<table>
<thead>
<tr>
<th><strong>Docket Number:</strong></th>
<th>82-AFC-01C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title:</strong></td>
<td>Compliance - Application for Certification for PG&amp;E Geysers Unit 20</td>
</tr>
<tr>
<td><strong>TN #:</strong></td>
<td>240995</td>
</tr>
<tr>
<td><strong>Document Title:</strong></td>
<td>2020 Annual Compliance Report - Grant</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Filer:</strong></td>
<td>William King</td>
</tr>
<tr>
<td><strong>Organization:</strong></td>
<td>Geysers Power Company, LLC</td>
</tr>
<tr>
<td><strong>Submitter Role:</strong></td>
<td>Applicant</td>
</tr>
<tr>
<td><strong>Submission Date:</strong></td>
<td>12/20/2021 2:46:24 PM</td>
</tr>
<tr>
<td><strong>Docketed Date:</strong></td>
<td>12/20/2021</td>
</tr>
</tbody>
</table>
George Veerkamp, Compliance Project Manager
Energy Facilities Siting and Environmental Protection Division
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, California 95814-5512

Mr. Veerkamp,

Subject: 82-AFC-1C 2020 Annual Compliance Report Geysers Unit 20 (Grant) Power Plant

In fulfillment of the Compliance Plan’s annual reporting requirement, Geysers Power Company, LLC hereby submits the following report for Unit 20 (Grant).

If you have any comments or questions, please contact me at (707) 431-6097.

Sincerely,

Date: 2021.12.20
14:42:58 -08'00'

Bill King
Project Manager, EHS
Calpine Corporation
EXECUTIVE SUMMARY

Section 25532 of the Public Resources Code provides that the California Energy Commission (CEC) shall establish a monitoring system to assure that any facility certified by the CEC is constructed and operated in compliance with air, water quality, public health, safety, and other applicable regulations, guidelines, and conditions adopted or established by the CEC.

On March 18, 1982, PG&E filed an Application for Certification (AFC) for Geysers Power Plant Unit 20. In order for the AFC to be granted the CEC issued the “Final Commission Decision Document for Geysers Power Plant Unit 20”. In November, 1999, the CEC license was transferred from PG&E to Geysers Power Company LLC (GPC or Project Owner). The license requires GPC to be responsible for administering and monitoring various Conditions for Certification as contained in the Final Commission Decision, in accordance with the Compliance Plan for Unit 20, including submitting an Annual Report that summarizes compliance tasks conducted during the previous year.

Two amendments to the Final Decision have been approved by the CEC, resulting in the inclusion of additional on-going compliance tasks for reporting in the Annual Compliance Report.

First, on December 10, 2018 the CEC Final Decision was amended to revise the Air Quality Conditions of Certification and approved the installation of the wet down system permanent diesel engine at Grant, Socrates and Quicksilver (TN#: 226129). The new Air Quality and Worker Safety Conditions of Certification requires on-going reporting of certain monitoring and other activities at Grant.

Second, on November 16, 2020, additional Compliance Conditions of Certification were adopted for Unit 19 (TN#: 235699): GEN-1, COM-1 through 11, and FIRE PROTECTION-1 through 5. Condition COM-5 requires submission of Periodic and Annual Compliance Reports and details specific reporting requirements that should be included in each Annual Compliance Report (ACR). The following sections of this ACR corresponds with the reporting requirements set forth in Condition COM-5. The ongoing compliance tasks in each of the following areas are summarized below:
In accordance with Condition Compliance-5 of the License, Geysers Grant Plant (Grant) reports as follows:
1. **Updated Compliance Matrix**

A copy of the updated compliance matrix showing the status of all conditions of certification (with the exception of fully satisfied conditions) is included as an attachment under COMPLIANCE-5.

2. **Summary of current project operating status and explanation of any significant changes to facility operating status during the year**

Grant is currently operational and was operational during the 2020 reporting period with the exception of the following outage periods:

<table>
<thead>
<tr>
<th>Event</th>
<th>Summary</th>
<th>Start</th>
<th>Actual End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned Outage, Transmission supplier</td>
<td>Unit removed from service for scheduled 230 kV line outage</td>
<td>6/23/2020 4:00</td>
<td>6/24/2020 10:20</td>
</tr>
<tr>
<td>Forced Outage</td>
<td>Unit relayed on High #3 Bearing Vibration</td>
<td>11/14/2020 1:55</td>
<td>11/14/2020 8:30</td>
</tr>
<tr>
<td>Forced Outage, Transmission supplier</td>
<td>Unit Gen Breaker tripped during 230 kV system disturbance</td>
<td>10/2/2020 11:15</td>
<td>10/6/2020 21:25</td>
</tr>
<tr>
<td>Planned Outage, Transmission supplier</td>
<td>Unit was removed from service for scheduled P.G&amp;E 230 kV line outage</td>
<td>9/24/2020 4:00</td>
<td>9/24/2020 20:20</td>
</tr>
<tr>
<td>Forced Outage</td>
<td>Unit removed from service to perform a turbine balance shot</td>
<td>7/22/2020 20:00</td>
<td>7/23/2020 15:45</td>
</tr>
<tr>
<td>Forced Derate</td>
<td>Unit relayed on high vibration</td>
<td>7/7/2020 16:25</td>
<td>7/22/2020 15:25</td>
</tr>
</tbody>
</table>

3. **Required Annual Compliance Report Documents**

The following documents are required by specific conditions to be submitted along with the ACR:
4. **Cumulative List of All Known Post-Certification Changes Approved by the CEC or CPM**
   - Resolved alleged violations of license and LORS relating to fire systems. Added new COCs: GEN-1, COM-1 through COM-11, Fire Protection-1 through Fire Protection-5. Docketed 11/16/20 per TN#235698.

