other project roads This plan shall require car pooling and/or bussing of employees whenever possible and take into account the increase in heavy truck traffic which will accompany pad construction and well drilling The plan shall also address sign requirements and the coordination of heavy truck traffic (on Bottle Rock and Sulphur Creek Roads) with the school district to reduce safety concerns to school children The plan shall suggest mitigations which will prevent or alleviate the concomitant increase in danger due to traffic accidents and damage to the road which may occur following development This plan shall be approved prior to issuance of a grading permit for pad construction

During pad construction and well drilling permit holder shall provide staffing on a continuous basis at the guard station at the intersection of High Valley and Bottle Rock Roads Permit holder agrees to install an automatic rolling or sliding chain link (or equivalent) gate at the High Valley Road entrance This gate shall be installed upon completion of construction and drilling activities and termination of manned guard gate

13 All supplemental plans required by this permit including but not limited to revegetation sediment drainage monitoring and control scenic enhancement phasing, continuous water monitoring traffic control and maintenance noise abatement, emergency fire and medical evacuation, accidental

COUNTY OF LAKE

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3 The Planning Commission may during public hearing modify or revoke this use permit any time during its term if it is determined that the use herein permitted is creating a nuisance or a condition hazardous or detrimental to the general public or to property in the vicinity of the use

4 Days and hours of operation for facilities shall be twenty-four (24) hours per day seven (7) days per week except as specifically amended by conditions herein

5 No use structure or development shall occur that is inconsistent with the approved development plan or this use permit The permit holder shall apply for a use permit modification if the permit holder proposes any construction inconsistent with this use permit and the approved development plan

The Planning Director may approve minor modifications which are in substantial conformity with the uses and locations of uses approved by UP 87-92 and will not result in increased environmental impacts All amendment requests shall be in writing and be approved modified or denied by the Planning Director in writing

6 At least 60 days prior to initiation of drill pad construction permit holder shall submit to the Planning Department proof of agreement by the Binkley Family Trust to accept pad site spoil material at the locations shown in the project description and E I R or submit information on an alternate spoil site acceptable to the Planning Department

7 The permit holder shall comply with the mitigation measures derived from the project EIR which are included in Attachments 1 and 2 of this use permit.

8 This use permit may be reviewed by the Planning Commission as needed and shall be subject to the following conditions

A. TO PROTECT PLANT ASSOCIATIONS

1 The specific pad road and borrow site or other area of soil disturbance shall be evaluated by a landscape architect registered forester, plant ecologist or other qualified person acceptable to the Planning Department and the permit holder to select and program the re-establishment of ground cover and vegetation to include indigenous forage and habitat and provide maximum erosion control A revegetation program shall be submitted to the Planning Department for review and approval as described in condition A 2 of this permit

2 Cut slopes on the road and pad areas shall be constructed as agreed upon by the permit holder s engineers and Department of Public Works consistent with the revegetation and erosion/sedimentation control plans to be submitted for approval by the Public Works and Planning Departments sixty (60) days prior to initiation of construction and approved prior to issuance of a grading permit Stepped benches shall be used where appropriate unless considered unnecessary by the persons in A-1 and B-1 Top soil shall be stockpiled for later respreading over the disturbed areas prior to reseeding as recommended by person A-1

3 When each stage of road and pad construction has been completed the revegetation program developed in A-1 shall commence not later than the following fall The revegetation program shall be directed by the landscape architect registered forester plant ecologist or other qualified person acceptable to the Planning Department and the permit holder

4 The entire revegetation program shall be re-evaluated during the spring following initial planting and accompanied by a written statement from the qualified person listed in A-1 and provided to the Planning Director The written statement shall indicate which planting techniques were successful or unsuccessful and what will be done to improve the revegetation program if needed Photos shall be included to illustrate the relative success of revegetation

efforts This shall include photos taken prior to construction If deemed by the Planning Department to be unsuccessful additional revegetation will be required not later than the immediately succeeding fall season The revegetation program shall include periodic inspection and upgrading as necessary All plantings shall be maintained or replanted for the life of the project

The revegetation and sediment control measures shall follow the recommended mitigation measures included in attachment #1 of this use permit

5 Except for large stumps, vegetation removed during construction shall be chipped and respread when beneficial as determined by person in Section A-1 or burned under the permits required by the Lake County Air Quality Management Districts (LCAQMD) Stumps may be buried outside of engineered fill and embankments

6 Well discharge shall be directed away from adjacent woody vegetation and populated areas and appropriate energy dissipaters shall be used as required by the LCAQMD

7 In order to protect vegetation on the leasehold access to the drill site shall be restricted to existing roads and proposed roads as defined in the Development Plan and the Draft EIR (dated August 1988) as amended by this use permit

8 Vegetation within "fall-out" range of bleeding wells shall be assessed for damage or growth impedance by a plant pathologist or other qualified professional as approved by the Planning Director An annual report of these findings together with photographs of selected sites shall be submitted unless waived in writing by the Planning Department If damage to ecosystem is present mitigation measures shall be enacted according to direction from the Planning Department

9 Vegetation beyond the construction perimeter shall not be disturbed The clearing limits for pads are in the Plan of Development

B TO PROTECT AGAINST EXCESSIVE SOIL EROSION INDUCED LANDSLIDES AND SURFACE GEOLOGIC HAZARDS

1 Plans for the drill pad spoils areas sump and access road shall be prepared consistent with the recommendations of a certified engineering geologist Topographic mapping by photogrammetric methods shall be used for design and be supplemented as necessary with ground surveys Road spoil and pad locations shall be staked on the ground and adjusted as necessary before completion of final plans Plans shall include a drainage plan as required in condition B 8 using five foot contour intervals and supporting calculations for culvert sizes using acceptable engineering methods Plans shall show specific provisions for erosion protection at culverts and on cut and fill slopes Detailed specifications for construction should be prepared in a manner similar to applicable portions of "Forest Service General Provisions and Standard Specifications for Construction of Roads and Bridges - 1977" and "Regional Standard Specifications" a U S D A Forest Service publication Plans specifications and ground locations shall be submitted for approval to the Planning Department or their authorized representatives sixty (60) days prior to initiation of construction

2 Drill pad and road fills shall be compacted to a minimum 95% relative (ASTM-D-1557-70) which may be reduced to 90% compaction if approved by the Planning Department and Department of Public Works If significant erosion occurs as a result of any part of this project the permit holder shall take prompt remedial action as directed by the Planning Department Tests indicating compaction results shall be submitted for approval to the Department of Public Works within thirty (30) days of completion and filed with the Planning Department

3 Filled slope banks shall not exceed a gradient of 2 1 unless otherwise approved by the Department of Public Works and Planning Department Toes of all fills shall be stabilized with rock and gravel or keyed into stable soil and placed to reduce erosion potential to an absolute minimum on all fill slope banks Revegetation of slopes shall be carried out as specified in section A Unless approved by an engineering geologist and Public Works Department cut slopes shall not exceed a gradient of 1-1/2 1

4 Subdrains shall be provided under all fills where natural drainage courses and seepage are evident

5 No drill pad construction or access road shall be allowed on potentially active landslides unless properly mitigated subject to approval by the Public Works Department

6 Buffer zones of undisturbed vegetation shall be maintained 500 feet on either side of streams No geothermal related construction shall take place within this buffer zone unless consistent with the Development Plan approved by the Lake County Planning Commission Roads crossing riparian areas shall be minimum safe widths

7 An impermeable retaining levee of not less than eighteen (18) inches in height and three (3) feet in base thickness or an equivalent measure shall be placed and maintained in areas containing toxic or potentially hazardous materials including equipment service fuel transfer and drilling rig locations The levee or equivalent measure shall prevent spillage and/or storm runoff accumulation from random discharge To minimize damage to levees from truck traffic the permit holder shall place ramps of rigid construction over levees or take equivalent measures to minimize damage These ramps shall be in place immediately following completion of levee construction Drilling mud and cuttings shall be placed directly into the sump and not be allowed to intentionally flow onto the drill pad However during dewatering type processing drilling muds and cuttings may be placed on the pad if they meet liquid fraction standards established by the Central Valley Regional Water Quality Control Board in consultation with Lake County Planning and Health Departments A plan for the retaining levee or equivalent measure shall be submitted to the Public Works and Planning Departments as part of the overall drainage plan

8 A drainage plan shall be submitted for approval sixty (60) days prior to initiation of construction Sediment catchment basins shall be in place prior to construction Said plan shall include sedimentation control strategies and shall indicate how runoff will be distributed and channeled to existing natural waterways limiting an increase in water head and thereby avoiding unnatural channel abrasion Energy dissipaters and collection devices to reduce the erosion force of unnatural runoff shall be installed where required by a county or state agency

Sediment catchment basins and their locations shall be included in said plan Their siting and design shall follow the recommended mitigation measures included as Attachment 1 of this use permit

9 All grading activity and erosion prevention measures shall be completed and all drainage structures shall be in place and operational prior to October 10 of any year New grading and excavation activity may not be permitted during the consecutive period from October 10 to April 10 (Extensions for short term grading activities beyond October 10 may be allowed by the Lake County Public Works Director in writing weather permitting)

10 The permit holder shall agree to contract with the County of Lake for engineering and inspection services, as required, to a completion date agreed upon by the permit holder and the county to insure compliance with the above stated conditions

11 In areas requiring removal of vegetation but no grading root crowns shall be left intact so as to retard soil erosion Excavated materials shall not be sidecast or pushed over the edges during construction and final grading Excess earthen materials (rocks boulders and dirt) shall be removed from the site and disposed of in an approved disposal site Cut and fill operations shall be carried out so that the down slope roll of earthen material is prevented

C SUMP/PAD CONSTRUCTION, OPERATION, MAINTENANCE AND CLOSURE

1 The sump and pad shall be designed by a registered civil engineer consistent with the recommendations of a certified engineering geologist Design of the sump fill shall be to a specification to withstand both static loads and dynamic loads (imposed by credible seismic events) with safety factors of 1 5 and 1 3 respectively The sump shall be constructed of material compacted to at least 95% relative (ASTM-D-1557-70) which may be reduced to 90% compaction if approved by the CVRWQCB and Planning Director and demonstrated by soils reports as a hardship If sumps are used for a period of eight (8) months or less they shall be lined with at least two (2) feet of clay having permeability not to exceed 1 x 10^{-6} cm/sec or an equivalent impermeable membrane If used for a period of between eight (8) and twelve (12) months they shall be lined with at least three (3) feet of clay Sumps used for more than one (1) year shall be double-lined with leachate collection systems as required by the Central Valley Regional Water Quality Control Board (CVRWQCB) pursuant to Subchapter 15 Chapter 3 Title 23 California Code of Regulations

2 The sump shall be operated in such a manner as to preclude overtopping of the sump Three feet of freeboard shall be maintained at all times Volume of the sump shall be sufficient to accommodate both the drilling mud and any reasonable amount of precipitation which could enter the sump No transfer of drilling fluids between drill pads shall occur without prior approval of the CVRWQCB and Lake County Health Department except for emergency situations which shall be reported to the above mentioned agencies as soon as possible Said transfer shall occur in rigid transfer piping meeting approved engineered standards or by containerized vehicles designed for such purposes All

pipelines used for transfer of drilling fluids between sumps and condensate collection system shall be pressure tested at least once per year Testing shall occur prior to commencement of winter rains Placement of drill mud or cuttings directly on the pad is prohibited unless specifically allowed in condition D 2 of this use permit or an approved solids separation system (sumpless drilling) Plans for this solids separation system shall be submitted to the Planning Department for approval fifteen (15) days prior to the proposed use of said system

3 If a drill sump is to be used following sump cleanout or a period of deactivation it shall first be inspected by a civil engineer and certified engineering geologist satisfactory to the Planning Department to evaluate its condition and to recommend repairs as necessary Particular care shall be given to the waste sump liner to ensure that it is repaired or replaced as necessary A written engineering report on the condition of the sump and liner shall be submitted to the Planning Department and CVRWQCB within thirty (30) days of completion of inspection and approved in writing prior to reactivation of the sump

4 No hydrocarbon base cleaning agent, no waste oils or greases, and no liquid fuel shall be released directly into the environment other than incidental leakage from equipment or accidental spills of 5 gallons or less within bermed areas of a drill pad All such liquids shall be contained and removed from the site Any accidental discharge of the materials mentioned above shall be removed and properly disposed of by the permit holder and immediately reported to the Planning and Health Departments

5 The permit holder shall ensure that any hazardous waste hauler under contract to the permit holder and operating on or off the leasehold has a certificate of registration from the California Department of Health Services (DOHS) Hazardous Materials Management Section

6 If known hazardous materials are stored on site for more than ninety (90) days the permit holder shall obtain a determination from the DOHS that the requirements of a Hazardous Waste Facility Permit have been satisfied

7 All hazardous wastes are to be taken to a facility permitted by the California Department of Health Services to accept such wastes

8 All unattended active sumps containing waste material shall be enclosed with a field fence eight (8) feet or greater in height to prevent access by livestock wildlife and unauthorized persons

9 Wellhead components which are exposed to ambient conditions at a temperature of 140 degrees fahrenheit or higher where accessible to human reach shall be designed to prevent inadvertent human or burn injury

10 When each well drilling sequence has been completed the permit holder shall remove all drilling equipment and clean pad surface within thirty (30) days unless drilling of other wells on the pad is scheduled to commence within sixty (60) days When drilling is not occurring the pad shall be kept clean and neat in appearance and shall not be used for long term equipment and materials storage

D SUMPLESS DRILLING OPERATION AND MAINTENANCE

1 Sumpless drilling is approved to replace conventional sumps if used in conjunction with a solids separation system to process drilling wastes (refer to the project description in the use permit application and page 90-92 in the FIR entitled DWR Binkley Well Pad August 1988) All drilling solids and liquids shall be contained in impermeable covered steel tanks during winter Uncovered impermeable steel tanks may be used only between April 10 and September 30 (This time frame may be reduced or extended by the Planning Department, in writing in consultation with the Lake County Health Department)

2 A solids separation system (SSS) or an equivalent sumpless drilling technique may be installed and utilized on the drill site in accordance with condition C 2 of this use permit Plans and specifications of this process shall be submitted to the Health and Planning Departments for review and approval at least fifteen (15) days prior to installation of the facility

3 Steel tanks used to hold drilling solids or liquids shall be designed by a Registered Civil Engineer Volume of steel tanks shall be sufficient to accommodate the drilling solids produced during the drilling and testing precipitation and fluids which are not reinjected and other potentially hazardous materials draining into the tank consistent with condition F 2 of this use permit

4 The impermeable steel tanks shall be operated in such a manner as to preclude overtopping

E WASTE DISPOSAL

1 Prior to removal or burial of sump materials or within ninety (90) days of the removal of drilling equipment sump fluids (both mud and supernatant liquids) shall be chemically analyzed for type and quantity of biologically sensitive materials especially hazardous materials heavy metals and acids unless waived by the Planning Director upon written consultation with the CVRWQCB

Sampling and testing parameters and procedures shall be submitted to the Planning Department for review and approval Additional sump sampling and testing may be required if requested in writing by the Planning Director Lake County Health Department or CVRWQCB

Such testing shall be performed by a licensed water quality testing laboratory The chemical analysis shall be sent to the CVRWQCB and the Lake County Planning and Health Departments for review If said analysis does not indicate quantities in excess of allowable limits for either human or other important biological elements especially those of the aquatic ecosystem then sump materials shall be solidified dried mixed with native soil and buried If hazardous or biologically sensitive materials as specified by Section 66300 of Title 22 California Code of Regulations are found such materials shall be removed within ninety (90) days to an off-site Class I or Class II waste management unit which is in compliance with all local state and federal regulations, in a timely manner as directed by the county or appropriate state agency

2 After the sump has been filled all liquids produced during testing cleanout or blowdown which are not injected shall be containerized and removed to a waste management unit permitted to accept these wastes

3 All solid waste material other than chemically acceptable sump material (D-1) shall be removed from the site to a waste management unit which is in compliance with all local state and federal requirements

F TO PROTECT AGAINST SURFACE WATER DEGRADATION

1 In order to preserve the hydrologic integrity of this area the permit holder shall obtain by legal right purchase or agreement all water used and provide documentation to that effect to the Planning Director prior to construction The injection of on-site rainwater sump fluids and steam condensate is approved The injection of effluent shall be subject to approval by the CVRWQCB, and U.S Bureau of Land Management The injection of water from other on or off-site sources is disallowed without specific approval of the Lake County Planning Commission

2 All areas of drill pads containing potentially hazardous materials including the equipment service and fuel transfer areas and the area occupied by the drilling rig shall drain into the sump or tanks used in conjunction with sumpless drilling No sump materials shall be allowed on the pad unless they are in compliance with the conditions of the approved sumpless drilling plan identified in D 2 or the solids separation system discussed in C 2 of this use permit

3 The surface of roads bridging or fording any water course or stream shall be an asphalt emulsion or equivalent surfacing material as acceptable by the Department of Public Works and Planning Department to prevent erosion and sedimentation of leasehold surface waters

4 Permit holder shall monitor or contract to monitor water and aquatic biology of High Valley Creek and other nearby waterways if so required west of the drill pad Type, location and frequency of testing shall be determined by the Planning and Health Departments in consultation with CVRWQCB and consistent with Use Permit 85-27 Said monitoring proposal shall be submitted and approved by the Planning and Health Departments prior to issuance of a grading permit for pad construction The permit holder shall coordinate water monitoring activities with those occurring on the Francisco Leasehold to the south

If the permit holder elects to conduct or participate in a watershed or regional water quality monitoring program it can be substituted for the requirements of the above paragraph Such a proposal must be submitted to and accepted by the Planning and Health Departments in consultation with CVRWQCB prior to termination of the monitoring outline in the above paragraph

5 In addition to the periodic water monitoring discussed in F 4 above permit holder shall conduct a continuous surface water quality monitoring program similar to that required in the Francisco Leasehold Use Permit (UP 85-27) Plans and locations for this continuous water quality monitoring program shall be submitted to and approved by the Lake County Planning and Health Departments prior to pad or road construction Specific design for this program shall be

approved by the Planning and Health Departments in consultation with CVRWQCB and shall be operational prior to well drilling on the drill pad

The permit holder is encouraged to coordinate this continuous surface water quality program with the similar program required in UP 86-27 on the Francisco Leasehold

6 A pre-project baseline springs water quality and quantity monitoring program shall be instituted sixty (60) days prior to initiation of construction This program shall be continued without interruption for five years if there are no post-construction changes If unexplained changes in quality or quantity in any spring occurs then the program should be continued indefinitely until the cause of the changes and its remedy can be determined Proposed parameters to be monitored shall be provided to the Planning and Health Departments and shall be approved prior to initiation of monitoring.

7 Permittee shall also obtain a permit from and comply with all permit regulations of the CVRWQCB to prevent ground and surface water degradation All conditions of the permittee s waste discharge requirements are herein referenced and incorporated into this use permit A violation of the waste discharge requirement for this project shall be a violation of this permit

8 The permit holder shall provide an agreement acceptable to the Planning Department in consultation with the Binkley Family Trust to guarantee to supply water to residents in quantities previously naturally obtained if springs are adversely affected in quality or quantity as a result of this project

G TO PROTECT AIR QUALITY

1 The permit holder shall meet all regulations and standards set by the Lake County Air Quality Management District (LCAQMD) and utilize on a continuous basis best available control H_2S technology as determined by the LCAQMD All conditions of the LCAQMD Authority to Construct and Permit to Operate are herein referenced and made part of this use permit This use permit does not supercede the authority of said District in any way

2 The permit holder and/or any subsequent successor or assignee shall obtain and maintain an active Authority to Construct Permit(s) or Permit(s) to Operate from the LCAQMD prior to commencement of any construction activities

3 After completion of geothermal wells the H_2S emissions during standby venting of steam shall be either abated to an acceptable level per LCAQMD rules and regulations or standby venting shall be curtailed to the level necessary to attain emission limitations Curtailment methods to be utilized shall include the shutting in of geothermal wells in accordance with established procedures

4 The analysis shall include accurate "wet chemistry" and gas chromatograph determinations as referred to in the LCAQMD permits Heavy metals such as lead chromium arsenic mercury and cadmium should be determined as well as substances such as radon hydrogen sulfide boron manganese methane fluoride ammonia and carbon dioxide The analysis should also include Ph

5 Control of particulate emissions during air drilling shall be performed by use of a properly sized wet cyclone using a minimum of 60 gpm water injection If a resource high in arsenic or other toxic material is encountered mitigation of significant emissions will be accomplished by available remedies to be selected by the Department of Water Resources and approved by the LCAQMD Emissions shall not exceed the equivalent to Ringelmann one (1) for three (3) minutes duration in any one (1) hour

6 Control of particulate and dust emissions during construction spoils hauling and placement and operation shall be accomplished by the use of water compacting with rock paving and/or treating construction spoils sites roads and pad with a palliative to avoid dust of Ringelmann 2 for 3 minutes duration during any one (1) hour During the hauling and placement of spoil permit holder shall monitor or cause to be monitored asbestos at the pad site disposal sites and at a nearby down wind receptor If material excavated and hauled to spoil sites cannot be mitigated to prevent spillage and wind blown material from escaping haul trucks such hauling vessels shall be covered with tarps or other methods to prevent loss of hauled material Any serpentine material spilled on haul roads shall be immediately removed

7 If wells are bled to the atmosphere on standby they shall be controlled to 24 lbs H_2S per day or less, as specified by the AQMD

8 Use of a wet cyclone scrubber and process described in condition G 5 to abate particulate and water soluble constituents or equivalent technique approved by the LCAQMD shall be used on any long term high volume flow test subsequent to well completion

9 This permit and the conditions included herein are expressly designed to insure that the facilities and uses authorized by this permit will not result in the creation of any odor nuisance Should an odor nuisance develop as a result of this project the permit holder shall immediately take corrective action to eliminate the nuisance

H TO PROTECT AGAINST NOISE EXPOSURE

1 The permit holder shall not exceed a maximum noise standard of Ldn 60 dBA at sensitive receptors The permit holder shall design project components to minimize noise emissions generally consistent with the best available control technology (BACT) as described on pages 222-228 of the Union Oil Unit 21 Steamfield Use Permit No UP 80-41 and the recommended mitigation measures identified in the EIR The Noise Control Officer shall determine BACT for the drill site consistent with the Lake County General Plan and the project EIR and incorporate the recommendations of Attachment #2 of this use permit and the approved noise mitigation plan identified in H 5 of this use permit Mufflers of advance design lead/vinyl barriers enclosing large internal combustion engines and wrapping of the drill rig platforms and the bloole line or equivalent measures shall be necessary to meet the noise standards of this condition

2 It is stipulated that the Noise Control Officer will be spot monitoring noise levels in the vicinity of the proposed land use and that findings resulting from said monitoring may require the permit holder his contractors or agents to

provide continuous noise level monitorings and readings as may be directed by the Noise Control Officer Noise problems such as brake squeal low level engine rumble etc substantiated by public complaints may result in the Noise Control Officer imposing more stringent noise mitigation techniques upon permit holder such as the use of hospital grade mufflers on generators and air compressors extensive use of noise barriers enclosure of all noise generating equipment

3 The hours of large truck traffic, defined as vehicles over one (1) ton in weight shall be restricted to the hours from 7 00 a m to 7 00 p m except when setting casing and in cases of verified emergency An emergency is defined for the purpose of this permit as a spill accident imminent loss of equipment or other unforeseen event requiring immediate action to protect public health, safety or welfare All such emergencies shall be reported to the Noise Control Officer and Planning Department as soon as possible and in no case more than one hour after occurrence

The use of leasehold roads by heavy vehicles or equipment shall be strongly discouraged on Saturdays Sundays all legal holidays and during school bus hours, except in verified emergencies

4 Drill pipes shall not be laid in bins between the hours of 7 p m and 7 a m the following day except for emergencies

5 The permit holder shall prepare or cause to be prepared a leasehold noise mitigation plan based on the best available control technology and which incorporates all the recommended or equivalent mitigations of Attachment #2 of this use permit Said plan shall emphasize preventative rather than reactive noise abatement techniques The permit holder shall address low level and persistent noises associated with large diesel engines in the specific plan required in H 6 7 below This plan shall provide flexibility to allow for special circumstances which may develop as a result of problems related to borehole geology lost drilling tools fishing events and unanticipated large steam entries These special circumstances and abatement strategies shall be described in the noise control plan The permit holder shall implement the noise mitigation measures approved by the Noise Control Officer The noise control plan shall be approved by the Noise Control Officer no less than thirty (30) days prior to construction or well drilling on any new or expanded pads

Specific noise control plans shall be submitted and approved for the following project stages and reviewed every two years at a minimum

1 Road and pad construction and spoils hauling and placement

2 Each drilling operation

3 Operational Plan Update

I TO PROTECT ARCHAEOLOGICAL RESOURCES

1 If archaeological resources are encountered during excavation or other site disturbance all construction activity in the immediate area shall cease until mitigation measures can be determined by the Lake County Planning Department and implemented by the permit holder

J TO CONTROL VISUAL IMPACTS

1 On visual edges such as ridgelines low profile design shall be employed

2 All pad, road and spoils sites shall utilize existing vegetation and topography to maximize visual screening where feasible

3 All lights shall be shielded or directed away from adjacent residential or populated areas and consistent with OSHA and FAA requirements Lighting plans including shielding methods light placement etc shall be submitted to the Planning Department for review and approval sixty (60) days prior to initiation of construction Visual impacts shall be minimized at night at residences and to the portion of Bottle Rock Road from which the drilling mast is visible

K. UPON WELL ABANDONMENT

1 The permit holder shall abandon any well in accord with the U S Bureau of Land Management regulations

2 Permit holder shall refill sump and grade pad to reasonably restore a natural ground contour unless an alternative is approved by the Planning Department in consultation with the property owner

3 Permit holder shall revegetate the pad sump and all graded areas with native grasses and wood vegetation that can be tolerantly sustained in accord with recommendations of the revegetation consultant or the procedure in condition A-1

4 The permit holder shall submit a reclamation plan at the time of abandonment of any project facility for review and approval by the Planning Director including revegetation grading drainage and maintenance plans

L RE-ENTRY OF PRODUCTION OR SUSPENDED WELL BORES

1 Applicant may re-drill or otherwise re-enter the same well bore of any of the four (4) wells authorized under this use permit during the life of this permit as long as all conditions of the use permit are met

M SEVERABILITY

1 If any section subsection sentence clause of phrase of this permit is for any reason held by a court of competent jurisdiction to be invalid such decision shall not affect the validity of the remaining portions of the use permit The Planning Commission hereby declares that it would have passed this use permit and each section subsection sentence clause and phrase hereof irrespective of the fact that any one or more of the sections subsections, clauses or phrases are declared invalid

N PUBLIC HEALTH AND SAFETY

1 In the event of casing blowout or other uncontrolled venting the permit holder shall move immediately to control the vent No more than two (2) days shall elapse from the date of the uncontrolled vent to the date of equipment relocation to secure it

2 The permit holder shall prepare a contingency plan for all spills and potentially hazardous air emissions exceeding permit requirements including emergency pumping of the sump in the event of heavy, unexpected rainfall or if excessive geothermal fluids are encountered The Plan shall be approved by the Planning and Health Departments prior to well drilling and show who is responsible what equipment and manpower is available to respond to such an emergency, and notification procedures The permit holder shall maintain a current list of all surface water users downstream from the Pad to Clear Lake and a list of persons in the immediate impact area of hazardous air emissions Said plan shall include the method of notifying such persons and all responsible County and State agencies immediately following an emergency The list is to be included as an attachment to the contingency plan The plan shall be submitted for approval to the Lake County Planning Department sixty (60) days prior to initiation of construction This plan shall be reviewed and updated every two (2) years or as necessary

3 Applicant shall comply with the requirements of the fire prevention practices and measures as prescribed by the California Division of Forestry and/or County of Lake An emergency response contingency plan shall be submitted for approval by the Planning Department Fire access maps indicating roads and signing shall be provided to the appropriate fire district(s)

4 All extra-wide and slow moving vehicles shall be preceded by a flag car while on public roadways The California Highway Patrol shall be notified of geothermal waste generated by the permit holder and transported on public roads at least four (4) hours prior to occurrence of each activity

The permit holder shall provide to its contractors and vendors a detailed map of the area for distribution to truck drivers The map shall include a) all dangerous curves/elevation points--highlighted in red b) speed limits/reduced limits depicted on the map, c) safe locations for vehicle inspections and d) a serious warning clause/penalties if drivers violate any safety procedures while travelling on leasehold roads

The permit holder shall make it a contractual obligation that all of its contractors and their subcontractors of each truck hauling toxic or hazardous materials conduct a vehicle inspection prior to leaving the leasehold The inspection shall include brakes vehicle connection wheels/tires valves, tanks etc and other equipment as outlined in Title 13 CCR After loading a material inspection for leaks in the system shall be conducted All inspections shall be logged for verification by agency staff

5 The permit holder shall be responsible for repair of any direct verifiable damage to roadways resulting from construction or operation of this project including actions by contractors or subcontractors

6 Sanitary and handwashing facilities shall be provided at each drill site during well drilling in full compliance with all rules and regulations of the Lake County Health Department

7 The permit holder shall comply with all safety requirements of Cal/OSHA including an accident prevention program and conduct Cal/DOHS on-site worker safety inspections during construction and operation of the steamfield

8 The permit holder shall surface all regularly used permanent project roads (as indicated in Attachment #3) including the road between the intersection with High Valley Road and the drill pad with an adequate paving or chip seal surface approved by the Department of Public Works Surfacing shall commence upon initiation of pad construction and shall be completed within sixty (60) days of completion of initial well drilling Inspection costs for this surfacing shall be paid in accordance with condition B 10 of this use permit.

9 The permit holder shall maintain files on all supplemental plans and ongoing mitigation measures required by this use permit An annual report summarizing the primary compliance activities during the previous year shall be submitted to the Planning Department

10 The permit holder shall enter into a compliance monitoring inspection agreement with the County of Lake Said agreement shall provide for reimbursement to the County for the actual cost of inspection and monitoring limited to staff time equipment repair and mileage for the life of the project. If an area-wide fee schedule for inspection services is adopted in the future it shall replace this condition

11 The permit holder agrees that the Lake County Planning Commission shall have the right to require the permit holder to participate in a Geysers area seismic monitoring program on a pro rata basis if recommended by the Lake County General Plan

12 Permit holder shall submit a traffic control and road maintenance plan for High Valley Road and other project roads This plan shall require car pooling and/or bussing of employees whenever possible and take into account the increase in heavy truck traffic which will accompany pad construction and well drilling The plan shall also address sign requirements and the coordination of heavy truck traffic (on Bottle Rock and Sulphur Creek Roads) with the school district to reduce safety concerns to school children The plan shall suggest mitigations which will prevent or alleviate the concomitant increase in danger due to traffic accidents and damage to the road which may occur following development This plan shall be approved prior to issuance of a grading permit for pad construction

During pad construction and well drilling permit holder shall provide staffing on a continuous basis at the guard station at the intersection of High Valley and Bottle Rock Roads Permit holder agrees to install an automatic rolling or sliding chain link (or equivalent) gate at the High Valley Road entrance This gate shall be installed upon completion of construction and drilling activities and termination of manned guard gate

13 All supplemental plans required by this permit including but not limited to revegetation sediment drainage monitoring and control scenic enhancement phasing continuous water monitoring traffic control and maintenance, noise abatement emergency fire and medical evacuation accidental

spills and air exceeds shall be incorporated into the use permit once approved by the responsible department or official Public notice of all plans and reports shall be provided to all property owners within 700 feet of the project property lines as well as to the Planning Commission at least two (2) weeks prior to any action Any dispute regarding the adequacy of those plans may be appealed by any person to the Planning Commission for a final determination

14 A mutually acceptable agreement satisfactory in form and content to the Lake County Counsel, shall be provided and maintained by the permit holder to ensure cleanup in case of spills landslides, mishaps and site reclamation upon abandonment.

15 Prior to issuance of grading permits the permit holder shall enter into an agreement with the Lake County Office of Education to mitigate school impacts resulting from this project

16 Permit holder shall prepare or cause to be prepared and submit a radon monitoring plan to the Air Quality Management District and the Planning Department for approval sixty (60) days prior to initiation of construction The plan will provide for measurement of radon 222 and its daughters at appropriate locations on or adjacent to the project site and at a sufficient frequency to permit effective on-going monitoring during the projects existence Monitoring data will be reported to the Planning Department and Air Quality Management District on at least a quarterly basis and will be public information

17 In the event of an emergency condition, such as excessive noise levels above Ldn 60 dBA or an unsafe air exceed the permit holder agrees to relocate all impacted residents who cannot safely and reasonably occupy their dwellings, located within one mile of the drill pad, at the permit holder's expense

II IN GRANTING THIS USE PERMIT THE LAKE COUNTY PLANNING COMMISSION MAKES THE FOLLOWING FINDINGS

A Prior to approval of the use permit for this project the Planning Commission reviewed and considered the information contained in the Final Environmental Impact Report for the project certified by the Planning Commission in 1988 ("EIR") and the staff report written statements and oral presentations to the Planning Commission which are part of the record

B The project as proposed as indicated in the EIR would have the following significant effects on the environment, unless mitigation measures were imposed

1 Geology The project would have significant moderate impacts upon siltation in High Valley and Kelsey Creeks erosion and slope stability stream channels and surface drainage

2 Biological and Aquatic Resources The project would have moderate impacts on habitat conditions nearby vegetation and wildlife

3 Water Resources The project would have a potential significant impact from spills which may result from sump failures and overtopping surface run off and construction of the spoils sites

4 Air Quality The project would have a potential significant impact in terms of air emission from well drilling operations and pad construction

5 Noise The project would have significant noise impacts from pad construction and well drilling operations

6 Cumulative Impacts The project and other closely related past, present and reasonable foreseeable future projects of a similar nature would have a cumulative impact to the area's aesthetic and recreational quality

7 Visual While not identified as a significant environmental impact by the EIR, the project will alter the visual character of the area by introduction of industrial facilities vegetation loss, and altered landform

C Mitigation measures set forth in the EIR and imposed by the Planning Commission as conditions of approval will lessen and substantially mitigate environmental and other impacts the project might otherwise cause as identified in the EIR, as follows

1 Geology, Biology and Aquatic Life The conditions imposed by Section A-Plant Associations and B-Soil Erosion Induced Landslides and Geologic Hazards of the use permit the attachments thereto and the mitigation measures outlined in the EIR which are incorporated into this permit will lessen the impacts identified in the EIR The measures include erosion control sediment/drainage control, revegetation geotechnical investigations spill protection traffic control and road maintenance measures and supplemental plans which are incorporated into this permit

2 Water Resources Installation of rigid transfer piping continuous water monitoring periodic surface and springs water monitoring implementation of a contingency plan and the other conditions imposed by Sections A, B C, D E F, K and N of the use permit the attachments thereto and mitigation measures outlined in the EIR which are incorporated into this permit, will reduce the likelihood of water quality degradation and further protect public health

3 Air Quality The conditions imposed by Section G of the use permit and the other mitigation measures outlined in the EIR which are incorporated into this permit, such as inclusion of "best available" control technology will lessen the impacts identified in the EIR In addition to insure that emissions of noncondensible gases from the project will not constitute a nuisance to persons residing or working in the vicinity of the proposed use the permit holder must secure an Authority to Construct from the Lake County Air Quality Management District prior to commencing construction and/or drilling operations

4 Noise The conditions imposed by Section H of the use permit the attachments thereto and the other mitigations measured outlined in the EIR which are incorporated into this permit such as noise barrier mufflers and acoustical insulation, will avoid or reduced to acceptable levels the impacts identified in the EIR

In addition the revised noise standard of Ldn 60 dBa will reduce the likelihood of disturbances to residents in the project area

5 Visual The long term visual impacts of the project will be reduced by measures outlined in condition J imposed by the use permit which include retention of existing trees use of revegetation and screening and the measures outlined in the EIR which are incorporated into this permit

D In addition to use permit conditions mitigation measures and alternatives relating to drilling safety, water pollution and air pollution are within the responsibility and jurisdiction of U S Bureau of Land Management Central Valley Regional Water Quality Control Board and Lake County Air Quality Management District respectively, and such other agencies can and should adopt where feasible said mitigation measures and alternatives

E. The environmental document contains an adequate discussion of impacts from Radon 222 and the Planning Commission finds that Radon 222 will not be detrimental to persons residing or working in the neighborhood of the proposed project

F The mitigation measures identified in the FIR and imposed by the Planning Commission as conditions of approval substantially lessen significant effects on the environment to the extent feasible Geological biological water resources air quality noise and cumulative impacts can be lessened and substantially mitigated but not completely avoided by the mitigation measures set forth in the EIR and imposed by the Planning Commission as conditions of approval

G The project will have the public benefits identified in the EIR including additional revenues accruing to Lake County through the utilization of this natural resource creation of jobs during construction and operation of the project and the development of geothermal resources for energy supplies as an environmentally superior alternative to fossil fuel and nuclear power in accordance with state and federal energy policy

H After balancing the unavoidable adverse effects of the project and the benefits of the projected outlined above the benefits of the project outweigh the unavoidable significant effects on the environment, and the unavoidable significant effects are acceptable due to the benefits of the project

I The following alternatives or mitigation measures to the project described in the EIR which would reduce or avoid significant unmitigated impacts and which are not included as part of the project would not lessen or substantially mitigate potentially significant environmental effects or are either within the jurisdiction of another agency or are infeasible for the following reasons

1 No Project The "No Project Alternative" is infeasible because it would not achieve the goal developing the mineral resources of Lake County for energy supplies and would result in the failure to provide additional revenues accruing to Lake County new jobs and the other benefits which would be created by the project

2 Delayed Project The delaying of the project would not mitigate environmental effects These effects would be the same only delayed

3 Alternative Location The "Alternative Location Alternative" is infeasible since the project must be located where these are proven geothermal resources Engineers and geologists have determined that the project site is the best location to drill wells to tap the resources given geological features topographical features and environmental concerns Thus this alternative would not feasibly attain the basic objective of the project, to drill and produce geothermal steam

4 Project Design Alternatives The "Project Design Alternatives" which are not included in the project as approved are infeasible for the reasons set forth in the EIR

J This use permit does not abridge or supersede the regulatory powers or permit requirements of any state or federal agency or any special district or other Lake County department or division which may retain an advisory or regulatory function as specified by statute or ordinance, nor does this use permit grant any title or other real property solely to this permit holder or his assigns

K The permit holder agrees to comply with the recommended mitigation measures from attachments 1 and 2, and the use permit conditions dated December 8, 1988

L. The permit compliance monitoring agreement required by the use permit will provide for reimbursement of cost incurred by County staff

M This use permit is consistent with the Lake County General Plan

N The financial assurance agreement for spills, landslides mishaps and site restoration required by this permit will ensure that cleanup occurs in a safe and expeditious manner

O Implementation of the project development plan and options will provide for orderly and rational resource development while minimizing surface disturbance and environmental impacts

P The granting of this use permit is in the general public interest and environmental and performance parameters conditioning the proposed activity as specified in this use permit and as contained in the document entitled "Conditions Procedures and Performance Standards for Geothermal Regulations County of Lake " now referenced and made a part hereof will allow the proposed activity with adequate safeguards to the welfare of the people of Lake County at large and to the people residing in the vicinity of said activity

Q In light of the benefits of the project noted above and the mitigation measures set forth in the EIR and imposed by the Planning Commission in the use permit as conditions of approval, the Planning Commission finds that the establishment maintenance or operation of the use for which application is made will not under the circumstances of this particular case be detrimental to the health safety, peace, morals comfort and general welfare of the County

III THE PLANNING COMMISSION FURTHER DECLARES THAT

A This use permit may be modified or revoked if the Lake County Planning Commission finds that the use to which this permit is put is detrimental to the health safety morals comfort and general welfare of the persons residing or working in the neighborhood of such use, or if it is injurious or detrimental to property and improvements in the neighborhood or to the general welfare of the county, or is a nuisance

Date of Expiration December 8 2018

Date of Issuance January 5, 1989

ALEX T HINDS
Planning Director

By Irene L Brown
Irene L Brown Secretary

ACCEPTANCE

The Department of Water Resources (DWR) is committed to the long term and environmentally sound development of geothermal resources Toward this end DWR agrees to a cooperative management approach whereby mitigation

measures identified in the environmental impact report and other standard use permit terms and conditions will be complied with, consistent with best management practices and the BLM geothermal lease terms, conditions and stipulations In doing so however and in accepting the terms and conditions of this use permit including the process set forth below, DWR is not waiving any immunities it may have as a matter of law, nor is it consenting to any jurisdiction beyond that required by law or the Binkley geothermal resources lease

Minor alterations which do not result in increased environmental impacts to the environment may be undertaken upon the written approval of the BLM and the Lake County Planning Department

In the event other alterations are proposed outside the normal use permit amendment process, DWR shall provide a written description of the proposed action to the BLM and Lake County Planning Department Prior to implementing such action DWR shall hold or participate in a public hearing on the proposed action in Lake County for the purpose of receiving testimony from any interested person Public notice of such hearing shall be published in a paper of general circulation within Lake County at least 10 days prior to the hearing Written notice of such hearing shall be delivered or mailed to the BLM the Lake County Planning Department and all persons holding property within 700 feet of the Binkley Lease at least 10 days prior to the hearing In addition DWR shall obtain the review and approval of the BLM and shall comply with appropriate requirements of the California Environmental Quality Act including but not limited to State CEQA Guidelines Sections 15091 - 15094

I have read and understood the foregoing use permit and agree to each and every term and condition thereof

Date 12/29/88 _____ Vijay Patel _____
Applicant or Authorized Agent

cmp

ATTACHMENT #1

SEDIMENT CONTROL MITIGATIONS

DEPARTMENT OF WATER RESOURCES UP 87-92

The erosion and sediment control plan shall include a description of the following

- o Vegetative measures
- o Drainage provisions
- o Erosion and sediment control measures, including locations of sediment catch basins
- o Cut and fill construction
- o Disposal of spoil materials
- o Stockpiling of materials
- o Dust control measures

1 The plan shall include planting grasses, shrubs and trees to reduce the long-term erosion damage and to promote the aesthetic value of natural vegetation

2 Hydroseeding hydromulching shall be included in the plan (Hydroseeding/hydromulching is the process of spraying seed, mulch and fertilizer using a jet of water applied under pressure)

3 Consideration shall be given to stepping of cut slopes Stepping provides for the development of vegetation on soft rock cut slopes which normally cannot support vegetative cover The effectiveness of vegetating steep slopes is greatly increased by the stepping of cuts and fills

4 Protective mulches and coverings shall be included in the plan to prevent erosion from rainfall impact and runoff and from the action of wind on disturbed soil such as slopes of cut and fill Types of mulch to be considered include straw straw and hay, punched straw net-anchored straw, tackifiers with straw woodchips, sawdust wood fiber chemical mulch and jute netting

5 Slopes and other graded areas shall be protected from runoff Methods to be considered in the plan include temporary diversion dikes, permanent diversion dikes interceptor ditches, slope drains (down drains), flexible down drains rock-lined ditches and diversions

6 All drill pad runoff shall be routed to the Kelsey Creek drainage unless prohibited by the State Water Resources Control Board Division of Water Rights

Attachment #1, Sediment Control Mitigations

7. Energy dissipators shall be considered at all outlets discharging on erodible soil The energy dissipater may be used temporarily during construction or may be permanent Common types of energy dissipators are a level spreader, discharge apron, drop inlet and hydraulic jump

8 Permanent sediment catch basins shall be installed near the drill pad and spoils sites as recommended in the EIR. They shall be located wherever toes of fills terminate into natural drainage courses

9 The permit holder shall implement the recommendations for pad construction and spoil placement (pages 15-22) provided in the report entitled "Geotechnical Investigation, Proposed Geothermal Well Pad DWR/Binkley Project, Lake County, California" by John H Dailey (October 5, 1988)

ATTACHMENT #2

NOISE CONTROL MITIGATIONS

DEPARTMENT OF WATER RESOURCES UP 87-92

If required by the Noise Control Officer, all of the following mitigations shall apply to this permit

1 The diesel-electric generators (generally used to power the drilling rigs), and the air compressors shall be enclosed at least on the side facing Fidge and designed tc result in 15 dBA or more of noise reduction They shall include "hospital grade" or equivalent silencers, and the exhausts shall be directed away from the Fidge residence The radiator ends of this equipment should not face the Fidge residence This equipment should be located at the western edge of the well pad

2. Drilling rigs shall not have any large engines mounted on the rig The main deck of the rig will be equipped with a perimeter noise barrier The barrier shall be of leaded-vinyl or an equivalent, and result in a noise reduction of at least 10 dB

3 Steam venting without a muffler shall be prohibited in so far as possible (emergencies are the obvious exceptions) The muffler shall be designed so as not to exceed a noise level of 50 dBA at a distance of 1000 feet

4 Well bleeding without an effective muffler shall be prohibited The well-bleed muffler shall have acoustical characteristics similar to those specified for the steam venting muffler (3, above)

5 Air or steam releases associated with drill pipe disconnections shall be directed to an effective muffler and not released directly to atmosphere

6 Round tripping between 10 00 p m and 7 00 a m shall be avoided If operational problems necessitate round tripping between these hours then pipe handling and movement of the travelling block are to be skillful, slow and deliberate in order to reduce noise impacts

7 Well pad construction rig erection, and drill pipe lay down shall be limited to the daytime hours (7 00 a m to 7 00 p m)

8 All vehicles and engine-powered equipment, such as heavy earth-movers shall have effective mufflers Vehicles operating on public roads shall comply with Section 23130 of the California Motor Vehicle Code

9 The use of "jake" brakes on all project roads is prohibited

COUNTY OF LAKE

AMENDED USE PERMIT 85-27

(FORMERLY USE PERMIT 85-17)

MCR BOTTLEROCK STEAMFIELD GEOTHERMAL PROJECT

Pursuant to the approval of the Lake County Board of Supervisors on February 19, 1980, and as amended by the Lake County Planning Commission on July 29, 1982, March 14, 1985 and June 26, 1986, there is hereby granted to MCR Geothermal Corporation, P.O. Box 310, Cobb, CA 95426, a Use Permit for the construction of a geothermal steamfield including up to forty-one (41) geothermal development wells from five (5) pads. Pads and numbers of wells shall be limited to the following Francisco (9), Coleman (6), West Coleman (12), Alternate Boriak (7) and Oak Knoll (7). This permit also allows a total of forty-one (41) redrillings of well bores in new directions and/or replacement wells and unlimited rework of the 41 permitted wells The authorized project also includes associated steam and condensate pipelines, sediment catchment basins, water monitoring facilities, access roads, spoil site (Francisco Spoil Area) and reinjection wells, along with incidental uses and activities, further described in condition D 1 through 5 of this use permit and identified in the Plan of Development in the Supplemental EIR dated December 1985 as amended to exclude Hodges, Power Pole, and Modified Boriak pad sites in accordance with the Lake County Ordinance Code The project is located in the Cobb Valley along High Valley Road in Section 5 & 6, T11N, R8W, MDB&M, on approximately 390 acres identified as Lake County Assessors parcel numbers 013-002-03, 04 & 05, near the communities of Glenbrook and Pine Grove

The Planning Commission, finds that the establishment and maintenance or operation of the use for which application is made will not, under the circumstances of this particular case, be detrimental to the health, safety, peace, morals, comfort and general welfare of persons residing or working in the neighborhood of such use, or be detrimental to the general welfare of the County

The Planning Commission has caused to be prepared an Environmental Impact Report and Supplements on the subject of this application and has held public hearings thereon and has carefully considered this matter pursuant to the California Environmental Quality Act and the State CEQA Guidelines pertaining thereto, and pursuant to the Environmental Protection Guidelines of the County of Lake.

