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# Calpine Geyser's Units 3, 16, 17, 18, 19, and 20 Amendments

Prepared for  
**Calpine**

June 18, 2003

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# 1.0 Introduction

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## 1.1 Overview of Amendment

The Geysers Power Company, LLC, a wholly owned subsidiary of the Calpine Corporation (Calpine), owns and operates 19 geothermal power plant units at 16 sites within The Geysers, located in Sonoma County and Lake County. Geothermal wells located throughout The Geysers steam field produce dry steam, which is transported to the power plants and directed through turbines to generate electricity. Together, the 19 power plant units generate approximately 850 megawatts (MW) of electricity.

The Geysers Recharge Project will transport recycled water from the City of Santa Rosa Laguna Subregional Water Reclamation Facility (Laguna Treatment Plant) to The Geysers steam field where the recycled water would be injected into underground wells to augment steam field recharging. Approximately 11 million gallons per day (MGD) of recycled water will be transported to The Geysers in a 41-mile-long pipeline with an ultimate capacity of 16 MGD. The Geysers power plants covered by the Geysers Recharge Project are the following:

- Unit 1 Aidlin (20.0 MW)
- Unit 2 Bear Canyon (20.0 MW)
- Unit 3 Sonoma (53.0 MW)
- Unit 4 West Ford Flat (27.0 MW)
- Unit 5/6 McCabe (82.0 MW)
- Unit 7/8 Ridge Line (70.0 MW)
- Unit 9/10 Fumarole (31.0 MW)
- Unit 11 Eagle Rock (73.0 MW)
- Unit 12 Cobb Creek (41.0 MW)
- Unit 13 Big Geysers (74.0 MW)
- Unit 14 Sulphur Springs (63.0 MW)
- Unit 16 Quicksilver (71.0 MW)
- Unit 17 Lake View (42.0 MW)
- Unit 18 Socrates (65.0 MW)
- Unit 19 Calistoga (73.0 MW)
- Unit 20 Grant (45.0 MW)

Only six of the above plants were licensed by the California Energy Commission (CEC). These plants are Geysers Units 3, 16, 17, 18, 19, and 20. Table 1-1 presents the unit number, docket number, and plant name during licensing.

**Table 1-1** CEC-Licensed Power Plant Names, Current Calpine Name, Unit Number, and Docket Number

Unit Number	Current Power Plant Name	CEC Licensed Name	Docket Number
3	Sonoma	SMUDGEON No. 1 Geothermal Project	80-AFC-1
16	Quicksilver	PG&E Geysers Unit 16	79-AFC-5
17	Lakeview	PG&E Geysers Unit 17	79-AFC-1

**CALPINE GEYSER'S UNITS 3, 16, 17, 18, 19, AND 20  
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**Table 1-1 CEC-Licensed Power Plant Names, Current Calpine Name, Unit Number, and Docket Number**

<b>Unit Number</b>	<b>Current Power Plant Name</b>	<b>CEC Licensed Name</b>	<b>Docket Number</b>
18	Socrates	PG&E Geysers Unit 18	79-AFC-3
19	Calistoga	OXY Geothermal Plant No.1	81-AFC-1
20	Grant	PG&E Geysers Unit 20	82-AFC-1

Figure 1 shows the location of these power plant units.

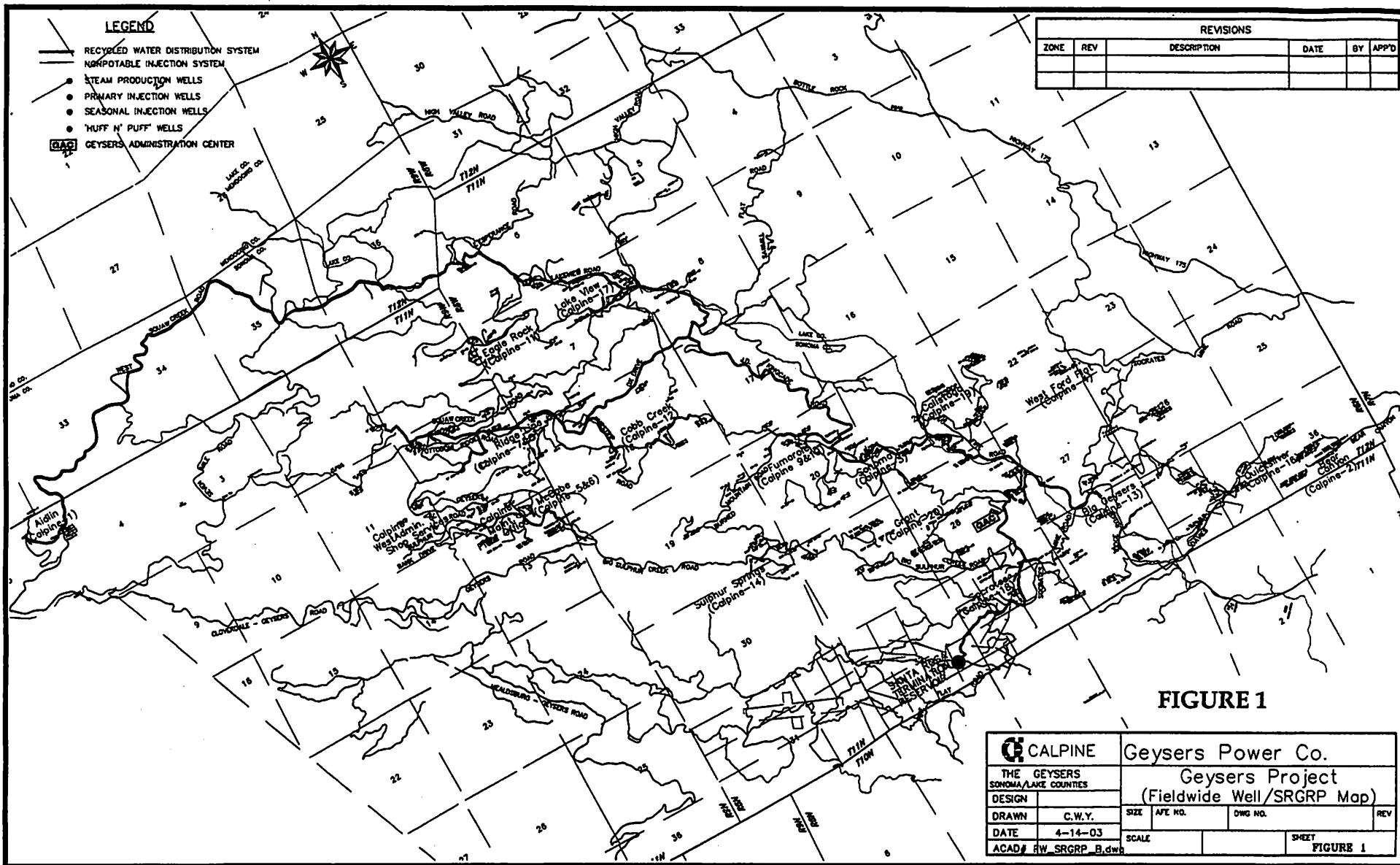
Calpine is seeking an amendment to Unit's 3, 16, 17, 18, 19, and 20 licenses to allow for the use of the recycled water in the cooling tower and for other process uses. This Amendment provides the appropriate information and environmental analysis on the water supply. Calpine believes that this Amendment demonstrates that this modification does not result in a significant impact to the environment, and will have a beneficial impact on the known geothermal resource area (KGRA). The Amendment also contains information to ensure that the project complies with all laws, ordinances, regulations, and standards (LORS) and will comply with the California Energy Commission's Conditions of Certification.

## **1.2 Summary of Environmental Impacts**

Section 1769 (a)(1)(E) of the CEC Siting Regulations requires that an analysis be conducted that addresses the impacts the modification might have on the environment and proposed measures to mitigate any significant adverse impacts. In addition, Section 1769 (a)(1)(F) of the Siting Regulations requires a discussion of the impacts the modification might have on the project's ability to comply with applicable LORS. Section 3.0 of this Amendment includes a discussion of the potential environmental impacts of the new water supply, as well as a discussion of the consistency of the modification with LORS. Section 3 concludes that with the proposed mitigation measures, there will be no significant environmental impacts associated with the Amendment and that the project as amended will comply with applicable LORS.

## **1.3 Consistency of Amendment with License**

Section 1769 (a)(1)(D) of the CEC Siting Regulations requires a discussion of the Amendment's consistency with the LORS and whether the modifications are based upon new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision. If the project is no longer consistent with the license, an explanation why the modification should be permitted must be provided. The proposed new water supply for Units 3, 16, 17, 18, 19, and 20 is consistent with the applicable LORS. In addition, the new water supply is not based upon new information that changes or undermines any bases for the final decision. The new water supply is beneficial to all of the geothermal projects in the KGRA and will increase the sustainability of the KGRA by providing an additional quantity of water for reinjection into the geothermal resource.



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	BY APP'D

FIGURE 1

CALPINE		Geysers Power Co. Geysers Project (Fieldwide Well/SRGRP Map)		
THE GEYSERS SONOMA/LAKE COUNTIES		SIZE	APE NO.	DWG NO.
DESIGN				REV
DRAWN	C.W.Y.			
DATE	4-14-03	SCALE		SHEET
ACAD# RW_SRGRP_B.dwg				FIGURE 1

## 2.0 Description of Project Amendment

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Consistent with California Energy Commission Siting Regulations Section 1769 (a)(1)(A) and 1769(a)(1)(B), this section includes a complete description of the project modification, as well as the necessity for the amendment.

### 2.1 Description of New Water Supply

The proposed project will take recycled water from the City of Santa Rosa – wastewater treated to Title 22 disinfected tertiary treatment standards – and employ it for onsite uses at Calpine's 19 power plant units. The recycled water will be transported from the City of Santa Rosa to The Geysers storage tank, which is on a ridge overlooking The Geysers steam field. From the storage tank, the water will flow by gravity to the injection wells and power plant units. The majority of the water will be used for The Geysers Recharge Project to replenish the steam field, but a portion of the flow will be directed toward the power plant units for onsite use.

The City of Santa Rosa, in partnership with Calpine, has constructed the 41-mile Geysers Recharge Pipeline and The Geysers storage tank where the pipeline will terminate. Once the water exits The Geysers storage tank, Calpine becomes solely responsible for the operation, maintenance, and replacement of the recycled water distribution system at The Geysers.

Calpine staff will be responsible for the operation of the recycled water pipelines within The Geysers and the management of recycled water use at the power plant sites. All Calpine personnel will receive necessary training for the operation and maintenance of the facilities and uses for which they are responsible.

Wastewater at the Laguna Treatment Plant undergoes four stages of treatment:

- **Primary Treatment:** Screening of large objects from the water; grit removal; primary sedimentation; equalization
- **Secondary Treatment:** Aeration
- **Advanced Secondary Treatment:** Biological and chemical processes to remove ammonia, phosphates, and additional solids; addition of aluminum sulfate; secondary clarification
- **Tertiary Treatment:** Coal filtration to remove remaining solids; ultraviolet (UV) disinfection to inactivate pathogens and other microorganisms

Once the water has undergone the four stages of treatment, the treated water meets the requirements of Title 22 of the California Code of Regulations for tertiary wastewater treatment and can be used as recycled water.

The Title 22 disinfected tertiary treated water will be transported from the City of Santa Rosa to the Geysers KGRA via a 41-mile-long underground pipeline. The pipeline, with a diameter ranging from 30 to 48 inches, will connect Santa Rosa's Delta Pond with the Geysers storage tank.

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AMENDMENT**

Water from the Geysers storage tank will flow by gravity to the Geysers steam field and power plant units in a distribution pipeline constructed by Calpine. Most of the pipeline is underground, with some above ground sections.

The existing recycled water supply pipelines are a combination of aboveground and underground. The pipelines for Units 16, 18, 19, and 20 are located in the access road just outside the Units fencelines. For Units 3 and 17, the recycled water supply pipelines are already onsite and are located aboveground and are already being reinjected using the existing pumping capacity of Units 3 and 17. No additional ground disturbance will be required for these units.

Table 2-1 presents the tertiary disinfected recycled water supply quality based on 2 years of sampling data.