5. **Submittal deadlines not met**
   There are no past due compliance submittals.

6. **Filings Submitted to or Permits Issued by Other Governmental Agencies**
   - Quarterly Compliance Reports for Sonoma County Title V compliance to NSCAPCD
• Title V Operating Permit 2020 Annual Compliance Certification for the Power Plants submitted to NSCAPCD
• Title V Responsible Official Certifications for Power Plant Operating Permit Applications and Annual Compliance Reporting Submitted to NSCAPCD
• 2020 PSD H2S Abatement System Performance Results: Geysers Power Company LLC’s Sonoma, Lake View, Grant, Quicksilver and Calistoga Power Plants submitted to CEC & NSCAPCD
• Sonoma County AB2588 Air Toxics "Hot Spots" Emission Inventory Report for the Inventory Year 2020 (electronic data submission) submitted to NSCAPCD
• Guzzler and Sediment Pond inspection pictures submitted to CEC
• 2020 Geysers Power Plant Units Recycled Water Use Report submitted to SWRCB
• Criteria Pollutant Year 2020 Emission Inventory for GPC Plants submitted to NSCAPCD
• Monthly submission of completed hazardous waste manifests to DTSC
• Annual Hazardous Waste Report submitted to DTSC
• Sulfur Hexafluoride (SF6) Geothermal Resource Tracer Testing Exemption- Progress Report submitted to CARB

7. **Projection of Scheduled Compliance Activities for Next Year**
   - Annual Asbestos Notification: 2021 Nonscheduled Maintenance Projects At Geysers Power Company LLC Facilities Located In Sonoma County submitted to NSCAPCD
   - AQ-1: Perform monthly source test cooling tower H2S
   - AQ-2: Perform annual performance test on turbine exhaust system
   - Compliance-5: Evaluate Site Contingency Plan for unplanned facility closure
   - Cultural Resources 4-4: Continued inspection, maintenance and repair of existing fencing around the archaeological site identified as CA-SON-793
   - Fire Protection-1: Perform annual inspection, testing, and maintenance of the non-NFPA cooling tower wet down system
   - Fire Protection-3: Perform inspections, testing, and maintenance of fire systems
   - Public Health 2-1: Perform quarterly sampling and analysis of radon-222 concentrations in noncondensable gases entering the power plant in the incoming steam line, or vent off-gas line, or H2S abatement off-gas line
   - Safety 12-14: Perform annual re-examination of the fire protection plan with California Department of Forestry
   - Soils 6-3: Perform triannual panicum monitoring program

8. **Additions to the Compliance Record**
   - Resolved alleged violations of license and LORS relating to fire systems. Added new COCs: GEN-1, COM-1 through COM-11, Fire Protection-1 through Fire Protection-5. Docketed 11/19/20 per TN#235698.
   - On-going logging of monitoring and calibration of H2S monitoring devices, continuous strip chart record and appropriate sampling line, and other additions pursuant to AQ-1.
• On-going analyses of results of source tests and other tests requested by the NSCAPCD or CEC pursuant to the AQ conditions of certification.

9. **Evaluation of the Site Contingency Plan**
   An evaluation of the Site Contingency Plan for unplanned facility closure was conducted and minor modifications were made to the plan to update the listed agency contact information for listed to be referenced in case of a facility closure.

10. **Listing of complaints, notices of violations, official warnings, and citations**
    No complaints, notices of violations, official warnings or citations were received in the 2020 reporting period.
CONDITION OF CERTIFICATION
AQ-C10/AQ-E1/AQ-SC2

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
Dear Mr. Bamford:

Subject: Compliance Reports – First Quarter of 2020 For Calpine Geysers Power Company LLC Power Plants Located in Sonoma County

Enclosed are Geysers Power Company LLC’s first quarter 2020 compliance reports for the Calpine Geysers Power Company LLC geothermal power plants located in the Northern Sonoma County Air Pollution Control District (NSCAPCD). The attached reports are submitted to the NSCAPCD in accordance with:

- Aidlin Power Plant PTO 88-35 & 88-36 Condition E.2,
- McCabe Power Plant Title V Operating Permit Condition II.A.V.1,
- Ridgeline Title V Operating Permit Condition II.A.V.1,
- Eagle Rock Title V Operating Permit Condition II.A.V.1,
- Cobb Creek Title V Operating Permit Condition II.A.V.1,
- Sulfur Springs Title V Operating Permit Condition II.A.V.1,
- 1 Lake View (Unit 17) Title V Operating Permit Condition II.A.V.1,
- 1 Socrates (Unit 18) Power Plant Title V Operating Permit Condition II.A.V.1,
- 1 Grant Power Plant (Unit 20) Title V Operating permit Condition II.A.V.1,
- 1 Sonoma Power Plant (Unit 3) Title V Operating permit Condition II.A.V.1,

If you have any questions, please contact me at (707) 431-6266.

Sincerely,

Brian J. Berndt
EHS Manager, Geysers

Enclosure

cc: Eric VeerKamp, Compliance Project Manager
    California Energy Commission (CEC),
    1516 Ninth Street, MS-15
    Sacramento, CA 95814-5512

1 These reports are copied to the CEC compliance project manager as a separate enclosure containing only the information required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C
CONTENTS

Introduction

- Table 1 Unit Operating Hours, and Continuous Compliance Monitor Availability
- Table 2 Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities
- Table 3 Monthly H2S Emissions from Method 102 Source Tests
Introduction: This report provides data and information for the period January 1, 2020 through March 31, 2020.