I. Approval is subject to the following terms and conditions

1 The Use Permit shall be valid until June 26, 2013. However, if the corrective measures required by this modified Use Permit are not initiated within sixty (60) days of approval of the Amended Use Permit, revocation proceedings may be initiated subject to Section 21-84 of the Lake County Code The Planning Commission may, in its discretion, approve time extensions

2 The permittee shall permit the County of Lake or its representative(s) or designee(s) to make periodic inspections at any reasonable time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein Applicant shall provide current access information and keys, key cards or other materials necessary for the agency staff with valid identification to gain access

3 The Planning Commission may, during public hearing, modify or revoke this Use Permit any time during its term if it is determined that the use herein permitted is creating a nuisance or a condition hazardous or detrimental to the general public or to property in the vicinity of the use

4 To provide adequate quantities of steam to the Department of Water Resources Bottle Rock Power Plant while minimizing impacts identified in the Supplemental EIR, this project shall follow a phased approach Details for this approach shall be described in the supplemental phasing plan to be submitted to the Planning Department for review and approval sixty (60) days prior to pad, road or pipeline construction and approved prior to issuance of a grading permit. Project phasing shall incorporate the following general principles

a Development will occur in an orderly and rational manner while achieving both resource and environmental objectives

b Environmental impact such as surface disturbance erosion, sedimentation, drilling noise and dust emissions shall be minimized. Because of its environmental sensitivity, at least 75% of all wells shall be drilled before construction or drilling occurs on the Oak Knoll site

c. Each individual phase of project development will be substantially completed prior to initiation of each subsequent phase.

d Leasehold reservoir information if prepared by a reservoir engineer, geologist or other qualified professional and provided to the Planning Department, may justify revisions in the phasing plan. All such information shall remain proprietary

5 Days and hours of operation for facilities shall be twenty-four (24) hours per day, seven (7) days per week, except as specifically amended by conditions herein

6 This Use Permit may be reviewed by the Planning Commission at the end of eighteen (18) months and every three (3) years thereafter, or as needed, and shall be subject to the following conditions

7 No use, structure or development shall occur that is inconsistent with the approved plan of development or this use permit The permit holder shall apply for a use permit modification if the permit holder proposes any construction inconsistent with this use permit and the approved plan of development.

The Planning Director may approve minor amendments which are in substantial conformity with the uses and locations of uses approved by UP 85-27 when, in the opinion of the Planning Director, such amendments will not result in any significant adverse environmental impacts

All amendment requests shall be in writing and be approved, modified or denied by the Planning Director in writing. The Planning Director shall provide public notice of the proposed amendment to all property owners within 700 feet of the project property lines, as well as to the Planning Commission, at least two (2) weeks prior to any action or an amendment by the Planning Director Any dispute regarding the proposed amendment may be appealed to the Planning Commission by any person or the Planning Director for a final determination

* A TO PROTECT PLANT ASSOCIATIONS

1 Each specific pad, road and borrow site, steam line or other area of soil disturbance shall be evaluated by a landscape architect, registered forester, plant ecologist or other qualified person acceptable to the Planning Department and permit holder, to select and program the re-establishment of ground cover and vegetation to include indigenous forage and habitat and provide maximum erosion control A revised revegetation program shall be submitted to the Planning Department for review and approval, as described in condition A 2 of this permit.

2 Cut slopes on the road and pad areas shall be constructed as agreed upon by permit holder's engineers and Department of Public Works consistent with revised revegetation and erosion/sedimentation control plans to be submitted for approval by the Public Works and Planning Departments thirty (30) days prior to pad, road or pipeline construction and approved prior to issuance of a grading permit Stepped benches shall be used where appropriate unless considered unnecessary by the person in A-1. Top soil shall be stockpiled for later respreading over the disturbed areas prior to reseeding as recommended by person A-1.

3 When each stage of road and pad construction has been completed in accordance with the approved phasing plan, the revegetation program developed in A-1 shall commence, not later than the following fall. The revegetation program shall be directed by the landscape architect, registered forester, plant ecologist or other qualified person acceptable to the Planning Department and permit holder.

4 The entire revegetation program shall be re-evaluated during the spring following initial planting and accompanied by a written statement from the qualified person listed in A-1, and provided to the Planning Department. The written statement shall indicate which planting techniques were successful or unsuccessful, and what will be done to improve the revegetation program if needed Photos shall be included to illustrate the relative success of revegetation efforts This shall include photos taken prior to construction If deemed by the Planning Department to be unsuccessful, additional revegetation will be required not later than the immediately succeeding fall season The revegetation program shall include periodic inspection and upgrading as necessary This program shall provide for an accelerated revegetation effort to mitigate additional surface disturbance documented in the Supplemental EIR All plantings shall be maintained or replanted for the life of the project.

The revegetation and sediment control measures shall follow the recommended mitigation measures included in attachments 1 and 2 of this use permit

5 Except for large stumps, vegetation removed during construction shall be chipped and respread when beneficial as determined by person in Section A-1, or burned under the permits required by the Lake County Air Quality Management District Stumps may be buried outside of engineered fill and embankments

6 Well discharge shall be directed away from adjacent woody vegetation and populated areas and appropriate energy dissipaters shall be used as required by the Air Quality Management District (AQMD)

7 In order to protect riparian and fen areas as well as other vegetation on the leasehold, access to the drill sites shall be restricted to existing roads and proposed roads as defined in the Plan of Development included in the Supplemental EIR (FINAL, dated June 1986) as amended by this use permit

8 Vegetation within "fall-out" range of bleeding wells shall be assessed for damage or growth impedance by a plant pathologist or other qualified professional as approved by the Planning Director and an annual report, together with photographs of selected sites, shall be

submitted to Planning Department If damage to ecosystem is present, mitigation measures shall be enacted according to direction from the Planning Department.

9 Vegetation beyond the construction perimeter shall not be disturbed The clearing limits for the pad are in the Plan of Development

B. TO PROTECT AGAINST EXCESSIVE SOIL EROSION, INDUCED LANDSLIDES AND SURFACE GEOLOGIC HAZARDS

1 Plans for drill pads, steam transmission pipelines, sumps and access road shall be prepared consistent with the recommendations of a registered engineering geologist. Topographic mapping by photogrammetric methods shall be used for design and be supplemented as necessary with ground surveys. Road, pipeline, and pad locations shall be staked on the ground and adjusted as necessary before completion of final plans. Plans shall include a separate drainage plan using five foot contour intervals and supporting calculations for culvert sizes using acceptable engineering methods. Plans shall show specific provisions for erosion protection along pipeline routes, at culverts and on cut and fill slopes. Detailed specifications for construction should be prepared in a manner similar to applicable portions of "Forest Service General Provisions and Standard Specifications for Construction of Roads and Bridges-1977" and "Regional Standard Specifications", a U S D.A Forest Service publication Plans, specifications and ground locations shall be approved by the Planning Department or their authorized representatives before starting construction, and shall also be approved by the Central Valley Regional Water Quality Control Board (CVRWQCB) prior to construction

2 Drill pad and road fills shall be compacted to a minimum 95% relative compaction to minimize erosion If significant erosion occurs as a result of any part of this project, permit holder shall take prompt remedial action as directed by the Planning Department. Tests indicating compaction results shall be submitted for approval to the Department of Public Works within thirty (30) days of completion, and filed with the Planning Department

3 Filled slope banks shall not exceed a gradient of 2 1. Toes of all fills shall be stabilized with rock and gravel or keyed into stable soil and placed to reduce erosion potential to an absolute minimum on all fill slope banks Revegetation of slopes shall be carried out as specified in Condition A Unless approved by an engineering Geologist and Public Works Department, cut slopes shall not exceed a gradient of 1-1/2 1

4 Subdrains shall be provided under all fills where natural drainage courses and seepage are evident

5 No drill pad construction or access road shall be allowed on potentially active landslides, unless properly mitigated, subject to approval by the Public Works Department

6 Buffer zones of undisturbed vegetation shall be maintained 500 feet on either side of streams No geothermal related construction shall take place within this buffer zone unless consistent with the Plan of Development approved by the Lake County Planning Commission. Roads crossing riparian areas shall be minimum safe widths

7 An impermeable retaining levee of not less than eighteen (18) inches in height and three (3)• feet in base thickness, or an equivalent measure shall be placed and maintained in areas containing potentially hazardous materials, including equipment service, fuel transfer and drilling rig locations The levee or equivalent measure shall prevent spillage and/or storm runoff accumulation from random discharge To minimize damage to levees from truck traffic, permit holder shall place ramps of rigid construction over levees These ramps shall be in place immediately following completion of levee construction. Revised plans for the retaining levee or equivalent measure shall be submitted to the Public Works and Planning Departments as part of the overall drainage plan. These plans shall be submitted within ninety (90) days of approval of the amended use permit, and shall be approved prior to additional well drilling or pad construction.

8 A revised drainage plan shall be submitted sixty (60) days prior, to pad,road or pipeline construction Sediment catchment basins shall be in place prior to said construction Said plan shall include sedimentation control strategies and shall indicate how runoff will be distributed and channeled to existing natural waterways, limiting an increase in water head and thereby avoiding unnatural channel abrasion Energy dissipaters and collection devices to reduce the erosion force of unnatural runoff will be required where determined by county or state agency representative.

Sediment catchment basins and their locations shall be included in said plan Their siting and design shall follow the recommended mitigation measures included as Attachment 2 of this use permit.

9 All grading activity and erosion prevention measures shall be completed and all drainage structures shall be in place and operational prior to October 10 of any year. New grading and excavation activity may not be permitted during the consecutive period from October 10 to April 10 (Extensions for short term grading activities beyond October 10 may be allowed by the Lake County Public Works Director in writing upon dry weather and establishment of a suitable soil moisture specification for any stated activity)

10 Applicant shall agree to contract with the County of Lake for engineering and inspection services, as required, to a completion date agreed upon by the permit holder and the county, to insure compliance with the above stated conditions

11 In areas requiring removal of vegetation but no grading, root crowns shall be left intact so as to retard soil erosion Excavated materials shall not be sidecast or pushed over the edges during construction and final grading Excess earthen materials (rocks, boulders and dirt shall be removed from the site and disposed of in an approved disposal site. Cut and fill operations shall be carried out so that the down slope roll of rocks, boulders and/or earthen material is prevented

C SUMP/PAD CONSTRUCTION, OPERATION, MAINTENANCE AND CLOSURE

1 The sumps and pads shall be designed by a registered civil engineer, consistent with the recommendations of a registered engineering geologist. Design of the sump fill shall be to a specification to withstand both static

loads and dynamic loads (imposed by credible seismic events) with safety factors of 1 5 and 1.3 respectively. The sump shall be constructed of material compacted to at least 95% relative (ASTM-D-1557-70), which may be reduced to 90% compaction if approved by the Central Valley Regional Water Quality Control Board (CVRWQCB) and Planning Director, and demonstrated by soils reports as a hardship. If used for a period of eight (8) months or less, the sump shall be lined with at least two (2) feet of clay having permeability not to exceed 1 x 10^{-6} cm/sec. or an equivalent impermeable membrane. If used for a period of between eight (8) and twelve (12) months, the sump shall be lined with at least three (3) feet of clay Sumps used for more than one (1) year shall be double-lined with leachate collection systems as required by the CVRWQCB pursuant to Subchapter 15, Chapter 3, Title 23, California Administrative Code.

2 The sump shall be operated in such a manner as to preclude overtopping of the sump Three feet of freeboard shall be maintained at all times. Volume of the sump shall be sufficient to accomodate both the drilling mud and any reasonable amount of precipitation which could enter the sump All sumps shall be equipped with measuring devices and alarms that indicate when freeboard level has been met Pumps used to transfer drilling fluids between drill pads shall be equipped with low pressure alarms and flow/no-flow shut-off switches on all pressure lines No transfer of drilling fluids between drill pads shall occur without prior approval of the Central Valley Regional Water Quality Control Board (CVRWQCB) and Lake County Health Department. Said transfer shall occur in rigid transfer piping meeting approved engineered standards Transfer piping shall be pressure tested at least once per year. Testing shall occur prior to commencement of winter rains. Placement of drill mud or cuttings directly on the pad is prohibited unless specifically allowed in the approved DRAVO plan in condition C.10. of this use permit, or an approved solids separation system Plans for this solids separation system shall be submitted thirty (30) days prior to the proposed use of said system, and fifteen (15) days thereafter The solids separation system shall not be used prior to written approval of said plans by the Planning Department

3 Applicant shall prepare a revised contingency plan for all spills including emergency pumping of the sump in the event of heavy, unexpected rainfall or if excessive geothermal fluids are encountered. The Plan shall show who is responsible and what equipment and manpower is available to respond to such an emergency, and shall be updated every six (6) months. Applicant shall maintain a current list of all surface water users downstream from Francisco Pad to Clear Lake Said plan shall include the method of notifying surface water users and all responsible County and State agencies immediately following an emergency The list is to be included as an attachment to the contingency plan The plan shall be submitted for approval to the Lake County Planning Department within sixty (60) days of approval of the amended use permit This plan shall be reviewed and revised, if necessary, every two (2) years and submitted to the Planning Department for approval.

4 Applicant shall prepare a contingency plan for emergencies due to breaks or unexpected deformation of the pipeline or their supports. The Plan shall show who is responsible and what equipment and manpower is available to respond to such an emergency. The plan

shall be submitted to the Lake County Planning Department prior to commencement or continuation of operations, and annually updated, if changes have occurred, on anniversary of permit.

5 If a drill sump is to be used following sump cleanout or a period of deactivation, it shall first be inspected by a civil engineer and engineering geologist satisfactory to the Planning Department to evaluate its condition and to recommend repairs as necessary. Particular care shall be given to the waste sump liner to ensure that it is repaired or replaced as necessary. A written engineering report on the condition of the sump and liner shall be submitted to the Planning Department and CVRWQCB within thirty (30) days of completion of inspection, and approved in writing prior to reactivation of the sump.

6 Prior to sump closure, removal or burial of sump materials or within thirty (30) days of the removal of drilling equipment, or as directed by the CVRWQCB, County or State Health Department Officials, sump fluids (both mud and supernatant liquids) shall be chemically analyzed for type and quantity of biologically sensitive materials, especially hazardous materials, heavy metals and acids unless waived in writing by the Planning Director upon written consultation with Central Valley Regional Water Quality Control Board (CVRWQCB).

Sampling and testing parameters, and procedures shall be submitted to the Planning Department for review and approval. Additional sump sampling, water quality monitoring and testing may be required if requested in writing by the Planning Department, Lake County Health Department, or Regional Water Quality Control Board (CVRWQCB)

Such testing shall be performed by a licensed water quality testing laboratory The chemical analysis shall be sent to the Central Valley Regional Water Quality Control Board (CVRWQCB) and Lake County Health and Planning Departments for review If said analysis does not indicate quantities in excess of allowable limits for either human or other important biological elements, especially those of the aquatic ecosystem, then sump materials may be solidified, dried, mixed with native soil and buried in the sump The location and disposal method of these materials shall be submitted for approval by the Central Valley Regional Water Quality Control Board (CVRWQCB) and Lake County Health Department. If hazardous or biologically sensitive materials are found, such materials shall be removed within sixty (60) days to an off-site Class I, Class II or equivalent waste management unit which is in compliance with all local, state and federal regulations, in a timely manner as directed by the county or appropriate state agency. All wastes shall be hauled in a securely containerized manner to prevent spilling of material

7 No hydrocarbon base cleaning agent, no waste oils or greases, and no liquid fuel shall be released directly onto the surface, other than incidental leakage from equipment or accidental spills of 5 gallons or less within bermed areas of a drill pad. All such liquids shall be contained and removed from the site Any accidental discharge of the materials mentioned above shall be removed and properly disposed of by the permit holder, and immediately reported to the Planning and Health Departments

8 If sumps are used for a total time period of longer than one year, it shall meet the requirements of Subchapter 15, Chapter 3, Title 23, California Administrative Code. The permit holder shall immediately inform the County Health Department and CVRWQCB of this occurrence. If hazardous or biologically sensitive materials are present, and if directed by the County Health and Planning Departments or CVRWQCB, the permit holder shall remove sump materials, modify the sump and/or monitor groundwater consistent with Lake County and CVRWQCB permit conditions.

9 The permit holder shall ensure that any hazardous waste hauler under contract to the permit holder and operating on or off the leasehold has a certificate of registration from the California Department of Health Services (DOHS), Hazardous Materials Management Section.

10 The DRAVO or an equivalent process may be installed and utilized on any drill site and liquid wastes may be transported from other drill sites on the leasehold to the selected DRAVO location(s) in accordance with condition C.2. of this use permit Plans and specifications shall be submitted to the Health and Planning Departments for review and approval fifteen (15) days prior to installation of the facility.

11 If known hazardous materials are stored on site for more than thirty (30) days, the permit holder shall obtain a determination from the DOHS that the requirements of a Hazardous Waste Facility Permit have been satisfied.

12 All hazardous wastes are to be taken to a facility permitted by the California Department of Health Services to accept such wastes

13 When sumps contain liquid or solid wastes, they shall be enclosed with field fence six (6) feet in height to prevent access by livestock, wildlife and unauthorized persons

14 Pipeline components which are exposed to ambient conditions at a temperature of 140 degrees fahrenheit or higher, where accessible to human reach, shall be designed to prevent inadvertent human burn injury

15 Sanitary and handwashing facilities shall be provided at each drill site during well drilling, in full compliance with all rules and regulations of the Lake County Health Department.

D. ACCESSORY ACTIVITIES

1 Accessory activities to the drilling and production of geothermal resources include drill pipe maintenance, steam line and valve fabrication, equipment maintenance, welding and materials storage, and other activities specifically related to drilling and production of geothermal resources

2 The fenced area and enclosed steel building west of the control building shall be used for drilling and production materials storage This fenced area shall not exceed 99,500 sq.ft In addition, equipment maintenance, welding and steam line and valve repair is allowed Welding may also be conducted on the gravel area east of the control building. Surface coverage shall not exceed 10 000 sq ft.

3 Because most drill pipe straightening and hard banding will occur off the leasehold, only limited amounts of this activity shall occur Drill pipe maintenance, hard banding and straightening is allowed only within the bermed area of drill pads, and is limited to twenty-five (25) days per year, from 7 00 a.m to 7:00 p.m daily.

4 When each well drilling sequence has been completed, permit holder shall remove all drilling equipment and clean pad surface within thirty (30) days, unless drilling of other wells in the pad is immediately scheduled to commence within forty-five (45) days. All drill pads not having drilling activities shall be kept clean and neat in appearance and shall not be used for equipment and materials storage.

E. TO PROTECT AGAINST SURFACE WATER DEGRADATION

1 In order to preserve the hydrologic integrity of this leasehold area, permit holder shall legally obtain by right or purchase all water used in the drilling process, dust control or steam production, and provide supporting documentation to the Planning Department. If possible, all water used for this project shall be obtained from leasehold water wells. Prior to using surface waters for this project, the permit holder shall provide verification that well water is not available or not sufficient for project needs

2 All areas on the pad containing potentially hazardous materials, including the equipment service and fuel transfer areas and the area occupied by the drilling rig, shall drain into the sump No sump materials shall be allowed on the pad unless they are in compliance with the conditions of the approved DRAVO Plan identified in C 10 , or the solids separation system discussed in C.2. of this use permit

All other areas with equipment service, fuel transfer, or potentially hazardous materials shall be compacted to 95% and be bermed as described in condition B 7. of this use permit It is understood that spraying of hydrocarbon based fluids or application of solvents or other potentially hazardous materials shall not be conducted in the storage and welding areas adjacent to the control building and identified on the approved plan of development If violations of this condition occur, impermeable catch basins and more extensive berming shall be required to protect water quality in the unnamed tributary (Cow Creek) of High Valley Creek.

3 Permit holder shall monitor or contract to monitor water and aquatic biology in the unnamed tributary (Cow Creek) of High Valley Creek in the vicinity of the Francisco pad expansion. Type, location and frequency of testing shall be determined by the Planning and Health Departments in consultation with CVRWQCB Said monitoring proposal shall be submitted and approved by the Planning and Health Departments prior to issuance of a grading permit for pad construction The permit holder shall coordinate water monitoring activities with Department of Water Resources

4 If the permit holder elects to conduct or participate in a watershed or regional water quality monitoring program, it can be substituted for the requirements of E-3. Such a proposal must be submitted to and accepted by the Planning and Health Departments in consultation with CVRWQCB prior to termination of the monitoring outline in E-3

5. In addition to the periodic water monitoring discussed in E 3 above, permit holder shall conduct a continuous water quality monitoring program similar to that identified in Attachment 3 of this use permit. Plans and locations for this continuous water quality monitoring program shall be submitted to and approved by the Lake County Planning and Health Departments prior to pad, road, or pipeline construction Specific design for this program shall be approved by the Planning and Health Departments in consultation with CVRWQCB, and shall be operational prior to well drilling on new or expanded drill pads

   The permit holder is encouraged to cooperate with other area developers to implement this continuous water quality program in a cost effective manner

6. The injection of water from on or off site surfaces or groundwater sources is prohibited except for rainwater and other sump fluids, and steam condensate. The injection of wastewater shall be subject to approval by the County Health Department

7. Applicant shall comply with all provisions of the waste discharge requirements approved by the Central Valley Regional Water Quality Control Board (CVRWQCB) and all other state laws and regulations pertaining to waste hauling and water quality.

F. TO PROTECT AIR QUALITY

1. Applicant shall meet all regulations and standards set by the Lake County Air Quality Management District (AQMD)and utilize on a continuous basis the state of the art of H_2S technology. All conditions of the AQMD Authority to Construct and Permit to Operate are herein referenced and made part of this use permit. This use permit does not supersede the authority of said District in any way.

2. After completion of geothermal wells, the H_2S emissions during standby venting of steam shall be either abated to an acceptable level per Air Quality Management District rules and regulations or standby venting shall be curtailed to the level necessary to attain emission limitations Curtailment methods to be utilized shall include the shutting in of geothermal wells in accordance with established procedures.

3 Permit holder shall minimize vehicular dust on unpaved roads and drill pads during construction by the use of water or other acceptable dust retardant approved by AQMD

4. Permit holder shall provide accurate chemical analysis of the geothermal resource if it is encountered, when required by the Air Quality Management District.

5 The analysis shall include accurate "wet chemistry" and gas chromatograph determinations as referred to in the AQMD permits Heavy metals such as lead, chromium, arsenic, mercury and cadmium should be determined as well as substances such as radon, hydrogen sulfide, boron, manganese, methane, flouride, ammonia and carbon dioxide. The analysis should also include Ph

6 Permit holder shall enter into agreements with Department of Water Resources or other parties as necessary and provide a written commitment and preliminary design of abatement systems as described in the AQMD modified Determination of Compliance dated February 2, 1982.

G. TO PROTECT AGAINST NOISE EXPOSURE

1 The permit holder shall not exceed a maximum noise standard of Ldn 50 dBA at residential receptors. The permit holder shall design project components to minimize noise emissions generally consistent with the best available control technology (BACT) as described on pages 222-228 of the Union Oil Unit 21 Steamfield Use Permit No. UP 83-41 and the recommended mitigation measures identified in the Supplemental EIR and included in this use permit as Attachment 4 The Noise Control Officer shall determine BACT for each drill site consistent with the Lake County General Plan and the project EIR.

2. If measurements by the Noise Control Officer indicate a possible violation of G 1 , a measurement of the source noise in an appropriate location in the immediate vicinity of the source may be made to determine if the source noise is sufficient to cause the level measured at G 1. to exceed 50 dBA Ldn using the inverse square law.

3 These regulations shall be adopted until a noise control ordinance is approved by the Board of Supervisors. Applicant agrees that the Planning Commission shall have the right to substitute the conditions of a general noise control ordinance for the conditions of this section when adopted by the Board of Supervisors. It is understood by the Planning Commission and permit holder that mufflers of advance design will be required for pertinent geothermal operations in order to meet these standards and that extraordinary mitigative techniques such as lead/vinyl barriers and the wrapping of the drill rig platforms may be necessary to meet the noise standards of Section G-1 and G-2

4 It is stipulated that the Noise Control Officer will be spot monitoring noise levels in the vicinity of the proposed land use and that findings resulting from said monitoring may require the permit holder, his contractors or agents to provide continuous noise level monitorings and readings as may be directed by the Noise Control Officer Noise problems such as brake squeal, low level engine rumble, etc , substantiated by public complaints may result in the Noise Control Officer imposing more stringent noise control techniques upon permit holder such as the use of hospital grade mufflers on generators and air compressors, extensive use of noise barriers and enclosure of all noise generating equipment in a "super pad" concept as described in the Final EIR (dated June 1986) It is the permit holders intent to address low level and persistent noises associated with large diesel engines in the specific plan required in condition G 8 3) of this use permit

5 It is also stipulated that the Noise Control Officer has jurisdiction over noise investigation procedures and enforcement

6 The permit holder shall, except in cases of verified emergency or unforeseen unusual need, schedule delivery of supplies and travel by large vehicles over the leasehold to the hours of 7 00 a m to 7 00 p m The use of leasehold roads by heavy vehicles or equipment shall be strongly discouraged on Saturdays, Sundays, all legal holidays, and during school bus hours, except in verified emergencies

The hours of large truck traffic, defined as vehicles over one (1) ton in weight, shall be restricted to the hours from 7 00 a.m to 7 00 p.m , except when setting casing and in cases of verified emergency An emergency

is defined for the purpose of this permit as a spill, accident, imminent loss of equipment or other unforeseen event requiring immediate action to protect public health, safety or welfare. All such emergencies shall be reported to the Noise Control Officer and Planning Department as soon as possible, and in no case more than one hour after occurrence.

7. Drill pipes shall not be laid in bins between the hours of 7 p.m. and 7 a m the following day.

8 The permit holder shall prepare or cause to be prepared a revised leasehold noise control plan based on the best available control technology. Said plan shall emphasize preventative rather than reactive noise abatement techniques as recommended in the Supplemental EIR and included in this use permit as attachment 4. This plan shall provide flexibility to allow for special circumstances which may develop as a result of problems related to borehole geology, lost drilling tools, fishing events and unanticipated large steam entries. These special circumstances and abatement strategies shall be described in the noise control plan The permit holder shall implement the noise mitigation measures approved by the Noise Control Officer The noise control plan shall be submitted no less than thirty (30) days in advance of any additional pad construction or drilling, and fifteen (15) days thereafter, and approved by the Noise Control Officer prior to construction or well drilling on any new or expanded pads.

Specific noise control plans shall be submitted and approved for the following project stages, and reviewed every two years at a minimum

1) Drilling on Oak Knoll, Alternate Borisk, Coleman and Francisco pad extension.

2) Road and pad construction

3) Each drilling operation Plans shall be submitted no less than fourteen (14) days prior to commencement of drilling

4) Operational Plan Update.

H TO PROTECT ARCHAEOLOGICAL RESOURCES:

1 Archaeological sites identified on pages 125-127 of the McCulloch Department of Water Resources Bottlerock Steamfield FIR shall be preserved in their existing state No excavation or disturbance by the permit holder or his contractors shall be permitted at these archaeological sites unless mitigated, subject to approval by the Planning Department and Sonoma State University's Resources Facility

I. TO CONTROL VISUAL IMPACTS

1 A program of long-term site project maintenance shall be developed and implemented by the permit holder to ensure continued performance of project components To achieve this goal, permit holder shall submit to the Planning Department for approval a scenic enhancement plan to include the following project components 1) landscape plans for the control building, parking lot, storage and welding areas, 2) locations for temporary storage of equipment and material on pads during times of drilling and construction, 3) screening of the storage area west

of the control building shall include landscaping and wood slats in fencing. Screening of the welding area east of the control building shall include a redwood perimeter fence at least six feet in height. All equipment not specifically used for drilling activities shall be stored within the fenced area immediately west of the MCR control building. This plan shall be submitted within ninety (90) days of approval of this use permit and shall be approved prior to additional well drilling or pad construction.

2 Pipelines shall be colored to provide maximum color compatibility with the vegetation type through which it is routed. Pipeline color shall be the same as existing pipelines in the leasehold unless otherwise approved by the Planning Director.

3. On visual edges such as ridgelines, low profile design shall be employed In such cases, expansion loops shall be laid horizontally, not vertically.

4 All pad, road, and pipeline sites shall utilize existing vegetation and topography to maximize visual screening where feasible.

5 All lights shall be shielded or directed away from adjacent residential or populated areas and consistent with OSHA and FAA requirements. Lighting plans, including shielding methods, light placement, etc., shall be submitted to the Planning Department for review and approval thirty (30) days to new pad construction or expansion. Visual impacts shall be minimized at night at residences and to the portion of Bottlerock Road from which the drilling mast is visible.

J UPON WELL ABANDONMENT

1 The permit holder shall abandon any well in accord with the Division of Oil and Gas regulations

2 Permit holder shall refill sump and grade pad to reasonably restore a natural ground contour, unless an alternative is approved by the Planning Department in consultation with the property owner.

3 Permit holder shall remove all pipelines and supports not necessary for field operation

4 Permit holder shall revegetate the pad, sump, and all graded areas with native grasses and woody vegetation that can be tolerantly sustained in accord with recommendations of the revegetation consultant or the procedure in Condition A-1

5 The permit holder shall submit a reclamation plan at the time of abandonment of any project facility for review and approval by the Planning Director, including revegetation, grading, drainage and maintenance plans.

K. RE-ENTRY OF PRODUCTION OR SUSPENDED WELL BORES:

1 Applicant may re-drill or otherwise re-enter the same well bore of any of the forty-one (41) wells authorized under this use permit during the life of this permit as long as all conditions of the use permit are met.

L. SEVERABILITY

1 If any section, subsection, sentence, clause or phrase of this permit is for any reason held by a court of

competent jurisdiction to be invalid, such decision shall not affect the validity of the remaining portions of the use permit. The Board of Supervisors hereby declares that it would have passed this use permit and each section, subsection, sentence, clause and phrase hereof irrespective of the fact that any one of more sections, subsections, clauses or phrases are declared invalid.

M. **PUBLIC HEALTH AND SAFETY:**

1. In the event of casing blowout or other uncontrolled venting, the permit holder shall move immediately to control the vent. No more than two (2) days shall elapse from the date of the uncontrolled vent to the date of equipment relocation to secure it.

2. Applicant shall comply with the requirements of the fire prevention practices and measures as prescribed by the California Division of Forestry and/or County of Lake. An emergency response contingency plan shall be submitted for approval by the Planning Department. Fire access maps indicating streets and signing shall be provided to the appropriate fire district(s).

3. All extra-wide and slow moving vehicles shall be preceded by a flag car while on public roadways. The California Highway Patrol shall be notified of geothermal waste generated by permit holder and transported on public roads at least four (4) hours prior to occurrence of each activity.

   Prior to entering the Francisco Leasehold, the permit holder shall provide all truck drivers with a detailed map of the area in which they are traversing prior to entering the security gate. The map should include. a) all dangerous curves/elevation points--highlighted in red, b) speed limits/reduced limits depicted on the map, c) safe locations for vehicle inspections, and d) a serious warning clause/penalties if drivers violate any safety procedures while travelling on private roads.

   The permit holder shall require that each truck driver conduct a vehicle inspection at the gate area prior to leaving the leasehold. The inspection shall include brakes, vehicle connection, wheels/tires, valves, tanks, etc. and other equipment as outlined in Title 13 CAC. After loading, a material inspection for leaks in the system shall be conducted. All inspections shall be logged at the MCR guard gate for verification by agency staff.

4. The permit holder shall be responsible for repair of any direct verifiable damage to public roadways resulting from construction or operation of this project, including actions by contractors or subcontractors.

5. Sanitary and handwashing facilities shall be provided at each drill site during well drilling, in full compliance with all rules and regulations of the Lake County Health Department.

6. The permit holder shall comply with all safety requirements of Cal/OSHA, including an accident prevention program, and conduct Cal/DOHS on-site worker safety inspections during construction and operation of the steamfield.

7. The permit holder shall surface all project roads with a double chip seal surface approved by the Department of Public Works. Surfacing shall commence upon initiation of pad, road or pipeline construction and shall be

completed within 3 years as specifically provided for in the required phasing plan. Inspection costs for this surfacing shall be paid in accordance with condition B.10. of this use permit.

8. Applicant shall maintain files on all supplemental plans and ongoing mitigation measures required by this Use Permit. An annual report summarizing the primary compliance activities during the previous year shall be submitted to the Planning Department.

9. Applicant shall enter into a compliance monitoring inspection agreement with the County of Lake. Said agreement shall provide for reimbursement to the County for the actual cost of inspection and monitoring, limited to staff time, equipment repair, and mileage, for the life of the project. If an area-wide fee schedule for inspection services is adopted in the future, it shall replace this condition.

10. The permit holder agrees that the Lake County Planning Commission shall have the right to require the permit holder to participate in a Geysers area seismic monitoring program on a pro rata basis, if recommended by the Lake County General Plan.

11. Provision shall be made for adequate access by fire-fighting equipment to the site, and fire access maps shall be provided to the appropriate fire district(s).

12. Permit holder shall provide the Air Quality Management District with a plan which details the equipment and procedures which will be employed during power plant outages (stacking periods) and during maintenance venting. This plan shall include proposed hours during which planned maintenance venting will occur as well as projected time which will elapse between unscheduled power plant outages and the throttling back of wells to minimum bleed. The plan shall include personnel available for unscheduled outages and projected response time of those personnel.

13. Permit holder shall, submit a revised traffic control and road maintenance plan for High Valley Road. This plan shall require car pooling and/or bussing of employees whenever possible and take into account the great increase in heavy truck traffic which will accompany full field development and expansion of the Bottlerock site. The plan shall also address sign requirements and the coordination of heavy truck traffic (on Sulphur Creek Road) with the school district to reduce safety concerns to school children. The plan shall suggest mitigations which will prevent or alleviate the concomitant increase in danger due to traffic accidents and damage to the road which may occur following development. This plan shall be approved prior to issuance of a grading permit for pad, road, or pipeline construction.

14. Pipeline routes and design must be consistent with the approved plan of development, and be approved by the Planning, Public Works and Building Departments prior to construction.

15. All supplemental plans required by this permit, including but not limited to revegetation, sediment, drainage monitoring and control, scenic enhancement, phasing, continuous water monitoring, traffic control and maintenance, noise abatement, emergency fire and medical evacuation and accidental spills, shall be incorporated into the use permit once approved by the responsible department or official. Public notice of all plans and

reports shall be provided to all property owners within 700 feet of the project property lines, as well as to the Planning Commission, at least two (2) weeks prior to any action. Any dispute regarding the adequacy of those plans may be appealed by any person to the Planning Commission for a final determination.

16. A financial assurance agreement, certificate of deposit or bond, satisfactory in form and content to the Lake County Counsel, shall be provided and maintained by the permit holder to insure cleanup in case of spills, landslides, mishaps and site reclamation upon abandonment. Said financial agreement shall make available up to $350,000.00 (to be adjusted every two (2) years in accordance with the San Francisco Area Consumer Price Index) for this purpose and shall be payable to the County of Lake and require County approval to terminate.

II. **IN GRANTING THIS USE PERMIT, THE LAKE COUNTY PLANNING COMMISSION MAKES THE FOLLOWING FINDINGS:**

A. That this use permit does not abridge or supersede the regulatory powers or permit requirements of any state or federal agency of any special district or other Lake County department or division which may retain an advisory or regulatory function as specified by statute or ordinance, nor does this use permit grant any title or other real property solely to this permit holder or his assigns.

B. That the granting of this use permit is in the general public interest and that environmental and performance parameters conditioning the proposed activity as specified in this use permit and as contained in the document entitled "Conditions, Procedures and Performance Standards for Geothermal Regulations, County of Lake," now referenced and made a part hereof, will allow the proposed activity with adequate safeguards to the welfare of the people of Lake County at large and to the people residing in the vicinity of said activity.

C. The revised noise standard of Ldn 50 dBA will reduce the likelihood of disturbances to residents in the project area.

D. Installation of alarms and rigid transfer piping, continuous water quality monitoring, and implementation of a revised contingency spill plan will reduce the likelihood of water quality degradation and further protect public health.

E. Erosion control, sediment/drainage control, revegetation, scenic enhancement, project phasing, spill protection, traffic control and road maintenance measures have been adequately addressed by permit conditions and supplemental plans which shall be incorporated into this permit.

F. Air quality standards have not been lowered and the EIC abatement system has been replaced by equivalent air pollution control measures as required by the Lake County Air Quality Management District.

G. The permit holder agrees to comply with recommended mitigation measures from the Supplemental EIR as stated in Attachment 5 of the staff report dated July 20, 1982, mitigations from Supplemental EIR dated December 20, 1982, mitigations from Supplemental EIR dated December 1985 and June 1986, and included as attachments 1 through 4, and use permit revisions dated June 26, 1986.

H. This use permit is consistent with the Lake County General Plan.

I. The financial assurance agreement for spills, landslides, mishaps and site restoration required by this use permit will insure that clean up occurs in a safe and expeditious manner.

J. The permit compliance monitoring agreement required by this use permit will provide for reimbursement of costs incurred by County staff.

K. Implementation of project phasing and scenic enhancement plans will provide for orderly and rational resource development, while minimizing surface disturbance and environmental impacts.

L. The unavoidable adverse impacts from this project that were lessened but not completely avoided are overridden by the desirability to develop the geothermal resource for energy supplies, the additional revenue accruing to Lake County through utilization of this natural resource, and the creation of new jobs during construction and operation of the steamfield.

III. THE PLANNING COMMISSION FURTHER DECLARES THAT:

1. This use permit may be modified or revoked if the Lake County Planning Commission finds that the use to which this permit is put is detrimental to the health, safety, morals, comfort and general welfare of the persons residing or working in the neighborhood of such use, or if it is injurious or detrimental to property and improvements in the neighborhood or to the general welfare of the county, or is a nuisance.

Date of Expiration: June 26, 2013

Date of Issuance: July 22, 1986

ALEX T. HINDS
Planning Director

By: Irene L Brown
Irene L. Brown, Secretary

ACCEPTANCE

I have read and understand the foregoing use permit and agree to each and every term and condition thereof.

Date 7/21/86

Applicant or Authorized Agent

bjw

APPENDIX D

DETAILED COST ESTIMATE BACK-UP

DEMOLITION AND LIMITED RESTORATION OF THE BOTTLE ROCK FACILITY UNIT PRICES AND COSTS BY TASK (BACK-UP FOR TASK 1) Lake County California 15-May-96			
Description	**Unit**	**Unit Price**	**Total**
MOBILIZATION AND MANAGEMENT			
Equipment & Crusher Mobilization and Permits	1 ls	$137,500 00	$137,500
Management	1 ls	$156,250 00	$156,250
Overhead Cost (i.e , Project Office, Utilities, etc)	1 ls	$37,875 00	$37,875
Misc Tools and Equipment	1 ls	$31,250 00	$31,250
SUBTOTAL (Power Plant $279,309, Well Field $83,566)			$362,875
ABOVE GRADE DEMOLITION			
Cooling Tower			
Gather & Load Trash Debris	60 loads	$550 00	$33,000
Haul Trash Materials	60 loads	$537 50	$32,250
Dump Fees (Trash Materials Only)	768 tons	$93 75	$84,375
SUBTOTAL			$149,625
Power Plant Building			
Gather & Load Trash Debris	51 loads	$550 00	$28,050
Haul Trash Materials	51 loads	$537 50	$27,413
Dump Fees (Trash Materials Only)	768 tons	$93 75	$72,000
Turbine Building Cleaning	1 ls	$10,000	$10,000
Size Above Grade Structural Concrete	8,391 cy	$70 00	$587,370
Load & Haul Above Grade Materials (On-Site)	8,391 cy	$11 03	$92,511
SUBTOTAL			$817,344
BELOW GRADE DEMOLITION			
Cooling Tower			
Cap and Remove Utilities / Location	2 ea	$1,625 00	$3,250
Size Below Grade Structural Concrete (0-48")	1,895 cy	$65 00	$123,240
Load & Haul Below Grade Materials (On-Site)	1,895 cy	$11 03	$20,903
SUBTOTAL			$147,393
Power Plant Building			
Cap and Remove Utilities / Location	8 ea	$1,625 00	$13,000
Size Below Grade Structural Concrete (0-48")	6,502 cy	$65 00	$422,630
Load & Haul Below Grade Materials (On-Site)	6,502 cy	$11 03	$71,685
SUBTOTAL			$507,315
PIPELINE REMOVAL ABOVE GRADE (Including Footing Removal Below Grade)			
Gather and Load Trash Debris	39 loads	$4540 00	$21,450
Haul Trash Materials Grade	39 loads	$537 50	$20,963

DEMOLITION AND LIMITED RESTORATION OF THE BOTTLE ROCK FACILITY
UNIT PRICES AND COSTS BY TASK (BACK-UP FOR TASK 1)
Lake County California
15-May-96

Description	Unit	Unit Price	Total
Dump Fees (Trash Materials Only)	581 tons	$93 75	$54,469
Size Below Grade Structural Footings (0-45")	417 cy	$65 00	$27,105
SUBTOTAL			$123,987
SITE SURFACE DEMOLITION & REMOVAL			
Asphalt Road Removal (Wellfield)			
Stomp Asphalt Roads	255,722 sf	$0 15	$38,358
Load & Haul Asphalt Materials (On-Site)	3,281 cy	$11 03	$36,173
SUBTOTAL			$74,531
Concrete Walks & Paving / Power Plant Area			
Stomp Concrete Walks & Pavement Areas	108,450 sf	$0 15	$16,268
Load & Haul Concrete Materials (On-Site)	2,825 cy	$11 03	$31,146
SUBTOTAL			$47,414
RECYCLE ASPHALT & CONCRETE MATERIALS			
Rubble Crushing (Conc & Asphalt)	43,930 tons	$7 00	$321,510
(Wellfield 70%)		Wellfield	$225,057
(Power Plant 30%)		Power Plant	$96,453
BACKFILL & GRADE AREAS			
Power Plant Building Area			
Exterior Grading (Smooth Area Only)	8 acres	$3,500 00	$28,000
Backfill Voids	6,502 cy	$26 25	$170,678
Cooling Tower			
Exterior Grading (Smooth Area Only)	2½ acres	$3,500 00	$8,750
Backfill Voids	1,896 cy	$26 25	$49,770
Revegetation	5 acres	$8,000 00	$40,000
SUBTOTAL (Power Plant)			$297,198
Asphalt Areas (Roads) (Wellfield)			
Exterior Grading (Smooth Area Only)	5 9 acres	$3,500 00	$20,650
Revegetation	5 9 acres	$8,000 00	$47,200
Well Areas (Wellfield)			
Exterior Grading and Erosion Control	3 6 acres	$3,500 00	$12,600
Revegetation	7 47	$8,000 00	$59,760
Off-site Disposal	1 5 cubic yards	$1,300 00	$2,000
SUBTOTAL (Wellfield)			$142,210
			$2,991,400

APPENDIX E

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

FINAL REPORT
PHASE I ENVIRONMENTAL SITE ASSESSMENT
BOTTLE ROCK POWER PLANT AND STEAM FIELDS
LAKE COUNTY, CALIFORNIA
FOR CRESTON FINANCIAL GROUP

Job No. 30681-001-043
August 31, 1995

August 31, 1995
Job No 30681-001-043

Mr. Domenic J Falcone
President
Creston Financial Group
1800 Harrison Street, 18th Floor
Oakland, CA 94612

Dear Domenic.

Final Report
Phase I Environmental Site Assessment
Bottle Rock Power Plant and Steam Field
Lake County, California

Dames & Moore is pleased to submit our final Phase I Environmental Site Assessment of the Bottle Rock Power Plant and Steam Fields in Lake County, California. This report has been revised to incorporate the comments received on our draft report This report has been prepared in accordance with Task 1 of our proposal for Site Assessment and Remediation Services Project dated January 25, 1995.

We appreciate the opportunity to work with you on this project

Very truly yours,

DAMES & MOORE

Julie C. Moore
Project Geologist

Jill R. Haizlip
Senior Geochemist

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FINAL REPORT
PHASE I ENVIRONMENTAL SITE ASSESSMENT
BOTTLE ROCK POWER PLANT AND STEAM FIELDS
LAKE COUNTY, CALIFORNIA
FOR CRESTON FINANCIAL GROUP

1.0 INTRODUCTION

This report presents the results of Dames & Moore's Phase I Environmental Site Assessment (ESA) conducted for the California Department of Water Resources (DWR) Bottle Rock Power Plant and Steam Fields (the "site") located on High Valley Road in the town of Cobb, Lake County, California (Figures 1 and 2) The facility is situated within The Geysers geothermal district. It is our understanding that this ESA was requested by Creston Financial Group ("Creston") in connection with its potential financial interest in the property

The Bottle Rock facility consists of a 55-megawatt capacity geothermal power plant, 16 geothermal wells located on three well pads, paved and gravel roads, an equipment yard and steam and condensate pipe lines The power plant operated from 1985 until 1990, when operations ceased. Creston is considering plans to purchase the power plant, wellfield and geothermal leases and bring the power plant back on-line, estimating that the facility can be operated profitably for approximately 15 years As part of their economic evaluation of the facility, Creston is concerned about the potential costs of environmental cleanup and site decommissioning.

This ESA is the first task in our investigation of potential environmental concerns and liabilities at the site The findings of this assessment will be utilized for the later phases of this project· developing a sampling plan, evaluating future environmental cleanup issues, performing a risk assessment of environmental hazards, and estimating the future decommissioning costs for closure of the power plant and steam fields This ESA was conducted in accordance with Task 1 of Dames & Moore's proposal to Creston Financial Group dated January 25, 1995 and Task Order 1 dated April 13, 1995

1.1 PURPOSE AND SCOPE OF SERVICES

The purpose of this ESA was to review past and present land use practices, site operations and conditions, and nearby offsite land uses to evaluate the potential presence of soil and/or groundwater contamination at the site In particular, the ESA focused on identifying potential areas of environmental concerns in order to design a Phase II sampling investigation The ESA

was accomplished by a review of readily available pertinent documentation regarding past and current land use, interviews and other specific activities described below, for indications of the generation, use, storage and disposal of hazardous substances at the site. The scope of work included the following specific tasks:

- Review of pertinent, readily available documents and maps regarding local physiographic and hydrogeologic conditions in the site vicinity.

- Review of selected DWR documents currently stored at the power plant regarding past and/or current development, such as environmental permits, previous environmental investigations, and records of hazardous materials use, storage and/or disposal.

- Performance of a reconnaissance survey of the subject property to make observations of existing site conditions and activities and to observe general types of land use in the site vicinity

- Interviews with DWR staff to evaluate site history and operation and maintenance procedures.

- Review of federal and state lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations within one mile of the site

- Telephone interviews of applicable municipal, county, and state regulatory agencies for information regarding environmental permits, environmental violations or incidents, and/or status of enforcement actions at the subject property.

- Preparation of this report describing the research performed and summarizing our findings.

1.2 SITE DESCRIPTION

The site consists of two parcels, the main Francisco leasehold, a 350-acre parcel located on High Valley Road about three miles northwest of the town of Cobb, and the Binkley leasehold, situated adjacent to the north. A leasehold map is presented on Figure 2 All geothermal development

to date has occurred on the Francisco leasehold The Binkley leasehold has not yet been developed and will only be discussed in this report briefly Several residences, paved and dirt access roads are located on this land

The Francisco property has been developed with a 55-megawatt capacity power plant and its associated chemical abatement systems, hydrogen sulfide abatement system, water treatment facility, cooling towers, and electrical switching yard situated on an asphalt pad on the exterior of the power plant building, the steam field comprises steam production and injection wells located on three different well pads, well pads and sumps, and a steam gathering system. The gathering system includes steam pipelines, condensate lines and removal equipment (e.g., knockout pots), reinjection lines, and associated valves, supports, and electronic control system.