**TABLE 2-1  
Expected Recycled Water Quality**

<b>Constituent or Characteristic</b>	<b>Two Year Average Concentrations</b>
Total Suspended Solids	1.2 mg/L
pH	7.4
Biochemical Oxygen Demand	2.5 mg/L
Total Alkalinity	168.6 mg/L as CaCO <sub>3</sub>
Total Dissolved Solids	447.1 mg/L
Conductivity	702.6
Total Organic Carbon	16.8 mg/L
Phosphate	2.7 mg/L
Nitrate Nitrogen	8.3 mg/L
Nitrite Nitrogen	0.25 µg/L
Arsenic	2 µg/L
Cadmium	< Minimum Detection Level
Chromium	< Minimum Detection Level
Copper	11.4 µg/L
Lead	2 µg/L
Mercury	< Minimum Detection Level
Nickel	4 µg/L
Selenium	< Minimum Detection Level
Zinc	26.5 µg/L
Total Coliform	2 MPN

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Calpine proposes to add recycled water to its process makeup at all its geothermal power plants. The following uses are proposed:

- Cooling Tower makeup water
- Stretford Cooler makeup water
- Flushing toilets and urinals
- Priming drain traps
- Industrial process water that may come into contact with workers
- Structural fire fighting
- Consolidation of backfill around potable water pipelines
- Industrial boiler feed water
- Non-structural fire fighting
- Backfill consolidation around non-potable piping
- Soil compaction
- Mixing concrete
- Dust control on roads and streets during construction
- Cleaning roads, sidewalks and outdoor work areas; and
- Industrial process water that will not come into contact with workers.

Figure 2A and 2B present simplified process flow diagrams for the cooling tower circulating water systems for the six CEC-licensed facilities. Figures 3 through 8 present plot plans that show the extent of the pipeline modifications at Units 3, 16, 17, 18, 19, and 20. Calpine is in the process of obtaining Title 22 Permits from the State Department of Health Services, any necessary Waste Discharge Requirements Permits from the Regional Water Quality Control Boards, and injection approvals from the California Division of Oil, Gas and Geothermal Resources (DOGGR).

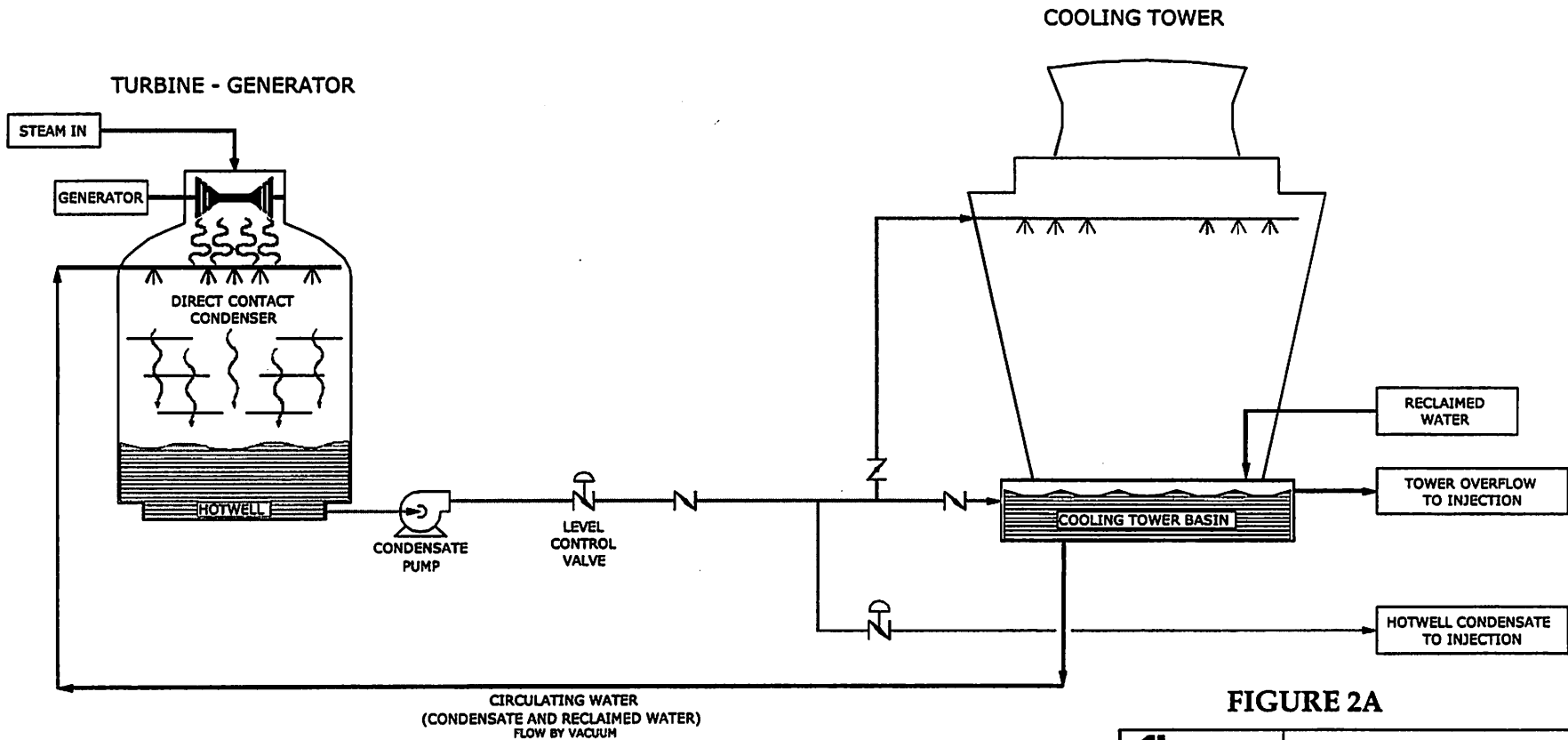
The new 41-mile pipeline and storage tanks were approved under a number of separate California Environmental Quality Act (CEQA) actions (State Clearinghouse Number 103069), and are not addressed in this amendment.

## **2.2 Necessity of Proposed Change**

Section 1769 (a)(1)(B) and 1769(a)(1)(C) of the CEC Siting Regulations require a discussion of the necessity for the proposed changes to the project and whether this modification is based on information that was known by the petitioner during the certification proceeding. In order to extend and enhance the generation capabilities of Calpine's geothermal power plants, an additional water supply was needed. During warmer weather, the geothermal power plants can not generate an adequate water volume through the condensing of geothermal fluids to operate the existing power plants at their maximum capacity. To resolve this problem, Calpine proposes to use some of the recycled water intended to be reinjected in Units 3, 16, 17, 18, 19, and 20 in the cooling towers to allow for additional generating capacity during these periods. The recycled water would be injected in the same manner as the condensed geothermal fluid. The recycled water supply was not available or known during the licensing of Units 3, 16, 17, 18, 19, and 20.



## Process Flow Diagram for Circulating Water System, Plants 5-6, 7-8, 9-10, 11, 12

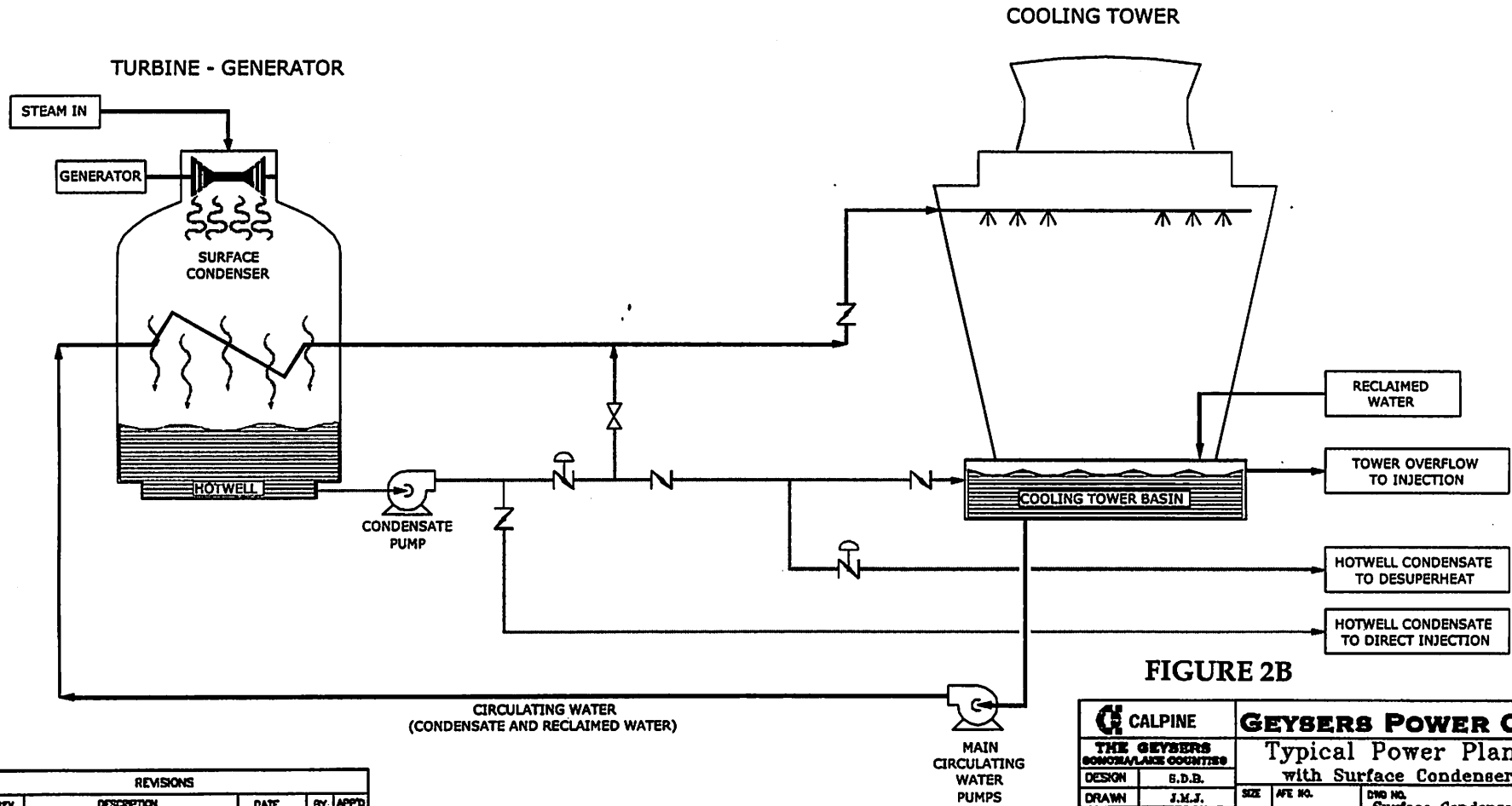


**FIGURE 2A**

REVISIONS					
ZONE	REV	DESCRIPTION	DATE	BY	APP'D

<b>CALPINE</b> <small>THE GEYSERS SONOMA/LAKE COUNTIES</small>	<b>GEYSERS POWER CO.</b>			
	<b>Typical Power Plant with Direct Contact Condenser</b>			
DESIGN	S.D.B.	SIZE	APE NO.	DWG NO.
DRAWN	J.M.J.	Direct Contact Cond.		REV
DATE	03/13/03	SCALE	SHEET	
ACAD#	Direct Contact			

## Process Flow Diagram for Circulating Water System, Plants 1, 2, 13, 14, 16, 17, 18, 19, 20



**FIGURE 2B**

REVISIONS					
ZONE	REV	DESCRIPTION	DATE	BY	APPD

<b>CALPINE</b>		<b>GEYSERS POWER CO.</b>			
<b>THE GEYSERS</b> <small>NONFURNACE COUNITED</small>		<b>Typical Power Plant</b> with Surface Condenser			
DESIGN	S.D.B.	SIZE	AFE NO.	DWG NO.	REV
DRAWN	J.M.J.			Surface Condenser	
DATE	03/13/03	SCALE			SHEET
ACAD#	Surf Cond.				