Table 1 lists the hours that the monitor was in service and operating within the permit required operational specification requirements for the monitor. The unit operating hours are included for reference. Monitor availability hours are determined by subtracting the duration of time that the monitor is out of service for repair and routine calibration from the abatement system operating hours.

Table 1
Unit Operating Hours, and Continuous Process Monitor Availability

<table>
<thead>
<tr>
<th>First Quarter 2020</th>
<th>Unit Operating Hours (Hrs)</th>
<th>Quarterly Continuous Process Monitor Availability (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>1713.9</td>
<td>1694.0</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>2095.7</td>
<td>2080.3</td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>1717.9</td>
<td>1697.4</td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>1732.1</td>
<td>1721.4</td>
</tr>
</tbody>
</table>
Table 2 may include NSCAPCD Rule 540 Breakdown events where operator actions were required to maintain emissions below the permitted H₂S emission limits. Events are included when meeting with the reporting criteria described in the NSCAPCD Continuous Compliance Monitoring Reporting Policy issued October 20, 1998. Table 2 Monitor irregularities identify periods when the output of the treated gas monitor drops to zero or suddenly spikes with no corresponding plant or abatement process changes. (Reference: Title V Permit Condition V.1.c.)

### Table 2 Summary of H₂S Abatement Incidents Requiring Corrective Action and Monitor Irregularities

<table>
<thead>
<tr>
<th>INCIDENTS REQUIRING CORRECTIVE ACTION</th>
<th>First Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs./Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td></td>
<td></td>
<td></td>
<td>8:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td></td>
<td></td>
<td></td>
<td>8:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td></td>
<td></td>
<td></td>
<td>8:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td></td>
<td></td>
<td></td>
<td>8:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MONITOR IRREGULARITIES</th>
<th>First Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs./Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>3/1/20 5:19 AM</td>
<td>3/2/20 10:41</td>
<td>5:23</td>
<td>CCM recording irregular negative values H₂S ppm</td>
<td>Unknown</td>
<td>Tech reported on Monday morning, performed cal check, weekly routines and found no apparent evidence of component failure or issues with the ASI.</td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>1/23/20 9:30</td>
<td>1/23/20 10:30</td>
<td>1:00</td>
<td>Mid-span daily check of calibration accuracy response recorded low.</td>
<td>Tech adjusted output isolator POT and returned CCM to service. During this period, the Operator’s Drag sample recorded less than 20 ppm H₂S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>3/28/20 11:49</td>
<td>3/28/20 12:04</td>
<td>1:15</td>
<td>Operator initiated a manual calibrations after observing that the daily calibration check did not occur.</td>
<td>Span Gas was not aligned following weekly calibration</td>
<td>Operator notified Tech. Tech verified alignment, and ran span gas to ensure CCM returns service.</td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>2/14/200 5:01</td>
<td>2/14/20 13:10</td>
<td>8:09</td>
<td>CCM problem</td>
<td>Tape not advancing</td>
<td>Tech repaired tape, CCM returned to service. Drag samples indicate compliance.</td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 includes the H₂S emission rates determined during the monthly source tests conducted by Calpine in accordance with Title V operating condition III.1, utilizing Modified District Method 102.

**Table 3**  
Monthly H₂S Emissions from Method 102 Source Tests

<table>
<thead>
<tr>
<th>First Quarter 2020</th>
<th>Date</th>
<th>Measured H₂S Emissions Kg/Hr</th>
<th>Allowable H₂S Emissions Kg/Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>1/14/2020</td>
<td>0.0</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>2/6/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/17/2020</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>1/18/2020</td>
<td>0.5</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>2/11/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/3/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>1/27/2020</td>
<td>4.5*(3.3)</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>2/20/2020</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/10/2020</td>
<td>4.2*(0.8)</td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>1/29/2020</td>
<td>0.2</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>2/24/2020</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/18/2020</td>
<td>3.0*(2.8)</td>
<td></td>
</tr>
</tbody>
</table>
Subject: Compliance Reports – Second Quarter of 2020 for Calpine Geysers Power Company LLC Power Plants Located in Sonoma County

Enclosed are Geysers Power Company LLC’s second quarter 2020 compliance reports for the Calpine Geysers Power Company LLC geothermal power plants located in the Northern Sonoma County Air Pollution Control District (NSCAPCD). The attached reports are submitted to the NSCAPCD in accordance with:

- Aidlin Power Plant PTO 88-35 & 88-36 Condition E.2,
- McCabe Power Plant Title V Operating Permit Condition II.A.V.1,
- Ridgeline Title V Operating Permit Condition II.A.V.1,
- Eagle Rock Title V Operating Permit Condition II.A.V.1,
- Cobb Creek Title V Operating Permit Condition II.A.V.1,
- Sulfur Springs Title V Operating Permit Condition II.A.V.1,
- Lake View (Unit 17) Title V Operating Permit Condition II.A.V.1,
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- Grant Power Plant (Unit 20) Title V Operating permit Condition II.A.V.1,
- Sonoma Power Plant (Unit 3) Title V Operating permit Condition II.A.V.1,

If you have any questions, please contact me at (707) 431-6266.

Sincerely,

Brian J. Berndt
EHS Manager, Geysers

Enclosure

cc: Eric VeerKamp, Compliance Project Manager
California Energy Commission (CEC),
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

1 These reports are copied to the CEC compliance project manager as a separate enclosure containing only the information required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C
SECOND QUARTER 2020 COMPLIANCE MONITORING REPORTS
TO THE CALIFORNIA ENERGY COMMISSION (CEC) COMPLIANCE PROJECT MANAGER
FOR GEYSERS POWER COMPANY LLC PLANTS LOCATED IN NORTHERN SONOMA COUNTY

CONTENTS

Introduction

- Table 1 Unit Operating Hours, and Continuous Compliance Monitor Availability
- Table 2 Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities
- Table 3 Monthly H2S Emissions from Method 102 Source Tests
Introduction: This report provides data and information for the period April 1, 2020 through June 30, 2020.