With the exception of a reinjection well, the wells have not operated for over five years and much of the steel piping that connects the well heads to the main steam line has been removed from the well pads A steam line connects the power plant to the three well field pads. Francisco, Coleman, and West Coleman. Each well pad contains several steam wells and a sump for drilling fluids. Additionally, the Francisco pad has two reinjection wells for geothermal fluid wastes. Asphalt-paved and gravel roads wind along the hillsides to access the well pads. The steam supplier's compound is located adjacent to the Francisco well pad This area contains a small building for offices and storage, a metal frame storage shed, and an equipment yard for the storage of pipes, valves and miscellaneous items.

The power plant and well fields, currently not operating, are reportedly being maintained in a state of readiness sufficient to resume operations within a few weeks, although actual start-up may take longer. All hazardous materials were removed from the site after operations ceased, and only a number of small containers of hazardous substances remain on site The sumps were reportedly emptied and the hazardous materials storage tanks were emptied and steam cleaned (Mr. Coe Hall, DWR).

2.0 PHYSICAL SETTING

Dames & Moore reviewed pertinent maps and readily available literature for information on the topography and hydrogeology of the site A summary of this information is presented in the following subsections

2.1 TOPOGRAPHY

The site is situated within the California Coast Range geomorphic province, a rugged north-south trending mountain range Elevations on the site range from 2550 feet above mean sea level (msl) on the valley floor to approximately 3000 feet in the surrounding hills. Drainages and tributaries at the site flow into High Valley Creek, which is part of the Kelsey Creek drainage system leading to Clear Lake. An unnamed tributary to High Valley Creek is located immediately west of the power plant area and south of the steam suppliers compound (U.S. Geological Survey, The Geysers 7.5-minute quadrangle, 1993)

2.2 GEOLOGY AND HYDROGEOLOGY

The site is located within the Clear Lake Volcanic Province No surface evidence of volcanic activity is evident at the site, although the heat source for The Geysers appears to be associated with this volcanism. Franciscan Formation rocks of Jurassic to Cretaceous Age and associated serpentinites underlie the site. This formation is divided into two distinct zones vertically non-reservoir and reservoir rocks. The predominant bedrock type is greywacke sandstone, with smaller amounts of conglomerate, chert, and greenstone also present. These rocks have been fractured and transported by a series of thrust and transform faults, including the currently active San Andreas system. Thin surficial deposits of Quaternary Age rocks are found in the High Valley area and a few locations along the tributary stream bottoms (Ecoview, 1979)

All of the wells on the Francisco leasehold were completed in fractured sandstone (greywacke) of the Franciscan Formation, which is the characteristic productive rock type throughout The Geysers geothermal field Most of the wells penetrate a thin layer of serpentinite within 2,000 feet of the surface and then pass through a sequence of metavolcanic rocks between elevations of 2,100 feet above to 3,000 feet below msl, before entering the productive reservoir Steam is encountered as shallow as 3,700 feet below msl in the southwestern corner of the leasehold, but tends to produce at a small rate until at least 4,500 feet below msl is reached (GeothermEx, 1989).

2.3 HYDROLOGY

Surface water on the site consists of unnamed ephemeral surface drainages, local springs, and local groundwater A drinking water well, installed in 1979, is located near the picnic area by West Coleman Road According to the well driller's log, the well is screened from 40 to 75 feet.

The initial depth to water was 40 feet, however, the water level rose nearly to the surface due to confined conditions.

Springs are generally present in The Geysers in locally thicker sections of colluvial soils (up to 300 feet thick) such as landslides, where water percolating through these unconsolidated deposits accumulates over the less permeable Franciscan bedrock as perched water. These springs are supported by shallow localized subsurface resources and are sometimes ephemeral. Groundwater in colluvium or landslide deposits moves downgradient, discharging at any point along the surface that is intersected by the underlying Franciscan bedrock.

The Franciscan non-reservoir rock is exposed over the entire surface of the site, varies in thickness from tens to several hundreds of feet, and has very low porosity and permeability. Water is found in a few open fractures with limited interconnection and storage capacity (Johnson and Treleaven, 1990). No substantial groundwater aquifer is known to exist in the vicinity (Cardwell, 1958).

3.0 FACILITY OPERATIONS AND HAZARDOUS MATERIALS MANAGEMENT

This section discusses the type of operations, hazardous materials used, and wastes generated by geothermal facilities. Substantial volumes of waste, very little of it hazardous, are generated during all phases of geothermal resource development including exploration, field development and power plant operations In addition, large quantities of hazardous materials including drilling additives, fuels, lubricants, and hydrogen sulfide abatement chemicals, are used in both drilling and power plant operations. These substances may be located at the wellfield, the power plant, and/or in the steam gathering system

3.1 WELLFIELD

Exploratory drilling and well development uses hazardous materials at the well pad in drilling cements, drilling muds, hydrogen sulfide gas abatement, fuels and lubricants

3.1.1 Drilling Muds

Drilling muds or compressed air are used to cool and lubricate the drill bit, remove rock cuttings from the well and maintain formation pressure control Typical drilling muds consist of approximately 92 to 97% water, 2 to 5% drilled solids, and less than 3% of various other drilling

additives such as clay and polymers Of the drilling mud additives, only calcium hydroxide (lime) and sodium hydroxide (caustic soda) are considered hazardous in their concentrated commercial form. The drilling mud itself is not hazardous due to the dilute concentration of these compounds in the mud mixture. Excess drilling muds are disposed of in drilling sumps located at each well pad.

3.1.2 Cements

Cements are used to install the casings in each well. During exploration, cements were mixed near the steam supplier's compound by adding water to the dry cement mixture. The components of cement include lime and silica flour, which may be hazardous if concentrated.

3.1.3 Hydrogen Sulfide Abatement

Hydrogen sulfide gas encountered during the drilling process must be abated to meet air emissions standards Gas abatement is performed by injecting low concentrations of sodium hydroxide and hydrogen peroxide into the "blooie line" upstream of the cyclone separator (muffler). Both of these chemicals are considered hazardous in this concentrated form

3.1.4 Fuels and Lubricants

Fuels (generally diesel) and lubricants are used for the operation of the drilling rig, generators, air compressors, and other equipment Fuels are typically stored on the well pad in large fuel tanks during drilling, lube oils and grease are stored in 55-gallon drums or smaller containers.

3.1.5 Drilling Wastes

Approximately 10,000 cubic feet of soil and rock as cuttings were removed from the geothermal wells and discharged into the drilling sump at the well pad Excess cement and drilling muds were also disposed of into the sump. Once steam is encountered, any steam that condenses during drilling or testing is collected in the sump. Since water is added to the blooie line during drilling, some steam usually condenses and flows into the sump from the rock muffler. Minor amounts of abatement chemicals and byproducts pass through the blooie line and separator and are discharged to the sump. Upon completion of drilling, sump wastes are sampled for chemical analysis To date, all drilling wastes at The Geysers have tested nonhazardous (Sonoma County

GRMP, 1990). After testing, the wastes were dewatered, mixed with soil, and buried in the drilling sumps on site

3.2 POWER PLANT FACILITY

Hazardous materials used in power plant operations include many of the same materials used during exploratory drilling, such as fuels and lubricants. Wastes are generated by the hydrogen sulfide gas abatement system, cooling tower basins, condensate, stormwater catchment sumps or basins.

3.2.1 Hydrogen Sulfide Abatement System

The Stretford abatement process is used to remove hydrogen sulfide from the noncondensible gas before releasing it to the atmosphere. The Stretford sulfur waste is converted through a chemical process to a sulfur cake, which is typically contaminated with vanadium and must be disposed of at an approved disposal facility Some sulfur cake is trucked off-site and recycled Additional waste streams from this process are the Stretford solution and froth, which contain vanadium, mercury, and arsenic and are also trucked off-site for disposal

3.2.2 Cooling Tower Water

A large quantity of water is used in the cooling towers After start-up of the power plant, the source of this water is steam condensate Reportedly, chlorine-based chemicals were not added to the water to inhibit microbial growth such as algae. The cooling water stored in a basin beneath the tower and is recycled through the system Occasionally, during a cooling tower blowdown, the water is sent to the reinjection sump and replaced with fresh water

3.2.3 Condensate

As steam loses pressure and temperature through the turbine and condenser, it condenses into liquid water The condensate is treated with hydrogen peroxide to transform volatile hydrogen sulfide to sulfate The condensate is used in the cooling tower, and forms the largest component of reinjection fluid. In the steam production pipeline the condensate is collected in drop pots on the steam line, and transferred to a separate, smaller condensate line that transfers the fluid for disposal by reinjection The condensate water may contain trace amounts of metals or other water

soluble constituents, naturally present in the geothermal steam from this area, such as arsenic, mercury, boron and ammonia

3.2.4 Fuels and Lubricants

Lubricating oil is used in the turbine generator in the power plant. The lube oil system, consisting of a clean oil storage tank, a waste oil tank, pumps and piping, contains about 10,000 to 20,000 gallons of oil .

Diesel fuel is stored in two above-ground tanks for use in the emergency backup generators.

Smaller quantities of antifreeze and other lubricants are also used in various locations throughout the power plant

3.3 STEAM GATHERING SYSTEM

The steam gathering system consists of the steam pipeline from the well heads to the power plant, and the condensate line carrying condensed steam (produced in small quantities as steam cools in surface gathering facilities) from the steam line liquid-removal (knock-out) system or the reinjection system The reinjection system disposes of waste fluids into the geothermal reservoir via a reinjection well The reinjection system consists of the reinjection sump located at the power plant, the reinjection pipeline and the reinjection wells The fluids in these lines may contain small amounts of hazardous materials

3.3.1 Steam

As discussed in Section 3 2 3, the steam (and steam consensate) is produced from the geothermal reservoir contain trace amounts of metals or other water soluble constituents, such as arsenic, mercury, boron and ammonia, which are naturally present in geothermal steam at The Geysers Potential releases of steam or condensate at the well pad may occur from the well head, the mufflers (during drilling, testing and blowdown), and from leaks in either the steam or condensate pipelines Potential releases from the steam and condensate pipelines, which generally are situated together, may also occur at any point along the pipelines between the well pads and power plant.

3.3.2 Reinjection Fluid

The fluid in the reinjection line to be disposed of in the reinjection well may contain a number of potential wastes· water from the condensate line, condensate treated with abatement chemicals in the power plant, generally sodium hydroxide and hydrogen peroxide, to remove hydrogen sulfide gas; cooling tower water treated with chlorine-based chemicals, the first inch of storm water runoff from the power plant pad; washdown material from power plant areas and sumps; and sanitary wastes The hazardous components of the reinjection fluid wastes are discussed above. The fluid is stored in the reinjection sump at the power plant and then transferred to the reinjection pipeline for gravity flow into the reinjection well Potential releases may occur along the reinjection line which is located both above and below ground between the power plant and the Francisco Well Pad reinjection well

4.0 SITE RECONNAISSANCE

On April 19, 1995, Ms Julie Moore, Project Geologist and Ms Jill Haizlip, Senior Geochemist with Dames & Moore, conducted a reconnaissance visit to the site and surrounding area. The reconnaissance consisted of the observation and documentation of the existing conditions at the site and the nature of neighboring property development The walkthrough focused on the power plant, the three well pads, and the steam suppliers compound The plant has not been operating for the past five years and was cleaned up following closure, therefore site conditions may not be indicative of conditions during active operations. Mr David Bogener, DWR Environmental Specialist, accompanied the representatives through the facility and provided background information on site operations and environmental monitoring programs On July 24, 1995, Ms Haizlip revisited the site to observe areas that were locked and inaccessible during the initial reconnaissance. Mr Glen Gordon, former plant superintendent, was present to answer questions regarding former plant operations A site plan is presented on Figure 3

4.1 POWER PLANT AREA

The power plant consists of a three-story concrete building housing the turbine and generator equipment, and the power plant pad surrounded by perimeter curbing with five pad drain sumps The power plant chemical abatement systems, hydrogen sulfide abatement system, water treatment facility, cooling towers, and electrical switching yard are situated on the exterior pad. The following conditions were noted

4.1.1 Aboveground Storage Tanks

Two large aboveground storage tanks (ASTs) are part of the chemical abatement system located to the east of the power plant building. The tanks were used to contain hydrogen peroxide and sodium hydroxide and are approximately 20,000 to 25,000 gallons in capacity. The tanks are situated in a concrete secondary containment area approximately two feet high that appeared to be in good condition. One drain was observed within the containment area. Mr Bogener believed that the tanks were empty

One 500-gallon diesel fuel tank was located on the southern edge of the power plant pad. The tank appeared to be relatively new and was in good condition It was located on a concrete pad, however, there was no containment surrounding the tank. There did not appear to be any leaks or stains.

Two approximately 10,000-gallon lubricating oil tanks are located within the hazardous materials room inside the power plant building A sump runs the length of the room to catch spills No evidence of spills was observed.

4.1.2 Cyclone Separator Tower/Muffler

According to Mr. Bogener, steam releases containing sodium and boron were emitted from the muffler when the power plant began operating in April 1985 due to a problem with the abatement system. Vegetation within approximately 100 yards to the east/northeast of the tower, in the direction of the prevailing wind, were impacted by sodium and boron releases at that time No evidence of this former release was readily apparent during our site visit

4.1.3 Hydrogen Sulfide Gas Abatement System

The hydrogen sulfide gas abatement system, or Stretford system, is located within a concrete berm area near the southeast edge of the power plant site The system functions are monitored from a small laboratory building The Stretford pad had reportedly been pressure washed and decontaminated following plant closure; however, pieces of sulfur cake were observed on the machinery and on the concrete floor within the bermed area. The concrete containment wall and pad floor appeared to be structurally sound and impermeable The area is connected to a pad drainage sump. Any former spills of sulfur cake from the loading of containers would occur on the asphalt outside of the Stretford enclosure, however, none were evident.

4.1.4 Water Treatment Facility

A small building located on the southeastern edge of the pad is used for treatment of domestic water and fire water. The pump room contained a 55-gallon drum of lubricating oil and batteries. No staining was observed on the concrete floor.

4.1.5 Cooling Tower

The cooling tower is constructed above a basin that was filled with water at the time of our visit, apparently to keep the wooden supports in good condition. The condition of the cooling tower basin could not be observed

4.1.6 Underground Sump

The underground concrete sump is part of the drainage collection system for the power plant building and pad. The pad is surrounded by a curbing to contain runoff from the power plant site. Storm drains are designed to collect storm water runoff to one of five sumps for transfer to the reinjection sump for clarification before being reinjected by gravity flow to the underground geothermal reservoir The RWQCB discharge permit requires that the first inch of rainfall on the power plant pad be disposed of by reinjection If more than one inch of rainfall occurs during a storm event, the pumps are switched to allow the additional storm water to discharge through storm drain piping directly to adjacent drainages The sump drainage system is also used to collect spills or washdown from the pad area and septic wastes, in which case the sumps are not allowed to overflow to local streams and are pumped for reinjection

Because the sumps are inaccessible, we could not observe the condition of the concrete with respect to leaks or cracks There are no monitoring devices to detect minor leaks, however, there are level controls which are designed to monitor blockage in the system These levels would also detect catastrophic failure According to Mr Gordon, there have not been any sump leaks.

4.1.7 Hazardous Materials Storage

Hazardous materials are principally stored in the power plant building in the lubricating oil tank room. Four 55-gallon drums containing gear oil, motor oil, lubricant, and antifreeze were present in addition to approximately ten 5-gallon containers of industrial fluid, grease, and cutting oil.

A sump runs the length of the room, and any spills would be transferred to the containment sump mentioned above. Spills and staining were not observed

A solvent cleaning station was observed in a metal machining room near drilling and press equipment. The solvent sink did not appear to be in use and two empty 30-gallon drums were nearby. The concrete floor appeared to be in good condition, covered by some metal shavings.

Several piles of wooden boards wrapped in plastic sheeting were observed on all three levels of the power plant. According to Mr Bogener, the boards were formerly laid across the metal grating which serves as the floor in the center portion of the building. During plant startup, a system failure released arsenic throughout the power plant building. The building was decontaminated, however, the boards, believed to be contaminated by arsenic, were wrapped in plastic and remain in the building

Hydrogen gas cylinders were present in a fenced storage shed on the outside of the plant near the electrical switch yard. An adjacent shed labeled "Paint Locker" stored small containers of paint, lubricants, waterproofing material and roof cement No evidence of spills was observed.

4.1.8 Transformers

One large pad-mounted substation transformer was observed on the southern edge of the pad adjacent to the water treatment facility The transformer was labeled as containing Wecosol fluid, in sulfur insulation There was no indication as to whether the transformer contained PCB-type cooling oils; no evidence of leakage was observed

One dry-type transformer was observed on the third floor of the power plant. Dry-type transformers typically do not contain PCB-type oils

4.1.9 Other Conditions of Concern

Discolored pavement or soils, discolored water, unusual odors, and unusual vegetative conditions were not observed on or immediately adjacent to the power plant area There was no vegetation growing on the gravel areas which, according to Mr Bogener, are sprayed with herbicides to suppress weeds.

4.2 STEAM SUPPLIER'S COMPOUND

The steam suppliers compound includes a warehouse-type building, a storage shed, and an equipment yard The building is constructed with concrete floors and walls with wood roofing A portion of the building has been finished as office space and storage closets, the remainder is an open maintenance area with a roll-up garage door. The maintenance area has equipment for welding and machining. A parts washing stand, which typically uses solvent cleaners, did not appear to be used. A loft area above the offices is used for heating and ventilation equipment, a water heater, and parts storage An instrument room and generator room were locked and could not be accessed The metal storage shed appeared to be used principally for valve storage An empty flammables cabinet was observed. The equipment yard stored miscellaneous steel pipes, valves, and other parts.

4.2.1 Underground Storage Tanks

A 1,000-gallon underground storage tank (UST) was formerly located directly west of the control room building This tank was used to store diesel fuel for the auxiliary power generator. The former tank location is indicated by a disturbed soil area. According to information obtained from the Lake County Environmental Health Department (LCEHD), the UST removal was performed in June 1991 A letter dated August 14, 1991 from DWR to the LCEHD states that additional sampling will be performed after overexcavation, presumably to remove contaminated soils, however no subsequent reports or sampling results have been submitted (Ruminisky, personal communication).

Dames & Moore has attempted to investigate this UST removal through DWR personnel and LCEHD. Mr. Glen Gordon recalled that the Delta Division of DWR handled the tank removal. He believed that confirmation samples were collected, and that Mr. Manuel Ramirez of the LCEHD observed the tank removal and may have collected some additional samples Evidence from invoices from the Delta division suggest that three samples were collected and analyzed for TPH-diesel and BTEX, around June 1991 Neither the exact sampling date, sample locations, nor the results were available In a telephone conversation, Mr. Ramirez of the LCEHD said he was not aware of any confirmation sampling at the site. He reported that there was not evidence of overexcavation or confirmation sampling in the file. He also stated that closure for this UST removal from the LCEHD would required analytical results from at least six samples collected from the bottom (two) and four sides (one each) of the excavation

In summary, our investigation indicates that although sufficient data to obtain closure or removal of potential contamination from this UST may have been collected, it does not appear to be available. Therefore, Dames & Moore recommends additional sampling in the vicinity of this UST removal site. The UST removal is discussed further in Section 5.3.2.

4.2.2 Aboveground Storage Tanks

One 500-gallon diesel fuel AST was located adjacent to the former UST excavation to replace the fuel storage tank for the auxiliary generator. The tank appears new and in good condition, although, there is no spill containment surrounding the tank.

The Woodward-Clyde 1988 Environmental Audit mentions two 600-gallon ASTs behind the control room building in a concrete berm. These tanks were not observed although the concrete pad and berm were still present. No evidence of former spills, such as soil staining, was observed surrounding the concrete pad.

One 500-gallon propane tank was present on the north side of the building in the parking lot area.

A large poly tank was observed in the equipment yard The tank was empty and appeared to be unused.

4.2.3 Hazardous Materials Storage

Evidence of former hazardous materials storage was indicated by a parts washing station in the main building and the flammables storage cabinet in the storage shed. Oil residue and staining was observed in and within one foot of the flammables storage cabinet; however, the concrete floor in the storage shed appeared to be in good condition and the spills do not appear to have penetrated to the subsurface.

The 1988 audit mentions a wooden storage shed containing various types of containers of paints and oils. The wooden floor and ground around the shed appeared to be impacted by petroleum products (WCC, 1988) This shed was no longer present and the former location of the shed was not apparent.

According to Mr. Bogener, contaminated pipes and equipment from the DWR South Geysers facility were brought to the equipment yard last year where it remained for six months before

finally being hauled off-site for disposal During the intervening months, storm water runoff came into contact with these contaminated materials In addition, a portion of the equipment yard was formerly utilized as a batch plant for mixing concrete

The yard currently stores drilling pipes and other materials. Some of the pipes contain scale material on the interior of the pipes Most of the pipes are quite rusted. Significant staining of the yard was not observed.

4.2.4 Septic Tank

A septic tank is located on the northern side of the control room building. Sewage from the septic tank is pumped to the injection well on the Francisco Well Pad

4.2.5 Other Conditions of Concern

Distressed vegetation was observed adjacent to the western edge of the equipment yard. Mr. Bogener believed it may be due to herbicide application rather than a hazardous materials release from the yard because the distress began during a dry period when runoff from the yard could not have impacted the plants

Storm water runoff from the yard is not treated or controlled and occasionally overflows the curbing near the southwestern corner of the yard An unnamed tributary to High Valley Creek is located approximately 25 feet south of the edge of the yard, is directly impacted by runoff Water quality sampling of High Valley Creek, however, indicates no significant water quality impairments

4.3 FRANCISCO WELL PAD

The Francisco Well Pad is located at the base of the hills on High Valley Road across from the steam suppliers compound. It consists of four steam production wells, two reinjection wells, two settling tanks and a drilling fluid/cuttings sump. As noted previously, the facility was not in operation during our site visit and these wells were shut in In addition, the piping connecting the production wellheads to the steam pipeline had been removed

4.3.1 Reinjection Wells

The two reinjection wells were originally extraction wells that were converted to injection The material reinjected into the geothermal aquifer includes drilling fluids, the first inch of storm water runoff from the Power Plant Area, waste fluids from spills and washdowns, and sanitary wastes from the power plant and steam supplier's buildings.

4.3.2 Drilling Fluid Sump

The sump was constructed to store fluids generated during exploratory drilling operations and to contain storm water runoff from the well pad The sump contained some fluid at the time of our visit.

4.3.3 Aboveground Storage Tanks

Two steel ASTs approximately 2,000-gallons in size are located between the sump and the reinjection well. The tanks appear to be utilized for fluid collection and settling prior to reinjection.

4.3.4 Other Conditions of Concern

According to Mr. Bogener, there have been two incidents at the Francisco Well Pad which have impacted the surrounding vegetation In 1981, uncontrolled steam venting from one of the wells killed most of the chaparral shrubs on the hillside within 50 yards north of the well head This area is currently covered by non-native grasses.

In December 1984, overflow from the pad entered a natural rainwater catchment area east of the pad and also ran along the western edge Distressed vegetation was not observed at either of these areas. Stained soil or unusual odors were not observed.

4.4 COLEMAN WELL PAD

The Coleman Well Pad is located at an intermediate elevation on the slope between the Francisco and West Coleman pads The pad has five steam production wells, two of which are plugged, capped and abandoned, a drilling fluid sump, two settling tanks, a water tank and a pump shed.

A portion of the steam pipeline connecting the wellhead to the pipeline had been removed, while other sections remained

4.4.1 Drilling Fluid Sump

The sump at the Coleman Well Pad can be utilized for overflow storage from the upper well pad (West Coleman) until fluids can be reinjected at the Francisco reinjection well. At the time of our visit, the drilling fluid sump at the Coleman Well Pad contained muddy water which was being pumped through a narrow plastic pipe to the injection line.

4.4.2 Aboveground Storage Tanks

Two steel ASTs, approximately 2,000 gallons in size, were situated adjacent to the sump. As above, these tanks are believed to be utilized for settling solids out of fluid pumped out of the sump before transfer to the injection line

One additional green AST contains water reportedly used for fire fighting operations (WCC, 1988).

4.4.3 Storage Shed

A small cinder block shed located near the sump and ASTs contained electronic control equipment. No obvious indications of hazardous materials releases were observed in the shed

4.4.4 Other Conditions of Concern

Distressed vegetation was observed on the north side of the sump as evidenced by approximately 30 pine tree stumps and yellow necrotic banding of pine needles on the existing trees Some madrone trees to the east of the pad have also been impacted. Spills, stains, discolored water and unusual odors were not observed

The open ends of the gate valves that formerly connected the pipe from the wellhead to the steam pipeline contained scale and pipeline corrosion

4.5 WEST COLEMAN WELL PAD

The West Coleman Well Pad is situated on the crest of the hill to the west of the power plant The pad consists of five production wells, a portion of the steam pipeline, a sump, two ASTs and a pump shed.

4.5.1 Steam Production Wells

The center production well appeared to be leaking near the well head, as indicated by a sulfurous odor adjacent to the well. The release appeared to consist of a small quantity of hydrogen sulfide gas only; no steam was observed though the temperature was cold during our visit

The cause of the leak has not been determined. If it arises from surface valving, the leak represents a much less serious concern than if it originates in or around the casing. If the problem is not corrected, regulatory agencies may question the well integrity and air emissions; however, it is unlikely that hydrogen sulfide emissions exceed permitted air emissions.

4.5.2 Drilling Fluid/Cuttings Sump

Muddy fluid, presumably rainwater, was being pumped out of the sump at the time of our site visit.

4.5.3 Aboveground Storage Tanks

Two steel ASTs were situated adjacent to the sump. As above, the tanks are used for settling fluids for pumping to the reinjection line.

4.5.4 Storm Drains

The well pad does not appear to be graded to ensure that all storm water from the well pad collects in the drilling fluid sump. A drain-like structure constructed of rock cobbles was observed near the northwest corner of the well pad. According to Mr Bogener, this was an unsuccessful attempt by MCR to control erosion caused by stormwater runoff onto the fill slope. A small gully initiated by runoff was observed near the northeast corner during our initial site visit Mr. Bogener stated that this damage has since been repaired.

4.5.5 Storage Shed

As at the other well pad, a small cinder block shed houses electronic control equipment

4.5.6 Transformers

One pole-mounted utility transformer was observed on a utility line crossing the well pad No evidence of leaks from the transformer was observed.

4.6 OTHER AREAS

Dames & Moore observed other areas of the site which were visible from the roadway and developed areas. An intensive field reconnaissance of all the lands within the leasehold was not considered to be pertinent or within the scope of this project Many of these areas are not readily accessible because of dense vegetative growth.

4.6.1 Steam and Condensate Lines

Steam lines and condensate return lines are located both aboveground and underground at the site, as shown on Figure 3 Indications of leaks such as residual stains were not observed, however, it is unlikely that stains would be present because the facility has not operated for five years and because the condensate water components would be broken down naturally and not persist in the soil Some solids were observed beneath the steam line knock-out pots on the well pads. Neither the steamline nor the condensate line have a leak detection system Mr. Bogener recalled many incidents of leakage from the condensate line. On at least one occasion, the underground section of the line had to be excavated and repaired

4.6.2 Drinking Water Well

One drinking water well is located approximately 800 feet southeast of the steam suppliers compound, in the picnic area adjacent to West Coleman Road According to Mr. Bogener, this well has been sampled at least quarterly and none of the tested constituents have exceeded maximum contaminant levels (MCLs) for drinking water.

4.6.3 Binkley Leasehold

An area along the ridge of the Binkley leasehold was cleared a number of years ago for potential development of a well pad that was never constructed This area has since been subject to a controlled burn and road construction. A paved road constructed by Unocal runs along the top of the ridge and may cover part of the proposed well pad site All evidence of the former well pad has disappeared. A dirt road connects High Valley Road to the Unocal road near the Jadiker gate.

4.6.4 Adjacent Properties

Unocal geothermal facilities are located to the south and west of the site Runoff from these facilities would impact drainages that flow into High Valley Creek on the western portion of the site.

5.0 RECORDS REVIEW

Dames & Moore reviewed readily available records regarding past and current site use, contacted applicable agencies regarding environmental concerns at the site, interviewed individuals with knowledge of the former operating practices, and reviewed an agency database list search for environmental concerns at surrounding properties The information obtained during the records review is provided in the following subsections.

5.1 HISTORICAL INFORMATION

The earliest known historical use of the site is by American Indians Their presence has been recorded by the discovery of five archeological sites within the leasehold (Ecoview, 1979). In the 1880s, the Francisco leasehold was homesteaded by the Victor Coleman family and the property was probably used for subsistence farming and grazing A sawmill was constructed in the early 1900s east of the current picnic meadow. The mill processed lumber from the leasehold and nearby areas until it burned in 1925 Subsequently, the property was used for grazing until Victor Coleman's retirement, at which point its principal use became a family recreation area (WCC, 1988) These historical site activities appear to pose no significant impacts to soil or groundwater conditions beneath the site.

The drilling of exploratory geothermal wells and the construction of the three well field pads began in 1975 by MCR Corporation. Construction of the control room and equipment yard, the pipelines and associated facilities began in 1982 while geothermal exploration continued. The power plant operated from 1985 to 1990. Since then, the site has been maintained in a standby condition should operations resume

5.2 INTERVIEWS WITH DWR PERSONNEL

Two DWR personnel were selected by Mr Coe Hall, Senior Electric Utilities Engineer for DWR, as being the most knowledgeable individuals with respect to plant operations and environmental compliance at the Bottle Rock facility. These individuals were interviewed for information regarding historical operations, spill incidents, and environmental compliance issues.

5.2.1 Mr. Glen Gordon, Former Plant Superintendent

Mr. Gordon was the plant superintendent while it was operating and currently manages the facility in its stand-by status Mr Gordon's recollection of incidents and potential areas of releases are summarized below.

- There was a major failure on the circulating water line between the power plant and the circulation pit in 1989. It caused a large spill of condensate into the unnamed tributary of High Valley Creek This caused an extensive clean-up with reports to Lake County Environmental Health and CVRWQCB.

- Plywood used on grating inside the power plant during turbine maintenance is probably contaminated with arsenic He said it is wrapped in plastic and still stored inside the building

- The steam stacking area could have arsenic and boron contamination, since there had been problems at that location in the past

- The underground circulation water return line (about 5 feet in diameter) between the plant and the cooling tower had a leak that required excavating to repair the line. He recalls that they overexcavated and removed the soil, presumably because it was contaminated

- The majority of spills were condensate from the injection pipeline between the power plant and the Franciscan well pad Many of these spills released into the unnamed tributary to High Valley Creek Some of the pipes were repaired or re-routed.

- There are no underground storage tanks at the power plant but potential hydrocarbon contamination in the soil could possibly be present next to the power plant oil room sump if the sump had ever leaked

- There was a total failure of a single large diameter (10 or 12-inch) fiberglass pipeline beneath the switchyard leading to the reinjection vault in front of the power plant. Because this area was located beneath the switchyard, it was not cleaned Potential soil contamination from condensate may be present The pipe was cut off, capped, and replaced by an above ground double-lined pipeline that goes around the back of the facility and connects to the remainder of the injection line.

- The buried injection line discussed above and built by MCR runs under the unnamed tributary to High Valley Creek has had numerous leaks The pipe is still underground and the replacement line (discussed above) connects to it. The failures of this pipeline have caused several spills into the tributary.

- All excess condensate for injection is stored in the two pits known as east and west. In addition, water, including the first inch of rain collected from the power plant pad, is collected at the five sumps at power plant drains. Each sump has a pump to move water to the reinjection sump and wells These power plant sumps could have residual contamination washed off from the power plant pad.

5.2.2 Mr. David Bogener, Environmental Specialist IV

Environmental monitoring has been conducted on the leasehold since the late 1970s Mr. Bogener has performed environmental compliance monitoring at the site since 1981. His comments regarding environmental incidents are summarized below

- A well on the Francisco pad was vented continuously for quite awhile. He said that it was not vented straight up, but an elbow was added to angle the plume. It

killed all of the surrounding chaparral and it took several years for plant growth to return He thought the area may have a greater soil deposition of hazardous substances like arsenic and boron.

- MCR had pipeline leaks several times while piping sump contents from the Coleman sump to the Francisco sump

- During a major storm event in 1986, there was a sump overflow spilling into the unnamed tributary of High Valley Creek The material probably reached the creek.

- Storm water runoff has become cleaner since the plant shut down in 1990.

- Initial operating problems with the original steam scrubber caused a release of sodium and boron which impacted plants and soil around the steam vent/muffler Boron has been detected in soil at levels above the 10 ppm threshold considered to be toxic to plants and is still present in the soil

- The storage area in the steam suppliers compound was used to store the dismantled well heads and pipes from the DWR South Geysers project Scale and particulate matter washed out of the pipes onto the ground when it rained. This area was not sampled or cleaned up to his knowledge. The pipes were finally hauled to the Kettleman Class I facility

- The required vegetation monitoring has shown several mature trees dying along the unnamed tributary to High Valley Creek, which may be attributed to the numerous condensate spills or geothermal drift.

- Continued vegetation damage downwind of the Coleman pad suggests that soil on the north side of the pad has been contaminated by historical steam releases on the site

5.3 INTERVIEWS WITH REGULATORY AGENCY PERSONNEL

Regulatory agency personnel were interviewed for information regarding environmental permits, violations or incidents, and the status of any enforcement actions at the site.

5.3.1 Lake County Planning Department

Mr. Mark Dellinger, Lake County Energy and Resource Manager (Former Geothermal Coordinator, Planning Staff) and Mr. Steve Zalusky, Lake County Zoning and Permit Enforcement, worked together on the project Their jurisdiction consists of the conditions listed in the two Conditional Use Permits (CUP) issued for the steamfield: CUP #85-27 for the main steamfield issued to MCR; and, CUP #87-92 for the Binkley Property, which was permitted but never developed. These two permits "run with the land" and would remain in effect should the operator change The power plant itself is under the jurisdiction of the California Energy Commission (CEC) and is permitted through the Application for Certification (AFC). Should the power plant capacity be derated to less than 55 MW, the County may become the lead agency responsible for permitting and require a CUP.

The well field is currently in compliance, because it is not operating and there are no outstanding enforcement actions If operations were to resume, a number of compliance reports required by the CUP would need to be updated Upon decommissioning, the conditions listed in Item J of the CUP would be required

5.3.2 Lake County Environmental Health Department

Mr. Ray Ruminiski, Supervising Environmental Health Specialist, stated that there are no outstanding enforcement actions or compliance issues at the site If operations were to resume at the site, the Hazardous Materials Business Plan and spill contingency plans would have to be updated Information concerning the UST removal is discussed in Section 4.2.1.

Mr. Manuel Ramirez, Hazardous Materials Specialist, was present during the UST excavation in June 1991. According to his field notes, the tank appeared to be in good condition; however, the inlet piping had leaked and stained soil was encountered beneath the fill end Soil sampling detected up to 990 parts per million (ppm) total petroleum hydrocarbons as diesel in soil Excavation of the impacted soil was planned, although Mr. Ramirez was not notified to observe the overexcavation and no follow-up reports were submitted.

5.3.3 Lake County Air Quality Management District

Mr. Robert Reynolds, District Officer, and Mr. Ross Kruper, Staff Personnel, stated that the facility is currently in compliance and did not recall any permit compliance issue during the plant's

operation. New air regulations such as the Clean Air Act Title V and Toxic Hot Spot updates may be required in the future.

5.3.4 California Regional Water Quality Control Board - Central Valley Region

Mr Paul Marshall, Area Engineer, stated that there are no outstanding enforcement or compliance issues at the site He recalled numerous incidents of condensate spills in the past After a particularly large spill on December 4, 1990, the CVRWQCB requested a characterization investigation of the underground injection line that had failed more than once The soil investigation prepared by Harding-Lawson Associates submitted to CVRWQCB on July 9, 1991 indicated that levels of arsenic, sulfur and manganese in soils were below the total threshold limit concentrations (TTLCs) established for these metals. (We have not located or reviewed this HLA report)

After reviewing the investigation report, the CVRWQCB issued a letter to the Northern California Power Agency dated July 30, 1991 that states "When compared to the background concentrations, the hazardous waste levels, and the extensive distribution of the samples, it appears that there is no need for further investigation or remediation All of the constituent concentrations found at the facility were orders of magnitude below the TTLC. and no additional testing would be required prior to abandonment of the reinjection pipeline."

5.3.5 California Division of Oil, Gas and Geothermal Resources

Mr Ken Stelling, District Supervisor, stated that the CDOGGR is responsible for the protection of groundwater by administering regulations to ensure the integrity of well casings Mr Stelling stated that the wells are currently in compliance The injection wells are available to dispose of storm water and the remaining production wells have all been plugged according to CDOGGR standards.

5.3.6 California Department of Toxic Substances Control

Mr. Dan Ziarkowski, who handles mitigation and cleanup cases in the Lake County area, did not have any record in the agency's Cal-sites List

5.4 POWER PLANT RECORDS REVIEW

Numerous boxes of files regarding power plant operations were available at the site. Files regarding environmental permits, spill incidents, and hazardous materials were reviewed for information regarding former plant operations A listing of the documents reviewed is included in the References, Section 9.0. Pertinent information is discussed below

5.4.1 Spill History

Several files contained handwritten notes, memos, and reports discussing the recorded spill incidents at the site. The material did not appear to be complete for all cases, and the following discussion summarizes these incidents based on the available information. There may be spills that occurred for which there are no records.

Francisco Well Pad, December 30, 1984

Due to a hose failure, drilling fluids were discharged into a small rainwater catchment basin at the east end of the Francisco Well pad. The catchment basin was equipped with an overflow standpipe that drains into an unnamed tributary of High Valley Creek on the south side of the control building. Additional overflow discharged from the west end of the well pad The spill was discovered by the downstream neighbors, the Jadikers, who found mud in the creek near their house. The duration of the spill was estimated to be approximately seven hours Residue in the eastern catchment basin indicated that flow could have been four to six inches deep, while residue in the tributary was one to two inches deep 1000 feet downstream and dead fish were found (CVRWQCB memo, Dan Daniels, Senior Engineer, March 4, 1985)

Remediation of the spill included the removal of 68,000 gallons of fluid from the east catchment basin by an IT vacuum truck, removal of soil from the rainwater catchment basin, damming the tributary and removal of over 5,000 barrels of creek water from sweeping, flushing, and vacuuming the tributary channel over a period of five days. MCR estimated the volume of sump water spilled was around 340 gallons (MCR Geothermal Corp , Statement to the Lake County Planning Department, January 24, 1985)

Four soil samples were collected on January 2, 1985 from the small sump and at several stream locations. Results indicated the presence of boron from 0 11 to 0.18 parts per billion (ppb), barium from 85 to 150 ppb, sulfate from 8 to 380 ppb; nitrate from less than 0 01 to 0.32 ppb,

and non detectable amounts of mercury and arsenic (Radian Analytical Services, Laboratory Report, February 18, 1985).

A DWR memo from Gerald Boles to Dick Lallatin dated February 11, 1985 indicates that the spill had insignificant impacts to water and habitat quality. The memo states that parameters monitored subsequent to the spill were well within the normal range of values of previous analyses from monthly water quality monitoring requirements, with the exception of turbidity. In addition, no degradation of benthic macro invertebrate habitat was indicated

CVRWQCB issued an Administrative Civil Liability Complaint to MCR Geothermal on March 7, 1985, seeking a fine of $5,320 which was calculated on the basis of $1 per gallon spilled, according to their estimated spill volume The complaint also references exceedances of the facility Waste Discharge Requirements established in Order No 76-202 in water samples collected from the tributary on the day of the spill The samples were analyzed for aluminum, arsenic, barium, boron, mercury, nitrate, selenium, silicon, and sulfate and exceedances include boron up to 1.6 mg/L, turbidity up to 110 NTU, specific conductivity up to 290 mhos In addition, the catchment basin fluid was determined to be toxic to fish in 96-hour fish toxicity test.

Coleman Pad Spill, August 4, 1988

Based on handwritten notes in the file, it appears that a release on the Coleman pad covered an area approximately 26 feet by 16 feet. Soil samples were collected and analyzed for arsenic, with results ranging from 9 6 to 4,500 ppm It appears that the soil was excavated and sent to Chemical Waste Management for disposal

Re-Injection Spill, November 22, 1988

An injection pipeline leak into an unnamed tributary of High Valley Creek released fluid containing sodium hydroxide from the hydrogen sulfide abatement steam stacking operation, septic tank overflow, and steam condensate Fluid released to the tributary had concentrations of arsenic and mercury slightly exceeding drinking water standards After cleanup (cleanup efforts were not described) fluid released was well below MCLs (Memo summarizing NET Pacific analyses).

Circulating Water Line Failure, November 3, 1989

An estimated 53,000 to 89,000 gallons of fluid were released from the cooling tower circulating water system through an outlet structure into an unnamed tributary to High Valley Creek (DWR, Report of Circulating Water Line Failure and Associated Condensate Spill at Bottlerock, November 3, 1989) Samples of the plant cooling water indicated that the discharge contained elevated levels of arsenic (0.087 ppm), boron (51 ppm), copper (0.04 ppm), and vanadium (0.035 ppm) (NET Pacific, Laboratory Report, December 5, 1989).

Reinjection Spill, December 4, 1990

Another injection pipeline spill occurred in December 1990 Although there was no spill file in the plant records, we understand that the CVRWQCB required a characterization investigation which was performed by Harding-Lawson Associates. According to Mr. Marshall of the CVRWQCB, the results of this soil investigation showed that the potentially hazardous constituents released to soil were well below TTLCs or hazardous waste action levels and that no further investigation of remediation was necessary

5.4.2 Air Emissions Impacts

Toxic levels of boron and sodium were released in the vicinity of the muffler during power plant startup when the original steam scrubbing system failed. Historical aerial photograph review shows vegetative damage Soil boron levels have been declining since plant closure. A soil sample collected in the vicinity (to the east, in the direction of the prevailing wind) of the muffler had concentrations of boron at 25 ppm and sodium at 190 ppm, in 1991. Soil boron levels exceeding the 10 ppm are considered toxic to plants (DWR, Mr. David Bogener, Vegetative Response to Geothermal Drift at the Bottle Rock Geothermal Power Plant, August 1992)

Soil sampling in June 1994 reported boron concentrations of 16 ppm, still in excess of toxic limits. Leaf tissue boron concentrations from rinsed leaves were significantly less than from unrinsed leaves, indicating that airborne boron deposition still continues despite the absence of releases from the power plant (DWR, 1994 Annual Compliance Monitoring Report, January 24, 1995).

5.4.3 1994 Annual Compliance Monitoring

Monitoring of environmental conditions at the site and in the site vicinity has been performed since the late 1970s. The monitoring program includes surface water quality, groundwater quality, vegetative assessment and wildlife use Surface water runoff is sampled from the power plant sump outfalls, from the well pads, and at five surface water quality sampling stations at nearby creeks Groundwater monitoring is conducted at five water quality monitoring stations including the on-site well and five stations on the Binkley lease. Vegetative damage is monitored by aerial photograph review and analysis of soil, duff and leaf boron concentrations within 50 meters of the power plant muffler. All boron concentrations detected during June 1994 sampling were at non-hazardous levels except soil boron. Wildlife surveys are also performed. The 1994 report found no adverse effects to surface water quality, groundwater quality, vegetative damage or wildlife use from the power plant (DWR, 1994 Annual Compliance Monitoring Report, January 24, 1995).

5.4.4 Bottle Rock Sump Rehabilitation

The WCC 1988 environmental audit noted that the liner in the sump at the Francisco Well Pad appeared to be breached by a naturally occurring spring which questioned the integrity of the liner. Subsequent rehabilitation of the Francisco and West Coleman sumps was performed in 1989. This rehabilitation, involving chemical testing of the original compacted clay sump liners showed that the concentrations of metals, the potential contaminants of concern, were well below allowable limits in the original liner material, with the exception of one anomalous arsenic detection. Groundwater below the Francisco sump invert was tested to evaluate if there had been any contamination of groundwater by possible seepage of drilling mud wastes through the old liner. The samples results were considered consistent with groundwater quality of the area· only iron and manganese exceeded drinking water limits. These exceedances are most likely naturally occurring and not related to a release from the sump

The Francisco and West Coleman sumps were rehabilitated with essentially impervious liners to meet RWQCB criteria. The West Coleman drill pad has a gap in the dike surrounding the pad so that some storm water runoff drains into ditches and culverts away from the sump When the dike is repaired and these culverts are blocked, the pad will meet RWQCB criteria The Coleman sump was not rehabilitated and is not suitable for drilling operations at this time (DWR, Final Geotechnical Report for Bottle Rock Sump Rehabilitation, November 1989)

5.5 AGENCY DATABASE REPORT REVIEW

Dames & Moore reviewed a database search report of Federal, State and local regulatory agency lists prepared by NATEC Environmental Reporting Services for the area within one mile of the site to identify activities on or near the subject property that could threaten environmental quality of the site. The agency lists reviewed are summarized in the NATEC report, which is included as Appendix A. It should be noted that this information is reported as Dames & Moore received it from NATEC, which in turn reports information as it is provided in the various government databases. It is not possible for Dames & Moore to verify the accuracy or completeness of information contained in these databases. The list review included the following regulatory agency lists.

- United States Environmental Protection Agency's (USEPA) Federal Superfund Sites National Priority List (NPL)

- USEPA Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Information System (CERCLIS) List

- USEPA Superfund Liens (LIENS) List

- California EPA's Actually or potentially contaminated sites under the Abandoned Site Program List (CAL-SITES/ASPIS)

- California EPA Hazardous Waste and Substance Site List (CORTESE)

- USEPA Resource Conservation and Recovery Act (RCRA) Hazardous Waste Generators, Treatment, Storage and Disposal Facilities List (HWIS)

- California Water Resources Control Board (CWRCB) Registered Underground Storage Tank (UST) List

- CWRCB Leaking Underground Storage Tank List (LUST)

- California Waste Management Board Active and Inactive Sanitary Landfills and Disposal Facilities List (SWIS)

- USEPA Emergency Response Notification System List (ERNS)

- California Division of Oil and Gas (DOG) List of Active or Abandoned Wells

The information obtained from our review is summarized below:

The Bottle Rock Power Plant is listed on the following three agency lists

- Federal Resource Conservation and Recovery Act (RCRA) - The site is listed as a large quantity generator of hazardous waste materials No outstanding violations are reported.

- California Environmental Protection Agency (Cal-EPA) Cal-Sites List - This list is a compilation of potential hazardous waste sites identified by various state environmental agencies The Bottle Rock facility status is listed as low priority, or judged by Cal-EPA to pose a low public health or environmental threat.

- California Waste Discharge Systems - The facility is listed as a site which has been issued waste discharge requirements

Nearby properties operated by Unocal Geothermal Division are also listed on the Waste Discharge System Discharges from these facilities could flow into and impact the drainages adjacent to the site. If persistent, the discharges could ultimately impact the creek near the northwest corner of the leasehold.

6.0 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Dames & Moore has performed an ESA for the Bottle Rock Power Plant and Steam Fields Our investigation included the following review of available historical information and documents regarding site history and plant operations, review of a database report of regulatory agency lists and interviews with local regulatory agency personnel familiar with the site, interviews with the former DWR plant manager and environmental specialist for information regarding operations, spill incidents, and environmental compliance; and a reconnaissance visit to the site to observe existing site conditions The following discussion summarizes our findings with respect to general environmental conditions at the site and specific areas of potential concern

6.1 GENERAL FINDINGS

The results of our investigation indicate that environmental conditions at the facility are good and that the potential for significant soil and groundwater contamination arising from geothermal operations is low. The type of contaminants associated with the reported spills and releases were typically relatively low levels of inorganic constituents such as boron, arsenic, vanadium, mercury, and zinc. Most of the data reported in the annual monitoring program and the various cleanup investigations following spill incidents indicate that soil and groundwater do not exceed hazardous cleanup levels A letter from the RWQCB following one of the larger releases from the reinjection line in 1990 states that all constituents were well below regulatory action levels and that no further investigation or remediation was required. Because these releases have occurred at least five years ago, the concentrations currently present have likely been attenuated. Subsurface releases from the underground circulation line, sumps, and former UST may have caused localized elevated levels of constituents, but extensive contamination appears to be unlikely. In addition, these constituents of concern are naturally occurring in the soil and groundwater and contamination related to a spill relative to background concentrations can be difficult to identify.