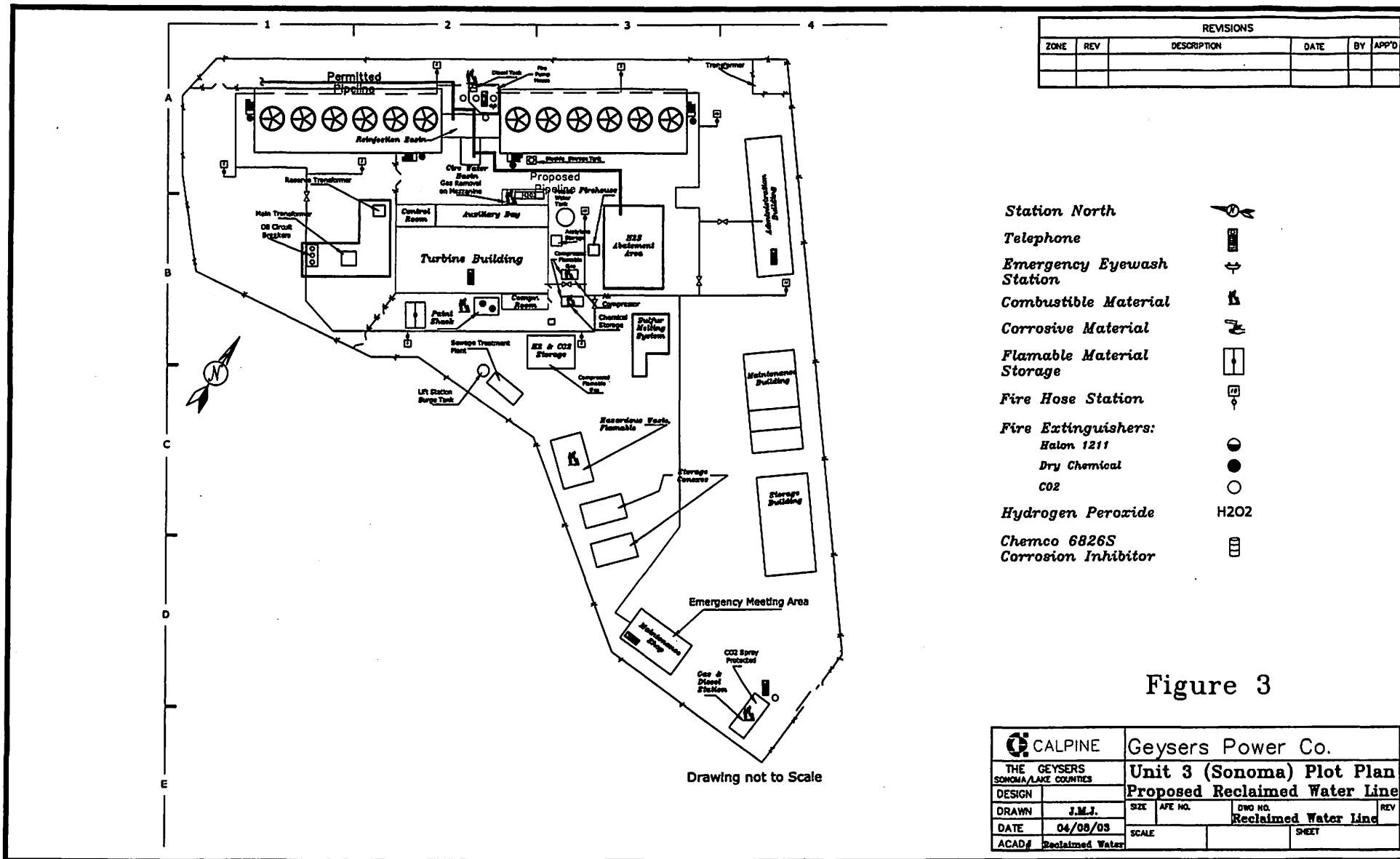
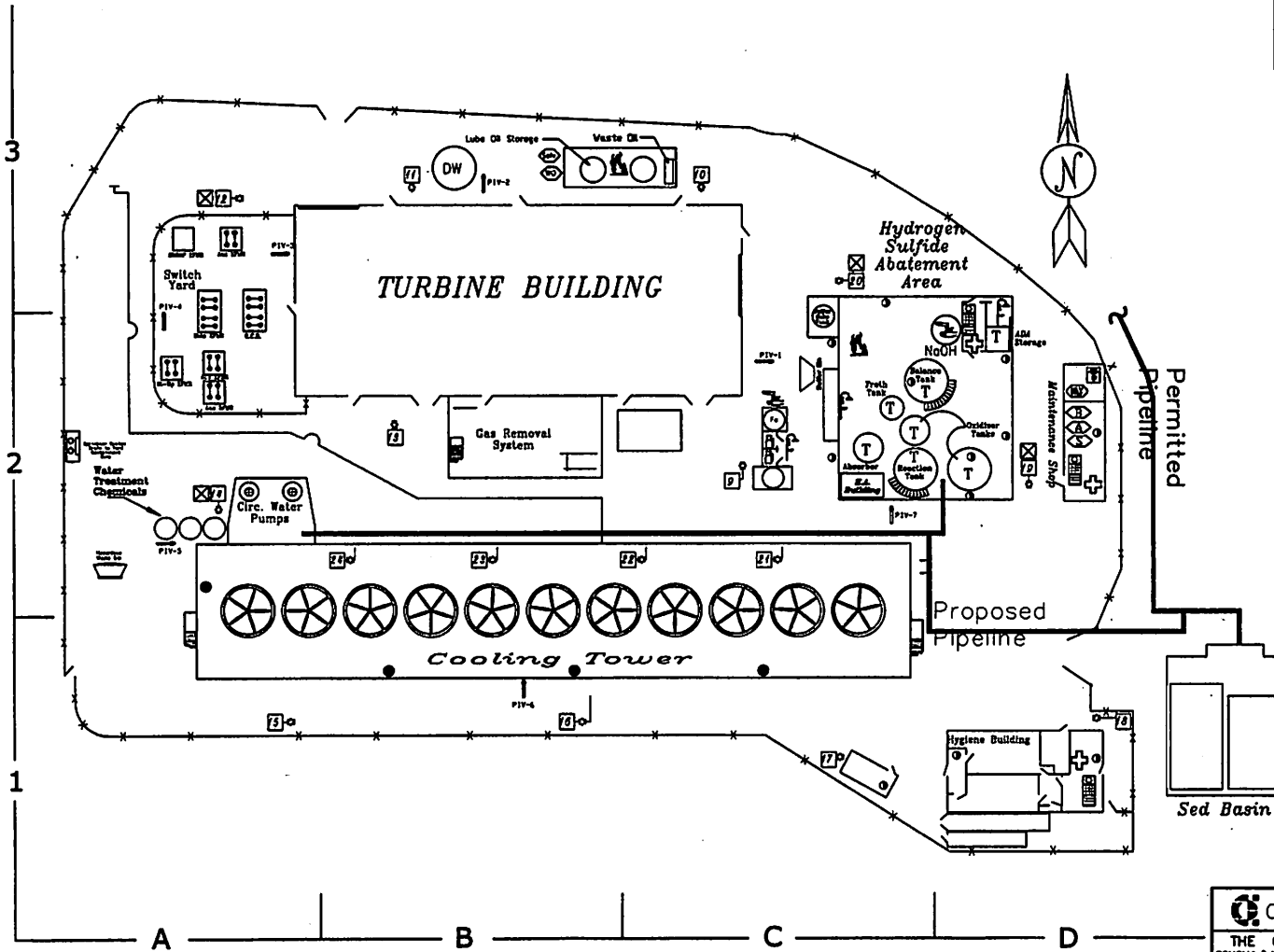












Figure 3


REVISIONS					
ZONE	REV	DESCRIPTION	DATE	BY	APP'D

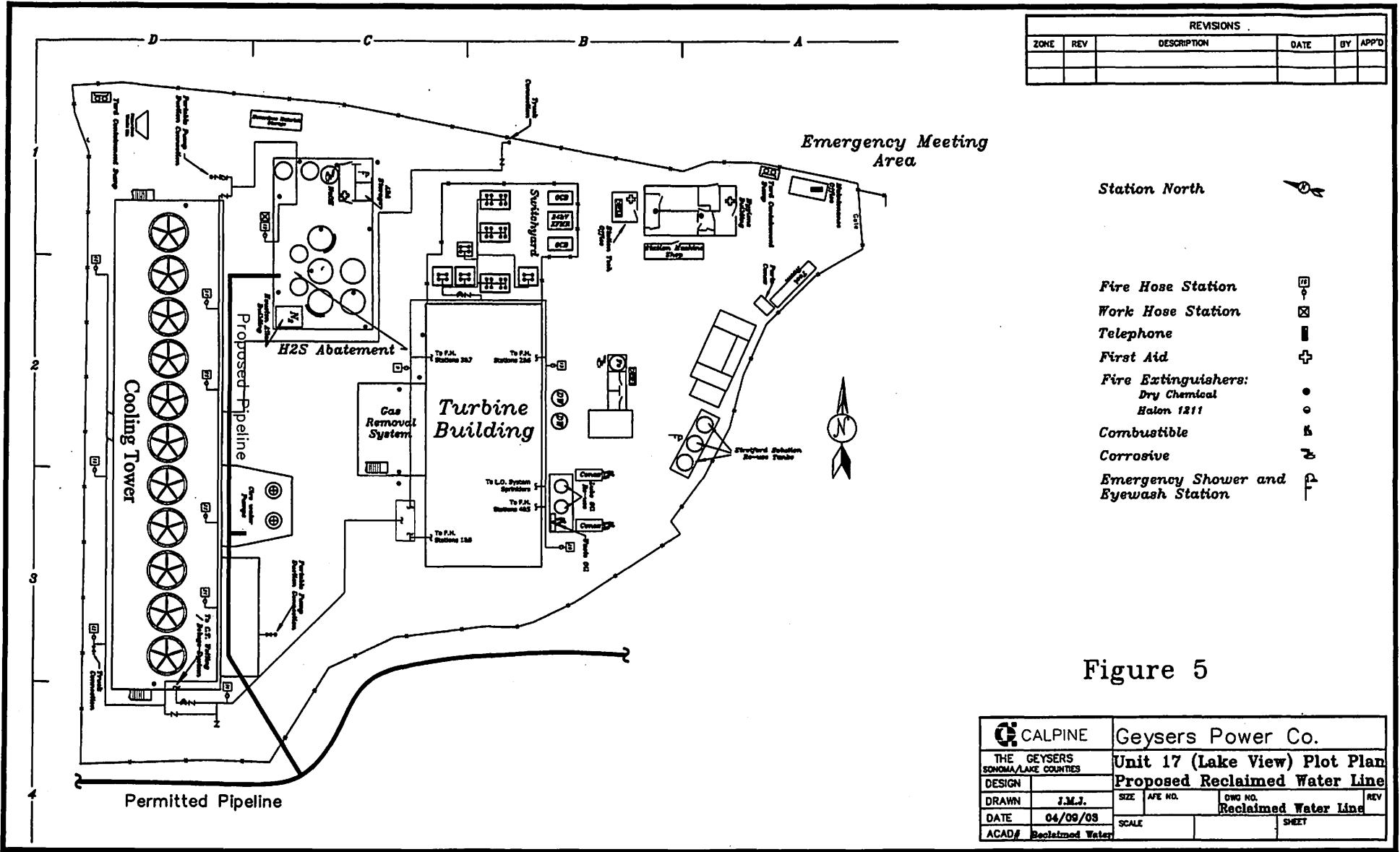


-  Station North
-  Telephone
-  Combustible Material
-  Corrosive Material
-  Fire Hose Station
- Fire Extinguishers:**
  -  Halon 1211
  -  Dry Chemical
-  Emergency Eyewash and Shower
-  Portable Emergency Eyewash
-  First Aid Kit

**Figure 4**

NOTE: All drawings are for reference only. Not drawn to scale.