Table 1 lists the hours that the monitor was in service and operating within the permit required operational specification requirements for the monitor. The unit operating hours are included for reference. Monitor availability hours are determined by subtracting the duration of time that the monitor is out of service for repair and routine calibration from the abatement system operating hours.

Table 1
Unit Operating Hours, and Continuous Process Monitor Availability

<table>
<thead>
<tr>
<th>Second Quarter 2020</th>
<th>Unit Operating Hours (Hrs)</th>
<th>Quarterly Continuous Process Monitor Availability (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>2161.6</td>
<td>2145.6</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>1918.3</td>
<td>1902.3</td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>2047.9</td>
<td>2035.1</td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>2153.6</td>
<td>2144.3</td>
</tr>
</tbody>
</table>
Table 2 may include NSCAPCD Rule 540 Breakdown events where operator actions were required to maintain emissions below the permitted H₂S emission limits. Events are included when meeting with the reporting criteria described in the NSCAPCD Continuous Compliance Monitoring Reporting Policy issued October 20, 1998. Table 2 Monitor irregularities identify periods when the output of the treated gas monitor drops to zero or suddenly spikes with no corresponding plant or abatement process changes. (Reference: Title V Permit Condition V.1.c.)

### Table 2 Summary of H₂S Abatement Incidents Requiring Corrective Action and Monitor Irregularities

#### Incidents Requiring Corrective Action

<table>
<thead>
<tr>
<th>Second Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 16)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant Line (Unit 20)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Monitor Irregularities

<table>
<thead>
<tr>
<th>Second Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>3/30/2020 8:30</td>
<td>5/18/2020 14:09</td>
<td>5:39</td>
<td>CCM failed auto calibration twice</td>
<td>Manual calibration required</td>
<td>Technician checked and calibrated CCM. Drags taken every 4 hours to verify compliance</td>
</tr>
<tr>
<td>Socrates (Unit 16)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 includes the H₂S emission rates determined during the monthly source tests conducted by Calpine in accordance with Title V operating condition III.1, utilizing Modified District Method 102.

### Table 3
**Monthly H₂S Emissions from Method 102 Source Tests**

<table>
<thead>
<tr>
<th>Second Quarter 2020</th>
<th>Date</th>
<th>Measured H₂S Emissions Kg/Hr</th>
<th>Allowable H₂S Emissions Kg/Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>4/14/2020</td>
<td>0.4</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>5/20/2020</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6/10/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>4/8/2020</td>
<td>0.3</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>5/5/2020</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6/15/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>4/7/2020</td>
<td>1.7</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>5/27/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6/9/2020</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>4/14/2020</td>
<td>*3.4 (2.9)</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>5/11/2020</td>
<td>*3.1 (2.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6/4/2020</td>
<td>*2.8</td>
<td></td>
</tr>
</tbody>
</table>

*Worst case potential emissions based upon condensate H₂S loading.

(Estimated actual emissions from parametric measurements in parentheses.)
Rob Bamford  
Air Pollution Control Officer  
Northern Sonoma County  
Air Pollution Control District  
150 Matheson St.  
Healdsburg CA, 95448  

Attention: Alex Saschin  

Dear Mr. Bamford:  

Subject: Compliance Reports – Third Quarter of 2020 for Calpine Geysers Power Company LLC Power Plants Located in Sonoma County  

Enclosed are Geysers Power Company LLC's third quarter 2020 compliance reports for the Calpine Geysers Power Company LLC geothermal power plants located in the Northern Sonoma County Air Pollution Control District (NSCAPCD). The attached reports are submitted to the NSCAPCD in accordance with:

- Aidlin Power Plant PTO 88-35 & 88-36 Condition E.2,  
- McCabe Power Plant Title V Operating Permit Condition II.A.V.1,  
- Ridgeline Title V Operating Permit Condition II.A.V.1,  
- Eagle Rock Title V Operating Permit Condition II.A.V.1,  
- Cobb Creek Title V Operating Permit Condition II.A.V.1,  
- Sulfur Springs Title V Operating Permit Condition II.A.V.1,  
- 1 Lake View (Unit 17) Title V Operating Permit Condition II.A.V.1,  
- 1 Socrates (Unit 18) Power Plant Title V Operating Permit Condition II.A.V.1,  
- 1 Grant Power Plant (Unit 20) Title V Operating permit Condition II.A.V.1,  
- 1 Sonoma Power Plant (Unit 3) Title V Operating permit Condition II.A.V.1,

If you have any questions, please contact me at (707) 431-6266.

Sincerely,

Dave Jackson  
Regional Manager, Geysers EHS  

Enclosure  

cc: Eric VeerKamp, Compliance Project Manager  
    California Energy Commission (CEC),  
    1516 Ninth Street, MS-15  
    Sacramento, CA 95814-5512  

1 These reports are copied to the CEC compliance project manager as a separate enclosure containing only the information required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C
CONTENTS

Introduction

- Table 1 Unit Operating Hours, and Continuous Compliance Monitor Availability
- Table 2 Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities
- Table 3 Monthly H2S Emissions from Method 102 Source Tests
Introduction: This report provides data and information for the period July 1, 2020 through September 30, 2020.

Table 1 lists the hours that the monitor was in service and operating within the permit required operational specification requirements for the monitor. The unit operating hours are included for reference. Monitor availability hours are determined by subtracting the duration of time that the monitor is out of service for repair and routine calibration from the abatement system operating hours.