The various locations at the Bottle Rock site which may represent potential environmental concerns are discussed individually below

6.1.1 Power Plant Area

- Plywood potentially contaminated with arsenic should be sampled and, if contaminated, disposed of properly

- Soil to the east of the power plant vent muffler may still have elevated levels of boron and sodium from the 1985 steam scrubber failure Samples collected in 1991 showed levels of 25 ppm and 190 ppm of boron and sodium, respectively. It is possible that low levels of arsenic and boron could also be present in surface materials in the steam stacking (vent) area. These levels have been decreasing and should further attenuate with time.

- Pieces of sulfur cake are still visible in the Stretford pad area, even after decontamination. Residual sulfur appears to be still present in the stormwater effluent sampling, possibly originating from the Stretford area Although it does not appear

to be a threat to soil or groundwater beneath the pad, this area should be washed down again to remove sulfur present and reduce stormwater discharge concentrations of sulfur.

- The integrity of the underground sumps is not possible to evaluate at this time. The sumps may be a potential source of contamination, especially if the oil room sump is cracked The sumps should be cleaned and inspected during plant closure.

- Failure of a fiberglass pipeline containing condensate beneath the switchyard may have caused a release of condensate to soil. This was not remediated when the pipe was capped because it is located beneath the switchyard

- Injection water (condensate) spills from the power plant area were released into the tributary at the stormwater outfall locations on the south and west sides of the plant between 1985 and 1990. Soil and surface water does not appear to be affected.

6.1.2 Steam Suppliers Compound

- A 1,000-gallon diesel fuel UST was removed from behind the control building Documentation of closure has not been located, therefore, this area may contain some residual hydrocarbons in soil.

- Contaminated pipes and equipment from DWR's South Geysers project were formerly stored in the yard and may have introduced contaminants to the yard and adjacent drainage through storm water runoff. Contaminants of concern are metals related to steam condensate and pipeline corrosion such as arsenic, mercury, boron

- Vegetation on the southern edge of the yard appears to have been impacted by hazardous substances, possibly herbicides

- Hazardous materials were formerly stored in a wooden shed and the metal building. Improper handling may have caused minor surficial impacts to soil

6.1.3 Francisco Well Pad

- Venting from one of the wells killed most of the chaparral bushes on the hillside north of the site and may have introduced elevated levels of contaminants related to geothermal steam (e g , mercury, arsenic, and/or boron) to surface soils.

- In 1984, waste fluids overflowed from the drilling pad into a rainwater catchment basin on the east end of the pad and into a drainage on the western edge of the pad. Fluids spilled into the tributary located south of the steam suppliers compound It appears that appropriate remediation was performed at that time, and subsequent sampling of the tributary near the yard has not detected elevated contaminant levels.

6.1.4 Coleman Well Pad

- The drilling fluid sump has not been rehabilitated and is not in condition to contain drilling fluids.

- Distressed vegetation on the north and east sides of the well pad indicates that a release has impacted and continues to impact vegetation. This release appears to have been geothermal steam, possibly including abatement chemicals The release is at least 5 years old.

6.1.5 West Coleman Pad

- One of the steam production wells has not been properly closed and is leaking.

- Site grading precludes flow of all rain water to the sump The berm would need to be repaired to prevent runoff to the drainages north of the pad should drilling resume. The sump has been rehabilitated to meet the CRWQCB criteria for drilling fluids

6.1.6 Other Areas

- Numerous spills of the injection pipeline and the condensate lines, both aboveground and underground sections, have been reported These areas of release are not considered potential concerns.

- Surface water and groundwater do not appear to be impacted from the geothermal operations.

6.2 CONCLUSIONS AND RECOMMENDATIONS

The potential for significant environmental impairments at the Bottle Rock facility appears to be low. It is likely that somewhat elevated levels of metals and boron may exist in areas formerly impacted by steam, condensate or drilling fluid releases. The concentrations of hazardous materials in the releases were relatively low and should attenuate with time. In addition, these constituents are also naturally occurring in The Geysers area. Potential releases under the asphalt plant pad would be immobile due to the impermeable cap covering the site, also diminishing potential health threats.

Dames & Moore recommends the following:

- The locked and inaccessible site locations should be observed during our next site visit, although no significant sources of contamination are expected to be found;

- Since documentation of the UST removal and sampling is unavailable, investigatory sampling should be sufficient to satisfy LCEHD requirements for closure, and regulatory agency closure should be pursued;

- The leaking wellhead should be investigated and any problems addressed immediately,

- Some confirmatory sampling of the affected areas described in this report should be performed, both to evaluate potential impacts of known releases and to establish baseline conditions before plant operations continue.

7.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon the visual observations of the subject property, and our interpretation of the available historical information and documents reviewed, as described in this report They are intended exclusively for the purpose outlined herein, and for the site location and project indicated.

This report is intended for the sole use of Creston Financial Group. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

It should recognized that this study was not intended to be a definitive investigation of contamination at the subject property Given that the scope of services for this investigation was limited and that exploratory borings, soil or groundwater sampling, and analytical testing were not undertaken, it is possible that currently unrecognized contamination may exist at the site

Services performed by Dames & Moore were conducted in a manner consistent with that of the same care and skill ordinarily exercised by members of the same profession currently practicing in the same locality under the same conditions It is important to recognize that even the most comprehensive scope of services may fail to detect environmental liabilities on a particular site Therefore, Dames & Moore cannot act as insurers and cannot "certify" that a site is free of environmental contamination. No expressed or implied representation or warranty is included or intended in our reports except that our services were performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession.

Opinions and recommendations presented herein apply to the existing and reasonable foreseeable site conditions at the time of our investigation They cannot necessarily apply to site changes of which this office is unaware and has not had the opportunity to review. Changes in the conditions of this property may occur with time due to natural processes or works of man on the subject property or on adjacent properties Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control

8.0 REFERENCES

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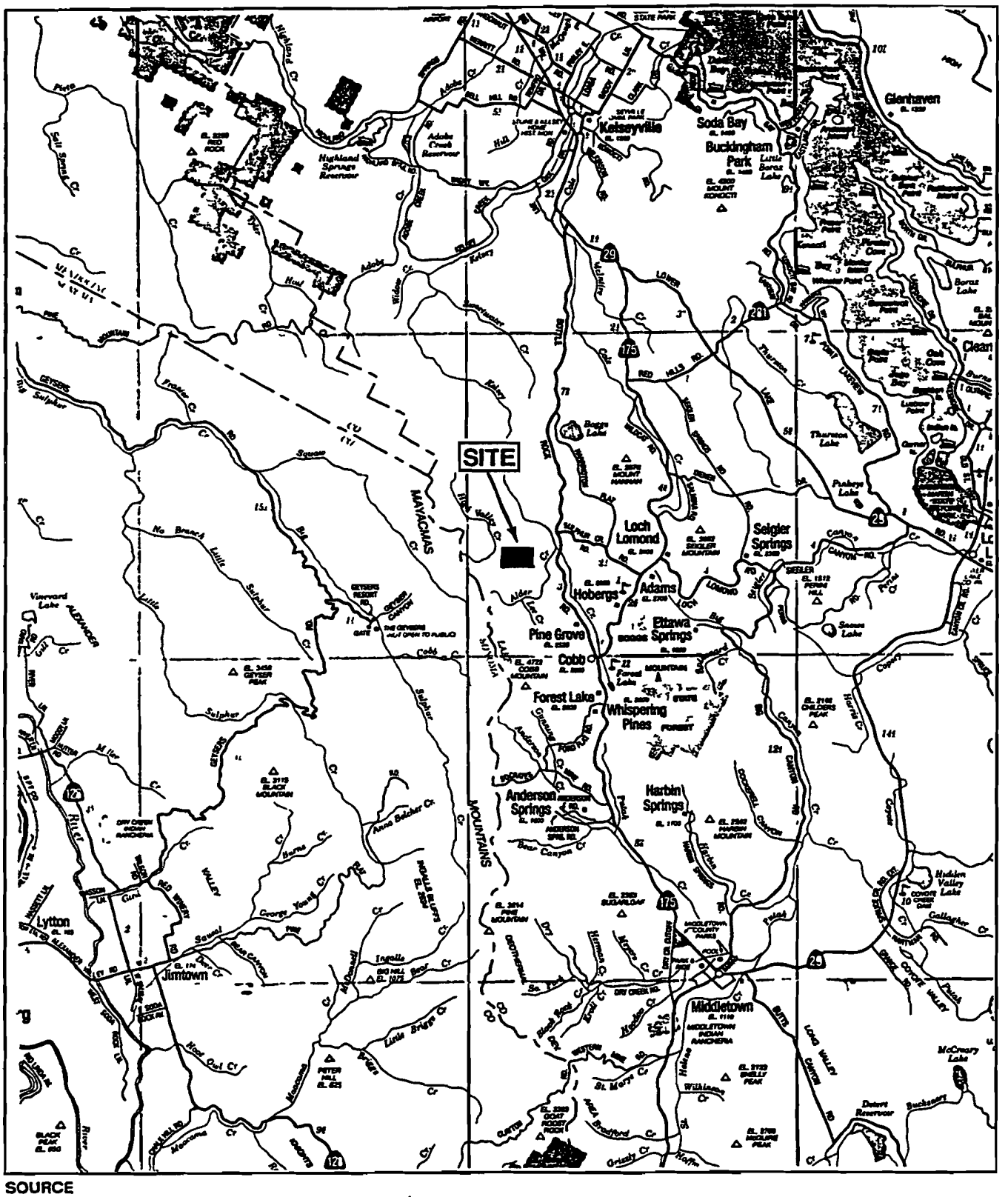


SOURCE
AAA, Mendocino and Sonoma Coast Region

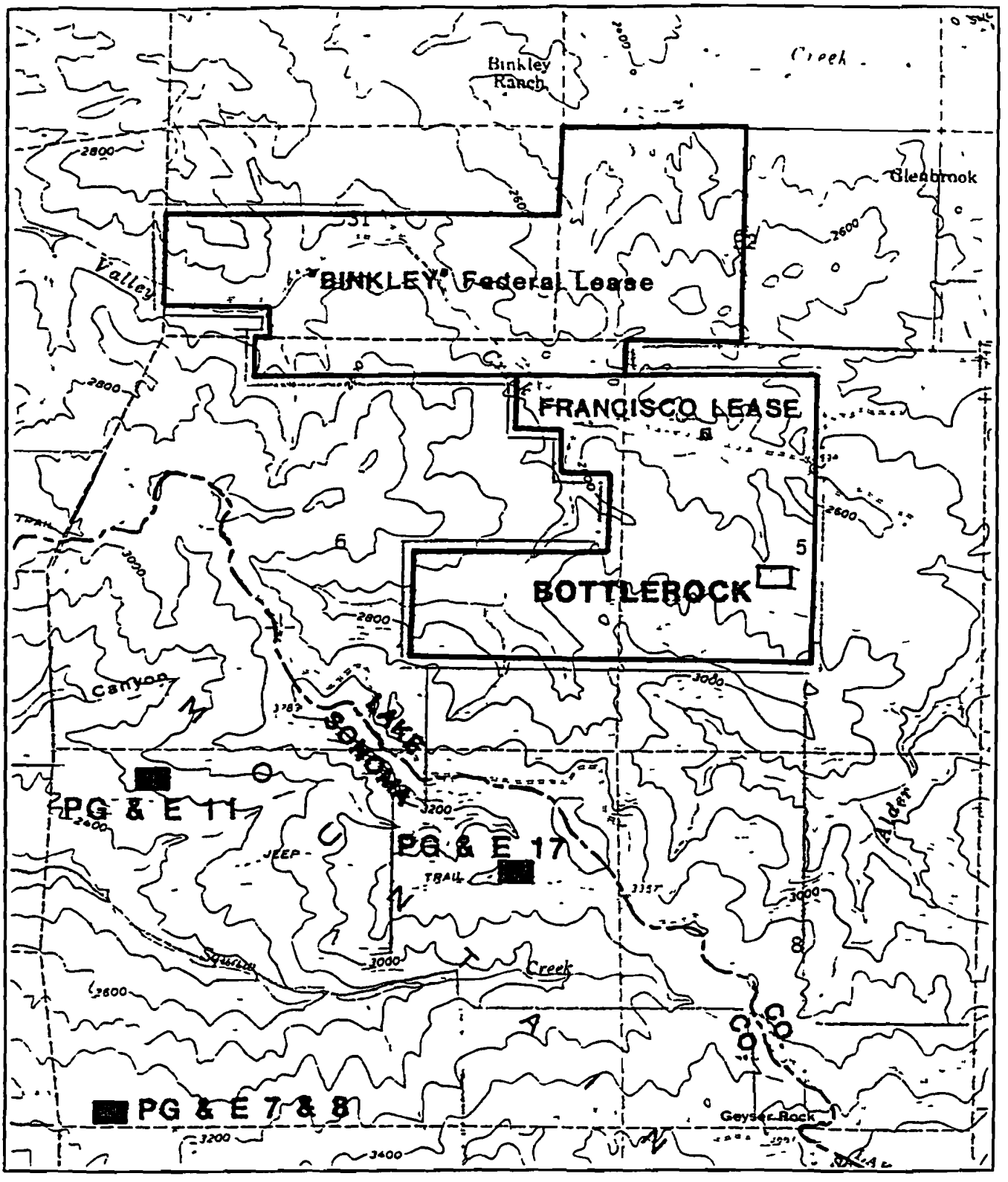
N

0 6
Scale in Miles

VICINITY MAP

Creston Financial Group
August 1995 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County, California

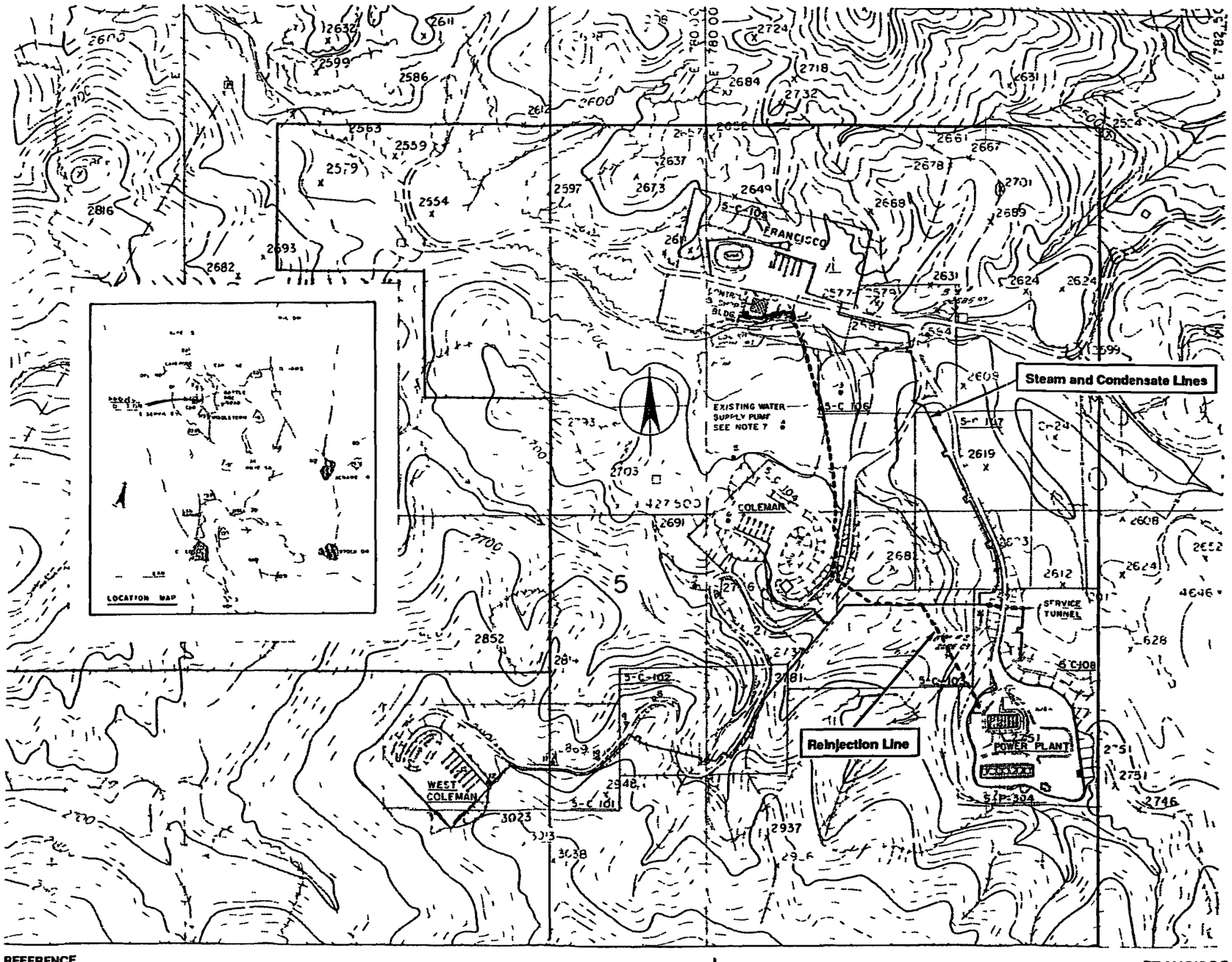
DAMES & MOORE FIGURE 1



LEASEHOLD LOCATION

Creston Financial Group
August 1995 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County, California

DAMES & MOORE FIGURE 2



REFERENCE
DMJM Energy Systems

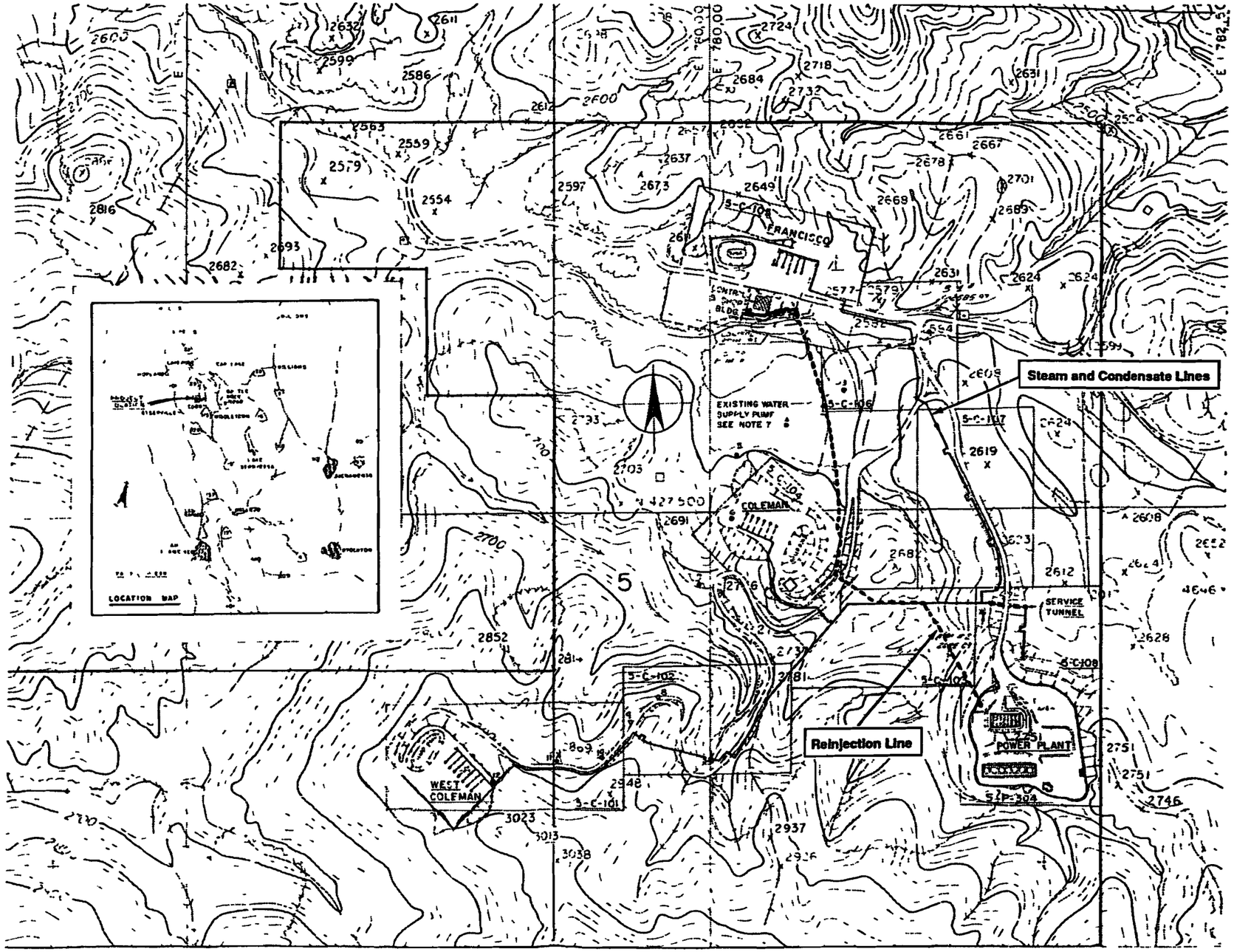
0 200 400
Feet

N

FRANCISCO LEASEHOLD SITE PLAN

Creston Financial Group
August 1995 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County California

DAMES & MOORE FIGURE 3



REFERENCE
DMJM Energy Systems

0 200 400
Feet

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FRANCISCO LEASEHOLD SITE PLAN
Cresion Financial Group
August 1995 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County, California

DAMES & MOORE FIGURE 3

Environmental Disclosure Report

a product of NATEC Environmental Reporting Services Ltd
7441 Anaconda Ave ◆ Garden Grove CA 92641 ◆ 800/969 3228 ◆ 714/894 7577 ◆ 714/373 1768 (FAX)

SUBSCRIBER INFORMATION

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Name DAMES & MOORE
Address 221 MAIN STREET
SAN FRANCISCO CA 94111

Phone 415-243-3820
Project BOTTLE ROCK POWER PL
DATE 04/21/95

SUBJECT PROPERTY

Legal Description NONE
Address HIGH VALLEY ROAD
COBB CA 95426

Order No AP95075

REQUESTED INFORMATION

Enviro Scan
1 0 Mile Site Map

Government Records Report
This report is limited in scope and accuracy to the available government records searched as listed in the table of contents This report represents only a search of those records as of the date specified herein The specific government records searched do not include all sites of environmental contamination or risk. The subscriber acknowledges that NATEC assumes no responsibility for the completeness and accuracy of the recorded lists as compiled by the various governmental agencies The purpose of this report is for a records search and is not a substitute for a Phase I Environmental Audit

Site Map
NATEC Site Maps are based on both U.S Geological Survey elevation data and U S Government Tiger files. The subscriber acknowledges that NATEC assumes no responsibility for the completeness or accuracy of such maps or coordinates derived there from.

Title Custody Report
The Title Custody Report represents a search of the recorded chain of title documents regarding a specific real property The title reports will show a summary of those deeds easements right of ways and ground leases of record as compiled by the respective County Recorder s Office
The subscriber acknowledges that other documents that may record pertinent information to the subject property will not be provided in the title report All services performed shall include only the subject property and shall not include any easements reversion or other interests in abutting properties This report is for information only and shall not be deemed to constitute title insurance and will not determine status of ownership or liens on the subject property

Historical Profile
The Historical Profile report will include a government records search and a written review of pertinent historical aerial photographs of the site on each available decade including one aerial photograph.
NATEC services does not include an evaluation of the information contained in the recorded documents The subscriber acknowledges that government records and title records may not include certain information and accepts the limitations of the service provided herein

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Reference Materials

3D Survey Maps	A
Statistical Summary	B
Site Map	C
Map Key	D
Quick Reference	E
RCRA Summary	F
CAL-Sites Summary	G

Detailed Enviro-Scan Data

Government Records Searched	Agencies and Source Lists	
CERCLIS	E P.A. Superfund Sites	1
NPL	E P A. National Priority Lists	2
LIENS	E P.A. Federal Superfund Liens	3
SWIS	C W M Solid Waste Information System List	4
RCRA.	E P.A. Hazardous Waste Generators	5
LUST·	W R.C B Underground Leaking Tanks	7
CORTESE	C W M B Hazardous Waste Substance Sites	8
BEP	C D H S Bond Expenditure Plan	9
CAL-SITES	E P.A. CAL - Sites	10
WDS	H M D M Waste Discharge System (NPDES Permits)	11
SARA.	E P.A. Superfund Amendments and Reauthorization Act	24
WMUDS	W R.C B Waste Management Unit Discharge Systems	25
UST·	W R.C B Registered Underground Storage Tanks	34
ERNS	E P.A. Emergency Response Notification System	35

SUBJECT PROPERTY

STATISTICAL REVIEW

This review is provided as a convenience only The intent of this review is to flag immediate problems It is not meant as a substitute for a Government Records Report.

List Name	Date	0 5 Mile	1 Mile	Over 1 Mile	Unknown	Total
CERCLIS	8/94	0	0	N/A	0	0
NPL	8/94	0	0	N/A	0	0
LIENS	11/92	0	0	N/A	0	0
SWIS	3/93	0	0	N/A	1	1
RCRA	1/95	0	0	N/A	2	2
LUST	1/95	0	0	N/A	0	0
CORTESE	11/90	0	0	N/A	0	0
BEP	1/90	0	0	N/A	0	0
CAL SITES	8/94	0	0	N/A	2	2
WDS	8/94	0	0	N/A	12	12
SARA	8/93	0	0	N/A	0	0
WMUDS	1/95	0	0	N/A	4	4
UST	8/94	0	0	N/A	2	2
ERNS	6/93	0	N/A	N/A	0	0
Total		0	0	0	23	23

Number of CAL-SITES
Other than NFA 0
Superfund 0

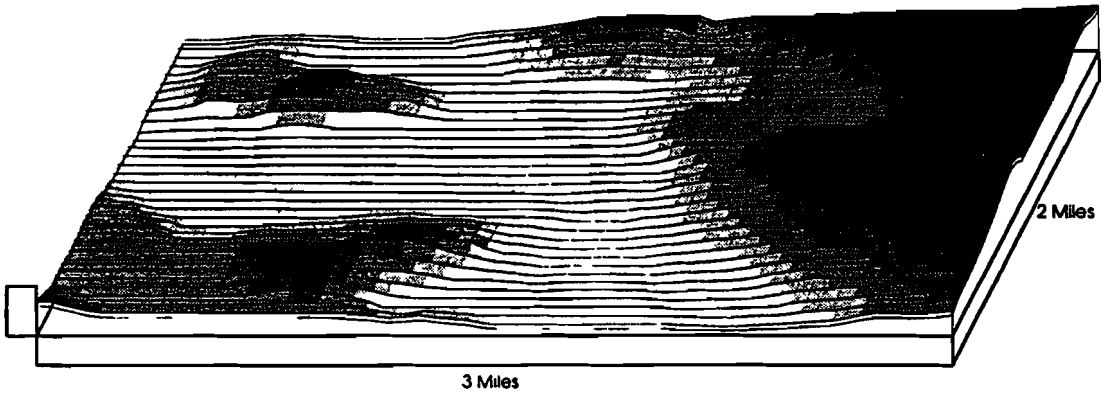
Number of sites in immediate vicinity (< 1 miles) 0

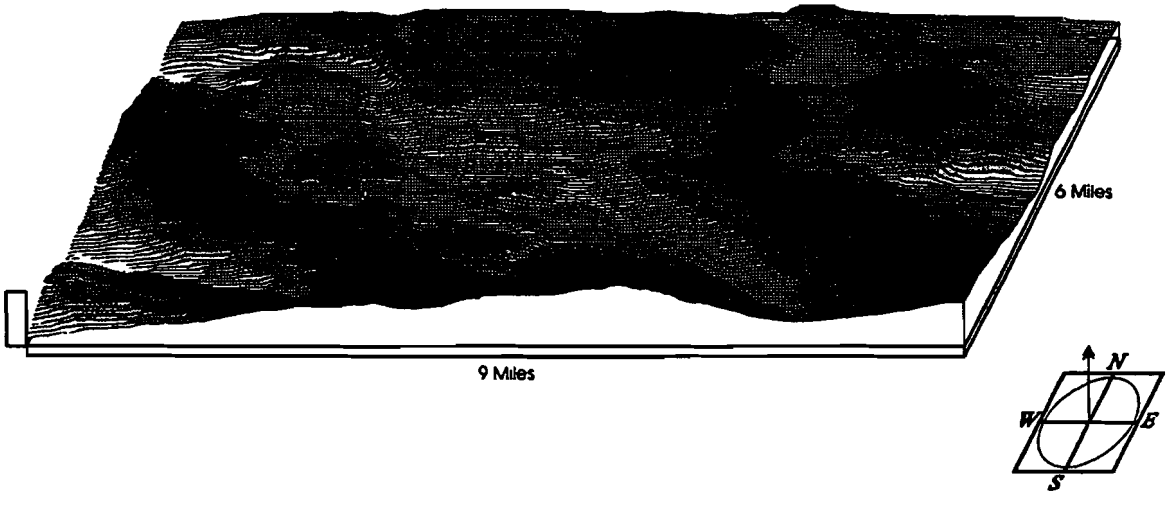
Lists of immediate concern
None

Chemicals reported in the area of this report include
Subject Elevation. 2349

Topographic Survey Model

Center of Model
HIGH VALLEY ROAD
COBB CA 95426
ID AP95075

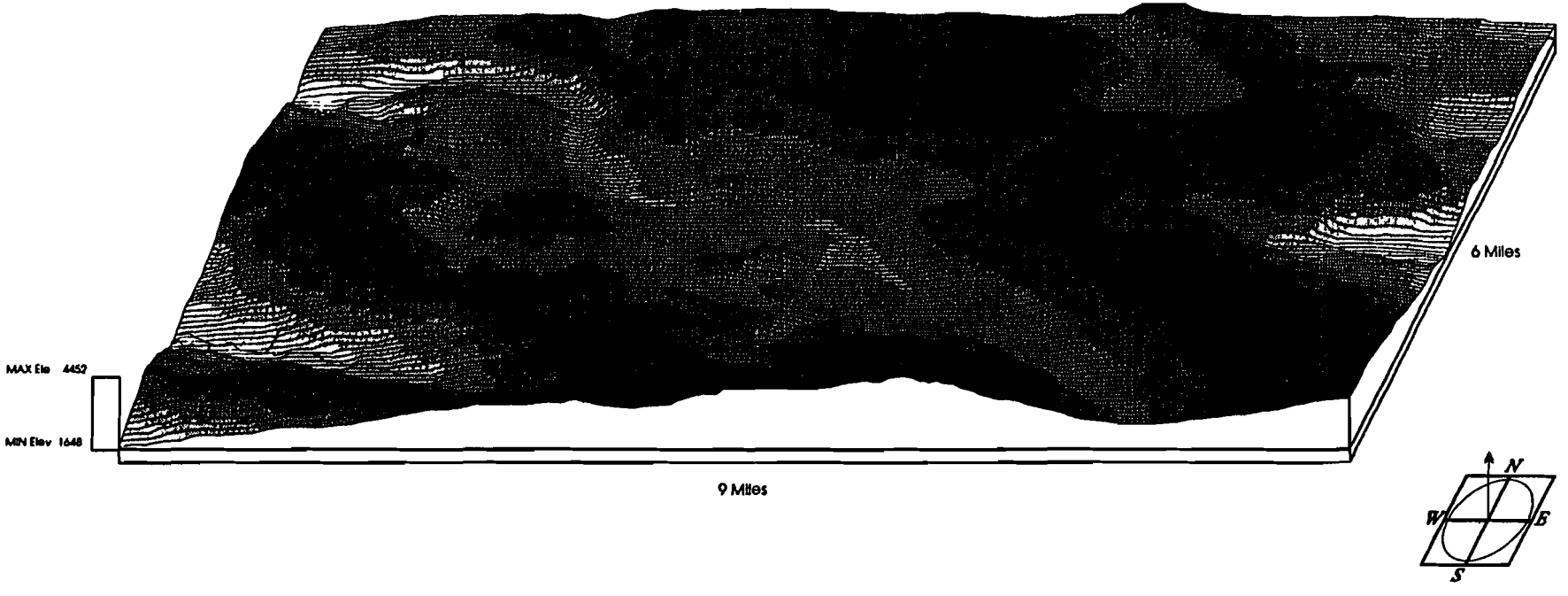


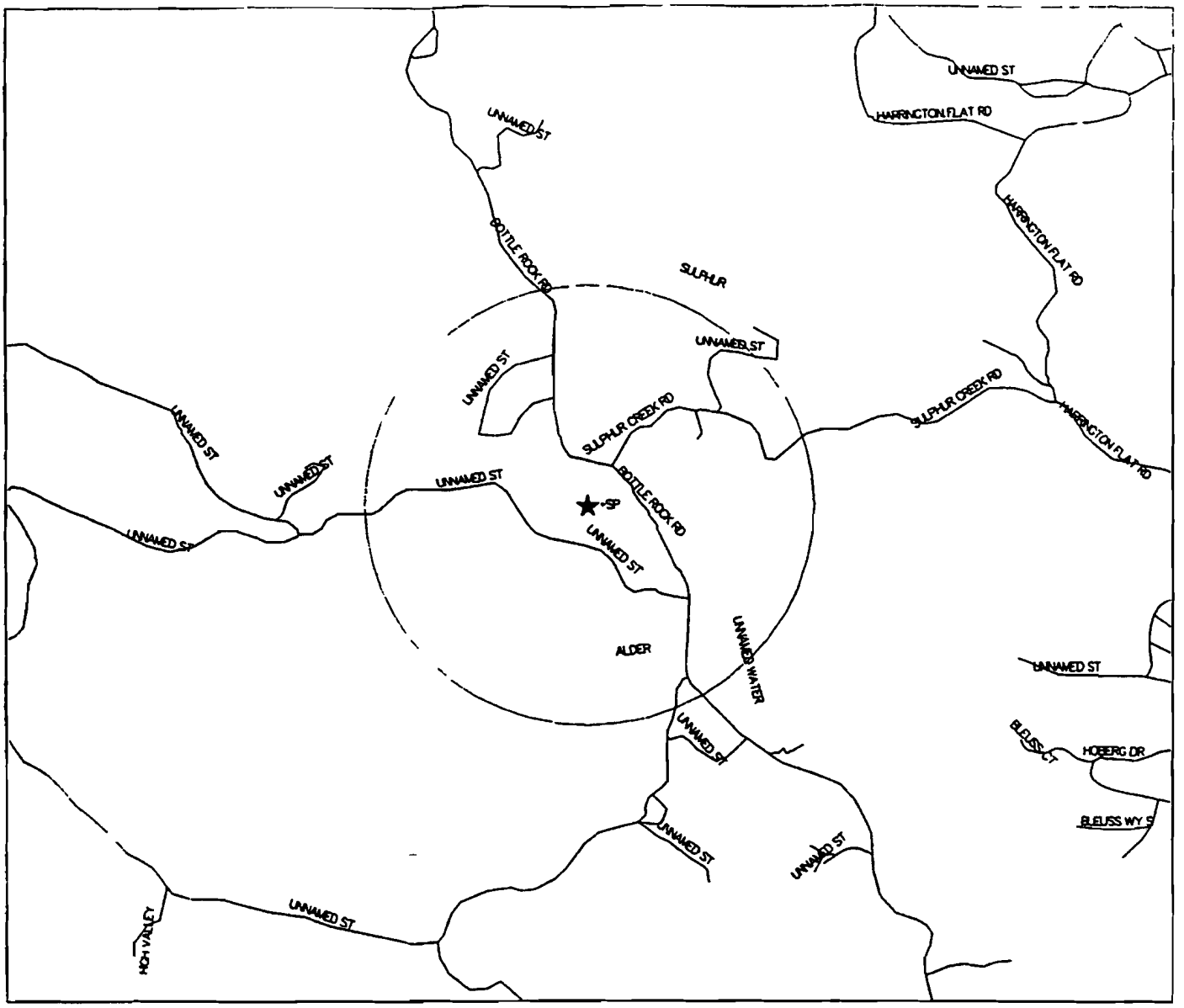


Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source

Topographic Survey Model

Center of Model
HIGH VALLEY ROAD
COBB, CA 95426
ID AP95075





Subject Property

Address	HIGH VALLEY ROAD
City	COBB
State	CA
Zip	95426
ID	AP95075

miles

0 0.25 0.5 0.75 1 1.25 1.35

Legend

SITE	★	CORTESE	▲
CERCLIS	✚	BEP	◆
NPL	■	CAL-SITES	□
LIENS	▼	WDS	■
SWIS	▼	SARA	■
LUST	▲	WMUDS	★
		CLUSTER	●

Map coordinates are provided as a convenience only. Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street map guides.

N W E S

MAP KEY

The preceding map represents specific properties found in this report by a corresponding icon and reference number If more than one site is in a small vicinity (03 miles), a cluster is assigned to the center of the given group An example of cluster numbering is as follows

C1 - (3)

Where C1 indicates CLUSTER #1 and the (3) indicates a total of 3 sites in this cluster

Mapping information is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps Sites that are not provided on the map are generally the result of inaccurate or incomplete information provided by Federal and State government record lists.

Agency	Ref #	Site Name	Site Address	Bearing	Page

QUICK REFERENCE LIST

This report provides a brief list of site information in a sorted by address format for quick and convenient reference when performing on site inspections

Site	Address Number	Street Name	Page	Bearing	Agency	Map Ref
		HIGH VALLEY RD			SUBJECT	SP
WASTE TREATMENT PLANT			14		WDS	N/A
TRUSTEES FOR U A. LOCAL 3			15		WDS	N/A
N W REGIONAL WASTE DISP			16		WDS	N/A
SOUTHEAST REGIONAL PLANT			17		WDS	N/A
USA LEASE CA 5636			19		WDS	N/A
UNIT 17 DEVELOPMENT AREA			20		WDS	N/A
UNIT 18 DEVELOPMENT AREA			21		WDS	N/A
UNIT 11 DEVELOPMENT AREA			22		WDS	N/A
NEGU 21 LEASES			23		WDS	N/A
MCLAUGHLIN MINE		P O BOX 1010	26		WMUDS	N/A
PINE GROVE RESORT	15960	BOTTLE ROCK RD	34		UST	N/A
PINE GROVE RESORT DISPOSA	15975	BOTTLE ROCK RD	4		SWIS	N/A
PINE GROVE RESORT DISPOSA	15975	BOTTLE ROCK RD	10		CAL-SIT	N/A
FRANCISCO GEOTHERM STEAM		PO BOX 310	12		WDS	N/A
THE CLAN JORDAN		PO BOX 269	34		UST	N/A
DWR MOBILE EQUIPMENT SHOP		GEYSERS FACILITIES	6		RCRA	N/A
LAKE COUNTY NICE LANDFILL	1	W MIOF TOWN	28		WMUDS	N/A
LAKE TOWN MIDDLENTOWN	2	W MIOF TOWN	32		WMUDS	N/A
GEO STEAMFIELD FED LEASE		SOUTHWEST LAKE COUNTY	18		WDS	N/A
LAKE COUNTY COBB MOUNTAIN		SULFUR CREEK RD	30		WMUDS	N/A
BOTTLE ROCK POWER PLANT		HIGH VALLEY RD	5		RCRA	N/A
MCR CORP		HIGH VALLEY & BOTTLE ROCK RD	10		CAL-SIT	N/A
MAHARISHI INTER UN		WWTF	13		WDS	N/A

RCRA SUMMARY

This report provides a brief list of RCRA facilities found within the specified radius grouped by site class For a more detailed site description refer to the page number associated with each site

Site Class Source	Site Name	Site Address	Bearing	Page
Treatment Storage Disposal Facility				
	Not found.			
Transporter Facility				
	Not found.			
Large Quantity Generator				
Notification	BOTTLE ROCK POWER PLANT	HIGH VALLEY RD		
Small Quantity Generator				
	Not found.			
Conditionally Exempt Small Quantity Generator				
Notification	DWR MOBILE EQUIPMENT SHOP	GEYSERS FACILITIES		
Burner Blender				
	Not found.			

CAL-SITES SUMMARY

This report provides a list of Cal-Sites facilities, found within the specified radius with status codes other then No Further Action (NFA) For a more detailed site description refer to the page number associated with each site

Site Class Site Status	Site Name	Site Address	Bearing	Page
Non NFA Sites				
PEARL	MCR CORP	HIGH VALLEY & BOTTLE ROCK RD		
RWQCB	PINE GROVE RESORT DISPOSAL S	15975 BOTTLE ROCK ROAD		

CERCLIS

(Federal)

The information contained in this report is the current database provided by the E P.A list as of August 1994

The U S Environmental Protection Agency (E P.A.) has compiled this list of contaminated properties for designation under the Federal Superfund Program pursuant to the *Comprehensive Environmental Response Compensation and Liability Act (CERCLA)* These sites represent environmental concern for the discharge of hazardous materials by hazardous waste generators treatment and storage facilities, and hazardous waste disposal sites

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

NPL

(Federal)

NATIONAL PRIORITY LIST

The information contained in this report is the current database provided by the E P.A. list as of August, 1994

The Environmental Protection Agency has compiled this list from the designated CERCLIS list. The NPL sites are prioritized as to their significant risk to human health and the environment The list targets those sites to receive remedial funding under the *Comprehensive Environmental Response Conservation and Liability Act (CERCLA)* The NPL lists the nation's highest priority sites for remedial action Only NPL sites can receive CERCLA funding

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists.

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

SUPERFUND (LIENS)

FEDERAL SUPERFUND LIENS

The information contained in this report is the current database provided by the E P.A. list as of November, 1992

Under the authority granted the E P.A. by the *Comprehenswe Environmental Response Conservation and Liability Act (CERCLA),* E P.A. is authorized to place a Superfund Lien on property that the agency has spent money on for remedial action or notified the owner of the potential of liability for remedial action

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists.

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

SWIS

SOLID WASTE INFORMATION SYSTEMS

The information in this report is the current list prepared by the California Waste Management Board as of March, 1993

The California Waste Management Board maintains this list pursuant to the Solid Waste Management and Resource Recovery Act of 1972 The list contains an inventory of active, inactive and closed solid waste disposal and transfer facilities

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

Site Information

SWIS 17-AA-0007 CATEGORY LANDFILL
Name PINE GROVE RESORT DISPOSAL SITE
Location. 15975 BOTTLE ROCK RD
Place. COBB95426

Operator Data

Name NOT APPLICABLE
Phone.
Company
Address.
Place

Land Owner Data

Name MR ROBERT GRAHN
Phone 7079285222
Company
Address. PO BOX 44
Place: COBB 95426

Facility Characteristics

Permit Status UNPERMITTED
Operational Status:
CLOSED
Operator type: N/A
Land Owner PRIVATE
Types Wastes Received.
MIX MUN
Tons-Per-Day 0
Permit Date
Closure Year 1983

RCRA

(FEDERAL RCRIS)

RESOURCE CONSERVATION AND RECOVERY ACT

The information in this report is the current database provided by the E P.A. as of January, 1995

Under the Resource Conservation and Recovery Act, the Environmental Protection Agency compiles this list classification of generators of hazardous waste materials Generators in this classification are required to have U S E P.A. I D numbers on all waste manifest disposal records This list is inclusive of but not limited to transporters, conditionally exempt small quantity generators small quantity generators large quantity generators, treatment/storage/disposal facilities, burner/blenders, transporters and handler violations

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

Facility ID: CAD980895700
Facility Name. BOTTLE ROCK POWER PLANT
Contact. ENVIRONMENTAL MANAGER 707/928-5234
Address. HIGH VALLEY RD
City State, Zip COBB, CA 95426
Date of Existance N/A
The following data was derived from Notification
Transporter Unverified
Generator Large Quantity Generator
Burner/Blender Unverified
TSD Unverified
This handler has been verified as.
Unknown - no verification flags are set.
This handler has violations outstanding for
No violations reported

RCRA FACILITY DATA CONTINUED

Facility ID: CAD981630270
Facility Name. DWR MOBILE EQUIPMENT SHOP
Contact. ENVIRONMENTAL MANAGER 209/835-2222
Address. GEYSERS FACILITIES
City, State, Zip COBB, CA 95426
Date of Existance: N/A
The following data was derived from Notification
Transporter Unverified
Generator Conditionally Exempt Small Quantity Generators
Burner/Blender Unverified
TSD Unverified
This handler has been verified as
Unknown - no verification flags are set.
This handler has violations outstanding for
No violations reported.

LUST

LEAKING UNDERGROUND STORAGE TANKS

The information in this report is the current list prepared by the California Water Resources Control Board as of January, 1995

The State of California Water Resources Control Board (WRCB) in Sacramento provides a list of all leaks of hazardous substances from underground tanks This database provides information on contamination case types Additional sources of information are provided by the nine local offices of the WRCB in California

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source. Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

CORTESE

STATE OF CALIFORNIA OFFICE OF PLANNING AND RESEARCH

The information contained in this report is compiled by the State of California s Governors Office and is current as of November, 1990

This is a listing of potential and confirmed hazardous waste and substance sites throughout California The information in this list was consolidated within the State Office of Planning and Research The data for the list was received from the State Water Resources Control Board (WRCB), The California Waste Management Board (CWMB), and the Department of Health Services (DHS)

This database is no longer in production and is provided as a convenience only

DHS Records that have been compiled by the Toxic Substances Control Division of the Department of Health Services This code indicates an abandoned hazardous waste site

DHS2 Records that have been compiled by the Environmental Health Division of the Department of Health Services This code indicates public water drinking wells that serve less than 200 connections (small wells")

DHS3 Records that have been compiled by the Environmental Health Division of the Department of Health Services and consist of public water drinking wells that serve more than 200 connections (large wells")

DHS5 Sites pursuant to Section 25356 of the Health and Safety Codes (sites included under the Hazardous Substance Cleanup Bond Act)

WRCB Records compiled by the Water Resources Control Board These are sites of reported leaks that have been investigated by the WRCB. Leak sites do not necessarily lie within incorporated boundaries of listed cities

CWMB Records compiled by the California Waste Management Board These are solid waste disposal facilities from which there is a known migration of hazardous waste

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

BEP

BOND EXPENDITURE PLAN

The information in this report is the current list prepared by the California Department of Health Services as of January, 1990

Under the California Hazardous Substance Bond Act of 1984, the California Department of Health Services has developed a listing of those hazardous waste sites subject to develop a site specific expenditure plan for an appropriation of funds for cleanup under the Bond Expenditure Plan

This database was incorporated into the CAL-SITES database It is no longer in production and is provided as a convenience only

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

CAL-SITES

The information contained in this report is the current database provided by the E P.A. as of August, 1994

The CDHS compiled this database pursuant to Section 253596 of the California Health and Safety Code The list contains information on potential hazardous waste sites that have been identified by the Historical Abandoned Site Survey Program The CDHS researched a major portion of the various state environmental agencies that could possibly help identify potential hazardous waste sites Once sites are confirmed as hazardous sites they may be merged into the database of the CORTESE List and/or the Bond Expenditure Program (BEP) List. Names may remain on this list even though a determination has been made that no leak had occurred and the DHS is requiring no further action to protect the environment or public health.