 CALPINE		Geysers Power Co.			
THE GEYSERS SONOMA/LAKE COUNTIES		Unit 16 (Quicksilver) Plot Plan			
DESIGN		Proposed Reclaimed Water Line			
DRAWN	J.M.J.	SIZE	A/E NO.	DWG NO.	REV
DATE	04/09/03	SCALE		Reclaimed Water Line	
ACAD#	Reclaimed Water	SHEET			



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	BY APP'D












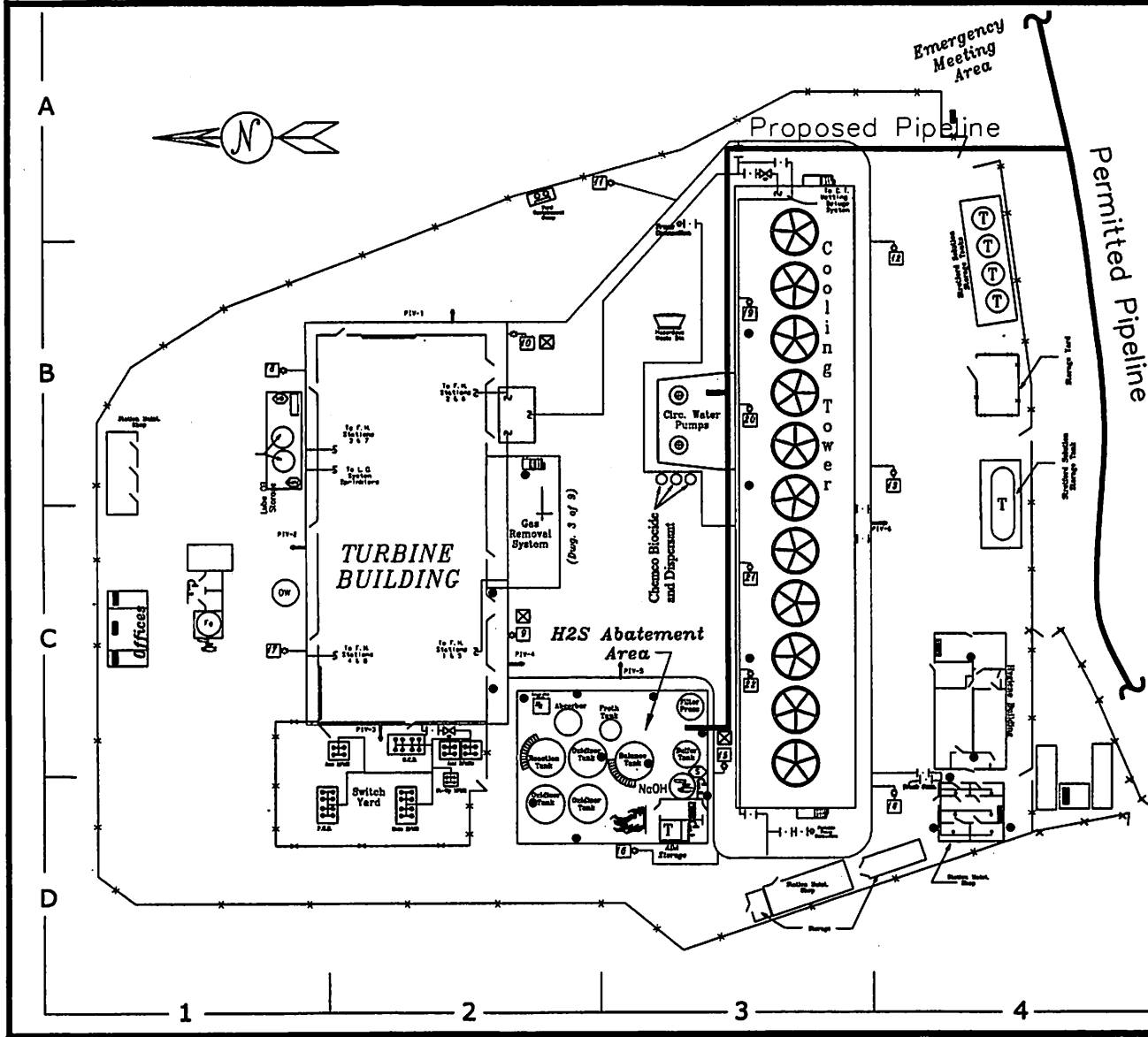
- Station North 
- Fire Hose Station 
  - Work Hose Station 
  - Telephone 
  - First Aid 
  - Fire Extinguishers:
    - Dry Chemical 
    - Halon 1211 
  - Combustible 
  - Corrosive 
  - Emergency Shower and Eyewash Station 

Figure 5

 CALPINE		Geysers Power Co.		
THE GEYSERS SONOMA/LAKE COUNTIES		Unit 17 (Lake View) Plot Plan		
DESIGN		Proposed Reclaimed Water Line		
DRAWN	J.M.J.	SIZE	A/E NO.	DWG NO.
DATE	04/09/03			Reclaimed Water Line
ACAD#	Reclaimed Water	SCALE	SHEET	



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	BY APP'D

Station North



Telephone



Fire Extinguishers:

Dry Chemical



Fire Hose Station



Work Hose Station



Emergency Shower and Eyewash Station



Combustible Material



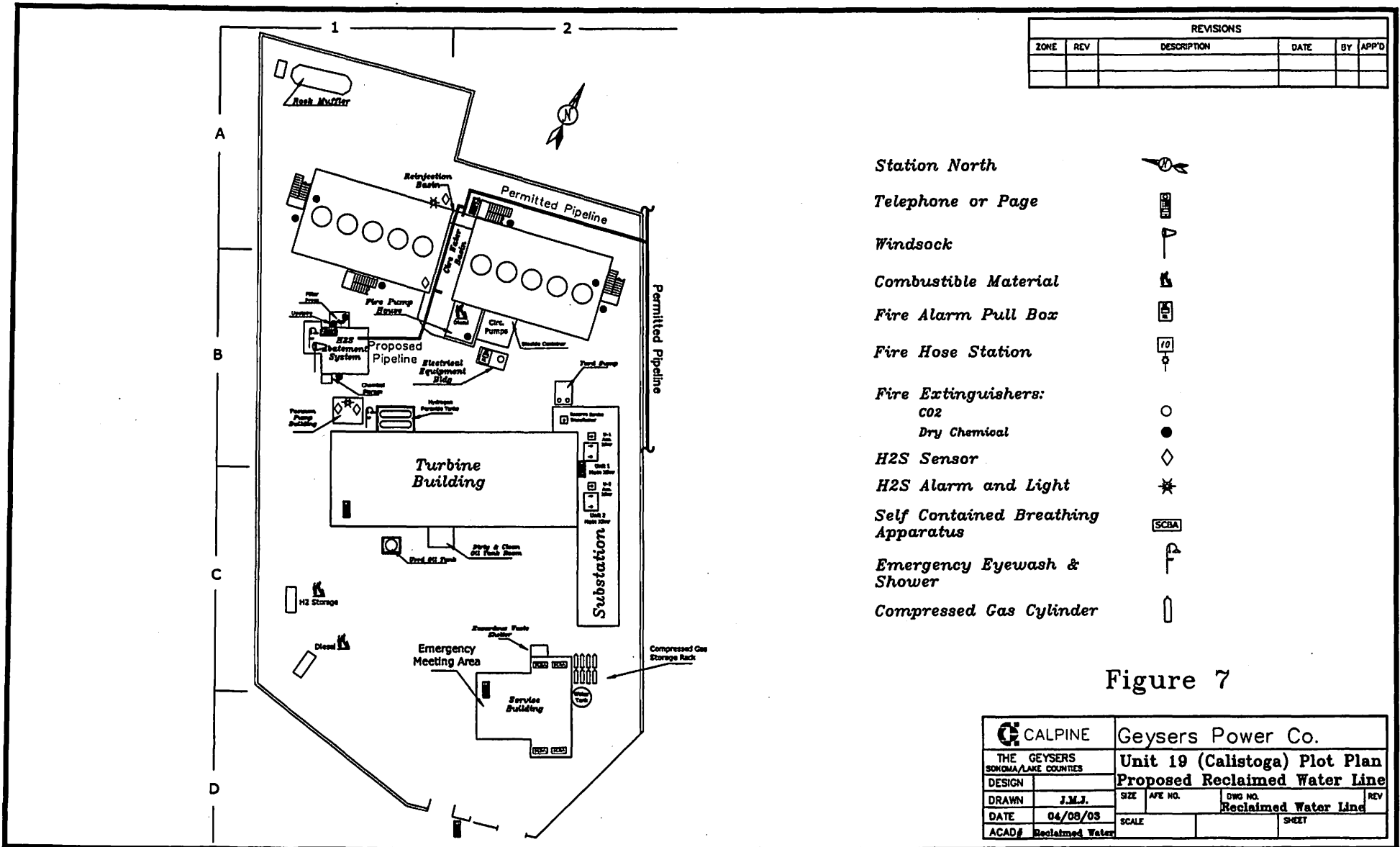
Corrosive Material



NOTE: All drawings are for reference only.  
 UNot drawn to scale.

Figure 6

CALPINE		Geysers Power Co.		
THE GEYSERS SONOMA/LAKE COUNTIES		Unit 18 (Socrates) Plot Plan		
DESIGN ENGINEER		Proposed Reclaimed Water Line		
DRAWN	J.M.J.	SIZE	AFE NO.	DWG NO.
DATE	04/09/03	SCALE		REV
ACAD#	Reclaimed Water	SHEET		



REVISIONS					
ZONE	REV	DESCRIPTION	DATE	BY	APP'D

Station North

Telephone or Page

Windsock

Combustible Material

Fire Alarm Pull Box

Fire Hose Station

Fire Extinguishers:

CO2

Dry Chemical

H2S Sensor

H2S Alarm and Light

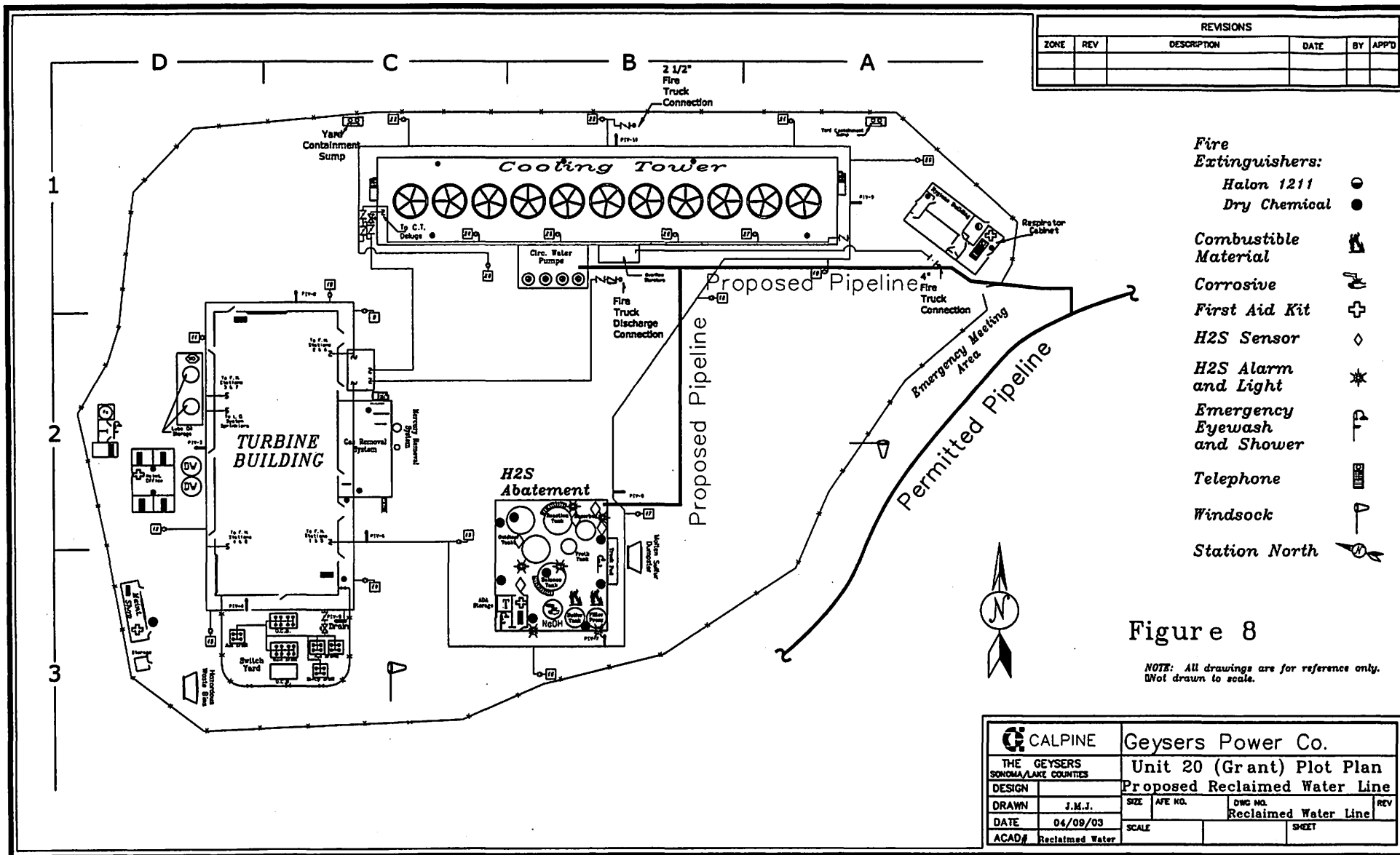
Self Contained Breathing Apparatus

Emergency Eyewash & Shower

Compressed Gas Cylinder

Figure 7

		Geysers Power Co.			
THE GEYSERS SONOMA/LAKE COUNTIES		Unit 19 (Calistoga) Plot Plan			
DESIGN		Proposed Reclaimed Water Line			
DRAWN	J.M.J.	SIZE	A/E NO.	DWG NO.	REV
DATE	04/08/03	Reclaimed Water Line			
ACAD#	Reclaimed Water	SCALE		SHEET	



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	BY APP'D

- Fire Extinguishers:**  
 Halon 1211 ●  
 Dry Chemical ●
- Combustible Material** [Symbol]
- Corrosive** [Symbol]
- First Aid Kit** [Symbol]
- H2S Sensor** [Symbol]
- H2S Alarm and Light** [Symbol]
- Emergency Eyewash and Shower** [Symbol]
- Telephone** [Symbol]
- Windsock** [Symbol]
- Station North** [Symbol]

Figure 8

NOTE: All drawings are for reference only. Not drawn to scale.