Table 1

Unit Operating Hours, and Continuous Process Monitor Availability

<table>
<thead>
<tr>
<th>Third Quarter 2020</th>
<th>Unit Operating Hours (Hrs)</th>
<th>Burner Off line (Hrs)</th>
<th>Quarterly Continuous Process Monitor Availability (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>2207.2</td>
<td></td>
<td>2183.4</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>2197.8</td>
<td></td>
<td>2179.3</td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>2208.0</td>
<td></td>
<td>2194.5</td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>1829.6</td>
<td></td>
<td>1820.8</td>
</tr>
</tbody>
</table>
Table 2 may include NSCAPCD Rule 540 Breakdown events where operator actions were required to maintain emissions below the permitted H$_2$S emission limits. Events are included when meeting with the reporting criteria described in the NSCAPCD Continuous Compliance Monitoring Reporting Policy issued October 20, 1998. Table 2 Monitor irregularities identify periods when the output of the treated gas monitor drops to zero or suddenly spikes with no corresponding plant or abatement process changes. (Reference: Title V Permit Condition V.1.c.)

### Table 2 Summary of H$_2$S Abatement Incidents Requiring Corrective Action and Monitor Irregularities

#### INCIDENTS REQUIRING CORRECTIVE ACTION

<table>
<thead>
<tr>
<th>Third Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant Line (Unit 20)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### MONITOR IRREGULARITIES

<table>
<thead>
<tr>
<th>Third Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>7/28/2020 23:25</td>
<td>7/28/2020 23:59</td>
<td>0:34</td>
<td>Analyzer reading erroneously</td>
<td>Broken tape</td>
<td>Tape repaired, analyzer returned to service</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>8/7/2020 1:10</td>
<td>8/7/2020 11:10</td>
<td>0:00</td>
<td>Analyzer reading negative H$_2$S</td>
<td>Operator checked analyzer operation including tape, all appears okay. Drager reading &lt;1 ppm H$_2$S. Tech checked analyzer and found faulty power supply module</td>
<td>Power supply module replaced</td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>None</td>
<td>0:00</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 includes the H₂S emission rates determined during the monthly source tests conducted by Calpine in accordance with Title V operating condition III.1, utilizing Modified District Method 102.

### Table 3
Monthly H₂S Emissions from Method 102 Source Tests

<table>
<thead>
<tr>
<th>Third Quarter 2020</th>
<th>Date</th>
<th>Measured H₂S Emissions Kg/Hr</th>
<th>Allowable H₂S Emissions Kg/Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>7/4/2020</td>
<td>0.1</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>8/12/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/16/2020</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>7/22/2020</td>
<td>0.2</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>8/11/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/2/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>7/2/2020</td>
<td>0.2</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>8/20/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/9/2020</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>7/7/2020</td>
<td>0.2</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>8/5/2020</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/1/2020</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>
January 26, 2021

Rob Bamford
Air Pollution Control Officer
Northern Sonoma County
Air Pollution Control District
150 Matheson St.
Healdsburg CA, 95448

Attention: Alex Saschin

Dear Mr. Bamford:

Subject: Compliance Reports – Fourth Quarter of 2020 for Calpine Geysers Power Company LLC Power Plants Located in Sonoma County

Enclosed are Geysers Power Company LLC’s fourth quarter 2020 compliance reports for the Calpine Geysers Power Company LLC geothermal power plants located in the Northern Sonoma County Air Pollution Control District (NSCAPCD). The attached reports are submitted to the NSCAPCD in accordance with:

- Aidlin Power Plant PTO 88-35 & 88-36 Condition E.2,
- McCabe Power Plant Title V Operating Permit Condition II.A.V.1,
- Ridgeline Title V Operating Permit Condition II.A.V.1,
- Eagle Rock Title V Operating Permit Condition II.A.V.1,
- Cobb Creek Title V Operating Permit Condition II.A.V.1,
- Sulfur Springs Title V Operating Permit Condition II.A.V.1,
- ¹Lake View (Unit 17) Title V Operating Permit Condition II.A.V.1,
- ¹Socrates (Unit 18) Power Plant Title V Operating Permit Condition II.A.V.1,
- ¹Grant Power Plant (Unit 20) Title V Operating Permit Condition II.A.V.1,
- ¹Sonoma Power Plant (Unit 3) Title V Operating Permit Condition II.A.V.1,

If you have any questions, please contact me at (707) 431-6858.

Sincerely,

Sharon Peterson
EHS Air Compliance Manager, Geysers

Enclosure

¹These reports are copied to the CEC compliance project manager as a separate enclosure containing only the information required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C
cc: Eric VeerKamp, Compliance Project Manager
California Energy Commission (CEC),
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512
FOURTH QUARTER 2020 COMPLIANCE MONITORING REPORTS
TO THE CALIFORNIA ENERGY COMMISSION (CEC) COMPLIANCE PROJECT MANAGER
FOR GEYSERS POWER COMPANY LLC PLANTS LOCATED IN NORTHERN SONOMA COUNTY

CONTENTS

Introduction

- Table 1 Unit Operating Hours, and Continuous Compliance Monitor Availability
- Table 2 Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities
- Table 3 Monthly H₂S Emissions from Method 102 Source Tests
Introduction: This report provides data and information for the period October 1, 2020 through December 31, 2020.

Table 1 lists the hours that the monitor was in service and operating within the permit required operational specification requirements for the monitor. The unit operating hours are included for reference. Monitor availability hours are determined by subtracting the duration of time that the monitor is out of service for repair and routine calibration from the abatement system operating hours.