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

Facility No..	17-49-0007
Facility Name:	MCR CORP
Address	HIGH VALLEY & BOTTLE ROCK RD
City and zip	COBB 95426
Status.	PEA Required, Low Priority DTSC has judged the site to pose a low public health or environmental threat.
Status Date:	07/14/88

Facility No	17-49-0003
Facility Name:	PINE GROVE RESORT DISPOSAL SITE
Address	15975 BOTTLE ROCK ROAD
City and zip	COBB 95426
Status.	Regional Water Quality Control Board Lead The site is being mitigated under the lead of the RWQCB and has never been on the Annual Workplan or State Bond Expenditure Plan (BEP)
Status Date:	04/22/88

WDS

WASTE DISCHARGE SYSTEMS

The information in this report is produced by the State of California Environmental Affairs Agency Office of Hazardous Material Data Management

This data base contains information on sites which have been issued waste discharge requirements Under State and Federal regulations, generators are allowed to discharge to publicly owned treatment works (POTW's) specified levels of waste water toxins (Some of these industries have categorical pretreatment standards for their discharges, other companies may fall under locally developed limits) The current information was compiled from the agency published list as of August, 1994

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170306001
Site: FRANCISCO GEOTHERM STEAMFIELD
Address: PO BOX 310
City and Zip: COBB 95426
Phone: 707-928-5277
Contact: BRIEN CROTHERS

Operator Data

Operator: CAL DEPT OF WATER RESOURCES
Address: P O BOX 270
City and Zip: COBB ,CA 95426
Phone: 707-928-5277
Contact: GLEN GORDON

Facility Characteristics

Status: Active
NPDES No.:
Operator type: State
Facility type: Industrial
Standard Industrial Classification Codes
Primary: 4961
Secondary:
Waste types:
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity: Other

WDS FACILITY DATA CONTINUED

Site Information

ID 5A171038001
Site. MAHARISHI INTER. UN
Address: WWTF
City and Zip COBB
Phone. 707-928-5213
Contact: RICHARD MORRIS

Operator Data

Operator CAPITOL AGE OF ENLIGHTENMENT
Address. P O BOX 288
City and Zip COBB ,CA 95426
Phone. 707-928-5213
Contact: RICHARD MORRIS

Facility Characteristics

Status: Active
NPDES No..
Operator type: Private
Facility type Municipal
Standard Industrial Classification Codes
Primary 8221
Secondary
Waste types.
Designated Domestic Sewage
Domestic Sewage
Design Flow 0 0000 Million Gallons per Day
Baseline Flow 0 0000 Million Gallons per Day
Self Monitoring
Report Frequency Monthly
Threat: Minor
Reclamation
Requirements. Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity Other

WDS FACILITY DATA CONTINUED

Site Information

ID 5A170100002
Site: WASTE TREATMENT PLANT
Address:
City and Zip
Phone. None
Contact: DAVE DAVIDSON

Operator Data

Operator CLEARLAKE OAKS CO WATER DIST
Address. P O BOX 736
City and Zip CLEARLAKE OAKS ,CA 95423
Phone. None
Contact. DAVE DAVIDSON

Facility Characteristics

Status. Active
NPDES No..
Operator type. Special District
Facility type Municipal
Standard Industrial Classification Codes
Primary 4952
Secondary
Waste types.
Designated Domestic Sewage
Domestic Sewage
Design Flow 0 5000 Million Gallons per Day
Baseline Flow 0 2500 Million Gallons per Day
Self Monitoring
Report Frequency Monthly
Threat: Moderate
Reclamation
Requirements Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity
Major NPDES facility, non-NPDES facility that would be
major is discharge was made to surface or ground waters
or Class I disposal site

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A171014001
Site: TRUSTEES FOR U A. LOCAL 38
Address.
City and Zip
Phone None
Contact:

Operator Data

Operator: KONOCTI HARBOR INN
Address. 8727 SODA BAY ROAD
City and Zip KELSEYVILLE ,CA 95451
Phone: None
Contact:

Facility Characteristics

Status Active
NPDES No
Operator type. Private
Facility type. Municipal
Standard Industrial Classification Codes
Primary: 7011
Secondary: 4952
Waste types
Designated Domestic Sewage
Domestic Sewage
Design Flow: 0 0370 Million Gallons per Day
Baseline Flow: 0 0370 Million Gallons per Day
Self Monitoring
Report Frequency: Quarterly
Threat. Moderate
Reclamation
Requirements. Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity
Facility having physical, chemical or biological waste treatment system, class II or III disposal sites or facilities without treatment system that are complex

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170104001
Site: N W.REGIONAL WASTE DISP FAC
Address:
City and Zip
Phone: None
Contact:

Operator Data

Operator: LAKE CO SANITATION DISTRICT
Address: 255 N FORBES ST
City and Zip LAKEPORT ,CA 95453
Phone: None
Contact:

Facility Characteristics

Status Active
NPDES No
Operator type: Special District
Facility type: Municipal
Standard Industrial Classification Codes
Primary: 4952
Secondary:
Waste types
Designated Domestic Sewage
Domestic Sewage
Design Flow: 2 0000 Million Gallons per Day
Baseline Flow: 1 3000 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity:
Facility having physical, chemical or biological waste treatment system, class II or III disposal sites or facilities without treatment system that are complex

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170102002
Site: SOUTHEAST REGIONAL PLANT
Address
City and Zip
Phone: 707-994-5053
Contact: DOUG PENNING PLNT SUPERVISOR

Operator Data

Operator: LAKE COUNTY SAN IMP DIST NO 1
Address: 255 NORTH FORBES STREET
City and Zip: LAKEPORT ,CA 95453
Phone: 707-994-5053
Contact: GARY BROWN

Facility Characteristics

Status: Active
NPDES No.:
Operator type: Special District
Facility type: Municipal
Standard Industrial Classification Codes
Primary: 4952
Secondary:
Waste types
Designated Domestic Sewage
Domestic Sewage
Design Flow: 1 4900 Million Gallons per Day
Baseline Flow: 0 8460 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity:
Facility having physical chemical or biological waste treatment system, class II or III disposal sites or facilities without treatment system that are complex

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170308001
Site: GEO STEAMFIELD FED LEASE CA949
Address: SOUTHWEST LAKE COUNTY
City and Zip:
Phone: 707-987-3101
Contact: RICHARD YARTER

Operator Data

Operator: NORTHERN CALIF POWER AGENCY
Address: 180 CIRBY WAY
City and Zip: ROSEVILLE ,CA 95678
Phone: 707-987-3101
Contact: JAMES WHALEN

Facility Characteristics

Status: Active
NPDES No.:
Operator type: Private
Facility type: Industrial
Standard Industrial Classification Codes
Primary: 4961
Secondary:
Waste types:
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Irregular
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity: Other

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170316001
Site: USA LEASE CA-5636
Address
City and Zip
Phone: 707-987-2335
Contact: MARK KUMATAKA

Operator Data

Operator: SANTA FE GEOTHERMAL
Address: P O BOX 1009
City and Zip: MIDDLETOWN ,CA 95461
Phone: 707-987-2335
Contact: DON BLACHLY

Facility Characteristics

Status: Active
NPDES No.:
Operator type: Private
Facility type: Industrial
Standard Industrial Classification Codes
Primary: 4961
Secondary:
Waste types:
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity: Other

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170301001
Site: UNIT 17 DEVELOPMENT AREA
Address:
City and Zip
Phone: 707-545-7600
Contact: ERIC STEGER

Operator Data

Operator: UNOCAL GEOTHERMAL DIVISION
Address: PO BOX 6854
City and Zip: SANTA ROSA ,CA 95406
Phone: 707-545-7600
Contact: ERIC STEGER

Facility Characteristics

Status: Active
NPDES No.:
Operator type: Private
Facility type: Industrial
Standard Industrial Classification Codes
Primary: 4961
Secondary
Waste types
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity: Other

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170323001
Site: UNIT 18 DEVELOPMENT AREA
Address
City and Zip:
Phone 707-545-7600
Contact: AGUSTIN VIESCA

Operator Data

Operator: UNOCAL GEOTHERMAL DIVISION
Address: PO BOX 6854
City and Zip SANTA ROSA ,CA 95406
Phone: 707-545-7600
Contact: WARREN SMITH

Facility Characteristics

Status Active
NPDES No.:
Operator type: Private
Facility type Industrial
Standard Industrial Classification Codes
Primary: 4961
Secondary:
Waste types:
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity Other

WDS FACILITY DATA CONTINUED

Site Information

ID: 5A170324001
Site: UNIT 11 DEVELOPMENT AREA
Address:
City and Zip:
Phone 707-545-7600
Contact: ERIC STEGER

Operator Data

Operator: UNOCAL GEOTHERMAL DIVISION
Address: PO BOX 6854
City and Zip: SANTA ROSA ,CA 95406
Phone: 707-545-7600
Contact: ERIC STEGER

Facility Characteristics

Status: Active
NPDES No.:
Operator type: Private
Facility type Industrial
Standard Industrial Classification Codes
Primary 4961
Secondary:
Waste types
Designated Drilling Muds
Inert Drilling Muds
Design Flow: 0 0001 Million Gallons per Day
Baseline Flow: 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency: Monthly
Threat: Major
Reclamation
Requirements: Unknown
Pretreatment: POTW does not have an approved pretreatment program
Complexity: Other

WDS FACILITY DATA CONTINUED

Site Information

ID 5A170326002
Site. NEGU 21 LEASES
Address.
City and Zip
Phone: 707-545-7600
Contact: ERIC STEGER

Operator Data

Operator UNOCAL GEOTHERMAL DIVISION
Address. P O BOX 6854
City and Zip SANTA ROSA ,CA 95406
Phone: 707-545-7600
Contact: ERIC STEGER

Facility Characteristics

Status. Active
NPDES No.
Operator type. Private
Facility type. Industrial
Standard Industrial Classification Codes
Primary 4961
Secondary
Waste types
Designated Drilling Muds
Inert Drilling Muds
Design Flow 0 0001 Million Gallons per Day
Baseline Flow 0 0001 Million Gallons per Day
Self Monitoring
Report Frequency Monthly
Threat: Major
Reclamation
Requirements Unknown
Pretreatment POTW does not have an approved pretreatment program
Complexity Other

SARA TITLE III

TOXIC CHEMICAL RELEASE INVENTORY

Section 313 of the Emergency Planning and Community Right to Know Act (Title III of the Superfund Amendments and Re-authorization Act of 1986) requires certain facilities to file an annual toxic chemical release inventory form with the United States Environmental Protection Agency and the California Environmental Affairs Agency Facilities are required to report releases to air, water, and land The current information was compiled from the agency published list as of August, 1993

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source. Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations within a one mile radius of the subject property

WMUDS

WASTE MANAGEMENT UNIT DATABASE SYSTEM

This report lists sites tracked by the State of California Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units

WMUDS is intended as an enhancement to WDS (Waste Discharger System), it does not duplicate any information in WDS In addition, WMUDS contains information regarding SWAT (Solid Waste Assessment Test program) and TPCA (Toxic Pits) programs The current information was compiled from the agency published list as of January, 1995

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source. Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

WMUDS FACILITY DATA CONTINUED

Site Information

WDS ID: 5A172013001
NPDES #:
Name: MCLAUGHLIN MINE
Contact: PHIL BARNES AND RAY KRAUSS Department.
Phone: 9164461070
Address: P O BOX 1010
City, State, Zip: LOWER LAKE ,CA95451

Landowner Data

Name
Contact: Department.
Phone:
Address.
City, State, Zip , CA

Agency Data

Name HOMESTAKE MINING COMPANY
Contact: Department.
Phone: 9164461070
Address. 26775 MORGAN VALLEY ROAD
City, State, Zip: LOWER LAKE ,CA95451
Comments:

Additional Information

This facility is CLOSED to the public.

SIC code 1: 1041 - unknown

Waste Type 1: Erosion Wastes
Designated - Influent or solid wastes that contain nonhazardous wastes that pose a significant threat to water quality because of their high concentration. "Manageable" hazardous wastes (eg inorganic salts and heavy metals) are included in this catagory

Facility Complexity:
(A) - Major NPDES facility, non-NPDES facility that would be major if discharge was made to surface or ground waters or Class I disposal sites.

Facility Status.
Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements Those facilities that are not under Waste Discharge Requirements (NURDs) are coded as ACTIVE when. 1) there is an active enforsment order for the facility, 2) there is a significant violation that has not been resolved to the satisfaction of the Regional Board, 3) after an inspection further action is required to mitigate a problem at the facility, or 4) there is some problem that the Regional Board considers significant enough to warrent classification as an ACTIVE facility

Threat to Water Quality
Major threat to water quality

This facility is classified. SWAT WDS
WMU ID 5A172013001-01
WMU type. SURF IMP
Liner Comments

WMUDS FACILITY DATA CONTINUED

Township T12NR5WS20-9
WMU Name. MCLAUGHLIN PROJECT
Type of WMU operation OTHER
WMU classification (post 1984) UNK
WMU classification (pre 1984) UNKN
WMU status. OPERATING
Type of waste (post 1984)
Type of waste (pre 1984)
Year WMU will reach capacity
Nearest falut name UNKNOWN
Distance to nearest fault (Feet)
WMU Size in (Acres) >100
Average anual percipitation (Inches) 0
Ground water depth (Feet) 0
Formation name. UNKNOWN
type. UNKNOWN
permiability 2*10-7
Statistics used to analyze water quality U
WMU Monitoring status.
LCRS are not present.
Will not withstand maximum probable/credible earthquake.
Regional Board dosn't considers Vadose monitoring feasible.
Water quality protection standard isn't set to background.
Water quality protection standards haven't been exceeded.
SWIS ID
SWAT rank: 7
SWAT status LATE
SWAT report review percent complete 99
SWAT listing was last edited on 07/07/91
SWAT workplan status. NOT DUE YET

WMUDS FACILITY DATA CONTINUED

Site Information

WDS ID: 5 170002NUR
NPDES #:
Name: LAKE COUNTY-NICE LANDFILL
Contact: Department:
Phone:
Address: 1/2 MI WEST OF TOWN
City, State, Zip:

Landowner Data

Name
Contact: Department:
Phone:
Address:
City, State, Zip , CA

Agency Data

Name: LAKE COUNTY
Contact: Department:
Phone:
Address
City, State, Zip:
Comments:

Additional Information

This facility is CLOSED to the public.
SIC code 1 - unknown
Waste Type 1
Facility Complexity:
Facility Status
Threat to Water Quality
This facility is classified. SWAT
WMU ID: 5 170002NUR-01
WMU type: LANDFILL
Liner Comments:
Township
WMU Name: LAKE COUNTY-NICE LANDFILL
Type of WMU operation.
WMU classification (post 1984) UNK
WMU classification (pre 1984) UNKN
WMU status. CEASE DISCHARGE
Type of waste (post 1984)
Type of waste (pre 1984)
Year WMU will reach capacity:
Nearest fault name: UNKNOWN
Distance to nearest fault (Feet)
WMU Size in (Acres): <10
Average anual percipitation (Inches) 0

WMUDS FACILITY DATA CONTINUED

Ground water depth (Feet): 0
Formation name: UNKNOWN
type: UNKNOWN
permiability: UNKNOWN
Statistics used to analyze water quality: U
WMU Monitoring status. VERIFICATION
LCRS are not present.
Will not withstand maximum probable/credible earthquake.
SWIS ID:
SWAT rank: 8
SWAT status: LATE
SWAT report review percent complete:
SWAT listing was last edited on 07/07/91
SWAT workplan status. NOT DUE YET

WMUDS FACILITY DATA CONTINUED

Site Information

WDS ID: 5 170003NUR
NPDES #:
Name: LAKE COUNTY-COBB MOUNTAINS
Contact: Department:
Phone:
Address: SULFUR CREEK ROAD
City, State, Zip:

Landowner Data

Name:
Contact: Department:
Phone:
Address:
City, State, Zip: , CA

Agency Data

Name: LAKE COUNTY
Contact: Department:
Phone:
Address:
City, State, Zip:
Comments:

Additional Information

This facility is CLOSED to the public.
SIC code 1: - unknown
Waste Type 1:
Facility Complexity:
Facility Status:
Threat to Water Quality:
This facility is classified.: SWAT
WMU ID: 5 170003NUR-01
WMU type: LANDFILL
Liner Comments:
Township:
WMU Name: LAKE COUNTY-COBB MOUNTAINS
Type of WMU operation.:
WMU classification (post 1984): UNK
WMU classification (pre 1984): UNKN
WMU status.: CEASE DISCHARGE
Type of waste (post 1984):
Type of waste (pre 1984):
Year WMU will reach capacity:
Nearest faiut name: UNKNOWN
Distance to nearest fault (Feet):
WMU Size in (Acres): <10
Average anual percipitation (Inches): 0

WMUDS FACILITY DATA CONTINUED

Ground water depth (Feet) 0
Formation name UNKNOWN
type: UNKNOWN
permiability UNKNOWN
Statistics used to analyze water quality U
WMU Monitoring status. VERIFICATION
LCRS are not present.
Will not withstand maximum probable/credible earthquake.
SWIS ID
SWAT rank: 10
SWAT status LATE
SWAT report review percent complete:
SWAT listing was last edited on 07/07/91
SWAT workplan status. NOT DUE YET

WMUDS FACILITY DATA CONTINUED

Site Information

WDS ID: 5 170004NUR
NPDES #:
Name: LAKE TOWN-MIDDLENTOWN
Contact: Department:
Phone:
Address: 2 MI W OF TOWN
City, State, Zip:

Landowner Data

Name
Contact: Department:
Phone:
Address:
City, State, Zip , CA

Agency Data

Name LAKE COUNTY
Contact: Department:
Phone:
Address:
City, State, Zip
Comments

Additional Information

This facility is CLOSED to the public.
SIC code 1 - unknown
Waste Type 1
Facility Complexity:
Facility Status:
Threat to Water Quality
This facility is classified. SWAT
WMU ID: 5 170004NUR-01
WMU type LANDFILL
Liner Comments:
Township
WMU Name LAKE TOWN MIDDLENTOWN
Type of WMU operation
WMU classification (post 1984) UNK
WMU classification (pre 1984) UNKN
WMU status. CEASE DISCHARGE
Type of waste (post 1984)
Type of waste (pre 1984):
Year WMU will reach capacity:
Nearest falut name UNKNOWN
Distance to nearest fault (Feet):
WMU Size in (Acres) <10
Average anual percipitation (Inches) 0

WMUDS FACILITY DATA CONTINUED

Ground water depth (Feet): 0
Formation name: UNKNOWN
type: UNKNOWN
permiability: UNKNOWN
Statistics used to analyze water quality: U
WMU Monitoring status. VERIFICATION
LCRS are not present.
Will not withstand maximum probable/credible earthquake.
SWIS ID:
SWAT rank: 11
SWAT status. NOT DUE YET
SWAT report review percent complete.
SWAT listing was last edited on 07/07/91
SWAT workplan status. NOT DUE YET

UST

UNDERGROUND STORAGE TANKS

The information in this report is the current list prepared by the California Water Resources Control Board as of August, 1994

The State of California Water Resources Control Board (WRCB) in Sacramento provides a list of all permitted underground tanks containing hazardous substances This database provides information on all registered underground storage tanks

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

FACILITY DATA

Site: THE CLAN JORDAN
Phone: 707-928-5201
Address. PO BOX 269
City and zip COBB 95426
Number of tanks. 2

Site: PINE GROVE RESORT
Phone: None
Address. 15960 BOTTLE ROCK RD
City and zip COBB 95426
Number of tanks. 1

ERNS

EMERGENCY RESPONSE NOTIFICATION SYSTEM

ERNS supports the release notification requirements of section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended section 311 of the Clean Water Act, and sections 300 51 and 300 65 of the National Oil and Hazardous Substances Contingency Plan

ERNS is a national database and retrieval system of Incident-Notification information, as initially reported regarding incidents of reported releases of oil and hazardous substances The information contained in this report combines data from the United States Coast Guard National Response Center Database with data from the 10 EPA Regions

Information is recorded in ERNS when a release is initially reported to the federal government by any party Most of the information in ERNS is comprised of initial notifications supplying preliminary information on a release, and are cited as unverified data The current information was compiled from the agency published list as of June 1993

Distance coordinates are provided as a convenience only Estimated distance is based on the mapping information provided by the U.S. Government Tiger files and may vary from local street guide maps. Elevation data is based on U.S. Geological Survey data and is limited in scope and accuracy to this source Sites that are not provided with coordinates are generally the result of inaccurate or incomplete information provided by Federal and State government record lists

The NATEC database listing as of this date indicates no locations on the subject property

APPENDIX F

PHASE II ENVIRONMENTAL SITE CHARACTERIZATION REPORT

REPORT
PHASE II SITE INVESTIGATION
BOTTLE ROCK POWER PLANT AND STEAM FIELDS
LAKE COUNTY, CALIFORNIA
FOR CRESTON FINANCIAL GROUP

Job No. 30681-001-043
April 5, 1996

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REPORT
PHASE II INVESTIGATION
BOTTLE ROCK POWER PLANT AND STEAM FIELDS
LAKE COUNTY, CALIFORNIA
FOR CRESTON FINANCIAL GROUP

1.0 INTRODUCTION

This report presents the results of Dames & Moore's Phase II Investigation conducted for the California Department of Water Resources (DWR) Bottle Rock Geothermal Power Plant and Steam Fields (the "site") located on High Valley Road in the town of Cobb, Lake County, California (Figures 1 and 2) It is our understanding that this investigation was requested by Creston Financial Group ("Creston") in connection with its potential financial interest in the property

The Bottle Rock facility is situated within The Geysers geothermal district The facility consists of a 55-megawatt capacity geothermal power plant, 16 geothermal wells located on three well pads, paved and gravel roads, an equipment yard, and steam and condensate pipe lines The power plant operated from 1985 until 1990, when operations ceased and it was mothballed The wellfield production wells supplied steam to the power plant during this period, and accepted injection water from 1985 to the present

Creston is considering plans to purchase the power plant, wellfield, and geothermal leases and bring the power plant back on-line, estimating that the facility can be operated profitably for approximately another 15 years As part of their economic evaluation of the facility, Creston, as well as DWR, is concerned about the potential costs of environmental cleanup and site decommissioning

This report (representing Task 3 of our investigation), presents the results of Task 2, the second task in our investigation of potential environmental concerns and liabilities at the site, as described in our proposal dated January 25, 1995 Results from Task 8, the investigation of the former underground storage tank location at the Steam Suppliers Compound are also presented in this report The findings of this report, as well as the preceding Phase I Environmental Site Assessment (ESA) (Task 1), will be utilized for later phases of this project estimating future cleanup and decommissioning costs for closure of the power plant and steam fields (Tasks 5 and 6), and preparation of a Final Project Report (Task 7) This report was conducted in accordance with our Workplan dated August 29, 1995, which incorporated comments from Creston and DWR

(the workplan, Appendix A), Task 2 of Dames & Moore's proposal to Creston Financial Group dated January 25, 1995, and Task Order 2 dated April 13, 1995, and Task Order 8, dated September 12, 1995

The Phase I ESA indicated that steam releases have occurred at the site, these may have long-term impacts on the facility and site property Additionally, background levels of some metals in soil may classify soil removed during construction or decommissioning as a California hazardous waste under Title 22 of the California Code of Regulations The following issues are key concerns raised in the Phase I investigation that were addressed by this Phase II investigation

- Potential contamination (including arsenic, boron, chromium, mercury, vanadium, and chlorinated herbicides) in soil associated with site activities and accidental steam, condensate, or drilling fluid releases,
- Potential contamination including arsenic, boron, chromium, mercury and vanadium in facility structures, equipment, and associated removable materials,
- Potential levels of naturally occurring analytes such as arsenic, boron, chromium, mercury, and vanadium in soil that may impact disposal or decommissioning costs

Groundwater quality was not addressed in this investigation because of the lack of a large local aquifer Additionally, the onsite drinking water well, which was monitored quarterly, showed no impact due to site activity, and surface water testing showed only temporary effects from spills Thus no further evaluation was necessary

1.1 SITE DESCRIPTION

The site consists of two parcels, the main Francisco leasehold, a 350-acre parcel located on High Valley Road about three miles northwest of the town of Cobb, and the adjacent Binkley leasehold to the north A leasehold map is presented on Figure 2 All geothermal development to date has occurred on the Francisco leasehold The Binkley leasehold has yet to be developed and will be discussed only briefly Several residences, accessed by paved or dirt roads, are located on the Binkley leasehold

The Francisco property has been developed with a 55-megawatt capacity power plant and associated chemical abatement systems, a hydrogen sulfide abatement system, a water treatment facility, cooling tower, and an electrical switching yard outside the power plant building The steam field comprises 14 steam production wells (at least two of which are abandoned) and 2

reinjection wells located on three different well pads denoted Francisco, Coleman and West Coleman, well pads and sumps, and a steam gathering system The gathering system includes steam pipelines, condensate lines, and removal equipment (e g , knockout pots), reinjection lines, and associated valves, supports, and electronic control system

A steam line connects the power plant to the steam field Each well pad contains approximately five steam wells and a sump for drilling fluids Additionally, the Francisco pad has two reinjection wells for geothermal fluid wastes With the exception of both reinjection wells, the wells have not operated for over five years Much of the steel piping that connects the well heads to the main steam line has been removed from the well pads Asphalt-paved and gravel access roads wind along the hillsides to the well pads The steam supplier's compound is located adjacent to the Francisco well pad This area contains a small building for offices and storage, a metal frame storage shed, and an equipment yard for the storage of pipes, valves, and miscellaneous items

The power plant and well fields are reportedly maintained in a state of readiness sufficient to resume operations within six (6) months, although actual start-up could take longer DWR representative Dave Bogener stated that he believes the wells were grouted shut when the plant was closed Hazardous materials were reportedly removed from the site when operations ceased, and only approximately a dozen small containers of hazardous substances including gear oil, motor oil, lubricant, antifreeze, industrial fluid, grease, and cutting oil remain on site The sumps used to contain drilling fluids for well installation were reportedly emptied, and hazardous materials storage tanks containing hydrogen peroxide and sodium hydroxide for the chemical abatement system were emptied and flushed A propane tank which was located at the steamfield building was removed when service was terminated with the gas company (Mr Coe Hall, DWR)

1 2 HISTORICAL INFORMATION

The earliest known historical use of the site is by Native Americans Their presence has been confirmed by the discovery of five archeological sites within the leasehold (Ecoview, 1979) In the 1880s, the Francisco leasehold was homesteaded by the Victor Coleman family The property was probably used for subsistence farming and grazing A sawmill was constructed in the early 1900s east of the current picnic meadow The mill processed lumber from the leasehold and nearby areas until it burned in 1925 Subsequently, the property was used for grazing until Victor Coleman's retirement, at which point its principal use became family recreation (WCC, 1988)

Historical site activities appear to pose no significant concerns with respect to soil or groundwater conditions beneath the site

Drilling of exploratory geothermal wells and construction of the three pads was initiated in 1975 by MCR Corporation Construction of the control room and equipment yard, the pipelines and associated facilities began in 1982 while geothermal exploration continued The power plant itself operated from 1985 to 1990 when it was closed for financial reasons Since 1990, the site has been maintained in a standby condition should operations resume

2 0 PHYSICAL SETTING

Dames & Moore reviewed pertinent maps and readily available literature for information on the topography and hydrogeology of the site A summary of this information from the Phase I is presented in the following subsections

2.1 TOPOGRAPHY

The site is situated within the California Coast Range geomorphic province, a rugged north-south trending mountain range Elevations on the site range from 2550 feet above mean sea level (msl) (Figures 1-3) on the valley floor to approximately 3000 feet in the surrounding hills Drainages and tributaries at the site flow into High Valley Creek, which is part of the Kelsey Creek drainage system leading to Clear Lake An unnamed tributary to High Valley Creek is located immediately west of the power plant area and south of the steam suppliers compound (U S Geological Survey, The Geysers 7 5-minute quadrangle, 1993)

Surface water on the site consists of unnamed ephemeral surface drainages, local springs, and local groundwater A drinking water well, installed in 1979, is located near the picnic area by West Coleman Road According to the well driller's log, the well is screened from 40 to 75 feet First encountered water was at 40 feet, however, the water level subsequently rose nearly to the surface due to confined conditions According to Mr Bogener, the well has been sampled at least quarterly, and none of the tested constituents have exceeded drinking water maximum contaminant levels (MCLs)

2 2 GEOLOGY AND HYDROGEOLOGY

The site is located within the Sonoma-Clear Lake Volcanic Province No surface expression of volcanic activity is evident at the site, although the heat source for The Geysers appears to be associated with this volcanism Franciscan Formation rocks of Jurassic to Cretaceous Age underlie the site This formation is divided into two distinct zones vertically non-reservoir and reservoir rocks The predominant bedrock type is greywacke sandstone, with smaller amounts of argillite, conglomerate, chert, greenstone and serpentinite also present These rocks have been fractured and transported by a series of thrust and transform faults, including the currently active San Andreas system Thin surficial deposits of Quaternary Age are found in the High Valley area and a few locations along the tributary stream bottoms (Ecoview, 1979)

All of the wells on the Francisco leasehold are completed in fractured greywacke sandstone, the characteristic productive reservoir rock type throughout The Geysers geothermal field Most of the wells penetrate a thin layer of serpentinite within 2000 feet of the surface and then pass through a sequence of metavolcanic rocks between elevations of 2100 feet above to 3000 feet below msl, before entering the productive reservoir Steam is encountered as shallow as 3700 feet below msl in the southwestern corner of the leasehold, but does not produce well until at least 4500 feet below msl is reached (GeothermEx, 1989)

Cold-water springs are generally limited in The Geysers to locally thick sections of colluvial soils (up to 300 feet), where water percolating through these unconsolidated deposits accumulates over the less permeable Franciscan bedrock as perched water These springs are supported by shallow localized subsurface resources and are sometimes ephemeral Groundwater in colluvium or landslide deposits moves downgradient along the bedrock-colluvium contact, discharging at exposed points along the surface

The Franciscan non-reservoir rocks are exposed over the entire surface of the site The thickness varies from tens to several hundreds of feet Although water is found in a few open fractures with limited interconnection and storage capacity and in a few surficial landslide deposits (Johnson and Treleaven, 1990), no substantial groundwater aquifer is known to exist in the vicinity of the site (Cardwell, 1958)

3.0 PURPOSE AND SCOPE OF SERVICES

The Phase I indicated that historical releases of steam, condensate, or drilling fluids may have generated a long-term (post-release) environmental impact Potential areas of concern at the power plant and well pads were identified during Phase I Sampling locations selected to address each concern are described in detail in the Workplan (Appendix A) and not duplicated herein In addition to investigating these areas of concern, contamination of facility materials was investigated This Phase II work addressed two objectives as follows

- to collect and analyze soil samples to evaluate potential environmental impacts from geothermal activities at the site, and
- to collect and analyze samples from site facilities and equipment to ascertain potential levels of contamination in these facilities' materials that might impact costs of decommission and closure

To achieve these objectives, the sampling summarized by Tables 1 and 2 and described in detail in the workplan within Appendix B was performed Table 1 summarizes samples taken to evaluate potential facility and associated equipment contamination Table 2 summarizes samples taken to evaluate potential environmental (soil) contamination Additionally, the following scope of work was performed

- Developed a site-specific health and safety plan,

- Drilled six soil borings in the location of the former underground storage tank at the steam suppliers compound and took soil samples from the sidewalls of, and beneath, the previous excavation Samples were analyzed for diesel and the gasoline constituents benzene, toluene, ethylbenzene, and xylene (BTEX),

- Addressed questions generated by the DWR and presented to Dames & Moore in a meeting on September 20, 1995,

- Prepared this report describing the sampling performed and summarizing our findings

TABLE 1

BOTTLE ROCK POWER PLANT SAMPLE LOCATIONS AND ANALYSES FOR FACILITY EVALUATION

Location	Analyte					Matrix
	As	B	Cr	Hg	V	
Power Plant						
Turbine	X			X		scale
Injection Sump	X	X	X	X	X	concrete chips
2nd Floor Wall	X					concrete chips
3rd Floor Wall	X			X		concrete chips
Vent Separator	X	X		X		scale
Coleman Well Pad						
Main Pipeline	X			X		scale
Knockout Pot	X			X		scale

TABLE 2

BOTTLE ROCK POWER PLANT SAMPLE LOCATIONS AND ANALYSES FOR SOIL EVALUATION

Location	Analyte						
	As	B	Cr	Hg	V	pH	Herbicides
Power Plant							
Muffler	X	X	X	X		X	
Sump Outfalls	X	X		X	X	X	
Steam Suppliers Compound (except former UST location)							
Distressed Vegetation							X
South Geysers Steampipe	X	X	X	X		X	
Outfall	X	X	X	X		X	
Francisco Well Pad							
Distressed Vegetation	X	X		X		X	
Condensate Basin	X	X	X	X		X	
Injection Separator/ Outfall	X	X	X	X		X	
Coleman Well Pad							
Under Upstream Knockout Pot	X	X		X		X	
Under Downstream Knockout Pot	X	X	X	X	X	X	
Sump	X	X	X	X		X	
Distressed Vegetation	X	X	X	X		X	

3.1 PHASE I REPORT ISSUES

Three areas of concern identified in the Phase I Report are not being addressed by additional sampling in this investigation These concerns were discussed by Creston, DWR and Dames & Moore in a meeting in Dames & Moore's office on September 20, 1995, and summarized in a letter to Dames & Moore from Coe Hall of DWR dated October 11, 1995

1 Section 4 2 3 Hazardous Materials Storage The report references the existence of a wooden storage shed containing paints and oils, and states that the location is not apparent. Was the site located?

- There was no staining or other evidence noted that would identify the location of the storage shed Given that there was no contamination noted, it is unlikely that the shed impacted the site in a long-term fashion

2 Section 5 4 1 Spill History The report states that the August 4, 1988 Coleman Pad Spill contaminated soils with arsenic and that it appeared that the soil was excavated Was the excavation confirmed?

- Information gathered from DWR files during the Phase I investigation indicated that one foot of material was excavated in the vicinity of the spill The aerial extent of the excavation included the area of the spill, as determined visually as the wet area According to handwritten notes in DWR files, excavated soil appears to have been sent for disposal offsite by Chemical Waste Management The excavated area was replaced with clean fill

3 Section 4 6 4 Adjacent Properties The report indicates that runoff from the Unocal geothermal facilities may contaminate the site Is there data indicating that contamination has occurred?

- The Phase I Report was merely indicating the presence of another geothermal site adjacent to the subject site which has the potential of affecting the subject site There are no data indicating that contamination from the neighboring Unocal site is entering or has entered the subject site The contaminant transport paths between these sites are limited to airborne

transport from cooling towers or steam release, and shared drainages Results of this investigation indicate that contamination from these sources has limited distribution Therefore it's unlikely to be an issue

Additionally, it was noted in the Phase I Report that a wellhead is leaking at the West Coleman Pad At the time of our visit, it was still leaking

Results outside the range of background concentrations indicate that the concentraitons may be the result of impact from site activities Arsenic concentrations in the soil from the Francisco pad injection/separator outfall and from below the Coleman pad knockout pots exceed the range of background In addition, boron concentrations exceed background levels in the soil sample from the Francisco injection separator outfall These results suggest that steam field activities may have impacted soils at these two locations

4.0 FIELD INVESTIGATION PROCEDURES

Samples were collected October 3-4, 1995 by Dames & Moore representatives, with the assistance of Dave Bogener of DWR and other DWR staff The sampling was performed according to methods described in the workplan and Appendix A Confined-space entry and subsequent sampling was done by DWR staff with direction from a Dames & Moore representative Approximately 36 samples were taken, 30 for soil evaluation and 6 for facility and equipment evaluation. Sample locations are indicated on Figure 4

4.1 SOIL SAMPLES

Soil samples were collected at the surface and below ground surface (bgs) Surface samples were collected by scraping away several inches of surface soil using a cleaned trowel or pickaxe, collecting soil using a clean trowel, and placing it a glass jar supplied by the analytical laboratory Cleaning was done by washing the equipment in a dilute, phosphate-free laboratory cleanser, and rinsing twice with highly purified, deionized water

Subsurface samples were collected with a hand auger and Precision Sampling's coring system The samples collected at the Coleman pad sump were advanced using a hand auger and steel breaker bar to break rocks out of the hole Both the auger and the bar were cleaned prior to use as described above When the auger had reached an appropriate depth for sampling it was

withdrawn and the soil in the auger was emptied into a glass sample jar supplied by the laboratory Further sampling procedures are described in Appendices A and B

4.2 SCALE DEPOSIT SAMPLES

Scale samples were collected by scooping scale deposits from the pipeline walls, turbine blades or housing, or separator walls directly into the glass sampling jar In cases where the scale could not be reached, a cleaned long-handled metal scraper was extended to collect the scale sample, which was then placed directly into the sample jar The jars were labeled and placed in an iced cooler for storage and transport

4.3 CONCRETE CHIP SAMPLES

Concrete chips and dust were broken from the second and third floor walls of the power plant using a cleaned geologic pick. The chips were collected in a glass sample jar, labeled, and placed in an iced cooler for storage and transport

4.4 CHEMICAL TESTING PROGRAM

Soil samples were sent to Pace Laboratory of Petaluma, California for analysis by the following methods

- Arsenic, boron, chromium, vanadium by EPA Method 6010,
- Mercury by EPA Method 7471,
- pH by EPA Method 9045,
- BTEX by EPA Method 8020,
- Total Petroleum Hydrocarbons as diesel (TPHd) by EPA Method 8015 Modified,
- Chlorinated Herbicides by EPA Method 8150

Standard EPA chain-of-custody procedures were followed, as described in Appendix B Analyses were performed by Pace Laboratory in Petaluma, with the exception of the samples to be analyzed for chlorinated herbicides, which were analyzed by Pace Laboratory of Camarillo, California Pace Laboratory is a California certified analytical laboratory

5.0 FIELD INVESTIGATION RESULTS

5.1 POWER PLANT INVESTIGATION

5.1.1 Soil Samples

Soil samples collected in the vicinity of the power plant were all collected off of the main power plant pad because the power plant pad location is either paved or rocked These soil samples were analyzed for selected metals, boron and pH (see Table 2) Complete analytical results are presented in Table 3 and sample locations are presented in Figure 4

5.1.2 Facility Samples

The presence of contamination in power plant facility materials was evaluated by collecting material samples including concrete chip samples from the power plant walls and injection sump floor and scale samples from the turbine and separator These samples were analyzed for the constituents described in Table 1 Complete analytical results are presented in Table 4 and sample locations are presented in Figure 4

5.2 STEAM SUPPLIERS COMPOUND

Soil samples were collected from the steam suppliers compound Selected samples were composited prior to analyses Samples were analyzed as described in Table 2 Complete analytical results are presented in Table 3 and sample locations are presented in Figure 4

Soil samples from the borings at the former UST site were analyzed for BTEX and TPH-diesel BTEX was non-detect at laboratory reporting limits Complete analytical results for the UST borings are presented in Table 5 and sample locations are presented in Figure 4

5.3 FRANCISCO WELL PAD

Soil samples from areas of distressed vegetation near the Francisco well pad were analyzed for metals, boron, and pH as described in Table 2 Two composites of these soil samples, labeled 1 A&B and 2 A&B, were made by the laboratory

Samples of surface materials from the condensate basin and the injection/separator outfall were analyzed for arsenic, boron, chromium, mercury, and pH The injection/separator outfall was sampled where surface materials were discolored and scale appeared to have formed Complete analytical results are presented in Table 3 and sample locations are presented in Figure 4

5.4 COLEMAN WELL PAD

5.4.1 Soil Samples

Soil samples from beneath the knockout pots and from the sump were analyzed for arsenic, boron, mercury, and pH.

Two sets of two soil samples were taken from the areas of distressed vegetation at the Coleman pad and composited as 1A&B and 2A&B These samples were analyzed as described in Table 2 Complete analytical results are presented in Table 3 and sample locations are presented in Figure 4

5 4.2 Facility Samples

Scale samples taken from the main pipeline and knockout pots at the Coleman well pad were analyzed for arsenic and mercury Complete analytical results are presented in Table 4 and sample locations are presented in Figure 4

5.5 DISCUSSION OF RESULTS

5.5.1 Hazardous Waste Criteria

To address the objective of decommissioning the power plant, and the potential need for site clean-up and remediation, results were compared to hazardous waste criteria These criteria are used to classify materials in the event that they need to be removed from the site and disposed In that event, the materials would become waste, and if concentrations of regulated constituents exceed STLC or TTLC criteria, the wastes are hazardous At this time, these materials are not wastes As long as they remain in place, these waste classifications do not apply Analytical results were compared to California Soluble Threshold Limit Concentrations (STLCs) and Total Threshold Limit Concentrations (TTLCs), shown in Table 1, which define hazardous waste classifications under Title 22 of the California Code of Regulations Additional analysis, comprising of a Waste

Extraction Test (WET), may be performed as required for further characterization if the reported value of an analyte is less than the TTLC but greater than 10 times the STLC The extract values are then compared to the STLC value

The analytical results from this investigation indicate that soil and facility materials onsite do not exceed hazardous waste levels, with the following exceptions

1 Arsenic and chromium were reported below TTLC and greater than 10 times STLC values in soil samples collected under the knockout pots on the Coleman pad and near the muffler at the power plant (Muffler 1A&B), under the location where the South Geysers gathering system material was stored, and at the outfall at the steam suppliers compound, in the condensate basin at the Francisco Pad, and under the upstream knockout pot and at the distressed vegetation (1A&B and 2A&B) at the Coleman Pad For these samples, a WET would be required to further characterize the material The above results are discussed in respect to hazardous waste definitions in the summary section

2 Chromium concentration exceeded 10 times STLC in one concrete sample from the injection sump, and mercury exceeded 10 times STLC in scale samples from the turbine and vent muffler If these sampled materials become wastes, then the WET should be performed

3 Arsenic concentrations from scale from inside the main pipeline header at the Coleman pad and from surface materials at the injection/separator outfall at the Francisco pad exceeded TTLC Should these materials become waste, they would be classified as hazardous

5.5.2 Background Information

Background data concentrations of constituents of concern for this investigation (see "Analytes," Table 3) was unavailable for soil for the subject site prior to the development of the Bottle Rock power plant However, background concentrations of these constituents from soil within The Geysers geothermal development area was available This data was used to develop estimates of background concentrations of these constituents for previous plant closures (Units 1 & 2 and 3 & 4) The soil samples were collected to reflect the range of concentrations in a hydrothermically active area, outside areas potentially impacted by geothermal development The Geysers

background data was consistent with historical data taken by the DWR at the subject site Thus The Geysers area background data was compared to constituent concentrations from the subject site and to evaluate soil potentially impacted by site activities Background data was taken from analyses of soil samples from regions of high and low geothermal activity, and was averaged over all the samples taken Background concentrations are presented as a range, which is plus and minus two standard deviations the mean of all the background samples taken for each constituent Background ranges are presented in Tables 3 and 4

5.5.3 Data Validation and Data Quality

Laboratory results underwent a validation to evaluate the useability and overall quality of the data Laboratory results were checked fro compliance with required holding times, blank contamination, accuracy and precision (laboratory control samples [LCS], matrix spikes and matrix spike duplicates [MS/MSD] and surrogates recoveries) The following anomalies were noted

- Due to matrix spike recoveries below the QC criteria of 75% to 125%, arsenic (61%), chromium (37%), and vanadium (57%) results were qualified as estimated concentrations (flagged "J") or estimated detection limits (flagged "UJ") The following samples were affected TW-1, PPINUS, PP2A&2B, CMPSS, CKOOSEL, F10F, FCB, CS1, CS2, SSCUSEP, SSCOUT, PPCH1PS, PPCH1P3, PP3ODE, PP4OC and PP5OAB

- Due to poor matrix spike recovery for mercury (-593%), mercury concentrations were flagged "J," estimated in samples TW-1, TS1, PPINUS, FCVCSE, 1A&1B, FDCSW2A&2B, FCB, CK00SEL, CKOUSEL, CS1, CDVS1A&1B, CDVCS2A&2B, CDVCD3A&3B and PP5UAB

- The method blank associated with samples B-1-13, B-2-12 5, B-3-10, B-4-10, B-5-10 and B-6-10 for EPA Method 8010 contained 0 94 μg/L of methylene chloride Reported concentrations of this compound were flagged "U" and should be treated as non-detects below a revised detection limit of 9 4 μg/L

- Due to the presence of heavy hydrocarbons in sample B-5-10, the diesel concentration reported for that sample was flagged "J," estimated

These results are useable for their intended purpose None of the results have been rejected However, concentrations flagged "J" are estimated values and reporting limits flagged "UJ" are estimated reporting limits

6.0 DISCUSSION

6.1 GENERAL

The results of this investigation indicate that most of the soil and the facility materials sampled are either not impacted by site activities or impacted at levels below California hazardous waste criteria (Tables 3 and 4) With a few exceptions, concentrations of contaminants associated with the reported spills and releases such as boron, arsenic, vanadium, mercury, and zinc were within background concentrations for The Geysers area in soils These results are consistent with geologic setting of the site where these constituents occur naturally and attenuate in the soil and groundwater

Results of soil samples taken from the various locations at the Bottle Rock site that exceed hazardous waste criteria or background levels presented in Table 3 are discussed individually below.