CALPINE		Geysers Power Co.		
THE GEYSERS SONOMA/LAKE COUNTIES		Unit 20 (Grant) Plot Plan		
DESIGN		Proposed Reclaimed Water Line		
DRAWN	J.M.J.	SIZE	A/E NO.	DWG NO.
DATE	04/09/03	SCALE		Reclaimed Water Line
ACAD#	Reclaimed Water	SHEET		REV



# 3.0 Environmental Analysis of the Project Changes

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The proposed project change set forth in this Amendment will result in improved operational reliability of the Geysler power plant units 3, 16, 17, 18, 19, and 20. An analysis of each of the environmental areas is presented below for the proposed Amendment. Figures 9 through 14 present aerial photographs of the existing recycled water supply pipelines and the route of the extension pipelines to the Geysler power plant units 3, 16, 17, 18, 19, and 20.

## 3.1 Air Quality

A comprehensive air quality and public health impact analysis for the proposed recycled water supply's construction and operational impacts was prepared. Five copies of this analysis is being submitted under a separate cover. Below is a summary of the proposed recycled water supply's construction and operational impacts on air quality for Geysler Units 3, 16, 17, 18, 19, and 20.

### 3.1.1 Construction Emissions Impacts

Because construction activities will be extremely limited in scope, fugitive dust emissions are expected to be insignificant. Excavation of the recycled water supply pipeline will be required. However, in most cases, these excavations are in paved roadways and will be less than 100 feet in length. For three of the facilities (Units 3, 19 and 20) the reclaimed water pipeline is already permitted to inside the fence line of the power plant site. For Unit 16, a new pipeline extension of approximately 20 feet will be necessary. For Unit 17, the permitted pipeline already runs to just outside of the fence line. Unit 18 has the need for the longest extension of pipeline; estimated to be approximately 100 feet. Emissions from combustion equipment for construction activities are also expected to be insignificant because of the limited construction activities. There is expected to be some limited concrete pouring for pipeline foundations and the material of the pipeline will be carbon steel, stainless steel or high density polyethylene. Also, because of the nature of the proposed changes, commissioning emissions are not expected.

### 3.1.2 Operational Emissions Impacts

Based on the limited aspect of the proposed modification, i.e., use of recycled water supply in addition to or as a replacement for the process water already used, only two sources of emissions have the potential to be affected. They include the cooling tower PM<sub>10</sub> drift and the drift from the Stretford cooler. No other sources of air emissions are anticipated from the proposed modification.

#### 3.1.2.1 Cooling Tower Emissions Impacts

Currently the six power plants use condensate and other process waters for cooling tower makeup water. Substances present in the condensate, process water, or in the cooling water can be contained in the drift of the cooling tower. Drift is the entrained cooling water carried from

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the cooling tower by the exhaust air. Addition of reclaimed water to the process water could affect the potential emissions from the cooling tower. A review of the water quality of the recycled water is presented in Attachment A, Appendix B, Tables B-1.0 through B-1.2. The review was based upon analysis of the last two years of water quality measurements to derive average and peak concentrations. The air quality aspects from using recycled water at each power plant are discussed below.

**Unit 3**

The overall effect of using recycled water in the Unit 3 cooling tower is a net decrease in criteria and non-criteria air emissions. Table 3.1-1 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 3. The current air emissions are based on a 2-year average of concentration data for Unit 3's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-1 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 3**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	0.26	0.0037
Arsenic	0.00025	0.0000047
Boron	0.38	0.0065
Particulate Matter (PM <sub>10</sub> )	1.2	0.33

As can be seen from Table 3.1-1, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

**Unit 16**

The overall effect of using recycled water in the Unit 16 cooling tower is a net decrease in criteria and non-criteria air emissions. Table 3.1-2 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 16. The current air emissions are based on a 2-year average of concentration data for Unit 16's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-2 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 16**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	0.32	0.011
Arsenic	0.000094	0.0000047
Boron	0.24	0.0095
Particulate Matter (PM <sub>10</sub> )	1.0	0.4

**CALPINE GEYSER'S UNITS 3, 16, 17, 18, 19, AND 20  
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As can be seen from Table 3.1-2, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

**Unit 17**

The overall effect of using recycled water in the Unit 17 cooling tower is a net decrease in criteria and non-criteria air emissions. Table 3.1-3 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 17. The current air emissions are based on a 2-year average of concentration data for Unit 17's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-3 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 17**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	1.9	0.49
Arsenic	0.000094	0.000094
Boron	0.23	0.062
Particulate Matter (PM <sub>10</sub> )	10.1	3.18

As can be seen from Table 3.1-3, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

**Unit 18**

The overall effect of using recycled water in the Unit 18 cooling tower is a slight increase in criteria and a decrease in non-criteria air emissions. Table 3.1-4 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 18. The current air emissions are based on a 2-year average of concentration data for Unit 18's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-4 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 18**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	0.18	0.016
Arsenic	0.00016	0.000016
Boron	0.20	0.020
Particulate Matter (PM <sub>10</sub> )	0.71	0.75

**CALPINE GEYSER'S UNITS 3, 16, 17, 18, 19, AND 20  
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As can be seen from Table 3.1-4, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

**Unit 19**

The overall effect of using recycled water in the Unit 19 cooling tower is a net decrease in criteria and non-criteria air emissions. Table 3.1-5 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 19. The current air emissions are based on a 2-year average of concentration data for Unit 19's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-5 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 19**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	0.11	0.006
Arsenic	0.0004	0.000022
Boron	0.29	0.016
Particulate Matter (PM <sub>10</sub> )	0.55	0.35

As can be seen from Table 3.1-5, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

**Unit 20**

The overall effect of using recycled water in the Unit 20 cooling tower is a slight increase in criteria and net decrease in non-criteria air emissions. Table 3.1-6 presents a comparison of the current air emissions and proposed changes in air emissions for Unit 20. The current air emissions are based on a 2-year average of concentration data for Unit 20's cooling tower water. The proposed emissions are based on a maximum recycled water usage of 1,000,000 pounds per hour.

**Table 3.1-6 Comparison of Current and Proposed Cooling Tower Air Emissions for Unit 20**

Pollutant	Current Emissions	Proposed Emissions
	Pounds per Hour	
Ammonia	0.26	0.0071
Arsenic	0.00025	0.0000087
Boron	0.38	0.0071
Particulate Matter (PM <sub>10</sub> )	0.37	0.38

**CALPINE GEYSER'S UNITS 3, 16, 17, 18, 19, AND 20  
AMENDMENT**

As can be seen from Table 3.1-6, the proposed use of recycled water in the cooling tower will not result in an adverse air quality impact.

### **Stretford Coolers**

Currently, Geyser Units 3, 16, 17, 18, 19, and 20 use condensate or other process water as makeup for the Stretford coolers. A Stretford cooler is a single cell evaporative cooler with a heat rejection rating of approximately 3.6 million Btu per hour. These coolers have circulation ratings of about 1000 gallons per minute and drift eliminators with 0.002 efficiencies. The total dissolved solids (TDS) of the water used in these coolers average about 342,000 ppm. It is estimated that no more than 3,000 gallons per day of recycled water will be used at each cooler. Based on the very minor amounts of reclaimed water proposed, no measurable changes to air emissions are anticipated.

### **Cumulative Air Quality Impacts**

Calpine is proposing to use recycled water in all of its Geyser power plants. As shown above, the use of recycled water in the cooling towers will result in an overall reduction in criteria and non-criteria air emissions. As such, the results of a cumulative impact analysis would likely show a reduction in air quality impacts from the proposed use of recycled water.

## **3.2 Biological Resources**

### **3.2.1 Affected Environment**

Biological resources potentially affected by the proposed Calpine/Geyser Power Company reclaimed water pipeline interconnects project, includes previously disturbed erosion control vegetation, and paved and fenced power plant communities and associated wildlife habitats. These sites are set in native coastal coniferous forest/mixed hardwood deciduous woodlands and ruderal/annual grasslands of the Mayacmas Mountains "The Geysers" of Lake and Sonoma Counties.

### **3.2.2 Vegetation Communities**

Vegetation communities encountered around the 6 power plant unit's proposed waste water pipeline consists of annual/ruderal grasslands, and mature native coastal mixed coniferous forests, and mixed hardwood woodlands areas.

#### **Unit 3**

There are no vegetation communities within the proposed pipeline alignment. The proposed alignment will be routed through the paved roads and routinely maintained and paved plant site. The vegetation communities around Unit 3 consist of annual/ruderal grassland and mixed hardwood woodlands.

#### **Unit 16**

There are no vegetation communities within the proposed pipeline alignment. The proposed alignment will be routed through the paved roads and routinely maintained and paved plant site. The vegetation communities around the plant site consist of mixed conifer/mixed conifer woodlands.

**CALPINE GEYSER'S UNITS 3, 16, 17, 18, 19, AND 20  
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**Unit 17**

A portion of the proposed pipeline will run through an annual/ruderal grassland used for bank stabilization. The potential area of disturbance is approximately 100 linear feet and 20 feet in width. This area is just downslope of the existing facility and was planted with a mixture of upland vegetation such as; lolium (*Lolium multiflorum*), star thistle (*Centaurea* sp.), riggut brome (*Bromus hordeaceus*), barley (*Hordeum murinum*), and Johnson grass (*Sorghum halepense*). The remainder of the pipeline will be routed through the paved roads and routinely maintained and paved plant site. The vegetation communities around the plant site consist of annual/ruderal grasslands and mixed hardwood woodlands.

**Unit 18**

There are no vegetation communities within the proposed pipeline alignment. The proposed alignment will be routed through the paved road east of the plant site. The vegetation communities around the plant site consist of mixed coastal conifer forest/mixed hardwoods.

**Unit 19**

There are no vegetation communities within the proposed pipeline alignment. The proposed alignment will be routed through the paved roads and routinely maintained and paved plant site. The vegetation communities around the plant site consists of mixed conifer forest, and mixed hardwoods.

**Unit 20**

There are no vegetation communities within the proposed pipeline alignment. The proposed alignment will be routed through the paved roads and routinely maintained and paved plant site. The vegetation communities around the plant site consist of annual/ruderal grasslands that break into mixed hardwood woodlands.

**3.2.3 Wildlife**

Wildlife species occurring near the proposed project area include species that are accustomed to human disturbance. The six Geysers Power Plant Units, paved roads, and their associated industrial activities are disturbance sources for wildlife in the area. The habitats that surround the area consist of annual/ruderal grasslands, mixed hardwoods, and mixed conifer coastal forests. Song birds, migratory birds, and raptors may use the associated habitats that border the fenced-in power plants for nesting and foraging. Deer and other small mammals could also use these adjacent habitats.

**3.2.4 Special Status Species**

The California Natural Diversity Data Base reports numerous special-status plants and animals found in and around the project sites, however, due to the majority of work to be conducted within asphalt and fenced areas, impacts to special-status species are not expected. During the project surveys no special-status species were observed in or near the 6 proposed pipeline alignments or their associated habitats.

### **3.2.5 Environmental Consequences**

#### **3.2.5.1 Construction Impacts**

With the exception of Unit 17 the remaining Units 3, 16, 18, 19, and 20 of the Calpine Geyser Power Plant Waste Water Interconnection Project will be under existing paved roads or within asphalt paved power plants. The paved roads are routinely maintained and sprayed for weed suppression and fire control along their borders. Because all trenching and installation of the proposed pipeline is within previously disturbed areas or road beds, there should be no direct impacts to wildlife and/or native plant communities. Unit 17 will have a temporary impact to approximately 200 square feet of previously disturbed non-native annual grassland.

#### **3.2.5.2 Operation Impacts**

Operation impacts from the six waste water pipelines are not expected to impact biological resources since they will be under paved roads and covered with at least 4 feet of soil and re-paved after construction is completed.