Table 1
Unit Operating Hours, and Continuous Process Monitor Availability

<table>
<thead>
<tr>
<th>Fourth Quarter 2020</th>
<th>Unit Operating Hours (Hrs)</th>
<th>Burner Off line (Hrs)</th>
<th>Quarterly Continuous Process Monitor Availability (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>2033.07</td>
<td></td>
<td>2010.2</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>2012.10</td>
<td></td>
<td>1994.7</td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>2024.93</td>
<td></td>
<td>2012.5</td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>2005.42</td>
<td></td>
<td>1996.0</td>
</tr>
</tbody>
</table>

* Chemical abatement used until Burner repairs could be made and Burner placed back in service on 12/20/20. CCM out of service 10/1/20-12/19/20 until repairs to damage caused to off gas header could be made. District approved methods to monitor emissions used during this time.
Table 2 Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities

## INCIDENTS REQUIRING CORRECTIVE ACTION

<table>
<thead>
<tr>
<th>Fourth Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant Line (Unit 20)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## MONITOR IRREGULARITIES

<table>
<thead>
<tr>
<th>Fourth Quarter 2020</th>
<th>Event Start Time</th>
<th>Event End Time</th>
<th>Duration (Hrs:Min)</th>
<th>Description</th>
<th>Cause</th>
<th>Actions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma (Unit 3)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>10/25/2020 2:06</td>
<td>10/25/2020 2:07</td>
<td>0:01</td>
<td>H2S increased to 289ppm</td>
<td>Possibly excess water in off gas header</td>
<td>Dragers indicated &lt;10 ppm H2S. Tech ran calibration and found no problems</td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>10/25/2020 2:31</td>
<td>10/25/2020 2:47</td>
<td>0:16</td>
<td>H2S increased to 289ppm</td>
<td>Possibly excess water in off gas header</td>
<td>Dragers indicated &lt;10 ppm H2S. Tech ran calibration and found no problems</td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>None</td>
<td>None</td>
<td>0:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>10/29/2020 16:43</td>
<td>10/29/2020 16:50</td>
<td>0:07</td>
<td>Monitor spike to full scale, 50ppm</td>
<td>No issues identified</td>
<td>Normal readings returned after 7 minutes, Dragers indicated &lt;1 ppm H2S during spike</td>
</tr>
</tbody>
</table>
Table 3 includes the H₂S emission rates determined during the monthly source tests conducted by Calpine in accordance with Title V operating condition III.1, utilizing Modified District Method 102.

**Table 3**

*Monthly H₂S Emissions from Method 102 Source Tests*

<table>
<thead>
<tr>
<th>Fourth Quarter 2020</th>
<th>Date</th>
<th>Measured H₂S Emissions Kg/Hr</th>
<th>Allowable H₂S Emissions Kg/Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aidlin (Unit 1)</td>
<td>10/28/2020</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/19/2020</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12/15/2020</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Sonoma (Unit 3)</td>
<td>10/21/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/19/2020</td>
<td>0.1</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>12/10/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Lake View (Unit 17)</td>
<td>10/14/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/10/2020</td>
<td>0.1</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>12/15/2020</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Socrates (Unit 18)</td>
<td>10/12/2020</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/16/2020</td>
<td>0.9</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>12/8/2020</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Grant (Unit 20)</td>
<td>10/8/2020</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/12/2020</td>
<td>0.4</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>12/9/2020</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>
CONDITION OF CERTIFICATION
AQ-E2

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
GPC-21-016

February 9, 2021

Alex Saschin
Air Quality Engineer
Northern Sonoma County Air Pollution Control District
150 Matheson Street
Healdsburg, CA 95448

Subject: Criteria Pollutants Inventory Report Year 2020, For NSCAPCD Plants

Dear Mr. Saschin:

Enclosed is the year 2020 Criteria Pollutants Inventory Report for Geysers Power Plant generating units located in the Northern Sonoma County Air Pollution Control District. This inventory is submitted pursuant to the Title V Operating Permits for Units 5–12, 14, 17, 18, 20, and Sonoma, Condition II.A.V.2.

Included in the table of pollutants is the information required annually for the Aidlin Power Plant Permits to Operate #88-35 and #88-36 Condition E.3. Not included in the table, but required by the Aidlin permit, is the average annual supplied steam ammonia concentration, which is 525 ppm\(_{(w)}\).

Please call me at (707) 431-6858, if you have any questions on this subject.

Sincerely,

Sharon Peterson
EHS Air Compliance Manager, Geysers

Enclosure\(^1\) (CEC Licensed Units: 3, 17, 18, and 20)

cc: Eric VeerKamp, Compliance Project Manager
California Energy Commission (CEC)
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