6.1.1 Power Plant Area

- No metals were in soil to the east of the power plant vent muffler at concentrations of concern High concentrations of boron and sodium have been reported in these soils in the annual monitoring program Data from Dave Bogener of DWR suggests that boron concentrations in leaf tissue and soil samples from within 50 meters of the power plant muffler have attenuated by approximately 70% in soil since November 1986 (almost 90% if anomalous data from December 1986 are considered) These results are consistent with Mr Bogener's observations

- Concentration of chromium are above 10 times the STLC and below the TTLC in concrete samples from inside the injection sump Further analysis would be required before determination of whether it would be classified as hazardous waste

6.1.2 Steam Suppliers Compound

- Chromium concentrations above 10 times STLC and below TTLC were reported in soil samples from the outfall and below the South Geysers pipeline This soil would need further analysis (WET) if it needs to be moved and classified as a waste However, there is no indication that these concentrations are related to site activities Soil samples are within background concentrations for The Geysers

- Closure in agency files should be sought for the former UST location based on the non-detect for BTEX and low-level diesel hits

6.1.3 Francisco Well Pad

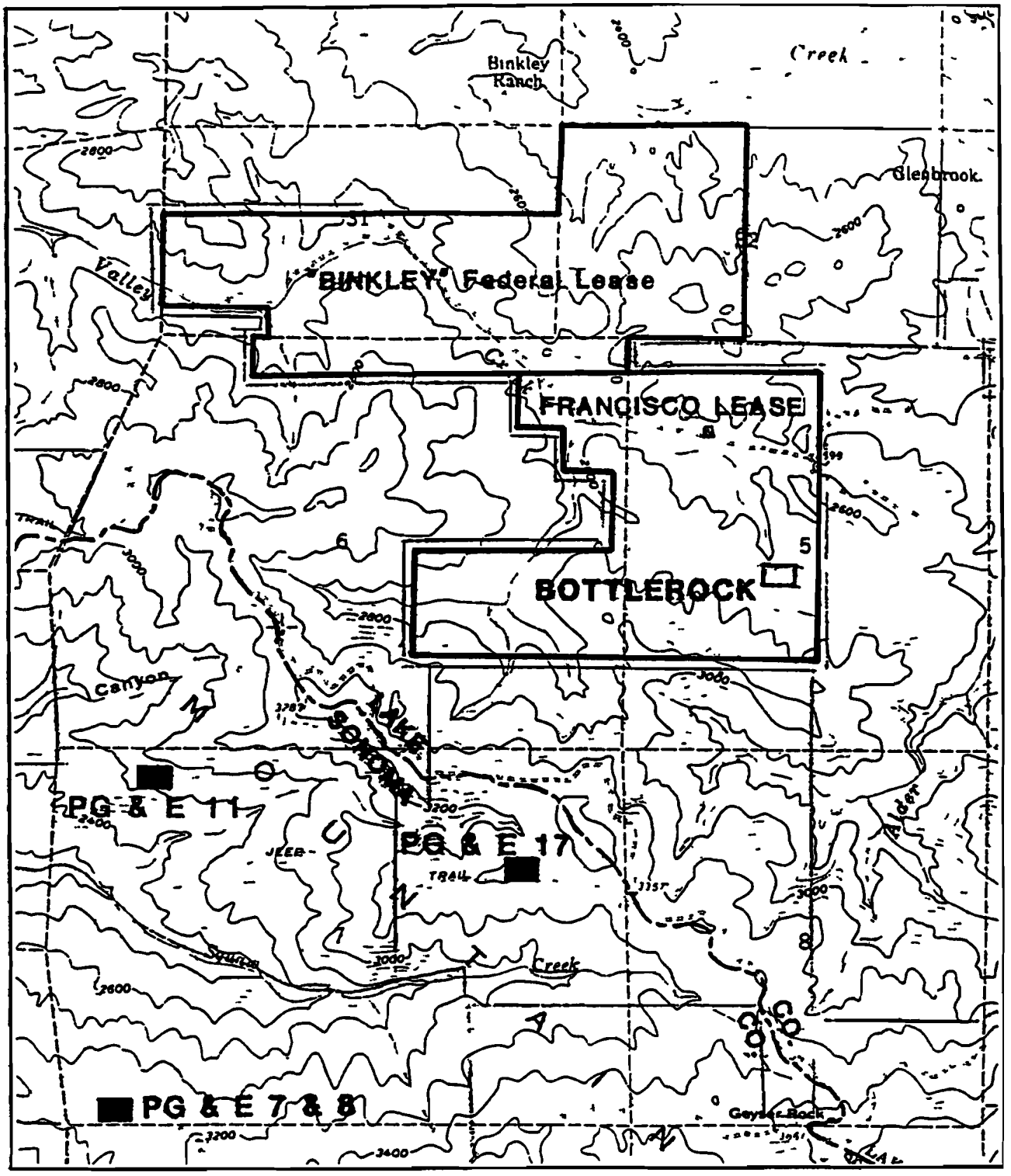
- Chromium in soil samples collected from the condensate basin are above 10 times STLC, below TTLC and within background concentrations WET analysis would be needed for classification of this soil as hazardous or non-hazardous if it becomes a waste

- Arsenic and chromium concentrations in samples from the injection/separator outfall were above TTLC, making the soil a California hazardous waste for disposal purposes Concentrations of boron and arsenic were also higher than the background concentrations, indicating that the location has probably been affected by site activities

6.1.4 Coleman Well Pad

- Arsenic concentrations in scale from the main pipeline were above the TTLC of 500 mg/kg, at 2,820 mg/kg, indicating this material would be classified as a California hazardous waste if it becomes a waste

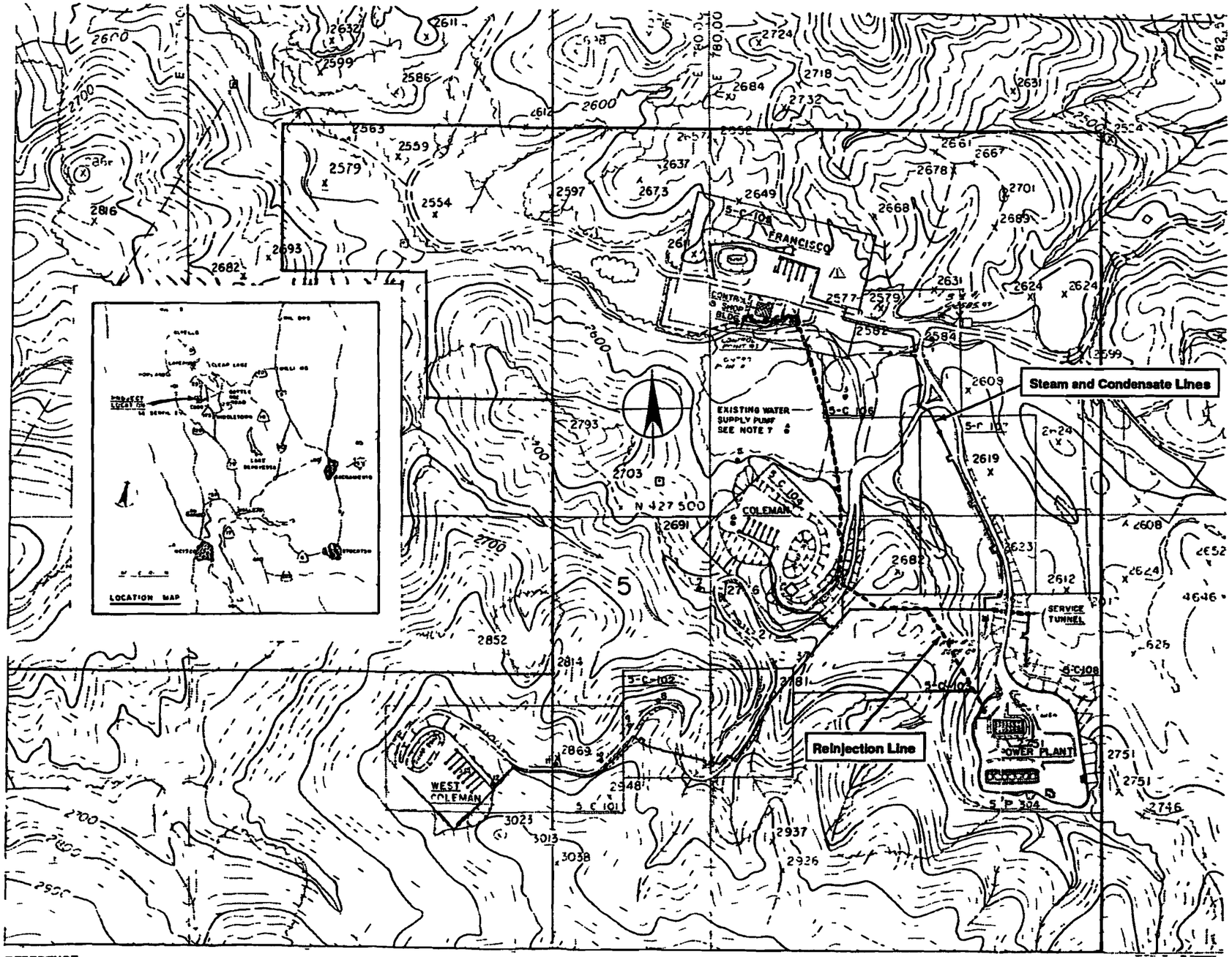
- Chromium in soil samples from the area of distressed vegetation on the north and east sides of the well pad were above 10 times STLC and below TTLC (requiring the WET analysis for waste characterization) but within background levels for The Geysers These results do not indicate site activities affected these soils, and as long as they are not removed (becoming waste), no additional work is necessary



LEASEHOLD LOCATION

Creston Financial Group
January 1996 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County California

DAMES & MOORE FIGURE 2



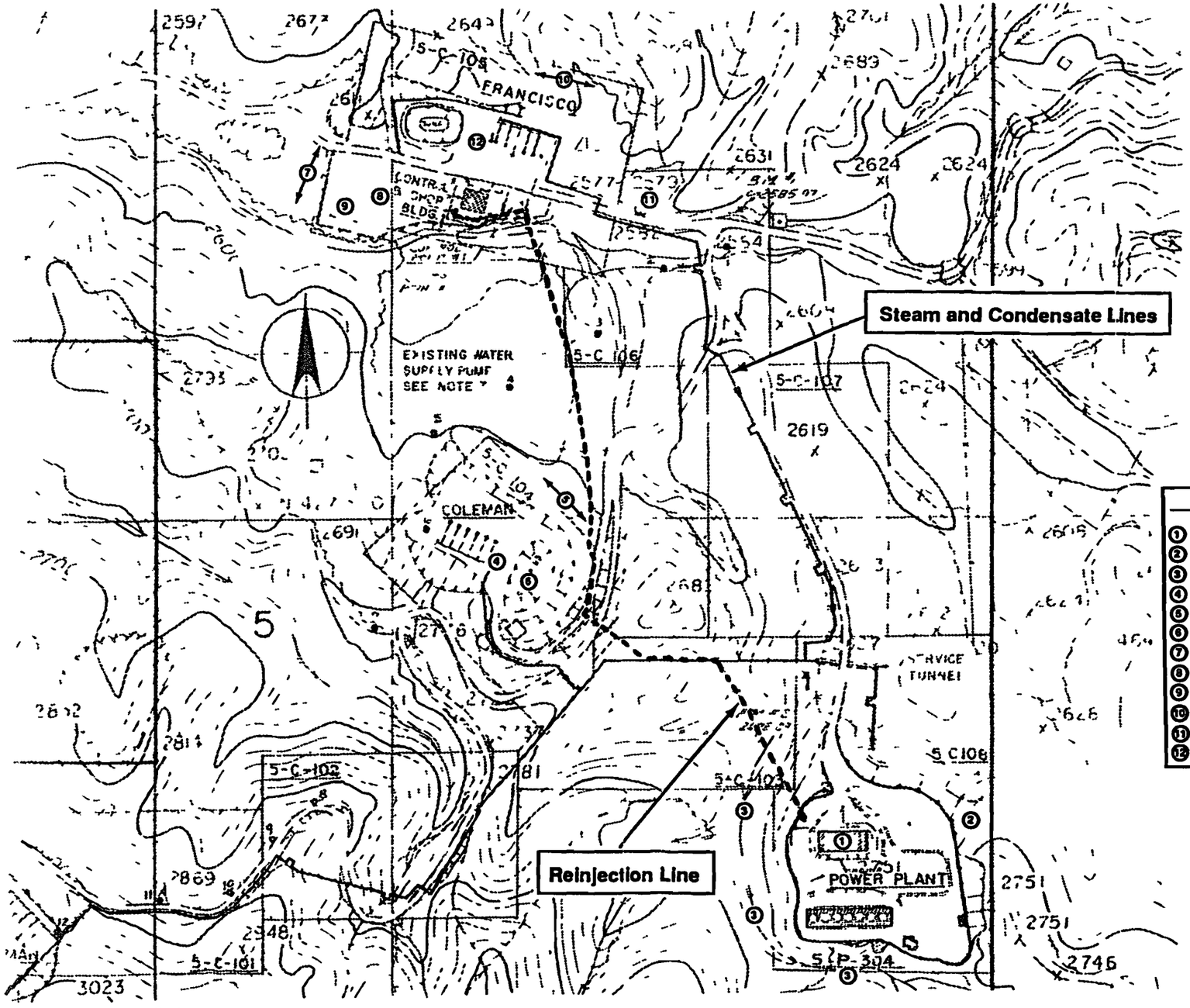
REFERENCE
DMJM Energy Systems

FRANCISCO LEASEHOLD SITE PLAN

Creston Financial Group
January 1996 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County California

DAMES & MOORE

FIGURE 3



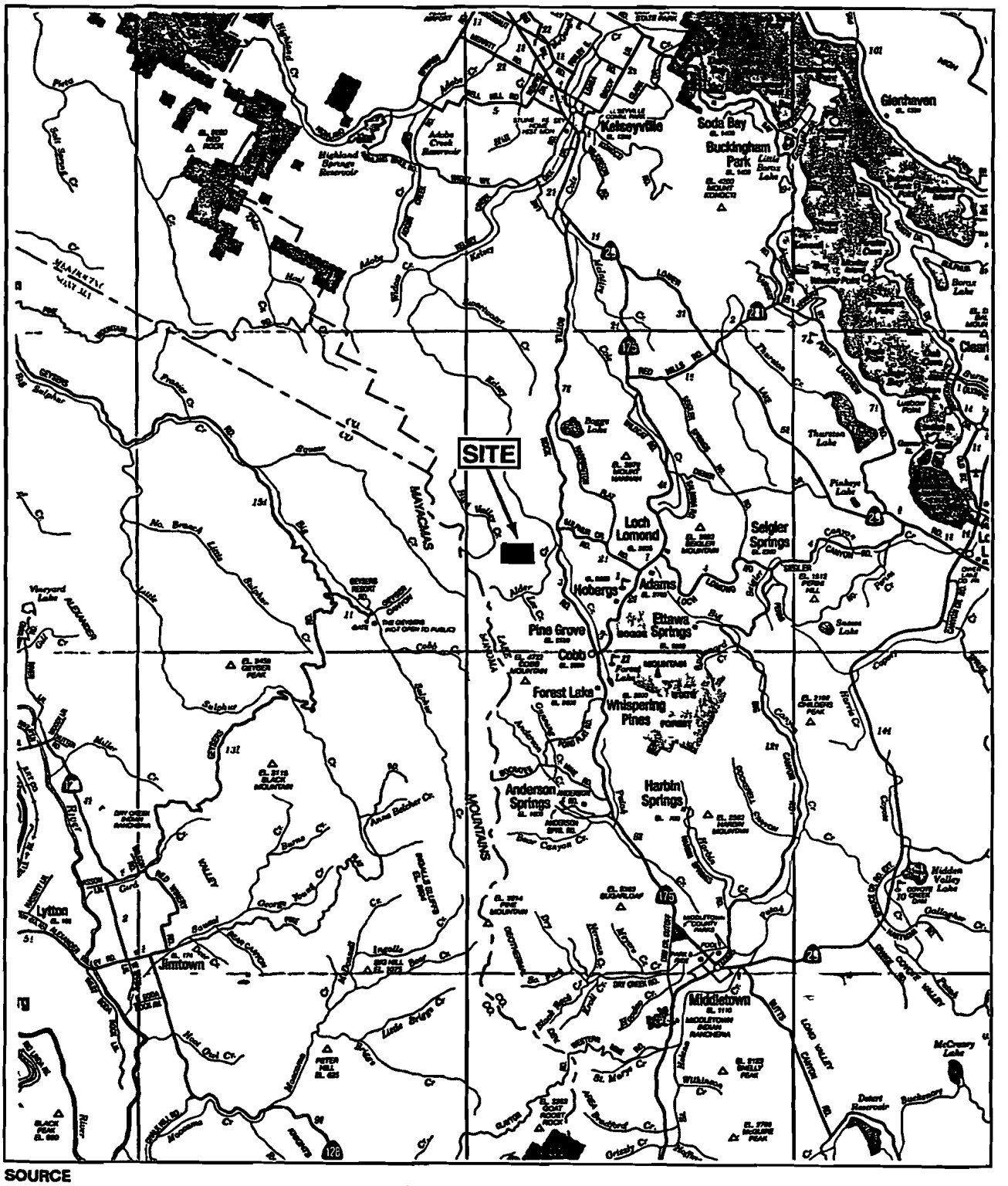
Source DMJM Energy Systems

SITE MAP WITH SAMPLE LOCATIONS

Creston Financial Group
March 1996 Bottle Rock Power Plant Phase II Investigation
30681-001-043 Lake County California

DAMES & MOORE

FIGURE 4



SOURCE
AAA Mendocino and Sonoma Coast Region

0 6
Scale in Miles

N

VICINITY MAP

Creston Financial Group
January 1996 Bottle Rock Power Plant and Steam Fields
30681-001-043 Lake County California

DAMES & MOORE **FIGURE 1**

- Arsenic (and chromium beneath the downstream knockout pot) levels were above 10 times STLC, and below TTLC (requiring the WET for waste characterization) in soil beneath the knockout pots The chromium concentration falls well below background concentration, but the arsenic concentrations are several times that of background concentrations, indicating that these concentrations were likely to have been affected by site activities

6.2 CONCLUSIONS AND RECOMMENDATIONS

Environmental impairments to soil and groundwater due to site activities at the Bottle Rock facility are limited to elevated concentrations of metals and boron in soil in areas formerly impacted by steam, condensate or drilling fluid releases The concentrations of hazardous materials in the steam releases were relatively low and should attenuate with time These constituents are naturally occurring in soil within The Geysers area, and the impacts are limited to increases in soil concentrations, above natural background soil conditions Although site clean-up levels are not currently established, it is reasonable to expect that a site clean-up plan would include removal of these impacted soils and appropriate confirmation sampling Results over fifteen years of surface and groundwater monitoring suggest that groundwater in the vicinity of the site has not been impacted by elevated concentrations of metals or boron due to geothermal development or operations

6.2.1 Soils

If soil impacted by the steam releases was to be excavated, it would need further characterization to determine appropriate disposal methods Background data indicated that the levels found in all the soil samples could be explained by the natural variability of the Geysers area except the soil at the injection/separator outfall at the Francisco Well Pad and the soil beneath the knockout pots at the Coleman Well Pad Both areas appear to have been affected by site activities based on their elevated constituent concentrations

As soils from these areas and other soils with concentrations above 10 times STLC at background levels (even if not impacted by site activities), are excavated, they will need to be further characterized by WET analysis

6.2.2 Facilities

The power plant and associated facilities appear to be only marginally affected by contamination from site activities In the decommissioning and destruction of the power plant, some of the components may be sold to other geothermal facilities and thus recycled Arsenic and mercury concentrations in the facility building materials were measurable and Dames & Moore recommends steam cleaning the entire facility to further reduce those concentrations before decommissioning or destroying the plant If the plant were to be destroyed and the concrete crushed for use as fill at the site and in the region, the concrete would be within background levels of arsenic and mercury, even without the steam-cleaning

Some of the power plant equipment has been contaminated in the course of normal site activity Items such as the turbine and the steam pipelines, while they may be recycled, can also be steam-cleaned to remove scale which contains high concentrations of steam components The scale and associated cleaning fluid can then be re-injected along with normal power plant wastes These issues will be discussed in more detail in our final report

7.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon the visual observations of the subject property, and our interpretation of the available historical information and documents reviewed, as described in this report They are intended exclusively for the purpose outlined herein, and for the site location and project indicated

This report is intended for the sole use of Creston Financial Group and DWR The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user

It should recognized that this study was not intended to be a definitive investigation of contamination at the subject property Given that the scope of services for this investigation was limited and that exploratory borings beyond the UST site and groundwater sampling were not undertaken, it is possible that currently unrecognized contamination may exist at the site

Services performed by Dames & Moore were conducted in a manner consistent with that of the same care and skill ordinarily exercised by members of the same profession currently practicing

in the same locality under the same conditions It is important to recognize that even the most comprehensive scope of services may fail to detect environmental liabilities on a particular site Therefore, Dames & Moore cannot act as insurers and cannot "certify" that a site is free of environmental contamination No expressed or implied representation or warranty is included or intended in our reports except that our services were performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession

Opinions and recommendations presented herein apply to the existing and reasonable foreseeable site conditions at the time of our investigation They cannot necessarily apply to site changes of which this office is unaware and has not had the opportunity to review Changes in the conditions of this property may occur with time due to natural processes or works of man on the subject property or on adjacent properties Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control

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TABLE 3 (Page 1 of 2)

BOTTLE ROCK POWER PLANT ANALYTICAL DATA FROM SOIL SAMPLES FOR CRESTON FINANCIAL

	Analyte (mg/kg)						
	As	B	Cr	Hg	V	pH	Herb
STLC	5 0	-	5 0	0 2	24	-	-
TTLC	500	-	2500	20	2400	-	-
Background	0-56	0-86	0-848	0-36	17-137	NA	NA
Sample Location	POWER PLANT						
Muffler 1A&B	15 6	2 5	58	0 166	NA	7 35	NA
Muffler 2A&B	14 9	3 06	30 7	0 0438	NA	6 48	NA
Outfall, sumps A&B	8 39	9 14	NA	0 0556	38 4	7 62	NA
Outfall, sump C	ND	3 73	NA	0 061	50	6 0	NA
Outfall, sumps D&E	ND	3 09	NA	0 171	43 6	6 21	NA
Steam Suppliers Compound (except UST investigation)							
Distressed Vegetation 1A&B and 2A&B	NA	NA	NA	NA	NA	NA	ND
South Geysers Pipeline	14 5	8 23	149	0 746	NA	5 71	NA
Outfall	ND	7 52	153	0 0498	NA	7 22	NA
Francisco Well Pad							
Distressed Veg 1 A&B	22	ND	NA	0 147	NA	7 24	NA
Distressed Veg 2 A&B	ND	ND	NA	0 0509	NA	6 24	NA
Condensate Basin	ND	ND	70 2	ND	NA	6 24	NA
Injection Separator/ Outfall	619	143	808	0 967	NA	4 41	NA
Coleman Well Pad							
Under Knockout Pot (Upstream)	95	68 8	NA	0 13	NA	6 69	NA
Under Knockout Pot (Downstream)	239	64 1	142	0 0837	54 9	5 21	NA
Sump 1	8 54	5 07	19 7	0 0724	NA	4 9	NA
Sump 2	8 68	9 16	26 5	0 0247	NA	5 96	NA

TABLE 3 (Page 2 of 2)

BOTTLE ROCK POWER PLANT ANALYTICAL DATA FROM SOIL SAMPLES FOR CRESTON FINANCIAL

	Analyte (mg/kg)						
	As	B	Cr	Hg	V	pH	Herb
Distressed Veg 1 A&B	15	10 2	99 3	0 0473	NA	6 75	NA
Distressed Veg 2 A&B	39 5	12	74 1	0 0779	NA	7 14	NA
Distressed Veg 3 A&B	25 7	5 57	57	0 0586	NA	6 8	NA

Notes:
STLC= California Soluble Threshold Limit Concentration
TTLC= California Total Threshold Limit Concentration
NA= Not analyzed
ND= Not detected at laboratory reporting limits
- = Not applicable as analyte is unregulated by STLC/TTLC values
As = arsenic, B = boron, Cr = chromium, Hg = mercury, V = vanadium
As, B, Cr, V analyzed by EPA Method 6010, Hg by EPA Method 7471
Herb = Chlorinated Herbicides, analyzed by EPA Method 8150
** Background data from Pacific Gas and Electric Company's Technical and Ecological Services Site Characterization Report, Former Geothermal Power Plants Units 1-4, The Geysers, Sonoma County, California, May 1994 Report 417-94 30

TABLE 4

BOTTLE ROCK POWER PLANT ANALYTICAL DATA FROM FACILITY SAMPLES FOR CRESTON FINANCIAL

	Analyte (mg/kg)					
	As	**B**	**Cr**	**Hg**	**V**	
STLC	5 0	-	5 0	0 2	24	
TTLC	500	-	2500	20	2400	
Sample Location	**Power Plant**					**Matrix**
Turbine	24 9	NA	NA	1 3	NA	scale
Injection Sump	12 8	216	76 7	0 152	65 9	concrete chips
2nd Floor Wall	ND	NA	NA	NA	NA	concrete chips
3rd Floor Wall	17 7	NA	NA	0 053	NA	concrete chips
Vent Muffler	43 4	56 1	NA	4 34	NA	scale
Coleman Well Pad						
Main Pipeline (Sidewall)	2820	NA	NA	0 139	NA	scale
Knockout Pot	27 5	NA	NA	ND	NA	scale

Notes
STLC = California Soluble Threshold Limit Concentration
TTLC = California Total Threshold Limit Concentration
NA = Not Analyzed
ND = Not detected at laboratory reporting limits
- = Not applicable as boron is unregulated by STLC/TTLC values
As = arsenic, B = boron, Cr = chromium, Hg = mercury, V = vanadium
As, B, Cr, V analyzed by EPA Method 6010, Hg by EPA Method 7471

TABLE 5

ANALYTICAL RESULTS FOR STEAM SUPPLIERS COMPOUND FORMER UST EXCAVATION, BOTTLE ROCK POWER PLANT FOR CRESTON FINANCIAL

Boring Number, Depth	BTEX	TPH-d (mg/kg)
B-1, 13'	ND	ND
B-2, 12 5'	ND	9 8
B-3, 10'	ND	14
B-4, 10'	ND	ND
B-5, 10'	ND	5 7
B-6, 10'	ND	ND
Equipment Rinse	ND	NA

Notes.
- ND = Not detected at laboratory reporting limits
- NA = Not analyzed
- BTEX analyzed by EPA Method 8020
- TPH-d analyzed by EPA Method 8015 Modified
- Laboratory detection limits benzene, 5 ug/kg, toluene, 5 ug/kg, ethylbenzene, 5 ug/kg, xylenes, 1 ug/kg, TPH-d, 5 ug/kg

TABLE 6

BOTTLE ROCK POWER PLANT AREAS OF SUSPECTED IMPACT DUE TO SITE ACTIVITY FOR CRESTON FINANCIAL

Location	Analyte		
	As (mg/kg)	B*(mg/kg)	Cr (mg/kg)
Background Range**	0-56	0-86	0-848
Injection Separator/Oufall (Francisco Well Pad)	619	143	808
Under Upstream Knockout Pot (Coleman Well Pad)	95	68 8	NA
Under Downstream Knockout Pot (Coleman Well Pad)	239	64 1	142

Notes

* Boron is unregulated by STLC/TTLC values

** Background data from Pacific Gas and Electric Company's Technical and Ecological Services Site Characterization Report, Former Geothermal Power Plants Units 1-4, The Geysers, Sonoma County, California, May 1994 Report 417-94 30

NA = Not analyzed

As=arsenic, B=boron, Cr=chromium, all analyzed by EPA Method 6010

APPENDIX A

WORKPLAN

APPENDIX A
WORKPLAN

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Table 2 - Fee Estimate Breakdown

1.0 INTRODUCTION

This work plan outlines the scope of work for additional field investigation based on the findings of Dames & Moore's Phase I Environmental Site Assessment (ESA) conducted for the California Department of Water Resources (DWR) Bottle Rock Power Plant and Steam Fields (the "site") located on High Valley Road in the town of Cobb, Lake County, California

The Bottle Rock facility consists of a 55-megawatt (MW) capacity geothermal power plant, 16 geothermal wells located on three well pads, paved and gravel roads, an equipment yard and steam and condensate pipe lines The power plant operated from 1985 until 1990, when operations ceased Creston is considering plans to purchase the power plant, wellfield and geothermal leases and bring the power plant back on-line, estimating that the facility can be operated profitably for approximately 15 years As part of their economic evaluation of the facility, Creston is concerned about the potential costs of environmental cleanup and site decommissioning

As part of the ESA, historical research, regulatory agency review, interviews with DWR personnel, and a site reconnaissance were performed to evaluate the potential for environmental contamination at the site resulting from site operations The findings of the ESA indicated that there were a number of areas at the site with a potential for environmental impacts due to former releases and spills The field investigation will be the second task in our investigation of potential environmental concerns and liabilities at the site The findings of this assessment will be utilized for the later phases of this project evaluating future environmental cleanup issues, performing a risk assessment of environmental hazards, and estimating the future decommissioning costs for closure of the power plant and steam fields This draft work plan has been prepared in accordance with Task 2 of Dames & Moore's proposal to Creston Financial Group dated January 25, 1995

2 0 PURPOSE AND SCOPE OF WORK

The findings of our ESA indicated that there are a number of potential areas of concern at the power plant and well pad locations Most of this concern stems from historical releases of steam, condensate, or drilling fluids which may have generated a long-term (post-release) environmental impact The constituents of concern in these types of releases are typically arsenic, mercury, boron, vanadium, and soil acidity Table 1 is a summary of the site locations, potential concerns, and proposed sampling plan

The purpose of the field investigation is to obtain sufficient data to evaluate environmental impacts of historical releases and to assess whether any remedial actions will be needed as part of site closure Some additional sampling will also be performed to evaluate equipment contamination for facility decommissioning In order to achieve this objective, Dames & Moore proposes to collect samples for laboratory analysis from the areas discussed below

2.1 POWER PLANT

Potential concerns identified during the ESA at the power plant include the following steam emissions from the muffler, the Stretford abatement area, underground sumps, stormwater outflow, and underground injection line leaks The following investigation will be performed

- Muffler - Collect four soil samples approximately 6 inches below ground surface (bgs) from the area downwind of the muffler Submit two composite samples for laboratory analysis of arsenic, boron, sodium, mercury and pH

- Underground Sumps - The underground sumps, particularly the main reinjection sump, the oil room sump, and the Stretford abatement area sump, represent a concern if any leakage has occurred to the subsurface Dames & Moore was unable to obtain access to these sumps during the ESA We would like to view the sumps during this sampling event. If we are unable to ascertain the integrity of the sump (due to confined space entry Dames & Moore personnel may not be able to perform this work), or if the integrity of the sump appears compromised, we recommend that an integrity inspection be performed by plant personnel and a core or chip sample of the concrete from the sump floor be obtained for laboratory analysis of arsenic, mercury, vanadium, boron, and pH

- Stormwater Outflow - Collect three soil samples approximately 6 inches bgs beneath the outflow to the unnamed tributary Potential concerns include constituents from surface spills, cooling tower blowdown, and condensate The soil samples will be analyzed for arsenic, mercury, vanadium, boron and pH

- Underground Lines - Leaks have been recorded from the fiberglass line below the switchyard and the reinjection line from the power plant to the Francisco sump Due to the inaccessibility of these areas, the lack of specific information regarding the leaks and regulatory response to other spill incidents, indicating that no further testing was necessary (RWQCB, 1991), we do not propose sampling at this time

2.2 STEAM SUPPLIERS COMPOUND

Potential areas of concern include the equipment yard where contaminated equipment was stored, distressed vegetation on the western edge of the yard, and a former diesel underground storage tank (UST) We understand that confirmatory soil samples were collected in the UST excavation at the time of tank removal (June, 1991) Documents provided by DWR indicated three soil samples were submitted to California Water Labs, in Sacramento, California, for analysis for benzene, toluene, ethylbenzene, total xylenes (BTEX) and total petroleum hydrocarbons as diesel (TPH/d) However, conversations with laboratory personnel indicated that records for this project were shipped to a warehouse in Chicago, Illinois, and would not be available in a timely basis for the needs of this investigation. Due to the absence of supporting documentation, the area of the UST excavation will be resampled. The proposed UST excavation sampling plan was prepared in coordination with Mr

Manuel Ramirez, Lake County Department of Environmental Health (LCDEH) to address LCDEH UST closure requirements

In order to address potential environmental concerns in the steam suppliers compound, the following investigation will be performed

- Distressed Vegetation - Four surface soil samples will be collected from the vicinity of the distressed vegetation and composited 2 1 by the laboratory Two samples will be analyzed for chlorinated herbicides, arsenic, mercury, boron, and pH

- Equipment Yard - Two soil samples will be collected approximately 6 inches bgs to evaluate the presence of contamination from scale inside of the pipes stored in the yard Soil samples will be analyzed for arsenic, mercury, boron, and pH

- UST Excavation - Six soil samples will be collected from the former UST excavation All sampling will be performed in accordance with the requirements of the *Tri-Regional Board Staff Recommendations for Primary Evaluation and Investigation of Underground Storage Tank Sites* dated August 10, 1990 The location of the 1991 UST excavation will be identified by a visual survey and interviews with knowledgeable personnel One soil sample will be collected from beneath the fill material at each end of the excavation, and one sample will be collected immediately adjacent to each of the four excavation sidewalls All six soil samples will be collected from borings advanced by a drilling rig The samples will be submitted to a laboratory and analyzed for TPH/diesel and BTEX

2.3 FRANCISCO WELL PAD

Potential concerns at the Francisco Well Pad are releases to soils on the north side of the pad from uncontrolled steam venting, and releases of geothermal and drilling fluids to soil from spill incidents The following sampling will be performed

- Distressed Vegetation - Two shallow soil samples will be collected for laboratory analysis of a 2 1 composite sample for arsenic, mercury, boron, and pH

- Spills - Two soil samples will be collected approximately 6 inches bgs near the catchment basin and stormwater outflow areas Samples will be analyzed for arsenic, mercury, boron, chromium and pH

2.4 COLEMAN WELL PAD

The Coleman drilling sump has not been rehabilitated and there are some concerns regarding its integrity Distressed vegetation on the north side of the well pad may be due to leakage from the sump or to historical steam emissions Residue was observed beneath the knockout pots on the steam gathering lines The following scope of sampling will be performed

- Sump integrity - Three samples will be collected approximately 1 to 2 feet below the clay liner, if possible The samples will be analyzed for arsenic, mercury, boron, chromium, and pH

- Distressed Vegetation - Six soil samples will be collected approximately 6 inches bgs Three 2 1 composite samples will be analyzed for arsenic, mercury, boron and pH.

- Knockout pots - Two soil samples will be collected approximately 6 inches bgs below two different knockout pots The samples will be analyzed for arsenic, mercury, boron and pH

2.5 WEST COLEMAN WELL PAD

The leaking wellhead at the West Coleman well pad will be investigated by inquiries to NCPA

2.6 STEAM GATHERING SYSTEM

Numerous leaks have been reported from leaks in the condensate and reinjection lines Extensive investigation was performed by Harding Lawson Associates to address these concerns at the request of the California Regional Water Quality Control Board (RWQCB) After reviewing the investigation report, the RWQCB concluded in their letter dated July 30, 1991, that no additional investigation would be necessary for site closure, therefore, it is our opinion that no further sampling is warranted in these areas

2.7 EQUIPMENT SAMPLING

To obtain preliminary data regarding potential contamination of pipelines and equipment in order to estimate the future facility decommissioning costs, several samples will be collected

- Piping - Two samples of the scale material on the interior of the piping will be sampled from the steam pipelines on the West Coleman well pad One sample of scale will be collected from the inside of the main knockout pot at the upstream side of the header One sample will be collected from the inside of the main steam line The assistance of DWR will be required to access these sample locations The samples will be analyzed for arsenic and mercury

- Muffler - One scale sample will be collected from the interior of the power plant vent muffler for analysis of arsenic, boron, and mercury The assistance of DWR will be needed to access the sample location

- Turbine - One wipe sample will be collected from the turbine and two chip samples will be collected from the walls adjacent to the turbine The impact to the integrity of the walls will be minimized The samples will be analyzed for arsenic and mercury

3.0 FIELD PROCEDURES

Shallow soil samples will be collected by first removing the top few inches of soil, and using a clean, stainless steel trowel to obtain a soil sample to place into a glass jar Deeper soil samples will be collected by drilling with a hand-operated slide hammer auger and sampler lined with stainless steel sleeves Upon retrieval of the sampler, the sleeve with the most undisturbed, representative soil will be retained A teflon sheet and polyethylene cap will be attached to each end of the sleeve. Prior to each use, the sampler, trowel and sleeves will be washed in detergent and rinsed with deionized water

Borings for soil sampling will be advanced using a hollow stem auger drilling rig equipped with six- or eight-inch diameter hollow stem augers The drill rig and all sampling equipment will be steam cleaned before and after drilling each boring The first boring will be advanced through fill material of the UST excavation Continuous drive samples will be collected from this boring to assess the depth of the excavation The boring will be terminated upon reaching native soil, anticipated to be 12 to 15 feet bgs All other borings will be sampled at the surface and thereafter at 5-foot intervals Samples will be obtained by using a modified California split spoon sampler lined with thin-walled stainless steel rings at least three inches long and two inches in diameter The rings will be precleaned prior to use The soil samples will be logged in the field by a geologist under the supervision of a California Registered Geologist using the Unified Soil Classification System

Upon retrieval, each sample will be prepared for potential chemical analysis Each end of the ring will be sealed with Teflon sheeting or aluminum foil, plastic endcap, and labeled The sample will then be immediately placed in a cooler and chilled for storage and delivery to the laboratory Sample storage, shipping and laboratory log-in will be performed in accordance with U S EPA Chain-of-Custody protocol

Two soil samples will be collected from beneath the fill material in the UST excavation, four samples will be collected from the sidewalls approximately one to two feet above the base of the tank pit. If groundwater is encountered, one soil sample from each boring will be collected for analysis from immediately above the water table Upon completion, the borings will be backfilled with neat cement grout containing no more than five percent bentonite Soil cuttings from the borings will be stockpiled on visqueen The stockpile will be covered with visqueen after completion of the six borings An appropriate soil disposal method will be determined after receipt of laboratory analyses

Wipe samples will be collected by wiping a sterile cloth over a measured area, and sealing the cloth in a zippered plastic bag Scale material and wall or concrete chips will also be collected using clean instruments and shipped to the lab in a sealed plastic bag

The samples will be labeled, put in an ice chest with blue ice, and shipped to D&M Laboratories of Petaluma, California, for laboratory analysis Standard EPA chain-of-custody documentation will be maintained for all samples collected

Borings will be backfilled with soil Decontamination rinseate will be stored in a resealable waterproof container Based on our knowledge of the site, rinseate should be disposed of with the reinjection fluid

4.0 QUALITY ASSURANCE/QUALITY CONTROL

4.1 GENERAL

This section contains procedures for quality control of sample handling and testing Laboratory testing will be carried out by a laboratory certified by the California Department of Health Services

4.2 SAMPLING QUALITY ASSURANCE

4.2.1 Equipment Calibration and Maintenance

All equipment used during the field investigation will be checked at least on a daily basis to ensure it is functioning properly Preventative maintenance will be emphasized to reduce the need for corrective action Manufacturer's manuals will be used as guides for maintenance requirements For equipment without manuals, generally accepted procedures will be used

The Organic Vapor Monitor (OVM) will be calibrated at the beginning of each sampling day and at any other time that out-of-calibration operation is suspected The OVM must have single-point calibration checks every hour, or full recalibration if readings of ≥ 10% difference from initial readings are obtained

The OVM is calibrated to a two-point procedure by sequentially introducing into the instrument certified zero-grade air, then a certified gas standard of known concentration

The results of calibration and records of repairs will be recorded in the field memos If an individual suspects an equipment malfunction, the device will be removed from service, tagged so that it is not inadvertently used, and the appropriate personnel notified so that a recalibration can be performed or a substitute piece of equipment can be obtained

Equipment that fails calibration or becomes inoperable during use will be removed from service and either segregated to prevent inadvertent use, or tagged to indicate that it is out of calibration Such equipment will be repaired and satisfactorily recalibrated Equipment that cannot be repaired will be replaced

4.2.2 Sample Collection Procedures

Standard procedures will be used for collecting soil samples The procedures are described in Section 3 0 of the Work Plan Field personnel will become thoroughly familiar with them prior to initiating activities at the site and a copy of the Work Plan will be kept on-site for reference

4.2.3 Sample Identification

Each sample collected will be assigned a unique number by which it will be identified and tracked from the time of collection until its final disposition

4.2.4 Sample Preservation Procedures

Samples will be preserved upon collection by cooling them in ice chests maintained at or below 4°C Samples will be cooled using ice and shipped by common carrier to the Certified Laboratory within 3 days of collection

4.2.5 Chain-of-Custody Procedures

All collected information, data, samples, and documents will be accounted for and retrievable at any time during this investigation Chain-of-custody procedures will be used to document the sample handling and shipping procedures, and in general, to identify and ensure the traceability of the collected samples Custody procedures will trace the sample from collection, through any custody transfers, and finally to the analytical laboratory where their internal procedures will take over until final disposition of the samples

All shipping containers will be sealed with custody tape prior to shipment In addition, entries noting the condition of the samples and their containers will be recorded in the field notes and laboratory logbook. The custody record will indicate any tampering that may have occurred The absence of such comments will indicate that no tampering was observed or suspected

A chain-of-custody form will be used to document changes of custody from the time of collection until final disposition The custody records will be used for a packaged lot of samples, therefore, more than one sample will be recorded on one form More than one form will be used if necessary to record all of the samples in a particular lot The original record will always remain with the samples The originator and other Appropriate persons in the chain-of-custody will retain copies

The analytical laboratory will have a designated sample custodian to implement a system for controlling samples This will include accepting custody of arriving samples, verifying that the information on the sample labels matches that on the chain-of-custody record, assigning unique laboratory numbers, and distributing the samples to the appropriate analyst

4 2.6 Decontamination of Sampling Equipment

The following decontamination procedures will be followed to restrict the movement of potentially contaminated materials into uncontaminated areas, and to reduce the potential of cross-contamination of the samples collected during the investigation from other materials or the sampling equipment

All sample containers will be precleaned by the supplier using EPA approved standard protocols

All field equipment that could contact the samples or sample containers will be cleaned prior to use and between each sampling event by washing in a detergent solution, then triple-rinsed in deionized water The rinsate will be retained disposed of by an appropriate method

4.2.7 Personnel Qualifications

Sampling will be conducted by Dames & Moore scientists or geologists, who will report to a registered geologist or certified engineering geologist

4.3 LABORATORY QUALITY ASSURANCE

4.3.1 Laboratory Certification by DHS

The testing laboratory will be one certified by the California Department of Health Services All of the chemical analytical methods are EPA or DHS-approved and described in detail in government references (see 40 CFR Part 1236, 26 October 1984, SW-846, Rev 1, 12/87 and DHS LUFT Manual)

4 3.2 Laboratory Quality Assurance Program

The general requirements of analyses are

- Analytical batch size will not exceed twenty samples,
- Data will be reported on moisture-free basis, and
- Results will not be altered by blank subtraction

Blanks The laboratory will be required to monitor the impact on accuracy of the sample preparation and measurement phases of the analyses Each analytical batch will include a method blank of the reagent mixture in contaminant-free water carried through the laboratory process Each group of samples in an instrument analytical run will include an instrument blank for that analysis group This blank is prepared from the same matrix, and at the same time as the calibration standards and shows the instrument response to the analyte-free matrix of the standards

Knowns The laboratory will be required to prepare and analyze a control sample or blank spike This sample will include a number of the requested analytes in a contaminant-free water at levels approximately equivalent to the midrange of quantification carried through the method preparation This sample will show the laboratory' s capability to process and measure accurately a matrixindependent suite of components The laboratory will run this sample in duplicate to show an ability to produce the same results

In addition to a blank spike, many analytical methods monitor the effectiveness of the extraction process on the actual sample by the spiking of each sample with surrogate substances These are chemically similar to the analytes but uniquely identifiable as not originally present in the sample Surrogate recoveries will be monitored for GC-MS analyses

As a further check on the matrix effects on the recovery of actual analyte substances, the laboratory will monitor each batch of extractions with a set of matrix spike samples (MS and MSD) A standard set of substances is spiked into duplicated portions of a single sample representing the apparent average matrix of that batch The level of recovery of the known concentration and the similarity on the two duplicates will be monitored

Precision The capability of the laboratory to generate the same results on the same sample will be checked in two ways First, the duplicate run of a blank spike sample will show the reproducibility of the laboratory preparation and instrumental response Second, the matrix spike and duplicate (MS, MSD) results will give an assessment of the effect of the matrix on the reproducible recovery of known levels of components

4.3.3 Laboratory Report

The laboratory will be required to include all quality control results with its data report on each batch of samples Results will include

- Instrument blanks,
- Method blanks,
- Blank spike sample recoveries in percent of known versus expected,
- Relative percent difference of results,
- Matrix spike, matrix spike duplicate percent recoveries,
- Relative percent difference of MS, MSD results,
- Surrogate recoveries,
- Detection limits, and
- Cover memorandum (contents discussed below)

The laboratory will be required to maintain a project file for 5 years Prior to any disposal, the file will be offered to Dames & Moore for control The project file will contain

- Originals or legible copies of all raw data,
- Standards and calibration records,
- Calculations,
- Quality control results,
- All corrective actions,
- Documentation of data quality problems,
- Modifications of methods,
- Problems with samples,
- Communications with the client,
- Chain-of-custody records, and
- Analyte requests

A copy of the final report will be retained as well

The report cover statement will notify us of any qualifications or exceptions to the data This should include, but not be limited to

- Any holding time problems,
- Incomplete data, i e , analyses requested, but not done,
- Detection limits higher than those of the standard method,
- Recoveries outside those expected from the method,
- Reproducibility outside those expected from the method, and
- Laboratory blank contamination

Each data package on receipt from the laboratory (14 day turnaround) will undergo immediate review We will make an assessment of the reports compliance for the analyses requested as to method, holding times, analyte list, and completeness The data's accuracy, precision, and usability will be reviewed with the laboratory or field operation and resolved before submitting the data to the client. Data accepted as meeting quality criteria will be maintained in a cumulative database for further analysis and report preparation

5.0 REPORT PREPARATION

Dames & Moore will prepare a summary report documenting our investigation and findings This report will be submitted to Creston in draft form approximately two weeks following receipt of the laboratory analytical results

Our report will evaluate the presence of any detections with respect to background levels of these constituents in soils from this area We will recommend further investigation, if necessary, to evaluate the extent of contaminants encountered

6.0 SCHEDULE AND ESTIMATED FEE

The total project time is estimated to be six weeks Field work should be completed within two days Laboratory turnaround will be standard (at ten working days) Dames & Moore has assumed that adjustments to the schedule due to inclement weather, obstructions to digging (such as impermeable barriers, buried debris or utilities) or equipment failure will not occur In the event of any unforeseen delays, however, we will notify you immediately

The estimated fee for this investigation is $18,920 A breakdown of this amount is provided in Table 2

TABLE 2

FEE ESTIMATE BREAKDOWN

Work Plan Preparation	
Project geologist	$1,600
Senior geologist	$ 500
Office Equipment	$ 200
Subtotal	$2,300
Field Investigation	
Staff geologist	$3,600
Rental Car	$ 250
Per diem (4 days @ $90/day)	$ 360
Field equipment	$ 250
Driller	$1,900
Miscellaneous	$ 200
Subtotal	$6,560
Laboratory Analysis	
Sample preparation	
27 samples @ $30	$810
Arsenic, mercury, boron	
27 samples @ $70	$1,890
Corrosivity, pH	
22 samples @ $15	$330
Vanadium	
2 samples @ $15	$30
Chromium	
4 samples @ $15	$60
Chlorinated Herbicides	
2 samples @ $175	$350
TPH/d and BTEX	$150
6 samples @ $165	$990
Subtotal	$4,460
Project Management and Report Preparation	
Project Geologist	$3,200
Project Chemist	$600
Senior Geologist	$900
Support Staff	$400
Technical Illustration	$300
Office Equipment	$200
Subtotal	$5,600
PROJECT TOTAL	$18,920

R:\WORDPROC\AB\96BMB.002

TABLE 1 PROPOSED SAMPLING PLAN			
LOCATION	**CONCERN**	**ACTION**	**ANALYSES**
Power Plant			
Muffler	Steam emissions, B, Na	2 composite soil samples approximately 6" depth	As, B, Hg, pH
Underground Sumps[1]	oil, condensate	inspect, concrete core, if possible	As, B, Hg, V
Fiberglass Line Failure	condensate	none (below switchyard)	none
Stormwater Outflow	condensate, cooling tower blowdown, surface spills	3 soil samples, 6" depth	As, B, Hg, V, pH
Underground Lines	condensate, cooling tower blowdown	none	none
Steam Suppliers Compound			
UST	diesel fuel	6 soil samples	BTEX, TPH/d
Distressed Vegetation	herbicides	2 composite shallow soil samples	Chlorinated herbicides
Equipment Yard Contaminated Equipment	scale, runoff	2 shallow soil samples	As, B, Hg, Cr, pH
Francisco Well Pad			
Distressed Vegetation	steam	2 composite samples	As, B, Hg, pH
Spills	drilling fluids, geothermal fluids	2 soil samples	As, B, Hg, Cr, pH
Coleman			
Sump Integrity	geothermal fluid	3 samples - 2' below liner	As, B, Hg, pH, Cr
Distressed Vegetation	drilling fluid	3 composite soil samples, 6" depth	As, B, Hg, pH, Cr
Knockout pots	steam	2 soil samples, 6" depth	As, B Hg, pH
West Coleman	leaking wellhead	contact NCPA to investigate	none
Surface Steam Gathering System	condensate leaks reinjection fluid	none needed, per RWQCB letter	none
Equipment Sampling			
Piping	scale	2 scale samples	As, Hg
Muffler	scale	1 sample	As, Hg, B
Turbine	steam	1 wipe sample 2 chip samples from walls	As, Hg

[1]Confined space entry may not be possible

APPENDIX B

FIELD METHODS

APPENDIX B- FIELD METHODS

B.1 Samples were collected as follows, summarized from Dames & Moore's Work Plan

B.1.1 Power Plant Locations

- Muffler - Collected four soil samples approximately 6 inches below ground surface (bgs) from the area downwind of the muffler Submitted two composite samples for laboratory analysis of arsenic, boron, sodium, mercury and pH

- Underground Sumps - A chip sample was obtained by plant personnel from the reinjection sump for laboratory analysis of arsenic, mercury, vanadium, boron, and pH

- Stormwater Outflow - Collected three soil samples approximately 6 inches bgs beneath the outflows to the unnamed tributary Potential concerns include constituents from surface spills, cooling tower blowdown, and condensate The soil samples will be analyzed for arsenic, mercury, vanadium, boron and pH

B.1.2 Steam Suppliers Compound

- Distressed Vegetation - Four surface soil samples were collected from the vicinity of the distressed vegetation and composited 2 1 by the laboratory Two samples will be analyzed for chlorinated herbicides, arsenic, mercury, boron, and pH

- Equipment Yard - Two soil samples were collected approximately 6 inches bgs to evaluate the presence of contamination from scale inside of the pipes stored in the yard Soil samples will be analyzed for arsenic, mercury, boron, and pH

- UST Excavation - Six soil samples were collected from the former UST excavation All sampling was performed in accordance with the requirements of the *Tri-Regional Board Staff Recommendations for Primary Evaluation and Investigation of Underground Storage Tank Sites* dated August 10, 1990 The location of the 1991 UST excavation was identified by a visual survey and discussion with Dave Bogener One soil sample was collected from beneath the fill material at each end of the excavation, and one sample was collected immediately adjacent to each of the four excavation sidewalls All six soil samples were collected from borings advanced by a drilling rig The samples were submitted to a laboratory and analyzed for TPH/diesel and BTEX

B.1.3 Francisco Well Pad

- Distressed Vegetation - Two shallow soil samples were collected for laboratory analysis of a 2 1 composite sample for arsenic, mercury, boron, and pH

- Spills - Two soil samples were collected approximately 6 inches bgs near the catchment basin and stormwater outflow areas Samples were analyzed for arsenic, mercury, boron, chromium and pH

B.1.4 Coleman Well Pad

- Sump integrity - Two samples were collected approximately 1 to 2 feet below the clay liner The samples were analyzed for arsenic, mercury, boron, chromium, and pH

- Distressed Vegetation - Six soil samples were collected downwind of the wellheads, approximately 6 inches bgs Three 2 1 composite samples will be analyzed for arsenic, mercury, boron and pH

- Knockout pots - Two soil samples were collected approximately 6 inches bgs below two different knockout pots The samples were analyzed for arsenic, mercury, boron and pH

B.1.5 Equipment Sampling

- Piping - Two samples of the scale material on the interior of the piping were taken from the steam pipelines on the West Coleman well pad One sample of scale was collected from the inside of the main knockout pot at the upstream side of the header One sample was collected from the inside of the main steam line The assistance of DWR was required to access these sample locations The samples will be analyzed for arsenic and mercury

- Muffler - A scale sample was gathered from the vertical separator at the power plant vent muffler The sample was analyzed for arsenic, boron, and mercury

- Turbine - One wipe sample was collected from the turbine and two chip samples were collected from the walls of the power plant adjacent to the turbine The impact to the integrity of the walls was minimized The samples were analyzed for arsenic and mercury

B.2 Soil Sampling

The samples at the steam suppliers compound UST location were advanced using a continuous coring direct-push system mounted on a Bobcat tractor Each boring was logged by a Dames & Moore geologist Soils were classified in accordance with the Unified Soil Classification System Copies of boring logs are included in Appendix B

The sampler was driven 36 inches into the soil and retrieved using a wireline Upon retrieval of the sampler, the geologist would log the material and take an undisturbed ring for analysis Teflon seals and plastic caps were placed on each end of the sample ring, and it was labeled with

job number, location, sample number, depth, time, date, and collector, and placed in an iced cooler for transport to the laboratory Field screening was conducted using an organic vapor meter (OVM) by placing soil from the unused sample rings in a plastic bag, agitating it and allowing it to volatilize, and then monitoring the headspace vapors

Prior to use, all sample rings and sampling equipment was cleaned using the method described above The coring equipment was decontaminated onsite by steam cleaning before and after each boring

B.3 Sample Documentation

Samples collected were labeled with the following information job number, location, sample I.D , depth, date, time, and collector Field records of sampling were kept in field notes, which are maintained in the project file

Chain of custody records were maintained for all samples collected Each chain of custody form was filled out by the sample collector before relinquishing custody of the samples for storage or transportation The form was then routed with the samples through storage, transportation, and laboratory analysis

When the samples arrived at the laboratory, the receiver signed the chain of custody forms and entered a laboratory identification number onto the sample label and chain of custody form The identification number was used by the laboratory in its internal tracking system, thus the status of any particular sample could be determined at any time by referring to the laboratory log books A copy of the completed chain of custody forms was provided to Dames & Moore by the laboratory after the samples were logged in

B.4 Waste Containment

Wastes generated included decontamination rinsate, and soil cuttings from the UST borings They were contained in a DOT-approved 55-gallon drum and a metal 5-gallon pail The containers were stored in the steam suppliers compound equipment yard pending lab results, when it was determined that they could be deposited and graded back onsite

B.5 Health and Safety Program

Dames & Moore has developed a firmwide Health and Safety Program to protect personnel who handle hazardous materials in the course of their work A Health and Safety Fact Sheet questionnaire was used to develop a site-specific Health and Safety Plan describing safety requirements and procedures of the project The program developed for the work at the site emphasized air quality monitoring and protective clothing, including hard hats, safety glasses, coveralls, steel-toed work boots, and rubber gloves, safe work practices, such as no eating, smoking, or drinking during work, and emergency response procedures

Dames & Moore also required that its drilling subcontractor for this project (Precision Sampling) have a health and safety program and that they be responsible for the health and safety practices of their employees.