#### **3.2.5.3 Maintenance Impacts**

Maintenance of the recycled water supply pipelines should not effect ruderal or native vegetation since they will be under paved roads that are routinely maintained. No trees will be removed during maintenance activities.

### **3.2.3 Protection Measures for Biological Resources**

Best Management Practices should be employed to insure sedimentation from excavation does not enter storm drains during the trenching process of the pipeline installation at all of the units. Unit 17 is the only site that may need a pre-construction survey to clear the small section of non-native annual vegetation that could harbor nesting bird species prior to construction activities. Silt fencing should be used downslope of the excavation if the pipeline is installed during the rainy season. Upon completion of trenching through the non-native annual grassland at Unit 17, the area should be re-seeded with a bank/cut stabilizing mixture.

## **3.3 Cultural Resources**

The construction of the recycled water supply pipelines was addressed under separate CEQA actions (SCH# 103069). As presented in Figures 9 through 14, the recycled water pipelines run adjacent to the Units 16, 18, 19, and 20, and the recycled water pipelines are already onsite for Units 3 and 17. For Units 16, 18, 19, and 20, the pipeline construction will occur in existing roadways, which were previously disturbed during the construction of these facilities. As presented in Section 2.0, the underground pipelines will be installed using standard trenching techniques, with a trench depth of 3 feet. As the ground beneath the project site and access roads was previously disturbed to this depth, no cultural resources are expected to be impacted during the construction of the new recycled water supply pipelines.

### **3.3.1 Construction and Operational Impacts**

The construction related cultural resource impacts are discussed below for Units 3, 16, 17, 18, 19, and 20.

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**Unit 3**

During the licensing of Unit 3, the Sacramento Municipal Utility District (SMUD) conducted a cultural resources evaluation (including field surveys) of the project area in November 1979. This evaluation was also used in the preparation of a Final Joint Environmental Statement for the project, as the project site was located on federal lands. This evaluation did not identify any prehistoric or historic sites. The evaluation also included the participation of the Wappo, Southern Pomo, and Lake Miwok tribes<sup>1</sup>.

As shown in Figures 3 and 9, the recycled water supply pipeline is already onsite and no ground disturbance is required on this Unit. Therefore, no additional construction will be required and no impacts to cultural resources are expected.

The operation of the Unit 3 recycled water supply pipeline will not result in any cultural resource impacts.

**Unit 16**

During the licensing of Unit 16, PG&E surveyed the project area and found a number of prehistoric and historic sites along the project's transmission line corridor (These sites are discussed below and records for these sites are contained in the project's evidentiary records of 79-AFC-5), but did not identify any site in the area being disturbed by the construction of Unit 16. The commission decision concludes that construction of Unit 16 will not adversely affect any identified archeological, ethnographic, or historic resources<sup>2</sup>.

As shown in Figures 4 and 10, the proposed recycle water supply pipeline route is located in the existing access road. The construction of this pipeline will be by open trenching to a depth of 3 feet in soils previously disturbed during construction of Unit 16. Therefore, no cultural resource impacts are expected.

The operation of the Unit 16 recycled water supply pipeline will not result in any cultural resource impacts.

**Unit 17**

During the licensing of Unit 17, PG&E surveyed the project area and did not identify any prehistoric and historic sites in the project area. The commission decision concludes that construction of Unit 17 will not adversely affect any identified significant cultural resources<sup>3</sup>.

As shown in Figures 5 and 15, the existing water supply pipeline is located across an access road from Unit 17, and will be routed up a short slope to the project site (estimated offsite length is 75 feet). The proposed pipeline will interconnect to the existing supply pipeline above grade (approximately 3 to 4 feet above grade) and will be trenched across the road and will daylight on the other side of the road. The pipeline will then proceed up a short embankment above ground, anchored by concrete foundations every 25 feet. These foundations are approximately 1 foot square and 3 feet deep. The roadbed and embankment are both highly disturbed fill. The existing pipeline is located on the side of the existing access road. The

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<sup>1</sup> Commission Decision on the Sacramento Municipal Utility District's AFC for SMUD GEO No. 1, 80-AFC-1, March 1981.

<sup>2</sup> Commission Decision on the Pacific Gas and Electric's AFC for Geysers Unit 16, 79-AFC-5, September 1981.

<sup>3</sup> Commission Decision on the Pacific Gas and Electric's AFC for Geysers Unit 17, 79-AFC-1, September 1979.



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construction of this pipeline will be by open trenching to a depth of 3 feet in soils previously disturbed during construction of Unit 17. Therefore, no cultural resource impacts are expected.

The operation of the Unit 17 recycled water supply pipeline will not result in any cultural resource impacts.

**Unit 18**

During the licensing of Unit 18, PG&E surveyed the project area and identified one archaeological site (CA-SON-793) in the project area. Condition 24 of the Commission Decision required PG&E to maintain the existing fence around this site. Furthermore, Condition 27 required PG&E to have a qualified archaeologist present during site vegetation and topsoil removal to monitor and mitigate any impacts to cultural resources encountered during construction. The Commission Decision concludes that construction of Unit 18 will not adversely affect any identified archaeological, ethnographic or historic resources<sup>4</sup>.

As shown in Figures 6 and 16, the existing water supply pipeline is located in the access road adjacent to Unit 18. The proposed pipeline will interconnect to the existing supply pipeline by trenching to the access road at a depth of approximately 3 feet directly to the west end of the cooling tower, where the pipeline will daylight and be above grade. The soils that will be disturbed in the roadbed and the plant site are highly disturbed due to the initial plant and road construction. Therefore, no cultural resource impacts are expected.

The operation of the Unit 18 recycled water supply pipeline will not result in any cultural resource impacts.

**Unit 19**

During the licensing of Unit 19, Occidental Geothermal Inc. surveyed the project area in 1976 and discovered one archaeological site (CA-LAK-711) on the western edge of the Occidental leasehold. This site consists of a surface scatter and a midden depth of nearly two meters. Site CA-LAK-711 was officially listed in the Federal Register of Historic Places in 1980. Conditions 4-3 and 4-5 require Occidental to designate a qualified archaeologist to be available to monitor during site construction to mitigate any potential impacts. The commission decision concludes that implementation of the mitigation measures set forth in the Decision would adequately mitigate all known and unknown archaeological and historic resources<sup>5</sup>.

As shown in Figures 7 and 13, the recycled water supply pipeline is already on site and no ground disturbance is required on this Unit. Therefore, no additional construction will be required and no impacts to cultural resources are expected.

The operation of the Unit 19 recycled water supply pipeline will not result in any cultural resource impacts.

**Unit 20**

During the licensing of Unit 20, PG&E conducted two intensive field surveys, and an ethnographic study of the project area. Two archaeological resource sites (CA-SON-792 and CA-

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<sup>4</sup> Commission Decision on the Pacific Gas and Electric's AFC for Geysers Unit 18, 79-AFC-3, May 1980.

<sup>5</sup> Commission Decision on the Occidental Geothermal Inc. AFC for Oxy Geothermal Plant No. 1, 81-AFC-1, January 1982.

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SON-793 were discovered approximately 1.5 miles east by northeast of Unit 20. The Commission concluded that construction of Unit 20 could potentially impact cultural resources and required the implementation of two Conditions to mitigate any potential impacts. These mitigation measures required the designation of a cultural resource specialist to monitor onsite during construction and to recover any cultural resources discovered during construction<sup>6</sup>.

As shown in Figures 8 and 14, the existing recycled water supply pipeline is located in the access road adjacent to Unit 20. The proposed pipeline will interconnect to the existing supply pipeline by trenching in the access road at a depth of approximately 3 feet directly to the west end of the cooling tower, where the pipeline will daylight and be above grade. The soils that will be disturbed are in the road bed and the plant site, and are already highly disturbed due to the initial plant and road construction. Therefore, no cultural resource impacts are expected.

The operation of the Unit 20 recycled water supply pipeline will not result in any cultural resource impacts.

### **3.4 Land Use**

Units 3, 16, 17, 18, 19, and 20 are located in the Geysers Known Geothermal Resource Area on lands where geothermal activities are an allowable land use. The construction of the recycled water supply pipelines to support and enhance the geothermal resource is consistent with this land use and all applicable land use requirements.

The operation of the pipelines will not result in any land use impacts.

### **3.5 Noise**

The construction of the recycled water supply pipelines is expected to result in a temporary and finite increase in noise levels due to the construction equipment. Construction equipment expected at each of the six Geyser units includes a backhoe, a mobile welding rig, paving equipment, and construction vehicles (tractor-trailers hauling pipe to each Unit and employee vehicles). Construction is expected to take less than 4 weeks at each of the six Geyser units. Table 3.5-1 presents the distance to the nearest sensitive receptor (including cabins not continuously occupied) to each of the Geyser Units.

**Table 3.5-1 Distance to Nearest Sensitive Receptor by Unit**

Unit	Distance to Nearest Sensitive Receptor (Feet)
3	2,835
16	2,280
17	4,740

<sup>6</sup> Commission Decision on the Pacific Gas and Electric's AFC for Geysers Unit 20, 82-AFC-1, February 1983.

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**Table 3.5-1 Distance to Nearest Sensitive Receptor by Unit**

Unit	Distance to Nearest Sensitive Receptor (Feet)
18	5,363
19	3,578
20	4,079

At these distances, it is highly unlikely that an increase of more than 5 dBA over the existing ambient noise levels will occur. Therefore, the potential increase in noise levels is not expected to be significant or impact the nearest sensitive receptors.

The operation of the recycled water supply pipeline will not result in any measurable increase in noise impacts over the existing noise environment.

### **3.6 Public Health**

A comprehensive public health impact analysis was prepared for the proposed recycled water supply's construction and operational impacts was prepared. This analysis is presented in Attachment A to this amendment. Below is a summary of the proposed recycled water supply's construction and operational impacts on air quality on Geyser Units 3, 16, 17, 18, 19, and 20.

#### **Unit 3**

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 3, a decrease in the acute, chronic, and cancer-related health impacts is expected.

#### **Unit 16**

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 16, a decrease in the acute, chronic, and cancer-related health impacts is expected.

#### **Unit 17**

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 17, a decrease in the acute, chronic, and cancer-related health impacts is expected.

#### **Unit 18**

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 18, a decrease in the acute, chronic, and cancer-related health impacts is expected.

#### **Unit 19**

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 19, a decrease in the acute, chronic, and cancer-related health impacts is expected.

## Unit 20

Based on the reduction of non-criteria air pollutants from using recycled water on Unit 20, a decrease in the acute, chronic, and cancer-related health impacts is expected.

### **3.7 Worker Safety and Health**

The recycled water supply pipeline construction or operation will not result in worker safety and health impacts any greater than those analyzed by the Commission during licensing for the six geothermal power plants.

### **3.8 Socioeconomics**

The recycled water supply pipeline construction and operation will provide a positive Socioeconomic impact for the Lake and Sonoma counties in the form of an incremental increased tax revenue due to the increased property values of Units 3, 16, 17, 18, 19, and 20.

### **3.9 Agriculture and Soils**

The areas expected to be disturbed by the construction activities are rural roadways on lands leased and controlled by Calpine. No agricultural lands exist in the project areas. As construction is expected to occur during the dry summer months, soil erosion is expected to be minimal. However, the Applicant will implement best management practices during the construction of the recycled water supply pipelines to further minimize soil erosion. The Applicant will water exposed soils to reduce the potential for wind erosion.

The construction and operation of the proposed recycled water supply pipelines are not expected to impact agricultural activities or soil resources in the impacted areas.

### **3.10 Traffic and Transportation**

Over the 2-week construction period, the Applicant expects two trucks per Unit per day and 4 additional construction workers per Unit per day, for a total of 6 additional vehicle trips per day. The total project related trips are expected to be 60. As these workers and truck deliveries will be used for all six Units combined, traffic and transportation impacts are not expected to be significant from the construction or operation of the recycled water supply pipelines.

### **3.11 Visual Resources**

The pipeline construction or operation will not result in visual resource impacts any greater than those analyzed by the Commission during licensing of Units 3, 16, 17, 18, 19, and 20.

### **3.12 Hazardous Materials Management**

The construction of the recycled water supply pipeline will involve the use of hazardous materials, in the form of lubricants, fuel oil (for diesel fuels in the construction equipment),

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welding materials, and some solvents and paints. With the exception of the lubricants and fuels used in the construction vehicles, no other hazardous materials will be stored at the construction sites. Those materials not used in the construction vehicles will be transported to and from the construction sites by the construction contractor in compliance with all applicable LORS.