\(^1\) Data are copied to the CEC compliance project manager as a separate enclosure containing only the information required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C
<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Gross Generation (MWHrs)</th>
<th>Gross Steam Rate (Klbs / MWHr)</th>
<th>Unit Operating Hour (hrs)</th>
<th>Avg. Circ. Water Flowrate (Gal/Min)</th>
<th>† TSDS (ppm w)</th>
<th>Cooling Tower Drift Rate</th>
<th>Cooling Tower PM: PM10 &amp; PM2.5 (tons)</th>
<th>&quot; Total Organic Gasses in supplied steam measured as methane.</th>
<th>NH3 Emissions (tons)</th>
<th>Avg. H2S Conc. (ppm w)</th>
<th>H2S (tons)</th>
<th>Stretford Cooler PM (tons)</th>
<th>Total PM: PM10 &amp; PM2.5 (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>554,760</td>
<td>16.6</td>
<td>8223.90</td>
<td>97,000</td>
<td>0.00002</td>
<td>7.8</td>
<td>1064.4</td>
<td>Total PM: PM10 &amp; PM2.5 (tons)</td>
<td>188</td>
<td>304</td>
<td>1.4</td>
<td>53299</td>
<td>1.5</td>
</tr>
<tr>
<td>18</td>
<td>455,210</td>
<td>15.4</td>
<td>7998.73</td>
<td>84,000</td>
<td>0.00001</td>
<td>0.9</td>
<td>105.4</td>
<td>Total PM: PM10 &amp; PM2.5 (tons)</td>
<td>143</td>
<td>62</td>
<td>20.1</td>
<td>5698</td>
<td>2.1</td>
</tr>
<tr>
<td>20</td>
<td>309,021</td>
<td>15.6</td>
<td>7720.72</td>
<td>84,000</td>
<td>0.00001</td>
<td>2.4</td>
<td>40.6</td>
<td>Total PM: PM10 &amp; PM2.5 (tons)</td>
<td>99</td>
<td>43</td>
<td>14.9</td>
<td>2316</td>
<td>6.2</td>
</tr>
<tr>
<td>3 (Sonoma)</td>
<td>496,598</td>
<td>15.4</td>
<td>8115.77</td>
<td>99,104</td>
<td>0.00001</td>
<td>1.7</td>
<td>227.3</td>
<td>Total PM: PM10 &amp; PM2.5 (tons)</td>
<td>156</td>
<td>99</td>
<td>1.8</td>
<td>10657</td>
<td>1.7</td>
</tr>
</tbody>
</table>

1Annual average of monthly samples of cooling tower water total suspended and dissolved solids, (TSDS)
2Total organic gasses in supplied steam measured as methane.
4Ammonia emissions expressed as NH3 determined from mass balance and steam and water analyses,
5H2S concentration in the supplied steam from the average of weekly samples.
6CO2e is regulated not as a criteria pollutant
CONDITION OF CERTIFICATION
AQ-F11

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
August 31, 2021

Alex Saschin
Air Quality Engineer
Northern Sonoma County
Air Pollution Control District
150 Matheson Street
Healdsburg, CA 95448

Subject: Title V Operating Permit Annual Compliance Certifications 2020

Dear Mr. Saschin:

Attached are the Annual Compliance Certifications required pursuant to Condition V.C.17 of the Title V Operating Permits.

The Certification Period for each Title V Permit is January 1, 2020 through December 31, 2020. The certification periods are all on a calendar year basis regardless of the permit issue date.

The certification signature by the duly authorized responsible official is included on the title page of each annual compliance report.

If you require any additional information on this subject, please call me at (707) 431-6858.

Sincerely,

[Signature]

Sharon Peterson
Air Compliance Manager, Geysers

Enclosures

cc: Eric VeerKamp, Compliance Project Manager
California Energy Commission (CEC)
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

1 Enclosed reports required for CEC licensed facilities pursuant to: Unit 17 CEC Docket 79-AFC-1C, Unit 18 CEC Docket 79-AFC-3C, Unit 20 CEC Docket 82-AFC-1C, and Unit 3 CEC Docket 80-AFC-1C are provided to the CEC compliance project manager.
ATTACHMENT

Geysers Power Company LLC,

Unit 20 Title V Operating Permit, Annual Compliance Certification Report

For The Period January 1, 2020 through December 31, 2020

I certify that all information submitted herein is true, accurate and complete. Based on belief formed after reasonable inquiry, the Geysers Power Company LLC, Unit 20 Geothermal Power Plant is in compliance with the applicable federal, state, and local requirement(s) as identified in the attached Geysers Power Company LLC, Unit 20 Title V Operating Permit Annual Compliance Certification Report.

[Signature]
Signature of Responsible Official

Michael Puccioni – General Manager

Date: 9/30/21
I. Equipment List
   A. Permitted Source List
   B. Abatement Device List

II. Permit Conditions
   A. Power Plant and abatement System Permit Conditions
   B. Plant Wide Permit Conditions
   C. Administrative Requirements

I. EQUIPMENT LIST

   A. PERMITTED SOURCE LIST
   Each of the following sources has been issued a Permit to Operate pursuant to the requirements of NSCAPCD Regulation 1, Chapter II Permits.

   The equipment and capacities listed in Tables I.A and I.B are based on information provided by the permit holder. Routine maintenance, repair, or replacement with identical or equivalent equipment that does not result in an increase, or potential increase, in emissions of any air pollutant subject to District control does not require a permit modification. Replacement equipment that is within 5% of the listed capacity shall be considered equivalent for the purposes of this permit.

   Pumps listed with a capacity range may be replaced with pumps within the listed range without notification to the District. Any replacement of pumps outside the listed range shall receive District approval prior to replacement;

<table>
<thead>
<tr>
<th>S-#</th>
<th>Grant Description</th>
<th>Capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steam Turbine</td>
<td>1,968,900 lb Steam/hr; maximum plant gross steam flow</td>
<td>No Changes</td>
</tr>
<tr>
<td>2</td>
<td>Generator</td>
<td>119 MW gross nameplate capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>3</td>
<td>Surface Condenser with Steam Operated 2 and 3 Stage Gas Ejector System</td>
<td>1,750,000,000 BTU/Hr Design Heat Load</td>
<td>No Changes</td>
</tr>
<tr>
<td>4</td>
<td>Cooling Tower, Cross Flow Mechanical Draft Type with 0.002% rated drift eliminators with 11x200 hp fans</td>
<td>168,000 gpm maximum 200 hp each</td>
<td>No Changes</td>
</tr>
<tr>
<td>5</td>
<td>Gland Seal Leak Off System</td>
<td></td>
<td>No Changes</td>
</tr>
<tr>
<td>6</td>
<td>Emergency Standby Wet-Down Pump Diesel Drive Engine</td>
<td>204 HP</td>
<td>New</td>
</tr>
</tbody>
</table>
## B. Abatement Device List