A "tailgate" safety meeting was conducted by the Dames & Moore geologist at the beginning of the day's work to address important health and safety issues and emergency response procedures

APPENDIX C

BORING LOGS

BORING B-1

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/12	9:55		0
	CC	36/28	10:10		4
5	CC	36/36	10:15	-	.4
	CC	36/21	10:20	-	.5
10	CC	36/24	10:25	B1/13'	.5
15					
20					
25					
30					
35					

SYMBOLS		DESCRIPTION
	GW/SW	RED SANDY GRAVEL [FILL] Red gravelly sand (30 70 0 0) moist fine to medium gravel [FILL] Rock fragments
	CL/SC	DARK BROWN GRAVELLY SANDY CLAY fine to medium sand medium gravel grades to medium brown with increased sand

NOTES

1 Boring completed at a depth of 13 feet on 10/3/95
2 Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
4 For an explanation of terms used see the Soil Classification Chart and Key to Test Data, Plate A-7

LOG OF BORING

Dames & Moore

PLATE A-1

BORING B-2

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/12	10 15	-	.3
	CC	36/27	10.55	-	.5
5	CC	36/28	11:00		.8
	CC	36/21	11:04	-	
10	CC	36/21	11:10	B2/12.5	4
15					
20					
25					
30					
35					

SYMBOLS	DESCRIPTION
SW	RED GRAVELLY SAND [Fill] rock fragments sand fine to medium gravel fine to coarse Slightly moist at 4 Moist, wet
SC	BROWN GRAVELLY CLAYEY SAND sand fine to medium gravel fine to medium (15 50 35)

NOTES

1 Boring completed at a depth of 13 feet on 10/03/95
2. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
3 For an explanation of terms used see the Soil Classification Chart and Key to Test Data, Plate A 7

LOG OF BORING

Dames & Moore

30681-001-043

PLATE A-2

BORING B-3

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/10	11:30	-	1
	CC	36/6	11:36	-	.5
5	CC	36/12	11:45	-	4
	CC	36/16	11:50	63/10	4
10					
15					
20					
25					
30					
35					

SYMBOLS	DESCRIPTION
GW	GRAY AND RED SANDY GRAVEL [Fill] 4" red fill, 2-inch diameter rock fragments gray-brown sandy gravel with clay [Fill]
CL	BROWN-GREENISH GRAY SILTY CLAY WITH GRAVEL AND SAND moist, rock fragments [Fill] areas of increasing sand and/or gravel

NOTES

1 Boring completed at a depth of 10 feet on 10/03/95
2 Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
3 For an explanation of terms used see the Soil Classification Chart and Key to Test Data, Plate A-7

LOG OF BORING

Dames & Moore

30681-001-043

PLATE A-3

BORING B-4

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/10	12:30		.3
	CC	36/16	12:40	-	1
5	CC	36/12	12:45	-	1
	CC	36/15	12:50	B4/10	.5
10					
15					
20					
25					
30					
35					

SYMBOLS		DESCRIPTION
	GM	RED AND GREY ROCK FRAGMENTS AND SAND [Fill]
	CL	BROWN-GRAYGREEN SANDY GRAVELLY CLAY moist, gravel and sand fine to medium, rock fragments, (30, 20 0 50) [Fill]
		color changes to greenish gray, increased fine sand

NOTES
1 Boring completed at a depth of 10 feet on 10/03/95
2 Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
3 For an explanation of terms used see the Soil Classification Chart and Key to Test Data, Plate A-7

LOG OF BORING

Dames & Moore

30681-001-043

PLATE A-4

BORING B-5

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/10	13:30		.9
	CC	36/16	13:10		.5
5	CC	36/16	13:15	-	.4
	CC	36/8	13:20	B5/10	.4
10					
15					
20					
25					
30					
35					

SYMBOLS	DESCRIPTION
GM	BROWN SILTY SANDY GRAVEL, fine-medium (45,30 25 0) [Fill] gets darker brown increasing clay sandy rock fragments and gravel fill
CL	VARIEGATED BROWN AND RED BROWN SANDY CLAY WITH GRAVEL,medium soft, moist (10 30, 0, 60) [Fill] some green-gray, less gravel

NOTES

1 Boring completed at a depth of 10 feet on 10/03/95
2 Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
3 For an explanation of terms used see the Soil Classification Chart and Key to Test Data, Plate A 7

LOG OF BORING

Dames & Moore

30681-001-043

PLATE A-5

BORING B-6

DATE DRILLED 10/3/95

DEPTH IN FEET	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	OVA
0	CC	12/8	13:35	-	1
	CC	36/14	13 40		.5
5	CC	36/16	13 45	-	2.5
	CC	36/16	13.50	B6/10	1 1
10					
15					
20					
25					
30					
35					

SYMBOLS	DESCRIPTION
GM	RED ROCK FRAGMENTS AND SANDY GRAVEL [Fill] 4 of red fill, as above, then gray silty gravel, then brown-dark brown gravelly sandy clay, fine-medium, moist, medium stiff All fill. 4" of red fill, then 2" sandy gravel fill, then brownish sandy clay with gravel, gravel fine, red moist.
CL	GREENISH YELLOW TO BROWN SANDY CLAY WITH GRAVEL, trace rootlets moist medium stiff (5 25, 0 70)

NOTES
1 Boring completed at a depth of 10 feet on 10/03/95
2 Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled
3 For an explanation of terms used see the Soil Classification Chart and Key to Test Data Plate A-7

LOG OF BORING

Dames & Moore

30681-001-043

PLATE A-6

APPENDIX D

LABORATORY REPORTS, CHAIN OF CUSTODY DOCUMENTATION, AND SUMMARY OF DATA VALIDATION

OFFICE MEMORANDUM

SACRAMENTO, CALIFORNIA

ACTION		INFO	DATE	November 17, 1995
TO	Brandon Born		FILE	30681-001-043
FROM	Sacramento Data Validation Group		REPLY BY	
SUBJECT:	Summary of Data Validation for 703651 Bottle Rock Power Plant			

A check for data completeness (Completeness Check) was performed by the Sacramento QA/QC Group on Pace Laboratory Report 703651 for the Bottle Rock Power Plant samples This report contains analytical data for 39 soil, wipe, and concrete chip samples These samples were collected on October 2-3, 1995 for analysis by EPA 7471 (Mercury), EPA 6010 (Arsenic, Chromium, Vanadium, and Boron), EPA 8015M (TPH-diesel), and EPA 8010/8020 (Volatile Organic Compounds), and EPA 9045 (pH) This report was received from Pace Laboratories on November 15, 1995

The data were reviewed in accordance with analytical methods outlined in EPA SW-846, and CA LUFT Manuals The data were evaluated based on the following parameters

- ✓ Data Completeness
- ✓ Holding Times
- ✓ Blanks
- ✓ Laboratory Control Samples
- ✓ Matrix Spike/Matrix Spike Duplicates
- ✓ System Monitoring Compounds (Surrogates)
- ✓ Compound Identification and Quantification

The following is a summary of the Completeness Check

- All analyses were performed as per Chain-of-Custody (COC) with the except of Chromium by EPA 6010 for samples **PP1A+PP1B, PP2A+PP2B, PPINUS, and CKOOSEL** and Aromatic Volatiles by EPA 8020 for samples **B1, B2, B3, B4, B5, B6 and EQUIP RINSE**, which were requested by Dames & Moore, but not indicated on the COC Due to this oversight no associated laboratory QC data has been reported for EPA Method 8020

- The associated EPA Method 8010 (VOCs) Matrix Spike/Matrix Spike Duplicate were not performed on samples from this project, therefore, no assessment of matrix effects can be made Sample **B-3-10** was used for the MS/MSD for EPA 8015M (TPH-diesel) analysis and met method acceptance criteria. Laboratory Control Sample (LCS) results were within acceptance criteria.

- Due to poor Matrix Spike (MS) recovery for Arsenic (61%), Chromium (37%), and Vanadium (57%) for project sample **PPINUS**, sample results have been flagged as estimated (J), if detected, and (UJ) if not detected, in the following samples **TW-1, PPINUS, PP2A+2B, CMPSS, CK00SEL, F10F, FCB, CS1, CS2, SSCUSGP, SSCOUT, PPCHIP2, PPCHIP3, PP30DE, PP40C, and PP50AB** Also, due to poor MS recovery for Mercury (-593%) in sample **TW-1**, sample results have been flagged as estimated (J) in the following samples **TW-1, TS1, PPINUS, FDVCSE 1A+1B, FDCSW2A+2B, FCB, CK00SEL, CKOUSEL, CS1, CDVCS1A+1B, CDVCS2A+2B, CDVCS3A+3B, and PP50AB** Some project samples were not qualified based on poor matrix spike recoveries since these samples were run with Batch-QC using samples from another project, therefore, no assessment of matrix effects could be made All Laboratory Control Sample (LCS) results were within acceptance criteria.

- The method blank associated with samples **B-1-13, B-2-12 5, B-3-10, B-4-10, B-5-10, and B-6-10** for EPA 8010 was reported to contain methylene chloride at a concentration of 0 94 ppb Reported concentrations of methylene chloride in these samples have been flagged as anomalous (U), and should be treated as non-detects

- Sample **CMPSS** was diluted for the arsenic analysis (EPA 6010) due to high interfering iron concentrations in the sample

- Heavy hydrocarbons were reported as being present in sample **B-5-10** Sample results have been flagged as estimated (J)

- All analysis holding times were met.

- A corrected report is being issued by the laboratory due to errors in collection dates and reporting units and detection limits

These data are acceptable in all other areas of review and useable for their intended purpose

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

RECEIVED
NOV 1 5 1995

November 1, 1995

Ms Jill Haizlip
Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

RE PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Dear Ms Haizlip

Enclosed are the results of analyses for samples received on October 5, 1995

The analysis for chlorinated herbicides was performed by PACE Southern California A copy of the analytical report is attached

If you have any questions concerning this report, please feel free to contact me

Sincerely,

Carol S McHale
Project Manager

Enclosures

1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
TEL. 707 792-1865
FAX. 707 792-0342

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone. (412)896-5858

PACE Sample No 70346036
Client Sample ID B-1-13

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated and Aromatic Organics								
Chloromethane	ND	ug/kg	0 8	10/16/95	EPA 8010	mdw	74-87-3	
Bromomethane	ND	ug/kg	3	10/16/95	EPA 8010	mdw	74 83 9	
Vinyl Chloride	ND	ug/kg	1 8	10/16/95	EPA 8010	mdw	75-01 4	
Chloroethane	ND	ug/kg	5 2	10/16/95	EPA 8010	mdw	75-00-3	
Methylene Chloride	4 1 U	ug/kg	2 5	10/16/95	EPA 8010 U	mdw	75-09 2	1
Trichlorofluoromethane	ND	ug/kg	5	10/16/95	EPA 8010	mdw	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1 3	10/16/95	EPA 8010	mdw	75-35-4	
1,1 Dichloroethane	ND	ug/kg	0 7	10/16/95	EPA 8010	mdw	75-34-3	
trans-1,2 Dichloroethene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	156-60-5	
Chloroform	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	67-66-3	
1,2 Dichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	107-06-2	
1,1,1-Trichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	71-55 6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/16/95	EPA 8010	mdw	56-23 5	
Bromodichloromethane	ND	ug/kg	1	10/16/95	EPA 8010	mdw	75-27 4	
1,2 Dichloropropane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	78-87 5	
cis 1,3 Dichloropropene	ND	ug/kg	3 4	10/16/95	EPA 8010	mdw	10061-01-5	
Trichloroethene	ND	ug/kg	1 2	10/16/95	EPA 8010	mdw	79-01-6	
Dibromochloromethane	ND	ug/kg	0 9	10/16/95	EPA 8010	mdw	124-48-1	
1,1 2-Trichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	79-00 5	
trans-1,3 Dichloropropene	ND	ug/kg	3 4	10/16/95	EPA 8010	mdw	10061 02-6	
Bromoform	ND	ug/kg	2	10/16/95	EPA 8010	mdw	75-25 2	
Tetrachloroethene	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	127 18-4	
1,1,2,2 Tetrachloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	79-34 5	
Chlorobenzene	ND	ug/kg	0 7	10/16/95	EPA 8010	mdw	108-90-7	
2 Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/16/95	EPA 8010	mdw	110 75-8	
1,2 Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	95-50 1	
1,3 Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	541 73-1	
1,4 Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	106-46-7	

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346036
Client Sample ID B-1-13

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzene	ND	ug/kg	0 5	10/16/95	EPA 8020	mdw		

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Toluene	ND	ug/kg	0.5	10/16/95	EPA 8020	mdw	
Ethylbenzene	ND	ug/kg	0.5	10/16/95	EPA 8020	mdw	
Xylenes (Total)	ND	ug/kg	1	10/16/95	EPA 8020	mdw	
Trifluorotoluene (S)	116	%		10/16/95	EPA 8020	mdw	
1,4-Dichlorobutane (S)	116	%		10/16/95	EPA 8010	mdw	110 56 5
Bromochloromethane	122	%		10/16/95	EPA 8010	mdw	
GC							
TPH in Soil by 8015 Modified							
Diesel Fuel	ND	mg/kg	5	10/24/95	TPH by EPA 8015M	DLL	
n-Pentacosane (S)	93	%		10/24/95	TPH by EPA 8015M	DLL	629 99 2
Date Extracted				10/17/95			

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REPORT OF LABORATORY ANALYSIS

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346044
Client Sample ID B-2-12 5

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/kg	0 8	10/16/95	EPA 8010	mdw	74-87-3	
Bromomethane	ND	ug/kg	3	10/16/95	EPA 8010	mdw	74-83-9	
Vinyl Chloride	ND	ug/kg	1 8	10/16/95	EPA 8010	mdw	75-01-4	
Chloroethane	ND	ug/kg	5 2	10/16/95	EPA 8010	mdw	75-00 3	
Methylene Chloride	3 4	ug/kg	2 5	10/16/95	EPA 8010	mdw	75-09-2	1
Trichlorofluoromethane	ND	ug/kg	5	10/16/95	EPA 8010	mdw	75-69 4	
1,1-Dichloroethene	ND	ug/kg	1 3	10/16/95	EPA 8010	mdw	75-35-4	
1,1-Dichloroethane	ND	ug/kg	0 7	10/16/95	EPA 8010	mdw	75-34 3	
trans-1,2-Dichloroethene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	156-60-5	
Chloroform	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	67 66 3	
1,2-Dichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	107-06-2	
1,1,1-Trichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	71-55 6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/16/95	EPA 8010	mdw	56-23 5	
Bromodichloromethane	ND	ug/kg	1	10/16/95	EPA 8010	mdw	75-27-4	
1,2-Dichloropropane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	78 87 5	
cis-1,3 Dichloropropene	ND	ug/kg	3 4	10/16/95	EPA 8010	mdw	10061-01 5	
Trichloroethene	ND	ug/kg	1 2	10/16/95	EPA 8010	mdw	79-01 6	
Dibromochloromethane	ND	ug/kg	0 9	10/16/95	EPA 8010	mdw	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	79-00 5	
trans-1 3-Dichloropropene	ND	ug/kg	3 4	10/16/95	EPA 8010	mdw	10061 02-6	
Bromoform	ND	ug/kg	2	10/16/95	EPA 8010	mdw	75-25-2	
Tetrachloroethene	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	127-18-4	
1,1,2,2 Tetrachloroethane	ND	ug/kg	0 5	10/16/95	EPA 8010	mdw	79-34-5	
Chlorobenzene	ND	ug/kg	0 7	10/16/95	EPA 8010	mdw	108-90-7	
2 Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/16/95	EPA 8010	mdw	110-75 8	
1,2-Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	95-50-1	
1,3 Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	541-73 1	
1 4-Dichlorobenzene	ND	ug/kg	1	10/16/95	EPA 8010	mdw	106-46-7	
Benzene	ND	ug/kg	0 5	10/16/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/16/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/16/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/16/95	EPA 8020	mdw		
Bromochloromethane (S)	126	%		10/16/95	EPA 8010	mdw	74-97-5	
1,4 Dichlorobutane (S)	110	%		10/16/95	EPA 8010	mdw	110-56-5	
Trifluorotoluene (S)	118	%		10/16/95	EPA 8020			
GC								
TPH in Soil by 8015 Modified								
Diesel Fuel	9 8	mg/kg	5	10/24/95	TPH by EPA 8015M	DLL		
n Pentacosane (S)	81	%		10/24/95	TPH by EPA 8015M	DLL	629 99-2	
Date Extracted				10/17/95				

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REPORT OF LABORATORY ANALYSIS

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346051
Client Sample ID B-3-10

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/kg	0 8	10/17/95	EPA 8010	mdw	74-87-3	
Bromomethane	ND	ug/kg	3	10/17/95	EPA 8010	mdw	74-83 9	
Vinyl Chloride	ND	ug/kg	1 8	10/17/95	EPA 8010	mdw	75-01-4	
Chloroethane	ND	ug/kg	5 2	10/17/95	EPA 8010	mdw	75-00-3	
Methylene Chloride	4 4 U	ug/kg	2 5	10/17/95	EPA 8010 U	mdw	75-09-2	1
Trichlorofluoromethane	ND	ug/kg	5	10/17/95	EPA 8010	mdw	75-69-4	
1,1 Dichloroethene	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	75 35-4	
1,1-Dichloroethane	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	75 34-3	
trans-1 2-Dichloroethene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	156-60-5	
Chloroform	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	67-66-3	
1,2-Dichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	107-06-2	
1,1,1 Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	56 23-5	
Bromodichloromethane	ND	ug/kg	1	10/17/95	EPA 8010	mdw	75-27-4	
1,2 Dichloropropane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	78 87-5	
cis 1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-01-5	
Trichloroethene	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	79-01-6	
Dibromochloromethane	ND	ug/kg	0 9	10/17/95	EPA 8010	mdw	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79 00-5	
trans-1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-02 6	
Bromoform	ND	ug/kg	2	10/17/95	EPA 8010	mdw	75 25 2	
Tetrachloroethene	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79 34-5	
Chlorobenzene	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	108-90-7	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	110-75-8	
1,2 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	95 50-1	
1,3-Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	106-46-7	
Benzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/17/95	EPA 8020	mdw		
Bromochloromethane (S)	130	%		10/17/95	EPA 8010	mdw	74 97-5	
1,4-Dichlorobutane (S)	119	%		10/17/95	EPA 8010	mdw	110-56-5	
Trifluorotoluene	125	%		10/17/95	EPA 8020	mdw		
GC								
TPH in Soil by 8015 Modified								
Diesel Fuel	14	mg/kg	5	10/30/95	TPH by EPA 8015M	DLL		2
n Pentacosane (S)	84	%		10/30/95	TPH by EPA 8015M	DLL	629-99-2	
Date Extracted				10/17/95				

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REPORT OF LABORATORY ANALYSIS

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346069 | Date Collected 10/03/95
Client Sample ID B-4-10 | Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/kg	0 8	10/17/95	EPA 8010	MDW	74 87-3	
Bromomethane	ND	ug/kg	3	10/17/95	EPA 8010	MDW	74 83-9	
Vinyl Chloride	ND	ug/kg	1 8	10/17/95	EPA 8010	MDW	75 01-4	
Chloroethane	ND	ug/kg	5 2	10/17/95	EPA 8010	MDW	75 00-3	
Methylene Chloride	6 2 U	ug/kg	2 5	10/17/95	EPA 8010 U	MDW	75 09-2	3
Trichlorofluoromethane	ND	ug/kg	5	10/17/95	EPA 8010	MDW	75 69-4	
1,1 Dichloroethene	ND	ug/kg	1 3	10/17/95	EPA 8010	MDW	75-35 4	
1,1-Dichloroethane	ND	ug/kg	0 7	10/17/95	EPA 8010	MDW	75-34-3	
trans 1,2 Dichloroethene	ND	ug/kg	1	10/17/95	EPA 8010	MDW	156-60-5	
Chloroform	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	67-66-3	
1,2-Dichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	107-06-2	
1,1,1-Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/17/95	EPA 8010	MDW	56-23-5	
Bromodichloromethane	ND	ug/kg	1	10/17/95	EPA 8010	MDW	75-27-4	
1,2-Dichloropropane	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	MDW	10061-01-5	
Trichloroethene	ND	ug/kg	1 2	10/17/95	EPA 8010	MDW	79-01-6	
Dibromochloromethane	ND	ug/kg	0 9	10/17/95	EPA 8010	MDW	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	79-00 5	
trans-1,3 Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	MDW	10061 02-6	
Bromoform	ND	ug/kg	2	10/17/95	EPA 8010	MDW	75-25 2	
Tetrachloroethene	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	127-18-4	
1,1,2,2 Tetrachloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	MDW	79-34-5	
Chlorobenzene	ND	ug/kg	0 7	10/17/95	EPA 8010	MDW	108-90-7	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/17/95	EPA 8010	MDW	110-75-8	
1,2-Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	MDW	95-50-1	
1,3 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	MDW	541 73-1	
1,4-Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	MDW	106 46-7	
Benzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/17/95	EPA 8020	mdw		
Bromochloromethane (S)	128	%		10/17/95	EPA 8010	MDW	74-97-5	
1,4-Dichlorobutane (S)	115	%		10/17/95	EPA 8010	MDW	110-56-5	
Trifluorotoluene (S)	119	%		10/17/95	EPA 8020	mdw		
GC								
TPH in Soil by 8015 Modified								
Diesel Fuel	ND	mg/kg	5	10/24/95	TPH by EPA 8015M	DLL		
n-Pentacosane (S)	102	%		10/24/95	TPH by EPA 8015M	DLL	629-99-2	
Date Extracted				10/17/95				

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REPORT OF LABORATORY ANALYSIS

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346077 Date Collected 10/03/95
Client Sample ID B 5-10 Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/kg	0 8	10/17/95	EPA 8010	mdw	74-87-3	
Bromomethane	ND	ug/kg	3	10/17/95	EPA 8010	mdw	74-83 9	
Vinyl Chloride	ND	ug/kg	1 8	10/17/95	EPA 8010	mdw	75-01 4	
Chloroethane	ND	ug/kg	5 2	10/17/95	EPA 8010	mdw	75-00-3	
Methylene Chloride	6 5 U	ug/kg	2 5 U	10/17/95	EPA 8010	mdw	75-09-2	1
Trichlorofluoromethane	ND	ug/kg	5	10/17/95	EPA 8010	mdw	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	75-35-4	
1,1-Dichloroethane	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	75-34-3	
trans-1,2-Dichloroethene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	156-60-5	
Chloroform	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	67-66-3	
1,2 Dichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	107 06-2	
1,1,1 Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	56-23-5	
Bromodichloromethane	ND	ug/kg	1	10/17/95	EPA 8010	mdw	75-27-4	
1,2 Dichloropropane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	78-87-5	
cis 1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-01 5	
Trichloroethene	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	79-01-6	
Dibromochloromethane	ND	ug/kg	0 9	10/17/95	EPA 8010	mdw	124-48 1	
1,1,2-Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79-00-5	
trans 1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-02-6	
Bromoform	ND	ug/kg	2	10/17/95	EPA 8010	mdw	75-25-2	
Tetrachloroethene	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	127-18 4	
1 1,2,2-Tetrachloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79-34-5	
Chlorobenzene	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	108-90 7	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	110 75 8	
1,2 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	95-50-1	
1,3 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	541-73 1	
1 4 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	106-46 7	
Benzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/17/95	EPA 8020	mdw		
Bromochloromethane (S)	143	%		10/17/95	EPA 8010	mdw	74-97-5	
1,4 Dichlorobutane (S)	113	%		10/17/95	EPA 8010	mdw	110-56 5	
Trifluorotoluene (S)	131	%		10/17/95	EPA 8020	mdw		
GC								
TPH in Soil by 8015 Modified								
Diesel Fuel	5 7 J	mg/kg	5	10/30/95	TPH by EPA 8015M	DLL		2
n-Pentacosane (S)	84	%		10/30/95	TPH by EPA 8015M	DLL	629-99 2	
Date Extracted				10/17/95				

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REPORT OF LABORATORY ANALYSIS

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346085
Client Sample ID. 8-6-10

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/kg	0 8	10/17/95	EPA 8010	mdw	74-87-3	
Bromomethane	ND	ug/kg	3	10/17/95	EPA 8010	mdw	74-83-9	
Vinyl Chloride	ND	ug/kg	1 8	10/17/95	EPA 8010	mdw	75-01-4	
Chloroethane	ND	ug/kg	5 2	10/17/95	EPA 8010	mdw	75-00-3	
Methylene Chloride	3 8 U	ug/kg	2 5	10/17/95	EPA 8010 U	mdw	75-09-2	1
Trichlorofluoromethane	ND	ug/kg	5	10/17/95	EPA 8010	mdw	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	75-35-4	
1,1 Dichloroethane	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	75-34-3	
trans 1,2 Dichloroethene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	156-60-5	
Chloroform	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	67-66-3	
1,2-Dichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	107-06-2	
1,1,1-Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	56-23-5	
Bromodichloromethane	ND	ug/kg	1	10/17/95	EPA 8010	mdw	75-27-4	
1,2-Dichloropropane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-01 5	
Trichloroethene	ND	ug/kg	1 2	10/17/95	EPA 8010	mdw	79-01-6	
Dibromochloromethane	ND	ug/kg	0 9	10/17/95	EPA 8010	mdw	124-48-1	
1,1,2 Trichloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79-00-5	
trans-1,3-Dichloropropene	ND	ug/kg	3 4	10/17/95	EPA 8010	mdw	10061-02 6	
Bromoform	ND	ug/kg	2	10/17/95	EPA 8010	mdw	75-25-2	
Tetrachloroethene	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	127-18-4	
1 1,2,2-Tetrachloroethane	ND	ug/kg	0 5	10/17/95	EPA 8010	mdw	79-34-5	
Chlorobenzene	ND	ug/kg	0 7	10/17/95	EPA 8010	mdw	108-90-7	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1 3	10/17/95	EPA 8010	mdw	110-75-8	
1,2 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	95-50 1	
1,3 Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	541-73 1	
1,4-Dichlorobenzene	ND	ug/kg	1	10/17/95	EPA 8010	mdw	106-46-7	
Benzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/17/95	EPA 8020	mdw		
Bromochloromethane (S)	116	%		10/17/95	EPA 8010	mdw	74-97-5	
1,4-Dichlorobutane (S)	115	%		10/17/95	EPA 8010	mdw	110-56-5	
Trifluorotoluene (S)	113	%		10/17/95	EPA 8020	mdw		
GC								
TPH in Soil by 8015 Modified								
Diesel Fuel	ND	mg/kg	5	10/24/95	TPH by EPA 8015M	DLL		
n-Pentacosane (S)	94	%		10/24/95	TPH by EPA 8015M	DLL	629-99 2	
Date Extracted				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346093 Date Collected 10/03/95
Client Sample ID EQUIP BLANK Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Volatile Halogenated Organics								
Chloromethane	ND	ug/L	0 8	10/17/95	EPA 8010	LMK	74 87-3	
Bromomethane	ND	ug/L	3	10/17/95	EPA 8010	LMK	74 83-9	
Vinyl Chloride	ND	ug/L	1 8	10/17/95	EPA 8010	LMK	75 01-4	
Chloroethane	ND	ug/L	5 2	10/17/95	EPA 8010	LMK	75 00-3	
Methylene Chloride	ND	ug/L	2 5	10/17/95	EPA 8010	LMK	75 09-2	
Trichlorofluoromethane	ND	ug/L	5	10/17/95	EPA 8010	LMK	75 69-4	
1,1 Dichloroethene	ND	ug/L	1 3	10/17/95	EPA 8010	LMK	75-35-4	
1,1-Dichloroethane	ND	ug/L	0 7	10/17/95	EPA 8010	LMK	75 34-3	
trans 1 2 Dichloroethene	ND	ug/L	1	10/17/95	EPA 8010	LMK	156-60 5	
Chloroform	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	67-66-3	
1,2-Dichloroethane	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	107-06 2	
1,1,1 Trichloroethane	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	71 55-6	
Carbon Tetrachloride	ND	ug/L	1 2	10/17/95	EPA 8010	LMK	56-23 5	
Bromodichloromethane	ND	ug/L	1	10/17/95	EPA 8010	LMK	75 27-4	
1,2 Dichloropropane	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	3 4	10/17/95	EPA 8010	LMK	10061-01-5	
Trichloroethene	ND	ug/L	1 2	10/17/95	EPA 8010	LMK	79 01-6	
Dibromochloromethane	ND	ug/L	0 9	10/17/95	EPA 8010	LMK	124-48 1	
1,1,2-Trichloroethane	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	79 00 5	
trans-1,3 Dichloropropene	ND	ug/L	3 4	10/17/95	EPA 8010	LMK	10061-02-6	
Bromoform	ND	ug/L	2	10/17/95	EPA 8010	LMK	75 25 2	
Tetrachloroethene	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	127-18 4	
1,1,2,2-Tetrachloroethane	ND	ug/L	0 5	10/17/95	EPA 8010	LMK	79-34-5	
Chlorobenzene	ND	ug/L	0 7	10/17/95	EPA 8010	LMK	108-90 7	
2 Chloroethyl Vinyl Ether	ND	ug/L	1 3	10/17/95	EPA 8010	LMK	110-75-8	
1,2 Dichlorobenzene	ND	ug/L	1	10/17/95	EPA 8010	LMK	95 50-1	
1,3 Dichlorobenzene	ND	ug/L	1	10/17/95	EPA 8010	LMK	541-73 1	
1 4-Dichlorobenzene	ND	ug/L	1	10/17/95	EPA 8010	LMK	106-46-7	
Benzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Toluene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Ethylbenzene	ND	ug/kg	0 5	10/17/95	EPA 8020	mdw		
Xylenes (total)	ND	ug/kg	1	10/17/95	EPA 8020	mdw		
Bromochloromethane (S)	105	%		10/17/95	EPA 8010	mdw	74-97 5	
1,4-Dichlorobutane (S)	111	%		10/17/95	EPA 8010	mdw	110-56 5	
Trifluorotoluene (S)	104	%		10/17/95	EPA 8020	mdw		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346101 Date Collected 10/02/95
Client Sample ID TURB-MID Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 233	mg/kg	0 0243	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	ND	mg/kg	11 6	10/13/95	EPA 6010	BRW	7440-38-2	
Date Digested				10/13/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346119
Client Sample ID. TURB EDGE

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0456	mg/kg	0 0234	10/12/95	EPA 7471	AMH	7439 97 6	
Metals, ICP								
Arsenic	ND	mg/kg	20 2	10/12/95	EPA 6010	BRW	7440-38 2	
Date Digested				10/11/95				

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PACE Project Number 703651
Client Project ID: Bottle Rock Power Plant

PACE Sample No 70346127 Date Collected 10/02/95
Client Sample ID. TURB BOT Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 727	mg/kg	0 0242	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	17	mg/kg	12 5	10/14/95	EPA 6010	BRW	7440-38-2	
Date Digested				10/13/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346135 Date Collected 10/02/95
Client Sample ID TW-1 Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	1 34 J	mg/kg	0 025	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	ND J	mg/kg	12 1	10/18/95	EPA 6010	BRW	7440 38-2	
Date Digested				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346168 Date Collected 10/02/95
Client Sample ID PP1A+PP1B Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 166	mg/kg	0 0192	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	15 6	mg/kg	4 29	10/14/95	EPA 6010	BRW	7440-38-2	
Chromium	58	mg/kg	0 354	10/14/95	EPA 6010	BRW	7440-47-3	
Boron	2 5	mg/kg	1 52	10/14/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	7 35			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346176
Client Sample ID PPINUS

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 152	mg/kg	0 0236	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	12 8	mg/kg	7 96	10/18/95	EPA 6010	BRW	7440-38-2	
Chromium	76 7	mg/kg	0 654	10/18/95	EPA 6010	BRW	7440-47-3	
Vanadium	65 9	mg/kg	1 12	10/18/95	EPA 6010	BRW	7440-62-2	
Boron	216	mg/kg	2 8	10/18/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346184
Client Sample ID PP2A+PP2B

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0438	mg/kg	0 025	10/12/95	EPA 7471	AMH	7439-97 6	
Metals, ICP								
Arsenic	14 9	mg/kg	8 33	10/18/95	EPA 6010	BRW	7440 38 2	
Chromium	30 7	mg/kg	0 686	10/18/95	EPA 6010	BRW	7440-47 3	
Boron	3 06	mg/kg	2 94	10/18/95	EPA 6010	BRW	7440 42 8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	6 48			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346200
Client Sample ID. TS1

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	1 3 J	mg/kg	0 0236	10/12/95	EPA 7471	AMH	7439-97 6	
Metals, ICP								
Arsenic	24 9	mg/kg	7 94	10/13/95	EPA 6010	BRW	7440 38 2	4
Date Digested				10/11/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346218
Client Sample ID CMPSS

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 139	mg/kg	0 0206	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	2820 J	mg/kg	37 3	10/18/95	EPA 6010	BRW	7440-38-2	4
Date Digested				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346226
Client Sample ID: CKOSS

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0 0169	10/12/95	EPA 7471	AMH	7439 97 6	
Metals, ICP								
Arsenic	27 5	mg/kg	7 52	10/12/95	EPA 6010	BRW	7440 38 2	
Date Digested				10/11/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346234 Date Collected 10/02/95
Client Sample ID CK00SEL Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0837 J	mg/kg	0 0223	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	239 J	mg/kg	7 73	10/18/95	EPA 6010	BRW	7440-38 2	
Chromium	142 J	mg/kg	0 636	10/18/95	EPA 6010	BRW	7440-47-3	
Vanadium	54 9 J	mg/kg	1 09	10/18/95	EPA 6010	BRW	7440-62-2	
Boron	64 1	mg/kg	2 73	10/18/95	EPA 6010	BRW	7440-42 8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	5 21			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346242
Client Sample ID CKOUSEL

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 13 J	mg/kg	0 0182	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	95 J	mg/kg	4 25	10/14/95	EPA 6010	BRW	7440-38-2	
Boron	68.8	mg/kg	1 5	10/14/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	6 69			10/10/95	EPA 9045	LDA		

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PACE Project Number: 703651
Client Project ID Bottle Rock Power Plant

composite

PACE Sample No: 70346259
Client Sample ID FDVCSE 1A+1B

Date Collected 10/02/95
Date Received 10/05/95

10/03/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 147 J	mg/kg	0 0187	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	22	mg/kg	4 23	10/14/95	EPA 6010	BRW	7440-38-2	
Boron	ND	mg/kg	1 49	10/14/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	7 24			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346267 Date Collected 10/02/95
Client Sample ID FDCSW2A+2B Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0509 J	mg/kg	0 0179	10/12/95	EPA 7471	AMH	7439-97 6	
Metals, ICP								
Arsenic	ND	mg/kg	8 25	10/12/95	EPA 6010	BRW	7440 38 2	
Boron	ND	mg/kg	2 91	10/12/95	EPA 6010	BRW	7440-42 8	
Date Digested				10/11/95				
Wet Chemistry								
pH, Soil								
pH	6 24			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346275
Client Sample ID F10F

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 967	mg/kg	0 0207	10/13/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	619 J	mg/kg	8 25	10/18/95	EPA 6010	BRW	7440-38-2	
Chromium	808 J	mg/kg	0 68	10/18/95	EPA 6010	BRW	7440 47-3	
Boron	143	mg/kg	2 91	10/18/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	4 41			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346283 Date Collected 10/03/95
Client Sample ID FC8 Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND J	mg/kg	0 0243	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	ND J	mg/kg	8 42	10/18/95	EPA 6010	BRW	7440-38 2	
Chromium	70 2 J	mg/kg	0 693	10/18/95	EPA 6010	BRW	7440 47-3	
Boron	ND	mg/kg	2 97	10/18/95	EPA 6010	BRW	7440 42 8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	6 24			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346291 Date Collected 10/03/95
Client Sample ID. CS1 Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0724 J	mg/kg	0 0219	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	8 54 J	mg/kg	8 25	10/18/95	EPA 6010	BRW	7440-38 2	
Chromium	19 7 J	mg/kg	0 68	10/18/95	EPA 6010	BRW	7440-47-3	
Boron	5 07	mg/kg	2 91	10/18/95	EPA 6010	BRW	7440-42 8	
Date Digested				10/17/95				
Wet Chemistry								
pH Soil								
pH	4 9			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346309
Client Sample ID CS2

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0247	mg/kg	0 0183	10/13/95	EPA 7471	AMH	7439 97-6	
Metals, ICP								
Arsenic	8 68	mg/kg	8 25	10/18/95	EPA 6010	BRW	7440 38-2	
Chromium	26 5	mg/kg	0 68	10/18/95	EPA 6010	BRW	7440 47-3	
Boron	9.16	mg/kg	2 91	10/18/95	EPA 6010	BRW	7440 42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	5 96			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346317
Client Sample ID SSCUSGP

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 746	mg/kg	0 0208	10/13/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	14 5 J	mg/kg	7 08	10/18/95	EPA 6010	BRW	7440-38-2	
Chromium	149 J	mg/kg	0 583	10/18/95	EPA 6010	BRW	7440-47-3	
Boron	8 23	mg/kg	2 5	10/18/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	5 71			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346325
Client Sample ID. SSCOUT

Date Collected 10/03/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0498	mg/kg	0 0249	10/13/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	ND UJ	mg/kg	7 52	10/18/95	EPA 6010	BRW	7440 38-2	
Chromium	153 J	mg/kg	0 619	10/18/95	EPA 6010	BRW	7440-47-3	
Boron	7 52	mg/kg	2 65	10/18/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	7 22			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346333
Client Sample ID. PPCHIP2

Date Collected ~~10/03/95~~
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0882	mg/kg	0 0245	10/26/95	EPA 7471	JLO	7439-97-6	
Metals, ICP								
Arsenic	ND UJ	mg/kg	8 17	10/18/95	EPA 6010	BRW	7440-38-2	
Date Digested				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346341
Client Sample ID PPCHIP3

Date Collected ~~10/03/95~~ CO 10/2/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 053 L	mg/kg	0 02	10/13/95	EPA 7471	ANH	7439-97-6	
Metals, ICP								
Arsenic	17 7 J	mg/kg	8 17	10/18/95	EPA 6010	BRW	7440-38-2	
Date Digested				10/17/95				

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346358
Client Sample ID PP3ODE

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 171	mg/kg	0 0248	10/12/95	EPA 7471	AMH	7439-97 6	
Metals, ICP								
Arsenic	ND UJ	mg/kg	8 25	10/18/95	EPA 6010	BRW	7440-38 2	
Vanadium	43 6 J	mg/kg	1 17	10/18/95	EPA 6010	BRW	7440 62 2	
Boron	3.09	mg/kg	2 91	10/18/95	EPA 6010	BRW	7440-42 8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	6 21			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346366
Client Sample ID PP40C

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 061	mg/kg	0 0235	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	ND UJ	mg/kg	7 87	10/18/95	EPA 6010	BRW	7440 38-2	
Vanadium	50 J	mg/kg	1 11	10/18/95	EPA 6010	BRW	7440-62-2	
Boron	3 73	mg/kg	2 78	10/18/95	EPA 6010	BRW	7440 42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	6			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346374
Client Sample ID. PP50A8

Date Collected 10/02/95
Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0556 J	mg/kg	0 0192	10/12/95	EPA 7471	AMH	7439 97-6	
Metals, ICP								
Arsenic	8 39 J	mg/kg	7 87	10/18/95	EPA 6010	BRW	7440 38 2	
Vanadium	38 4 J	mg/kg	1 11	10/18/95	EPA 6010	BRW	7440-62-2	
Boron	9 14	mg/kg	2 78	10/18/95	EPA 6010	BRW	7440 42-8	
Date Digested				10/17/95				
Wet Chemistry								
pH, Soil								
pH	7 62			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346382 | Date Collected 10/02/95
Client Sample ID CDVCS 1A+1B | Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0473 J	mg/kg	0 0225	10/12/95	EPA 7471	AMH	7439 97 6	
Metals, ICP								
Arsenic	15	mg/kg	4 17	10/14/95	EPA 6010	BRW	7440-38 2	
Chromium	99 3	mg/kg	0 343	10/14/95	EPA 6010	BRW	7440-47-3	
Boron	10 2	mg/kg	1 47	10/14/95	EPA 6010	BRW	7440 42 8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	6 75			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346390 Date Collected 10/02/95
Client Sample ID. CDVCS 2A+2B Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0779 J	mg/kg	0 0202	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	39 5	mg/kg	4 23	10/14/95	EPA 6010	BRW	7440-38-2	
Chromium	74 1	mg/kg	0 348	10/14/95	EPA 6010	BRW	7440-47-3	
Boron	12	mg/kg	1 49	10/14/95	EPA 6010	BRW	7440-42-8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	7 14			10/10/95	EPA 9045	LDA		

Comments COMPOSITE

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PACE Sample No 70346424 | Date Collected 10/02/95
Client Sample ID CDVCS 3A+3B | Date Received 10/05/95

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0 0586 J	mg/kg	0 0225	10/12/95	EPA 7471	AMH	7439-97-6	
Metals, ICP								
Arsenic	25 7	mg/kg	4 19	10/14/95	EPA 6010	BRW	7440-38-2	
Chromium	57	mg/kg	0 345	10/14/95	EPA 6010	BRW	7440-47-3	
Boron	5 57	mg/kg	1 48	10/14/95	EPA 6010	BRW	7440 42-8	
Date Digested				10/13/95				
Wet Chemistry								
pH, Soil								
pH	6 8			10/10/95	EPA 9045	LDA		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

PARAMETER FOOTNOTES

ND	Not Detected
NC	Not Calculable
PRL	PACE Reporting Limit
(S)	Surrogate
[1]	Analyte is found in the associated blank as well as in the sample
[2]	High boiling point hydrocarbons are present in sample
[3]	Methylene chloride is known to be a possible laboratory contaminant
[4]	Sample was diluted to reduce spectral interference from high iron concentration

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8438 QC Batch Method EPA 3050 Date of Batch 10/11/95
Associated PACE Samples 70346119 70346200 70346226 70346267

METHOD BLANK 70349386
Associated PACE Samples 70346119 70346200 70346226 70346267

Parameter	Units	Method Blank Result	PRL	Footnotes
Arsenic	mg/kg	ND	8 5	
Boron	mg/kg	ND	3	1

MATRIX SPIKE 70349410

Parameter	Units	70333703	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Arsenic	mg/kg	ND	96 2	68 5	67	

LABORATORY CONTROL SAMPLE & LCSD 70349394 70349402

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Arsenic	mg/kg	100	75	75	85 5	85	12	

SAMPLE DUPLICATE 70349428

Parameter	Units	70333703	Dup Result	RPD	Footnotes
Arsenic	mg/kg	ND	ND	NC	
Boron	mg/kg	2450	3110	24	