No hazardous materials are expected to be used during the operation of the recycled water supply pipelines except for maintenance (routine painting and repairs).

### **3.13 Waste Management**

The construction of the recycled water supply pipeline will generate very little waste materials. The hazardous wastes may include very small quantities of spent lubricants, solvents, paint, and welding materials. The non-hazardous waste will be in the form of packing materials, waste wood, paper, glass, and plastic. The project is not expected to generate significant quantities of either hazardous or non-hazardous waste.

Hazardous wastes are not expected to be generated during construction in significant quantities. Non-hazardous wastes will be handled in accordance with applicable LORS, and disposed of by licensed waste disposal contractors. Additionally, the volume of waste generated by the pipeline construction is not expected to be significant.

The operation of the pipelines is not expected to generate significant waste materials.

### **3.14 Water Resources**

#### **Construction Impacts**

The construction of the recycled water pipeline will not impact any water resources. The construction contractor will implement the Best Management Practices to eliminate water erosion from the construction area. Furthermore, any exposed soils will be watered as appropriate to minimize potential wind erosion. With the exception of Geyser Unit 17, all other pipeline construction will take place within existing asphalted areas. The Unit 17 pipeline construction will require the placement of several pipe supports in an embankment, in addition to the trenching in the adjacent road bed. Any disturbed soils will be revegetated to minimize future erosion of disturbed areas.

#### **Operational Impacts**

The current process water source for Geyser Units 3, 16, 17, 18, 19, and 20 is condensed geothermal fluid. This water is used in numerous processes, including as supply water for the cooling tower (the primary water-intensive piece of equipment on the project site). During warm summer months, the Geyser Units are not able to extract and condense adequate steam for sufficient cooling tower make up water to allow these units to operate at their maximum power generation rates. The addition of the recycled water supply will allow the Geyser power plants to operate at maximum rates during a period of peak power demand. The geothermal fluid is a lower quality of water relative to the recycled water (see Table 2-1) for use in the cooling towers and for other process water. Additionally, the recycled water would also be re-injected into the geothermal resource, extending the life of this resource. If the recycled water

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were not used at the Geyser Units, it would need to be disposed of in some other manner. The most common method of disposing of wastewater is to discharge the water to a surface water source, with the associated water quality impacts.

The use of recycled water on Geyser Units 3, 16, 17, 18, 19, and 20 will not impact surface or groundwater as it is re-injected when used into the geothermal resource. The re-injection wells and pipelines are constructed to eliminate the potential release of the injection fluid into any aquifer other than a geothermal reservoir or to surface water sources. Therefore, the use of the recycled water supply will not result in any operational water resources impacts.

### **3.15 Geologic Hazards and Resources**

The recycled water supply pipeline construction or operation will not result in geologic hazard and resource impacts any greater than those analyzed by the Commission during licensing of the project. The use and re-injection of recycled water will provide a positive benefit to the geothermal resource in the Geysers KGRA by providing additional recharge water for this geothermal system.

### **3.16 Paleontological Resources**

The construction of the recycled water supply pipelines will be primarily in disturbed soils. For Units 3, 16, 18, 19, and 20, the construction will occur in the existing road and on the project sites. The pipeline trenching is expected to be at a depth of 3 feet and is not expected to disturb any soils that were not previously disturbed during the initial project construction. Unit 17 pipeline construction will require a 3 foot trench to be cut across an existing road (approximately 12 feet wide), where it will daylight and proceed up an embankment of fill to Unit 17. The soils expected to be disturbed in the roadbed and on the embankment were previously disturbed soils during the initial construction.

The operation of the pipelines will not result in any paleontological resource impacts.

### **3.17 Cumulative Impacts**

The cumulative impact study area associated with the proposed Amendment includes the geographic area within a six-mile (10 kilometer) radius of the Geyser Units 3, 16, 17, 18, 19, and 20 project sites. Other than the proposed changes reflected in this Amendment, no other project's in the study area were identified. Therefore, this Amendment will not change the assumptions or conclusions made in the Commission Decisions.

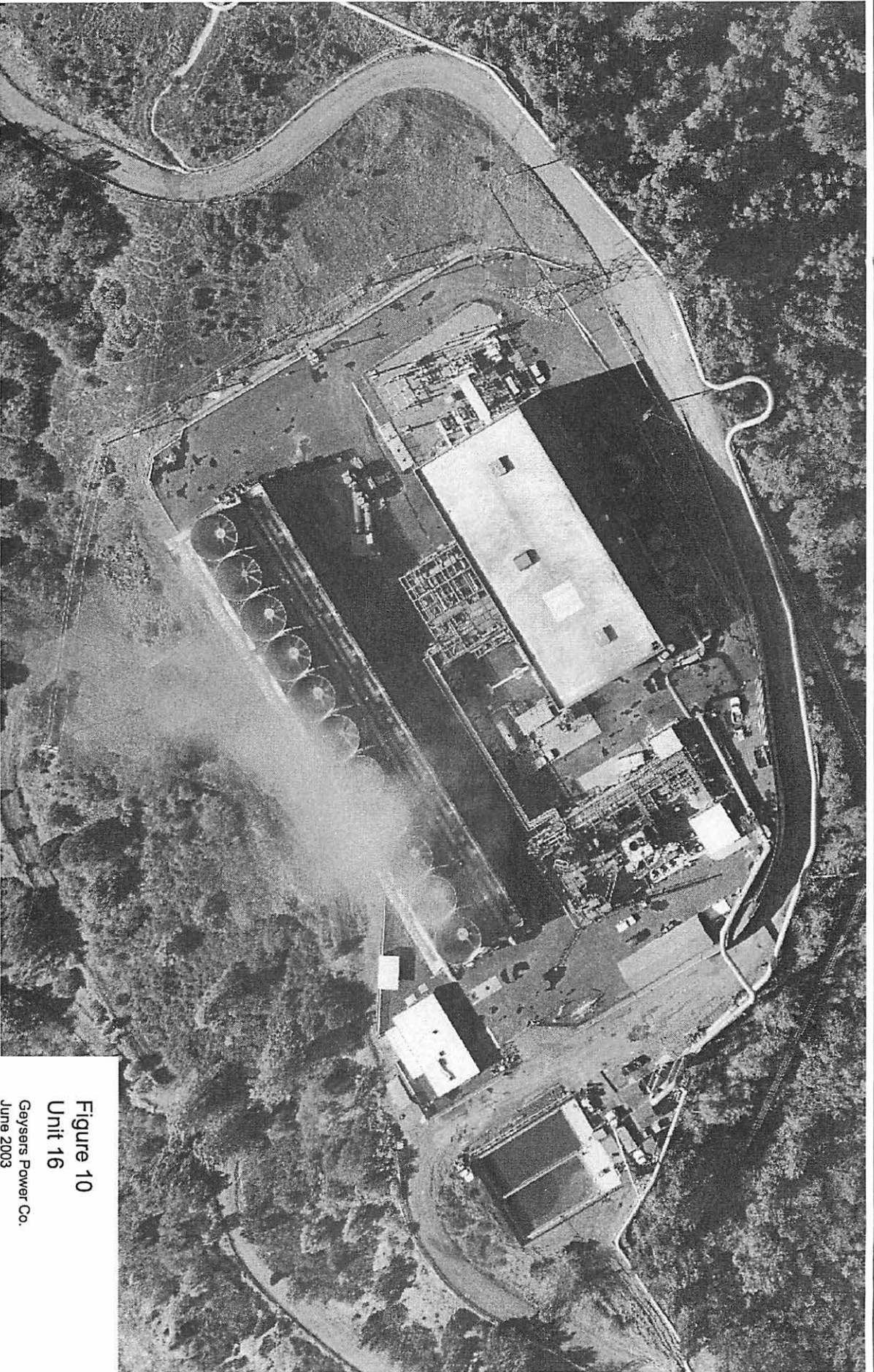
### **3.18 Laws, Ordinances, Regulations, Standards**

The Commission Decision certifying the Geyser projects concluded that these projects complied with all applicable LORS. As shown above, the potential impacts from this Amendment will be equal to or less than the impacts analyzed in the Commission Decision.