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896 5858

QC Batch ID 8443 QC Batch Method EPA 7471 Date of Batch 10/11/95
Associated PACE Samples 70346101 70346119 70346127 70346168 70346184
70346218 70346226 70346358 70346366

METHOD BLANK 70349709
Associated PACE Samples.
70346101 70346119 70346127 70346168 70346184 70346218 70346226
70346358 70346366

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	mg/kg	ND	0 025	

MATRIX SPIKE 70349717

Parameter	Units	70338033	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Mercury	mg/kg	ND	0 193	0 162	82	

LABORATORY CONTROL SAMPLE & LCSD 70349733 70349741

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Mercury	mg/kg	0 2	0 206	103	0 205	103	0	

SAMPLE DUPLICATE 70349725

Parameter	Units	70338033	Dup Result	RPD	Footnotes
Mercury	mg/kg	ND	ND	NC	

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QUALITY CONTROL DATA

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8444 — QC Batch Method EPA 7471 — Date of Batch 10/11/95

Associated PACE Samples: 70346135, 70346176, 70346200, 70346234, 70346242, 70346259, 70346267, 70346283, 70346291, 70346374, 70346382, 70346390, 70346424, 70346382, 70346390, 70346424

METHOD BLANK 70349758

Associated PACE Samples: 70346135, 70346176, 70346200, 70346234, 70346242, 70346259, 70346267, 70346283, 70346291, 70346374, 70346382, 70346390, 70346424

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	mg/kg	ND	0 025	

MATRIX SPIKE 70349782

Parameter	Units	70346135	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Mercury	mg/kg	1 34	0 18	0 276	593	

LABORATORY CONTROL SAMPLE 70349766

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	Footnotes
Mercury	mg/kg	0 2	0 195	98	

SAMPLE DUPLICATE 70349790

Parameter	Units	70346135	Dup Result	RPD	Footnotes
Mercury	mg/kg	1 34	0 105	171	

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8473 QC Batch Method EPA 9045 Date of Batch 10/11/95

Associated PACE Samples

70346168	70346184	70346234	70346242	70346259
70346267	70346275	70346283	70346291	70346309
70346317	70346325	70346358	70346366	70346374
70346382	70346390	70346424		

SAMPLE DUPLICATE 70351598

Parameter	Units	70346358	Dup Result	RPD	Footnotes
pH		6 21	6 19	0	

SAMPLE DUPLICATE 70351606

Parameter	Units	70346325	Dup Result	RPD	Footnotes
pH		7 22	7 26	1	

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896 5858

QC Batch ID 8549 QC Batch Method EPA 3050 Date of Batch 10/12/95
Associated PACE Samples 70346101 70346127 70346168 70346242 70346259
70346382 70346390 70346424

METHOD BLANK 70354204
Associated PACE Samples 70346101 70346127 70346168 70346242 70346259 70346382 70346390 70346424

Parameter	Units	Method Blank Result	PRL	Footnotes
Arsenic	mg/kg	ND	8 5	
Chromium	mg/kg	ND	0 7	
Boron	mg/kg	ND	3	2

MATRIX SPIKE 70354857

Parameter	Units	70333299	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Arsenic	mg/kg	12 8	92 6	86	79	
Chromium	mg/kg	33 5	92 6	114	87	

LABORATORY CONTROL SAMPLE & LCSD 70354238 70354246

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Arsenic	mg/kg	100	82 3	82	75 5	76	8	
Chromium	mg/kg	100	92 4	92	90 7	91	1	

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QUALITY CONTROL DATA

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

SAMPLE DUPLICATE 70354865

Parameter	Units	70333299	Dup Result	RPD	Footnotes
Arsenic	mg/kg	12 8	ND	NC	
Chromium	mg/kg	33 5	23 7	34	3
Boron	mg/kg	7 61	11 5	41	3

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896 5858

QC Batch ID 8550 QC Batch Method EPA 7471 Date of Batch 10/12/95
Associated PACE Samples 70346275 70346309 70346317 70346325 70346341

METHOD BLANK 70354253
Associated PACE Samples 70346275 70346309 70346317 70346325 70346341

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	mg/kg	ND	0 025	

MATRIX SPIKE 70354287

Parameter	Units	70352331	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Mercury	mg/kg	0 952	0 199	1 53	290	

LABORATORY CONTROL SAMPLE & LCSD 70354261 70354279

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Mercury	mg/kg	0 2	0 201	101	0 209	104	3	

SAMPLE DUPLICATE 70354295

Parameter	Units	70352331	Dup Result	RPD	Footnotes
Mercury	mg/kg	0 952	0 343	94	3

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8555 QC Batch Method EPA 8010 Date of Batch 10/12/95
Associated PACE Samples 70346036 70346044 70346051 70346069 70346077 70346085

METHOD BLANK 70365564
Associated PACE Samples 70346069

Parameter	Units	Method Blank Result	PRL	Footnotes
Chloromethane	ug/kg	ND	0 8	
Bromomethane	ug/kg	ND	3	
Vinyl Chloride	ug/kg	ND	1 8	
Chloroethane	ug/kg	ND	5 2	
Methylene Chloride	ug/kg	0 94	2 5	4,5
Trichlorofluoromethane	ug/kg	ND	5	
1,1 Dichloroethene	ug/kg	ND	1 3	
1,1 Dichloroethane	ug/kg	ND	0 7	
trans-1,2-Dichloroethene	ug/kg	ND	1	
Chloroform	ug/kg	ND	0 5	
1,2 Dichloroethane	ug/kg	ND	0 5	
1,1,1-Trichloroethane	ug/kg	ND	0 5	
Carbon Tetrachloride	ug/kg	ND	1 2	
Bromodichloromethane	ug/kg	ND	1	
1,2 Dichloropropane	ug/kg	ND	0 5	
cis 1,3-Dichloropropene	ug/kg	ND	3 4	
Trichloroethene	ug/kg	ND	1 2	
Dibromochloromethane	ug/kg	ND	0 9	
1,1,2 Trichloroethane	ug/kg	ND	0 5	
trans 1,3 Dichloropropene	ug/kg	ND	3 4	
Bromoform	ug/kg	ND	2	
Tetrachloroethene	ug/kg	ND	0 5	
1,1,2,2-Tetrachloroethane	ug/kg	ND	0 5	
Chlorobenzene	ug/kg	ND	0 7	

METHOD BLANK 70365564
Associated PACE Samples
70346069

Parameter	Units	Method Blank Result	PRL	Footnotes
2 Chloroethyl Vinyl Ether	ug/kg	ND	1 3	
1,2 Dichlorobenzene	ug/kg	ND	1	
1,3 Dichlorobenzene	ug/kg	ND	1	
1,4-Dichlorobenzene	ug/kg	ND	1	
Benzene	ug/kg	ND	0 5	
Toluene	ug/kg	ND	0 5	
Ethylbenzene	ug/kg	ND	0 5	
Xylenes (total)	ug/kg	ND	1	
Trifluorotoluene (S)	%	107		mdw
Bromochloromethane (S)	%	110		
1,4-Dichlorobutane (S)	%	104		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE 70354600 70354618

Parameter	Units	70329099	Spike Conc	Matrix Spike Result	Spike % Rec	Matrix Sp Dup Result	Spike Dup % Rec	RPD	Footnotes
Chloromethane	ug/kg	ND	20	22	110	19	95	15	
Bromomethane	ug/kg	ND	20	27	137	27	134	2	
Vinyl Chloride	ug/kg	ND	20	24	120	23	116	3	
Chloroethane	ug/kg	ND	20	28	143	26	130	10	
Methylene Chloride	ug/kg	ND	20	26	120	27	129	7	
Trichlorofluoromethane	ug/kg	ND	20	29	146	26	131	11	
1,1-Dichloroethene	ug/kg	ND	20	23	115	23	115	0	
1,1-Dichloroethane	ug/kg	ND	20	25	127	26	131	3	
trans 1,2-Dichloroethene	ug/kg	ND	20	21	103	22	108	5	
Chloroform	ug/kg	ND	20	24	122	26	128	5	
1,2-Dichloroethane	ug/kg	ND	20	23	116	25	124	7	
1,1,1-Trichloroethane	ug/kg	ND	20	27	134	26	132	2	
Carbon Tetrachloride	ug/kg	ND	20	26	132	25	127	4	
Bromodichloromethane	ug/kg	ND	20	24	119	25	125	5	
1,2 Dichloropropane	ug/kg	ND	20	25	124	26	128	3	
cis-1,3 Dichloropropene	ug/kg	ND	20	19	93	21	105	12	
Trichloroethene	ug/kg	ND	20	20	103	21	107	4	
Dibromochloromethane	ug/kg	ND	20	23	117	24	121	3	
1,1,2-Trichloroethane	ug/kg	ND	20	25	123	26	129	5	
trans-1,3 Dichloropropene	ug/kg	ND	20	16	83	19	96	15	
Bromoform	ug/kg	ND	20	22	111	24	118	6	
Tetrachloroethene	ug/kg	9 1	20	27	89	21	61	37	
1,1,2,2 Tetrachloroethane	ug/kg	ND	20	25	125	25	124	1	
Chlorobenzene	ug/kg	ND	20	15	77	17	87	12	
2 Chloroethyl Vinyl Ether	ug/kg	ND	20	22	113	25	126	11	
1,2 Dichlorobenzene	ug/kg	ND	20	15	74	15	77	4	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE 70354600 70354618

Parameter	Units	70329099	Spike Conc	Matrix Spike Result	Spike % Rec	Matrix Sp Dup Result	Spike Dup % Rec	RPD	Footnotes
1,3 Dichlorobenzene	ug/kg	ND	20	13	67	14	68	1	
1,4-Dichlorobenzene	ug/kg	1 3	20	13	58	15	68	16	
Benzene	ug/kg	ND	20	28	139	30	148	7	
Toluene	ug/kg	ND	20	24	120	26	128	8	
Ethylbenzene	ug/kg	ND	20	22	109	22	109	0	
Xylenes (total)	ug/kg	ND	60	64	107	66	111	3	
Bromochloromethane (S)					117		117		
1,4 Dichlorobutane (S)					92		95		

LABORATORY CONTROL SAMPLE & LCSD 70354584 70354592

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Chloromethane	ug/kg	20	14	71	14	72	1	
Bromomethane	ug/kg	20	20	101	20	100	1	
Vinyl Chloride	ug/kg	20	17	87	18	89	2	
Chloroethane	ug/kg	20	20	102	20	101	1	
Methylene Chloride	ug/kg	20	19	96	19	97	1	
Trichlorofluoromethane	ug/kg	20	20	98	20	98	0	
1,1-Dichloroethene	ug/kg	20	18	92	19	94	2	
1,1 Dichloroethane	ug/kg	20	19	96	20	99	3	
trans-1,2-Dichloroethene	ug/kg	20	19	94	19	96	2	
Chloroform	ug/kg	20	19	96	19	97	1	
1,2-Dichloroethane	ug/kg	20	19	97	20	99	2	
1,1,1-Trichloroethane	ug/kg	20	19	94	19	96	2	
Carbon Tetrachloride	ug/kg	20	19	95	19	95	0	
Bromodichloromethane	ug/kg	20	21	105	20	102	3	
1,2 Dichloropropane	ug/kg	20	20	98	20	99	1	
cis 1,3-Dichloropropene	ug/kg	20	19	97	19	94	3	
Trichloroethene	ug/kg	20	20	101	21	104	3	
Dibromochloromethane	ug/kg	20	20	103	20	102	1	
1,1,2-Trichloroethane	ug/kg	20	20	100	20	101	1	
trans 1,3 Dichloropropene	ug/kg	20	19	97	19	96	1	
Bromoform	ug/kg	20	21	105	20	101	4	
Tetrachloroethene	ug/kg	20	20	99	20	101	2	
1,1,2,2-Tetrachloroethane	ug/kg	20	19	93	18	90	3	
Chlorobenzene	ug/kg	20	20	98	20	99	1	
2-Chloroethyl Vinyl Ether	ug/kg	20	21	103	21	104	1	
1,2 Dichlorobenzene	ug/kg	20	19	96	19	97	1	
1,3 Dichlorobenzene	ug/kg	20	20	101	20	102	1	
1,4 Dichlorobenzene	ug/kg	20	20	101	20	103	2	
Benzene	ug/kg	20	21	104	21	105	1	
Toluene	ug/kg	20	21	102	21	105	2	
Ethylbenzene	ug/kg	20	20	101	21	103	2	
Xylenes (Total)	ug/kg	60	62	103	63	104	1	
Bromochloromethane (S)				98		95		
1,4 Dichlorobutane (S)				91		92		
Trifluorotoluene (S)				101		104		

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8617 QC Batch Method EPA 8010 Date of Batch 10/13/95
Associated PACE Samples 70346093

METHOD BLANK 70362314
Associated PACE Samples
70346093

Parameter	Units	Method Blank Result	PRL	Footnotes
Chloromethane	ug/L	ND	0 8	
Bromomethane	ug/L	ND	3	
Vinyl Chloride	ug/L	ND	1 8	
Chloroethane	ug/L	ND	5 2	
Methylene Chloride	ug/L	ND	2 5	
Trichlorofluoromethane	ug/L	ND	5	
1,1-Dichloroethene	ug/L	ND	1 3	
1,1-Dichloroethane	ug/L	ND	0 7	
trans 1,2 Dichloroethene	ug/L	ND	1	
Chloroform	ug/L	ND	0 5	
1,2-Dichloroethane	ug/L	ND	0 5	
1 1,1-Trichloroethane	ug/L	ND	0 5	
Carbon Tetrachloride	ug/L	ND	1 2	
Bromodichloromethane	ug/L	ND	1	
1 2-Dichloropropane	ug/L	ND	0 5	
cis-1,3 Dichloropropene	ug/L	ND	3 4	
Trichloroethene	ug/L	ND	1 2	
Dibromochloromethane	ug/L	ND	0 9	
1,1,2 Trichloroethane	ug/L	ND	0 5	
trans-1,3 Dichloropropene	ug/L	ND	3 4	
Bromoform	ug/L	ND	2	
Tetrachloroethene	ug/L	ND	0 5	
1,1,2,2 Tetrachloroethane	ug/L	ND	0 5	
Chlorobenzene	ug/L	ND	0 7	
2 Chloroethyl Vinyl Ether	ug/L	ND	1 3	
1,2-Dichlorobenzene	ug/L	ND	1	

METHOD BLANK 70362314
Associated PACE Samples
70346093

Parameter	Units	Method Blank Result	PRL	Footnotes
1,3 Dichlorobenzene	ug/L	ND	1	
1,4 Dichlorobenzene	ug/L	ND	1	
Bromochloromethane (S)	%	106		
1,4 Dichlorobutane (S)	%	110		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE 70358577 70358585

Parameter	Units	70325865	Spike Conc	Matrix Spike Result	Spike % Rec	Matrix Sp Dup Result	Spike Dup % Rec	RPD	Footnotes
Chloromethane	ug/L	ND	20	16	80	15	75	6	
Bromomethane	ug/L	ND	20	21	105	19	97	8	
Vinyl Chloride	ug/L	ND	20	19	94	17	85	10	
Chloroethane	ug/L	ND	20	21	105	20	102	3	
Methylene Chloride	ug/L	ND	20	21	104	19	96	8	
Trichlorofluoromethane	ug/L	ND	20	22	110	21	105	5	
1,1 Dichloroethene	ug/L	ND	20	21	103	20	99	4	
1,1-Dichloroethane	ug/L	ND	20	22	110	21	106	4	
trans-1,2 Dichloroethene	ug/L	ND	20	22	108	20	100	8	
Chloroform	ug/L	ND	20	22	109	21	102	7	
1,2 Dichloroethane	ug/L	ND	20	21	105	21	103	2	
1 1,1-Trichloroethane	ug/L	ND	20	21	103	20	102	1	
Carbon Tetrachloride	ug/L	ND	20	21	106	20	102	4	
Bromodichloromethane	ug/L	ND	20	20	98	20	102	4	
1,2-Dichloropropane	ug/L	ND	20	21	104	21	103	1	
cis 1,3 Dichloropropene	ug/L	ND	20	21	105	21	104	1	
Trichloroethene	ug/L	1 4	20	20	96	20	91	5	
Dibromochloromethane	ug/L	ND	20	21	103	19	96	7	
1,1,2-Trichloroethane	ug/L	ND	20	20	103	21	107	4	
trans 1,3 Dichloropropene	ug/L	ND	20	22	112	21	107	5	
Bromoform	ug/L	ND	20	20	99	20	102	3	
Tetrachloroethene	ug/L	1 3	20	23	109	21	99	10	
1,1,2,2 Tetrachloroethane	ug/L	ND	20	23	116	23	117	1	
Chlorobenzene	ug/L	ND	20	21	107	20	101	6	
2 Chloroethyl Vinyl Ether	ug/L	ND	20	ND	5	ND	0	200	
1,2 Dichlorobenzene	ug/L	ND	20	22	108	23	112	4	
1,3 Dichlorobenzene	ug/L	ND	20	22	109	21	102	7	
1,4-Dichlorobenzene	ug/L	ND	20	24	118	23	115	3	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE 70358577 70358585

Parameter	Units	70325865	Spike Conc	Matrix Spike Result	Spike % Rec	Matrix Sp Dup Result	Spike Dup % Rec	RPD	Footnotes
Bromochloromethane (S)					91		94		
1,4-Dichlorobutane (S)					99		96		

LABORATORY CONTROL SAMPLE & LCSD 70358551 70358569

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Chloromethane	ug/L	20	15	74	15	73	1	
Bromomethane	ug/L	20	20	101	20	98	3	
Vinyl Chloride	ug/L	20	18	88	17	84	5	
Chloroethane	ug/L	20	20	102	20	101	1	
Methylene Chloride	ug/L	20	20	102	20	101	1	
Trichlorofluoromethane	ug/L	20	21	105	20	101	4	
1,1-Dichloroethene	ug/L	20	20	100	19	96	4	
1,1-Dichloroethane	ug/L	20	21	105	20	103	2	
trans 1,2 Dichloroethene	ug/L	20	20	100	19	97	3	
Chloroform	ug/L	20	20	102	20	102	0	
1,2-Dichloroethane	ug/L	20	20	102	20	99	3	
1,1,1 Trichloroethane	ug/L	20	21	107	20	102	5	
Carbon Tetrachloride	ug/L	20	21	107	20	101	6	
Bromodichloromethane	ug/L	20	20	103	21	104	1	
1,2 Dichloropropane	ug/L	20	21	103	20	101	2	
cis 1 3 Dichloropropene	ug/L	20	21	107	21	106	1	
Trichloroethene	ug/L	20	19	96	18	92	4	
Dibromochloromethane	ug/L	20	21	107	21	103	4	
1,1,2 Trichloroethane	ug/L	20	22	108	22	108	0	
trans 1,3 Dichloropropene	ug/L	20	22	111	22	108	3	
Bromoform	ug/L	20	22	109	21	104	5	
Tetrachloroethene	ug/L	20	21	106	19	97	9	
1,1,2,2-Tetrachloroethane	ug/L	20	23	114	23	113	1	
Chlorobenzene	ug/L	20	20	99	21	106	7	
2 Chloroethyl Vinyl Ether	ug/L	20	23	114	22	110	4	
1,2 Dichlorobenzene	ug/L	20	22	111	22	111	0	
1,3 Dichlorobenzene	ug/L	20	20	101	20	101	0	
1,4 Dichlorobenzene	ug/L	20	23	114	22	112	2	
Bromochloromethane (S)				98		95		
1,4 Dichlorobutane (S)				99		98		

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Dames & Moore, San Francisco
221 Main Street, Ste 600
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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 8717 QC Batch Method CA LUFT Date of Batch 10/17/95
Associated PACE Samples 70346036 70346044 70346051 70346069 70346077 70346085

METHOD BLANK 70363312
Associated PACE Samples 70346036 70346044 70346051 70346069 70346077 70346085

Parameter	Units	Method Blank Result	PRL	Footnotes
Diesel Fuel	mg/kg	ND	5	
n-Pentacosane (S)	%	73		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE 70363346 70363353

Parameter	Units	70346051	Spike Conc	Matrix Spike Result	Spike % Rec	Matrix Sp Dup Result	Spike Dup % Rec	RPD	Footnotes
Diesel Fuel	mg/kg	14	33	91	232	74	180	25	6
n Pentacosane (S)					115		106		

LABORATORY CONTROL SAMPLE & LCSD 70363320 70363338

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Diesel Fuel	mg/kg	33	18	55	25	75	31	
n-Pentacosane (S)				80		75		

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
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QC Batch ID 8752 — QC Batch Method EPA 3050 — Date of Batch 10/17/95

Associated PACE Samples: 70346135, 70346176, 70346184, 70346218, 70346234, 70346275, 70346283, 70346291, 70346309, 70346317, 70346325, 70346333, 70346341, 70346358, 70346366, 70346374

METHOD BLANK 70365499

Associated PACE Samples: 70346135, 70346176, 70346184, 70346218, 70346234, 70346275, 70346283, 70346291, 70346309, 70346317, 70346325, 70346333, 70346341, 70346358, 70346366, 70346374

Parameter	Units	Method Blank Result	PRL	Footnotes
Arsenic	mg/kg	ND	8 5	
Chromium	mg/kg	ND	0 7	
Vanadium	mg/kg	ND	1 2	
Boron	mg/kg	ND	3	7

MATRIX SPIKE 70365630

Parameter	Units	70346176	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Arsenic	mg/kg	12 8	90 9	68 1	61	
Chromium	mg/kg	76 7	90 9	111	37	
Vanadium	mg/kg	65 9	90 9	118	57	

LABORATORY CONTROL SAMPLE & LCSD 70365523 70365531

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Arsenic	mg/kg	100	83 2	83	76 6	77	8	
Chromium	mg/kg	100	93 6	94	94 9	95	1	

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

DATE 11/01/95
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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

LABORATORY CONTROL SAMPLE & LCSD 70365523 70365531

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Vanadium	mg/kg	100	93 6	94	94 1	94	0	

SAMPLE DUPLICATE 70365648

Parameter	Units	70346176	Dup Result	RPD	Footnotes
Arsenic	mg/kg	12 8	8 44	0	
Chromium	mg/kg	76 7	71 5	7	
Vanadium	mg/kg	65 9	57 5	14	
Boron	mg/kg	216	189	13	

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
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QC Batch ID 9038 QC Batch Method EPA 7471 Date of Batch 10/25/95
Associated PACE Samples 70346333

METHOD BLANK 70379839
Associated PACE Samples 70346333

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	mg/kg	ND	0 025	

MATRIX SPIKE 70379862

Parameter	Units	70379516	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Mercury	mg/kg	0 0871	0 177	0 228	80	

LABORATORY CONTROL SAMPLE & LCSD 70379847 70379854

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Mercury	mg/kg	0 2	0 205	103	0 212	106	3	

SAMPLE DUPLICATE 70379870

Parameter	Units	70379516	Dup Result	RPD	Footnotes
Mercury	mg/kg	0 0871	0 05	0	

PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

QUALITY CONTROL DATA PARAMETER FOOTNOTES

The Quality Control Sample Final Results listed above have been rounded to reflect an appropriate number of significant figures
Consistent with EPA guidelines unrounded concentrations have been used to calculate % Rec and RPD values

ND	Not Detected
NC	Not Calculable
PRL	PACE Reporting Limit
RPD	Relative Percent Difference
(S)	Surrogate
[1]	LCS/LCSD @100mg/kg LCS= 93 7%, LCSD= 109%
[2]	Expect 1000 ug/L LCS and LCS Dup LCS = 913 99 ug/L (91%) and LCS-Dup = 916 15 ug/L (92%) RPD = 0
[3]	High RPD may be due to sample nonhomogeneity
[4]	Detected but below the PRL, therefore, result is an estimated concentration
[5]	Compound is known to be a possible laboratory contaminant
[6]	High boiling point hydrocarbons are present in sample
[7]	LCS/LCSD @100 mg/kg, LCS= 89 8ppm (89 8%), LCSD= 92 5ppm (92 5%) RPD = 3

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PACE Project Number 703651
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
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PACE Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
70346119	TURB EDGE	EPA 3050	8438	EPA 6010	8595
70346200	TS1	EPA 3050	8438	EPA 6010	8595
70346226	CKOSS	EPA 3050	8438	EPA 6010	8595
70346267	FDCSW2A+2B	EPA 3050	8438	EPA 6010	8595
70346101	TURB-MID	EPA 7471	8443		
70346119	TURB EDGE	EPA 7471	8443		
70346127	TURB BOT	EPA 7471	8443		
70346168	PP1A+PP1B	EPA 7471	8443		
70346184	PP2A+PP2B	EPA 7471	8443		
70346218	CMPSS	EPA 7471	8443		
70346226	CKOSS	EPA 7471	8443		
70346358	PP3ODE	EPA 7471	8443		
70346366	PP4OC	EPA 7471	8443		
70346135	TW 1	EPA 7471	8444		
70346176	PPINUS	EPA 7471	8444		
70346200	TS1	EPA 7471	8444		
70346234	CKOOSEL	EPA 7471	8444		
70346242	CKOUSEL	EPA 7471	8444		
70346259	FDVCSE 1A+1B	EPA 7471	8444		
70346267	FDCSW2A+2B	EPA 7471	8444		
70346283	FCB	EPA 7471	8444		
70346291	CS1	EPA 7471	8444		
70346374	PP5OAB	EPA 7471	8444		
70346382	CDVCS 1A+1B	EPA 7471	8444		
70346390	CDVCS 2A+2B	EPA 7471	8444		
70346424	CDVCS 3A+3B	EPA 7471	8444		
70346168	PP1A+PP1B	EPA 9045	8473		
70346184	PP2A+PP2B	EPA 9045	8473		

REPORT OF LABORATORY ANALYSIS

PACE Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
70346234	CKOOSEL	EPA 9045	8473		
70346242	CKOUSEL	EPA 9045	8473		
70346259	FDVCSE 1A+1B	EPA 9045	8473		
70346267	FDCSW2A+2B	EPA 9045	8473		
70346275	F10F	EPA 9045	8473		
70346283	FCB	EPA 9045	8473		
70346291	CS1	EPA 9045	8473		
70346309	CS2	EPA 9045	8473		
70346317	SSCUSGP	EPA 9045	8473		
70346325	SSCOUT	EPA 9045	8473		
70346358	PP3ODE	EPA 9045	8473		
70346366	PP4OC	EPA 9045	8473		
70346374	PP5OAB	EPA 9045	8473		
70346382	CDVCS 1A+1B	EPA 9045	8473		
70346390	CDVCS 2A+2B	EPA 9045	8473		
70346424	CDVCS 3A+3B	EPA 9045	8473		
70346101	TURB-MID	EPA 3050	8549	EPA 6010	8656
70346127	TURB BOT	EPA 3050	8549	EPA 6010	8656
70346168	PP1A+PP1B	EPA 3050	8549	EPA 6010	8656
70346242	CKOUSEL	EPA 3050	8549	EPA 6010	8656
70346259	FDVCSE 1A+1B	EPA 3050	8549	EPA 6010	8656
70346382	CDVCS 1A+1B	EPA 3050	8549	EPA 6010	8656
70346390	CDVCS 2A+2B	EPA 3050	8549	EPA 6010	8656
70346424	CDVCS 3A+3B	EPA 3050	8549	EPA 6010	8656
70346275	F10F	EPA 7471	8550		
70346309	CS2	EPA 7471	8550		
70346317	SSCUSGP	EPA 7471	8550		
70346325	SSCOUT	EPA 7471	8550		
70346341	PPCHIP3	EPA 7471	8550		
70346036	B-1-13	EPA 8010	8555		
70346044	B 2 12 5	EPA 8010	8555		
70346051	B-3 10	EPA 8010	8555		
70346069	B-4 10	EPA 8010	8555		
70346077	B 5 10	EPA 8010	8555		
70346085	B-6 10	EPA 8010	8555		
70346093	EQUIP BLANK	EPA 8010	8617		
70346036	B-1 13	CA LUFT	8717	TPH by EPA 8015M	8935
70346044	B-2 12 5	CA LUFT	8717	TPH by EPA 8015M	8935

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REPORT OF LABORATORY ANALYSIS

PACE Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
70346051	B 3-10	CA LUFT	8717	TPH by EPA 8015M	8935
70346069	B-4-10	CA LUFT	8717	TPH by EPA 8015M	8935
70346077	B-5-10	CA LUFT	8717	TPH by EPA 8015M	8935
70346085	B 6-10	CA LUFT	8717	TPH by EPA 8015M	8935
70346135	TW-1	EPA 3050	8752	EPA 6010	8802
70346176	PPINUS	EPA 3050	8752	EPA 6010	8802
70346184	PP2A+PP2B	EPA 3050	8752	EPA 6010	8802
70346218	CMPSS	EPA 3050	8752	EPA 6010	8802
70346234	CKOOSEL	EPA 3050	8752	EPA 6010	8802
70346275	F10F	EPA 3050	8752	EPA 6010	8802
70346283	FCB	EPA 3050	8752	EPA 6010	8802
70346291	CS1	EPA 3050	8752	EPA 6010	8802
70346309	CS2	EPA 3050	8752	EPA 6010	8802
70346317	SSCUSGP	EPA 3050	8752	EPA 6010	8802
70346325	SSCOUT	EPA 3050	8752	EPA 6010	8802
70346333	PPCHIP2	EPA 3050	8752	EPA 6010	8802
70346341	PPCHIP3	EPA 3050	8752	EPA 6010	8802
70346358	PP3ODE	EPA 3050	8752	EPA 6010	8802
70346366	PP4OC	EPA 3050	8752	EPA 6010	8802
70346374	PP5OAB	EPA 3050	8752	EPA 6010	8802
70346333	PPCHIP2	EPA 7471	9038		

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CHAIN-OF-CUSTODY RECORD

703651

WHITE COPY Original (Accompanies Samples) YELLOW COPY Collector PINK COPY Project Manager

Boring or Well Number	Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (M) Diesel	TITLE 22 METALS	WET Test	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TCLP	pH	ASBESTOS	As	B	Hg	V	chlor. Herbicides	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
B1	T	13	1025	Soil	SS ring 6"	/				/																10/3 346036	1	
B2	|	12.5	1110	|	|	/				/																10/3 346044	1	
B3	|	10	1150	|	|	/				/																10/3 346051	1	
B4	|	10	1250	|	|	/				/																10/3 346069	1	
B5	|	10	1320	|	|	/				/																10/3 346077	1	
B6	L	10	1350	L	L	/				/																	10/3 346085	1	
EQUIP RINSE	—	—	1400	H_2O	40 ml VOA	x																					10/3 346093	3	
TURB	MID	—	1600	WIPE																/		/					10/2 346101	1	
TURB-	EDGE	—	1600	|	|														/		/					10/2 346119	1	
TURB-	BOT	—	1600	L	L															/		/					10/2 346127	1	
TW1	—	—	1210																	/		/					10/2 346135	3	
SSCDV	1A	—	1000	Soil	SS ring 3"												346143									/	COMPOSITE 1A+1B 10/3	1	
|	1B	—	1000	|	|											346150									/		1	
|	2A	—	1000	|	|											346150									/	COMP 2A+2B 10/3	1	
L	2B	—	1000	L	L																					/		1	
PP1A	—	—	1030	Soil	GLASS JAR								346168					/		/	/	/					10/2	1	
PP1B	—	—	1035	Soil	GLASS JAR													/		/	/	/					10/2 COMP. 1A+1B	1	
PPINJS	—	—	1615	Concrete chips	GLASS JAR								346176							/	/	/	/				10/2	1	

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

[Signature] 10/4/95 1500

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

10/5 9:00 [Signature]

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

LABORATORY NOTES

ANALYTICAL LABORATORY PACE

LABORATORY CONTACT Carol McHale

D&M CONTACT Jill Hartzler PHONE

DAMES & MOORE
221 Main Street, Suite 600
San Francisco, California 94105 1917
(415) 896-5858 Fax (415) 882-9261

JOB NO 30681 021 043 SHEET 1 OF 3

PROJECT Bottle Rock Power Plant

LOCATION Cobb, CA

COLLECTOR BB/JH DATE OF COLLECTION 10/2/95 - 10/3/95

705051

CHAIN-OF-CUSTODY RECORD

WHITE COPY Original (Accompanies Samples) YELLOW COPY Collector PINK COPY Project Manager

Boring or Well Number	Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (M)	TITLE 22 METALS	WET Test	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TCLP	pH	ASBESTOS	AS	B	HG	V	CC	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
PP1A	—	—	1040	SOIL	GLASS JAR							346184							/		/	/	/			1&2 COMPOSITE	1	
PP2B	—	—	1045	SOIL	GLASS JAR														/		/	/	/			1&2 2A+2B	1	
PPVSEP	—	—	1615	SCALE	"																					10/2 346192	1	
TS1	—	—	1220	SCALE	" "																/		/			10/2 346200	1	
CMPSS	—	—	1430	SCALE	" "																/		/			10/2 346218	1	
CKOSS	—	—	1430	SCALE	" "																/		/			10/2 346226	1	
CKODSEL	—	—	1400	SOIL	" "														/		/	/	/			10/2 346234	1	
CKOUSEL	—	—	1400	SOIL	" "														/		/	/	/			10/2 346242	1	
FDVCSE 1A	—	—	900	"	"								346259						/		/	/	/			2 COMPOSITE 1A+1B	1	
FDVCSE 1B	—	—	900	"															/		/	/	/			10/3	1	
FDVCSW 2A	—	—	900	"	"								346267						/		/	/	/			2 COMP 2A+2B	1	
FDVCSW 2B	—	—	900	"	"														/		/	/	/			10/3	1	
FIOF	—	—	1030	"	" "														/		/	/	/		/	10/3 346275	1	
FCB	—	—	1030	"	" "														/		/	/	/		/	10/3 346283	1	
CS1	—	4'	1600	"	" "														/		/	/	/		/	10/2 346291	1	
CS2	—	4'	1615	"	" "														/		/	/	/		/	10/2 346309	1	
SSCWSGP	—	—	930	"	" "														/		/	/	/		/	10/3 346317	1	
SSCOUT	—	—	930	"	" "														/		/	/	/		/	10/3 346325	1	

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

[signature] 10/4/95 1500

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

10/5 900 [signature]

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

LABORATORY NOTES

ANALYTICAL LABORATORY Pace

LABORATORY CONTACT Carol McHale

D&M CONTACT Jill Hartzler PHONE

DAMES & MOORE
221 Main Street, Suite 600
San Francisco, California 94105-1917
(415) 896-5858 Fax (415) 882-9261

JOB NO 30681 001 043 SHEET 2 OF 3

PROJECT Bottle Rock Power Plant

LOCATION Cobb, CA

COLLECTOR BB/JH DATE OF COLLECTION 10/2-10/3/95

703651

CHAIN-OF-CUSTODY RECORD

WHITE COPY Original (Accompanies Samples) YELLOW COPY Collector PINK COPY Project Manager

Boring or Well Number	Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (M)	TITLE 22 METALS	WET Test	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TCLP	pH	ASBESTOS	As	Hg	Pb	V	Cr	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
PPCHIP2	-	-	1200	concrete chip	40 ml VOA															/	/					10/2 346333	1	
PPCHIP3	-	-	1200	↓	GLASS JAR															/	/					10/2 346341	1	
PPSODE	-	-	1055	SOIL														/		/	/	/	/			10/2 346358	1	
PP4OC	-	-	1105															/		/	/	/	/			10/2 346366	1	
PPSOAB	-	-	1115															/		/	/	/	/			10/2 346374	1	
CIVCS	1A	-	1515										346382					/		/	/	/		/		10/2 COMPOSITE	1	
	1B	-	1515															/		/	/	/		/		10/2 1A+1B	1	
	2A	-	1520										346390					/		/	/	/		/		10/2 COMP 2A+2B	1	
	2B	-	1520															/		/	/	/		/		10/2	1	
	3A	-	1530										346424					/		/	/	/		/		10/2 COMP 3A+3B	1	
	3B	-	1530															/		/	/	/		/		10/2	1	

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

10/4/95 1500

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

10/5 9 30

RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature)

LABORATORY NOTES

ANALYTICAL LABORATORY FACE

LABORATORY CONTACT Carol McHale

D&M CONTACT Jill Hazlip PHONE

DAMES & MOORE
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San Francisco, California 94105-1917
(415) 896-5858 Fax (415) 882-9261

JOB NO 30681.001.013 SHEET 3 OF 3

PROJECT Bottle Rock Power Plant

LOCATION Cobb, CA

COLLECTOR BB/JH DATE OF COLLECTION 10/2-10/3/95

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

October 18, 1995

C McHale
Pace Inc
1455 McDowell Blvd North, Suite D
Petaluma, CA 94954

Re PACE Project No CL4670
Client Reference DMSFO Bottlerock Power Plant

Dear C McHale

Enclosed is a report of laboratory analysis for the above referenced project Samples were received under chain-of-custody at the Pace - Southern California Laboratory in Camarillo, California, on October 7, 1995

This report has been reviewed for accuracy and completeness and conforms to your analytical requirements

If you have any questions regarding this report, require sampling supplies, field services or information on our analytical services, please call me at (805) 389-1353

Sincerely,

Pace, Inc - Southern California Laboratory

Melanie Concepcion-Gonzalez
Project Manager

This Cover Page is an integral part of the Analytical Report

TEL 805 389 1353

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT C McHale
Pace, Inc
1455 McDowell Blvd North, Suite D
Petaluma, CA 94954

Lab Number CL-4670-1
Project DMSFO Bottlerock Power Plant
Analyzed 10/16/95
Analyzed by SG
Method EPA 8150

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	RECEIVED
Composite of SSCDV-1A & SSCDV-1B	Soil	Client	10/03/95 1000	10/07/95

CONSTITUENT	(CAS RN)	*PQL mg/Kg	RESULT mg/Kg	NOTE
Chlorinated Herbicides				1
2,4-D	(94757)	0 5	ND	
2,4,5-TP (Silvex)	(93721)	0 2	ND	
Dichloroprop (2,4-DP)	(120365)	0 5	ND	
2,4,5-T	(93765)	0 1	ND	
Dinoseb	(88857)	0 1	ND	
2,4-DB	(94826)	0 5	ND	
Dalapon	(75990)	0 5	ND	
Dicamba	(1918009)	0 1	ND	
MCPA	(94746)	2	ND	
MCPP	(93652)	2	ND	
Percent Surrogate Recovery			84	

Lab Certifications CAELAP #1598, UTELAP #E-142, AZELAP #AZ0162, A2LA #0136-01, L A Co CSD #1018
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Lim
(1) Sample Preparation on 10/12/95 by HK using EPA 8150

10/18/95
GC12/S1228746
SJG/jgydnn/gcc(dw)/sjg
8150-0-101295A

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT C McHale
Pace, Inc
1455 McDowell Blvd North, Suite D
Petaluma, CA 94954

Lab Number CL-4670-2
Project DMSFO Bottlerock Power Plant
Analyzed 10/16/95
Analyzed by SG
Method EPA 8150

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	RECEIVED
Composite of SSCDV-2A & SSCDV-2B	Soil	Client	10/03/95 1000	10/07/95

CONSTITUENT	(CAS RN)	*PQL mg/Kg	RESULT mg/Kg	NOTE
Chlorinated Herbicides				1
2,4-D	(94757)	0 5	ND	
2,4,5-TP (Silvex)	(93721)	0 2	ND	
Dichloroprop (2,4-DP)	(120365)	0 5	ND	
2,4,5-T	(93765)	0 1	ND	
Dinoseb	(88857)	0 1	ND	
2,4-DB	(94826)	0 5	ND	
Dalapon	(75990)	0 5	ND	
Dicamba	(1918009)	0 1	ND	
MCPA	(94746)	2	ND	
MCPP	(93652)	2	ND	
Percent Surrogate Recovery			102	

Lab Certifications CAELAP #1598, UTELAP #E-142, AZELAP #AZ0162, A2LA #0136-01, L A Co CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limi
(1) Sample Preparation on 10/12/95 by HK using EPA 8150

10/18/95
GC12/S1228747
SJG/jgygcc(dw)/sjg
8150-0-101295A

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Southern California Laboratory (805) 389-1353
4765 Calle Quetzal, Camarillo, California 93012 FAX (805) 389-1438

QC Batch ID 8150-0-101295A

CLIENT PACE, Incorporated

Analyzed 10/16/95
Analyzed by SG
Method EPA 8150

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
METHOD BLANK	Solid			

CONSTITUENT	(CAS RN)	*PQL mg/Kg	RESULT mg/Kg	NOTE
Chlorinated Herbicides				1
2,4-D	(94757)	0 5	ND	
2,4,5-TP (Silvex)	(93721)	0 2	ND	
Dichloroprop (2,4-DP)	(120365)	0 5	ND	
2,4,5-T	(93765)	0 1	ND	
Dinoseb	(88857)	0 1	ND	
2,4-DB	(94826)	0 5	ND	
Dalapon	(75990)	0 5	ND	
Dicamba	(1918009)	0 1	ND	
MCPA	(94746)	2	ND	
MCPP	(93652)	2	ND	
Percent Surrogate Recovery			109	

Lab Certifications CAELAP #1598, UTELAP #E-142, AZELAP #AZ0162, A2LA #0136-01, L A Co CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Lim
(1) Sample Preparation on 10/12/95 by HK using EPA 8150

10/18/95
GC12/S1228743
SJG/jgydnn/gcc(dw)/sjg

ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Southern California Laboratory (805) 389-1353
4765 Calle Quetzal, Camarillo, California 93012 FAX (805) 389-1438

QC Batch ID 8150-0-101295A

CLIENT PACE, Incorporated

Analyzed 10/16/95
Analyzed by SG
Method EPA 8150

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
QC SPIKE	Solid		

CONSTITUENT	*PQL mg/Kg	SPIKE AMOUNT	RESULT mg/Kg	%REC	NOTE
Chlorinated Herbicides					1
2,4-D	0 5	0 100	0 107	107	
2,4 5-TP (Silvex)	0 2	0 0100	0 0088	88	
Dichloroprop (2,4-DP)	0 5	0 100	0 100	100	

Lab Certifications CAELAP #1598, UTELAP #E-142, AZELAP #AZ0162, A2LA #0136-01, L A Co CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limi
(1) Sample Preparation on 10/12/95 by HK using EPA 8150

10/18/95
GC12/S1228744
SJG/jgydnn/gcc(dw)/sjg

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

QC Batch ID 8150-0-101295A

CLIENT PACE, Incorporated

Analyzed 10/16/95
Analyzed by SG
Method EPA 8150

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
QC SPIKE DUPLICATE	Solid			

CONSTITUENT	*PQL mg/Kg	SPIKE AMOUNT	RESULT mg/Kg	%REC	RPD	NOTE
Chlorinated Herbicides						1
2,4-D	0 5	0 100	0 112	112	4 6	
2,4,5-TP (Silvex)	0 2	0 0100	0 0101	101	14	
Dichloroprop (2,4-DP)	0 5	0 100	0 102	102	2	

Lab Certifications CAELAP #1598, UTELAP #E-142, AZELAP #AZ0162, A2LA #0136-01, L A Co CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit
(1) Sample Preparation on 10/12/95 by HK using EPA 8150

10/18/95
GC12/S1228745
SJG/jgydnn/gcc(dw)/sjg

(DMSFO) 3617

Proj : Battle Rock Power Plant

pace INCORPORATED
ENVIRONMENTAL LABORATORIES

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client Pace Petaluma | Report To | Pace Client No

Address | Bill To | Pace Project Manager

P O # / Billing Reference IR WO# 2211 | Pace Project No

Phone | Project Name / No | *Requested Due Date

Sampled By (PRINT) Client

Sampler Signature | Date Sampled 10-3-95

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	ANALYSES REQUEST: 8150	REMARKS
1	SSCDV-1A	1000	SO	Comp						X	composite 2>1 -1
2	SSCDV-1B	1000	↓	Comp							
3	SSCDV-2A	1000		Comp						X	composite 2>1 -2
4	SSCDV-2B	1000		Comp							
5											
6											
7											
8											

CL4670

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT DATE	SHIPMENT METHOD RETURNED DATE

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Jack Hellman Fed Ex		10/6	4:40
	Fed Ex		10/7	1100

SEE REVERSE SIDE FOR INSTRUCTIONS

PACE ANALYTICAL SERVICES, INC.

REPORT OF LABORATORY ANALYSIS

January 10, 1996

Ms Jill Hazlip
Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

RE PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

Dear Ms Hazlip

Enclosed are the results of analyses for sample(s) received on January 9, 1996 If you have any questions concerning this report, please feel free to contact me

Sincerely,

David A Pichette
Project Manager

Enclosures

1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
TEL 707 792-1865
FAX 707 792-0342

REPORT OF LABORATORY ANALYSIS

DATE 01/10/96
PAGE 1

Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone. (412)896-5858

PACE Sample No 70473426 Date Collected 10/02/95
Client Sample ID PPVSEP AKA 346192 Date Received 01/09/96

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	4 34	mg/kg	0 223	01/09/96	EPA 7471	JLO	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	43 4	mg/kg	10	01/09/96	EPA 7060	JLO	7440-38 2	
Date Digested				01/09/96				
Metals, ICP								
Boron	56 1	mg/kg	27	01/09/96	EPA 6010	SMS	7440-42-8	
Date Digested				01/08/96				

1455 McDowell Blvd. North. Suite D
Petaluma. CA 94954
TEL. 707 792-1865
FAX. 707 792-0342

PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

PARAMETER FOOTNOTES

ND	Not Detected
NC	Not Calculable
PRL	PACE Reporting Limit

1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
TEL. 707 792 1865
FAX. 707 792-0342

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

DATE 01/10/96

Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896 5858

QC Batch ID 11304
QC Batch Method EPA 3050
Date of Batch 01/08/96
Associated PACE Samples 70473426

METHOD BLANK 70472907
Associated PACE Samples 70473426

Parameter	Units	Method Blank Result	PRL	Footnotes
Arsenic	mg/kg	ND	0 5	

MATRIX SPIKE 70472915

Parameter	Units	70472212	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Arsenic	mg/kg	2 87	3 88	5	55	1

LABORATORY CONTROL SAMPLE & LCSD 70472931 70472949

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Arsenic	mg/kg	4	3 68	92	3 58	89	3	

SAMPLE DUPLICATE 70472923

Parameter	Units	70472212	Dup Result	RPD	Footnotes
Arsenic	mg/kg	2 87	1 86	43	

Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 11305 QC Batch Method EPA 3050 Date of Batch 01/08/96
Associated PACE Samples 70473426

METHOD BLANK 70474408
Associated PACE samples
70473426

Parameter	Units	Method Blank Result	PRL	Footnotes
Boron	mg/kg	ND	3	

LABORATORY CONTROL SAMPLE & LCSD 70474416 70474424

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Boron	mg/kg	100	89 8	90	90 7	91	1	

1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
TEL. 707 792-1865
FAX. 707 792-0342

QUALITY CONTROL DATA

DATE 01/10/96
PAGE 5

Dames & Moore, San Francisco
221 Main Street, Ste 600
San Francisco, CA 94105-1917

PACE Project Number 704720
Client Project ID Bottle Rock Power Plant

Attn Ms Jill Haizlip
Phone (412)896-5858

QC Batch ID 11306 QC Batch Method EPA 7471 Date of Batch 01/08/96
Associated PACE Samples 70473426

METHOD BLANK 70473038
Associated PACE Samples 70473426

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	mg/kg	ND	0 025	

MATRIX SPIKE 70473046

Parameter	Units	70472212	Spike Conc	Matrix Spike Result	Spike % Rec	Footnotes
Mercury	mg/kg	ND	0 181	0 217	113	

LABORATORY CONTROL SAMPLE & LCSD 70473061 70473079

Parameter	Units	Spike Conc	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Mercury	mg/kg	0 2	0 212	106	0 214	107	1	

SAMPLE DUPLICATE 70473053

Parameter	Units	70472212	Dup Result	RPD	Footnotes
Mercury	mg/kg	ND	ND	NC	