June 12, 2003 Figure 9 - Sonoma.dwg

Figure 9  
Unit 3 - Sonoma  
Geysers Power Co.  
June 2003



June 12, 2003

Figure 10 - Unit 16.dwg

Figure 10  
Unit 16

Geysers Power Co.  
June 2003

**CH2MHILL**



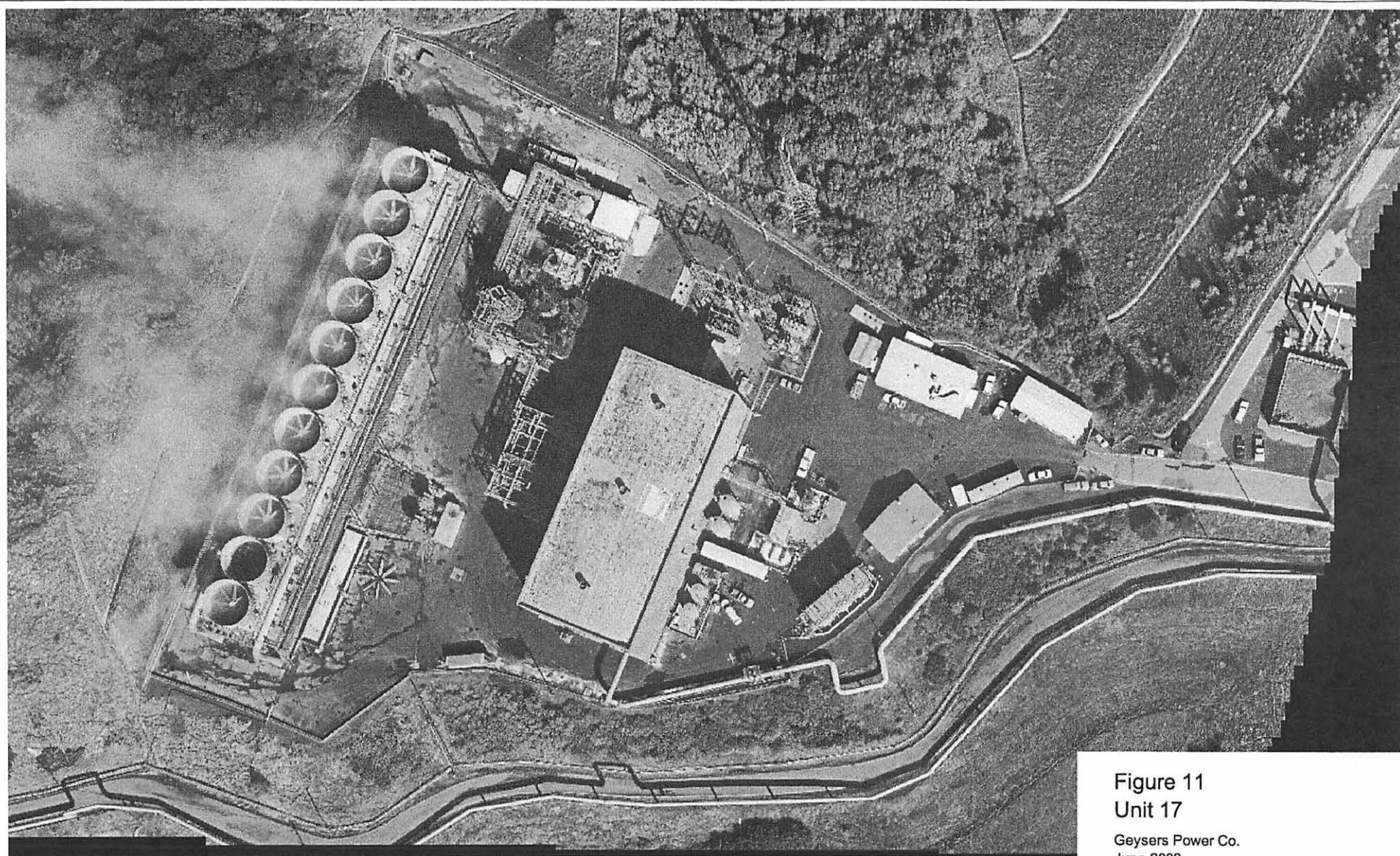


Figure 11  
Unit 17

Geysers Power Co.  
June 2003

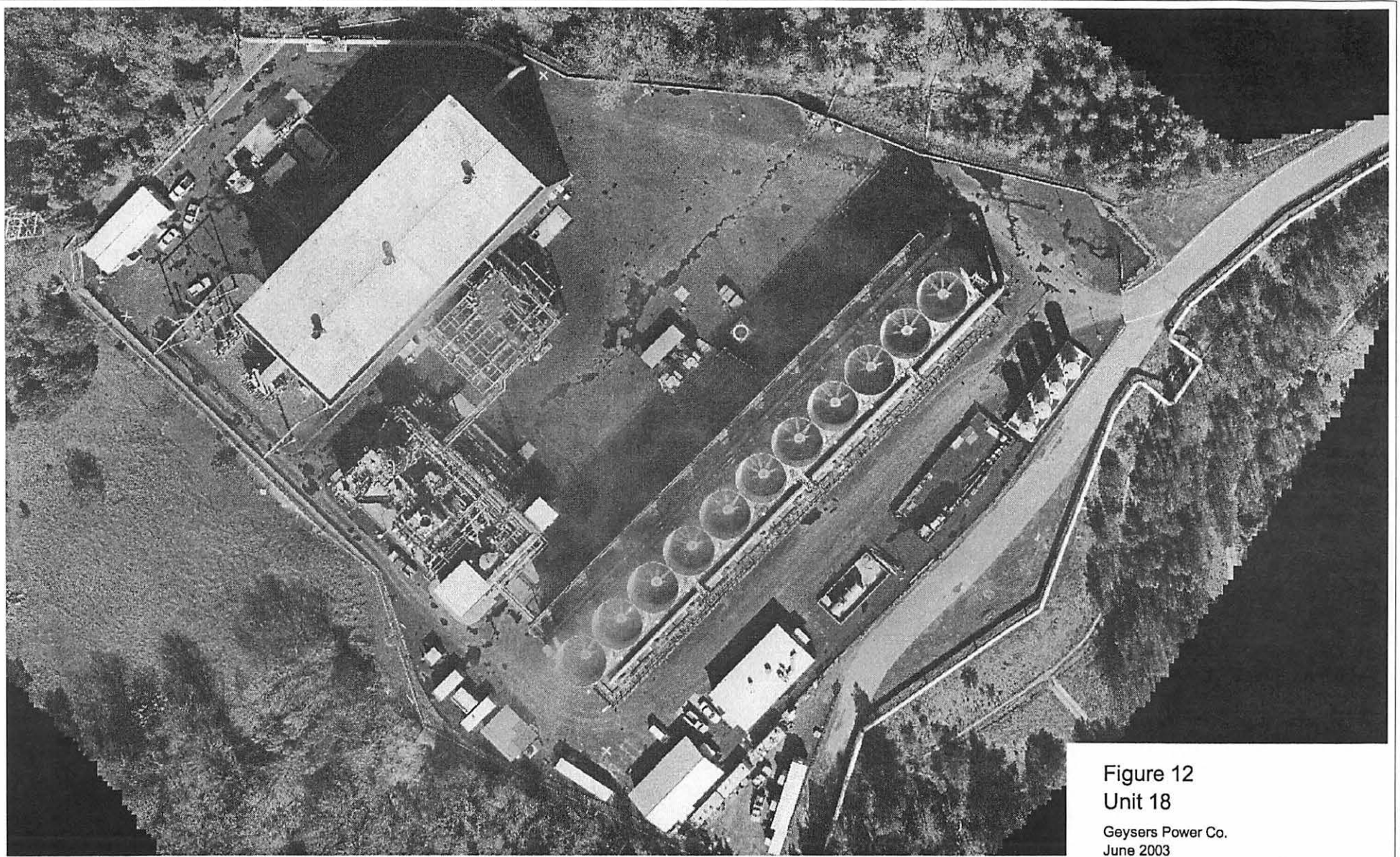


Figure 12  
Unit 18

Geysers Power Co.  
June 2003

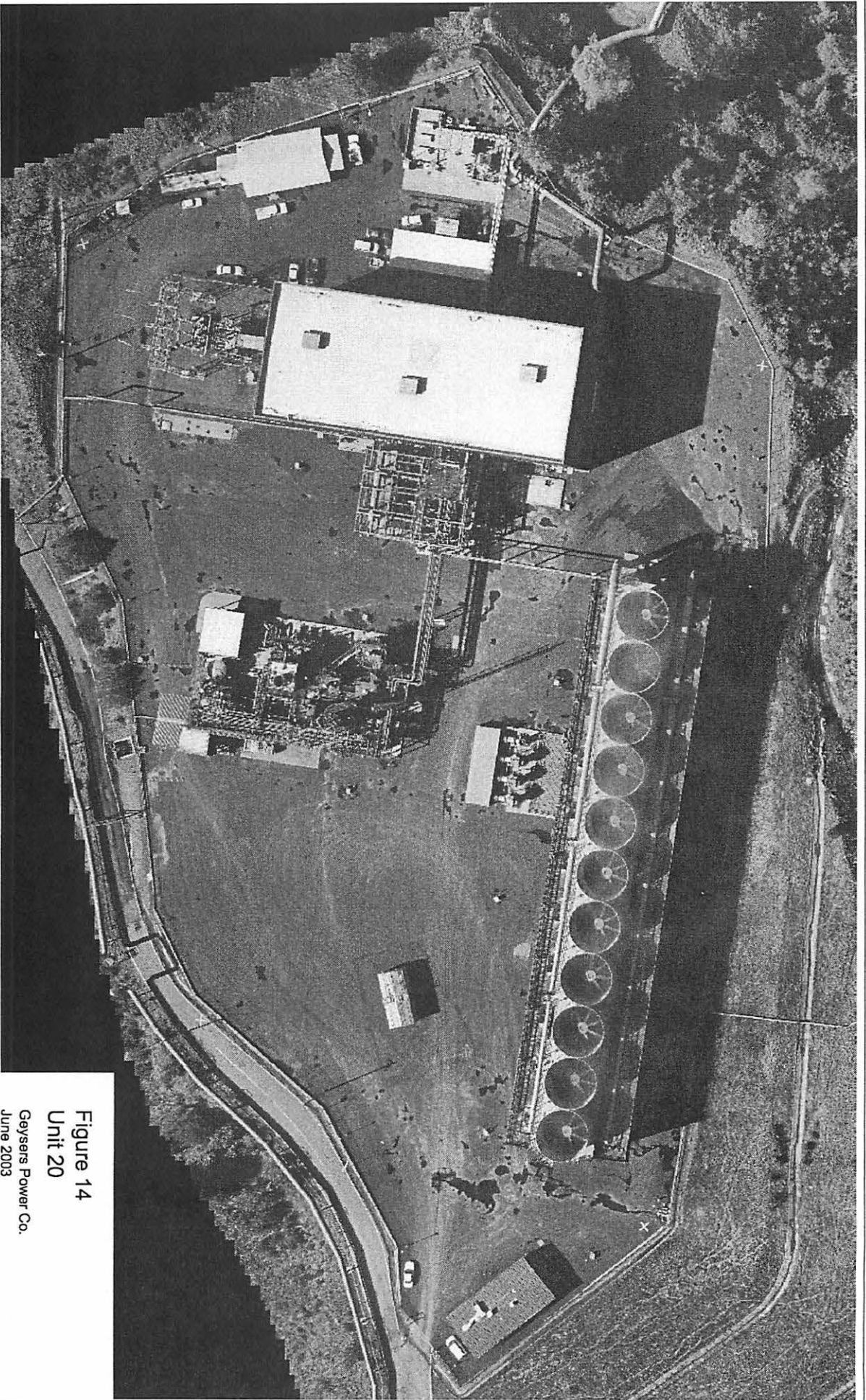


June 12, 2003

Figure 13 - Unit 19.dwg

Figure 13  
Unit 19 - Calistoga  
Geysers Power Co.  
June 2003

**CH2MHILL**



June 12, 2003 Figure 14 - Unit 20.dwg

Figure 14  
Unit 20  
Geysers Power Co.  
June 2003

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## 4.0 Proposed Modifications to the Conditions of Certification

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Consistent with the requirements of the CEC Siting Regulations Section 1769 (a)(1)(A), this section addresses the proposed modifications to the project's Conditions of Certification.

The construction and operation of the recycled water supply pipelines at Geyser Units 3, 16, 17, 18, 19, and 20 will not require the modifications to any of Commission Decision's for Geyser Units 3, 16, 17, 18, 19, and 20 conditions of certification.

## 5.0 Potential Effects on the Public

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Consistent with the requirements of the CEC Siting Regulations Section 1769 (a)(1)(G), this section addresses the proposed Amendment's effects on the public.

The proposed addition of a recycled water supply and associated pipelines will not impact the public, as shown in the air quality and public health assessments presented in Section 3.1 and 3.6, respectively.

## 6.0 List of Property Owners

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Consistent with the CEC Siting Regulations Section 1769(a)(1)(H), this section lists the property owners affected by the proposed modifications:

### Unit 3 (Sonoma):

1. Lakoma Fame (group)  
c/o Don Emerson  
P.O. Box 69  
Cobb, CA 95426
2. Antonio Angeli, et al  
c/o Ernest Angeli  
28905 River Road  
Cloverdale, CA 95425
3. Silverado Geothermal Resources, Inc. (Calpine)  
10350 Socrates Mine Road  
Middletown, CA 95461
4. USA (Regulated by BLM)  
Bureau Of Land Management  
Clearlake Resource Area  
2550 N. State Street  
Ukiah, CA 95482-3023

### Unit 16 (Quicksilver):

1. MLM  
c/o Lee S. & Betty Murphy  
145 Morningside Drive  
San Anselmo, CA 94960
2. Ralph K. Davies Estate, et al  
c/o Maryon Davies Lewis and  
The Whittier Trust Company  
1600 Huntington Drive  
South Pasadena, CA 91030
3. USA (BLM)  
Bureau of Land Management  
Clearlake Resource Area  
2550 N. State Street  
Ukiah, CA 95482-3023

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4. Alberta Mae Barrows, et al  
2460 Longview Drive  
San Leandro, CA 94577
5. Lawrence E. Armstrong  
3890 Old Redwood Highway  
Santa Rosa, CA 95405
6. Gloria McKinley  
P.O. Box 476  
Middletown, CA 95461

**Unit 17 (Lake View):**

1. Gordon D. Horner  
4025 Sears Road  
Columbus, GA 31907
2. Lakoma Fame  
c/o Don Emerson  
P.O. Box 69  
Cobb, CA 95426
3. Decca Xagon  
c/o Serafino Ragni  
5 La Solano  
Millbrae, CA 94030

**Unit 18 (Socrates):**

1. Tim Zink, et al  
P.O. Box 1113  
Carnelian Bay, CA 96140
2. Beigel & Associates  
c/o Ron Beigel  
P.O. Box 6233  
San Rafael, CA 94903
3. James & Shirley Modini  
P.O. Box 272  
Healdsburg, CA 95448



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4. USA (BLM)  
Bureau of Land Management  
Clearlake Resource Area  
2550 N. State Street  
Ukiah, CA 95482-3023
5. State of California  
c/o California State Lands Commission  
200 OceanGate, 12<sup>th</sup> Floor  
Long Beach, CA 90802
6. Geysers Development Partners  
c/o Frank Swirles  
P.O. Box 1490  
Rancho Santa Fe, CA 92067

**Unit 19 (Calistoga):**

1. Silverado Geothermal Resources, Inc. (Calpine)  
10350 Socrates Mine Road  
Middletown, CA 95461
2. USA (BLM)  
Bureau of Land Management  
Clearlake Resource Area  
2550 N. State Street  
Ukiah, CA 95482-3023
3. Beigel & Associates  
c/o Ron Beigel  
P.O. Box 6233  
San Rafael, CA 94903
4. Lakoma Fame  
c/o Don Emerson  
P.O. Box 69  
Cobb, CA 95426

**Unit 20:**

1. Beigel & Associates  
c/o Ron Beigel  
P.O. Box 6233  
San Rafael, CA 94903
2. Geysers Development Partners  
c/o Frank Swirles  
P.O. Box 1490  
Rancho Santa Fe, CA 92067

## **7.0 Potential Effects on Property Owners**

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Consistent with the CEC Siting Regulations Section 1769(a)(1)(I), this section addresses potential effects of the proposed Amendment on nearby property owners, the public, and parties in the application proceeding.

Due to the temporary nature of construction-related activities, the proposed recycled water supply pipelines will not create any significant impacts. The use of the proposed recycle water supply will not change the assumptions or conditions of approval for the project license and will not have an effect on any property owners in the project areas.