### Hydrogen Sulfide Control System consisting of:

<table>
<thead>
<tr>
<th>A-#</th>
<th>Description</th>
<th>Nominal Capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stretford Air Pollution Control System consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Two Venturi Scrubbers</td>
<td>1,120 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>H₂S Absorber, 5’6” D x 38’ H.</td>
<td>560 gpm</td>
<td>No Changes</td>
</tr>
<tr>
<td>C</td>
<td>Two Oxidizer Tanks 19’D x20’H, with 4 oxidizer blowers, 100 HP each</td>
<td>790 scfm air per blower</td>
<td>No Changes</td>
</tr>
<tr>
<td>D</td>
<td>Reaction Tank 19’D x 20’ H</td>
<td>42,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>E</td>
<td>Balance Tank, 24’ D x 18’ H</td>
<td>60,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>F</td>
<td>Froth Tank 12’ D x 12 H</td>
<td>15,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>G</td>
<td>Caustic Tank 12’ D x 12’ H</td>
<td>9,300 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>H</td>
<td>Condensate Tank 4’ D x 5’ H</td>
<td>450 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>I</td>
<td>Heat Exchangers consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Stretford Heater</td>
<td>3.0 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>b</td>
<td>Stretford Cooling Tower, 0.005% drift</td>
<td>5.3 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>c</td>
<td>Auxiliary Stretford Heater</td>
<td>1.75 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>J</td>
<td>Main Pumps Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>3 Stretford Circulating Pumps</td>
<td>1560 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>b</td>
<td>2 Stretford Cooler Circulating Pumps</td>
<td>1100 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>c</td>
<td>Caustic Additive Pump</td>
<td>15-100 gpm</td>
<td>No Changes</td>
</tr>
<tr>
<td>K</td>
<td>Stretford Treated Gas Analyzer and Alarm System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>One Sulfur Vacuum Filter Belt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Circulating Water H₂S Abatement Solution Injection (For H₂S Control) System Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Abatement Solution Storage Tanks</td>
<td>5,400 gallons minimum</td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>One Abatement Solution Feed Pump and One Spare Pump</td>
<td>0-100 gph range</td>
<td>No Changes</td>
</tr>
<tr>
<td>C</td>
<td>Mass Flow Meter and Flow Alarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mercury Removal System Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Vapor Liquid Separator Assembly</td>
<td></td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>Mercury Adsorption Vessel</td>
<td></td>
<td>No Changes</td>
</tr>
</tbody>
</table>
II. PERMIT CONDITIONS

Permit conditions are designated federally (F), state (S), and/or locally (L) enforceable.

<table>
<thead>
<tr>
<th>1. POWER PLANT AND ABATEMENT SYSTEMS</th>
<th>Compliance</th>
<th>NOTES/MEANS/METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Emission Limits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emission Limits for H$_2$S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The Unit 20 power plant and associated abatement systems shall comply with Regulation 1 Rule 455 (b)-Geothermal Emission Standards. Total emissions of H$_2$S shall not exceed 4.7 kilograms averaged over any one-hour period. Total H$_2$S emissions shall be the cumulative emissions to the atmosphere from the power plant and associated abatement equipment. ref. Rule 455(b), PTO 82-45B Cond. 16.A.</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>Source Tests are conducted monthly, as required in condition III.1 to verify compliance. Results of the NSCAPCD Method 102 source tests, as well as excursions and exceedances, are reported to the District in the quarterly compliance reports.</td>
</tr>
<tr>
<td>2. The operator of this source shall not discharge or cause the discharge into the atmosphere of more than a total of 10.4 pounds/hour of H$_2$S from Geysers Unit 20. Ref. PSD SFB 81-03 Cond. IX.D.</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>Source Tests are conducted monthly, as required in condition III.1 to verify compliance. Results of the NSCAPCD Method 102 source tests, as well as excursions and exceedances, are reported to the District in the quarterly compliance reports.</td>
</tr>
<tr>
<td>3. The exit concentration in the process piping leading from the Stretford System shall not exceed 10 ppmv H$_2$S (dry) averaged over any consecutive 60-minute period unless operating under a District approved Alternative Compliance Plan (ACP). ref. PTO 82-45B Cond. 16.B.</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during this reporting period.</td>
</tr>
<tr>
<td></td>
<td>L</td>
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</tr>
<tr>
<td>4. The exit concentration from the Stretford unit shall not exceed 125 ppmv or 0.5 lb/hr. ref. PSD 81-03, 82-AFC-1 Cond. 3.b</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during this reporting period.</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>5. Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 20.6 tons per year of hydrogen sulfide (H$_2$S). ref. Rule 240 (d)</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Source tests are performed monthly as required by Condition III.1 to determine the H$_2$S emission rate. The monthly emission rates are averaged and multiplied by the annual hours of operation to calculate the annual emissions. Total 2020 H$_2$S emissions were 14.9 tons.</td>
</tr>
</tbody>
</table>

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6. The power plant and associated abatement systems shall comply with Regulation 1 Rule 455 (a)-Geothermal Emission Standards; no person shall discharge into the atmosphere from any geothermal operation sulfur compounds, calculated as sulfur dioxide, in excess of 1,000 ppmv. ref. Rule 455(a)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Yes</th>
<th>Plant systems that contain sulfur oxides are designed to limit emissions to concentrations less than the limit. Continuous monitoring of process piping gas concentration prior to release in the cooling tower is in service and maintained to verify compliance. No deviations to this condition occurred during the reporting period.</th>
</tr>
</thead>
</table>

**Emission Limits for Particulate Matter**

7. The power plant and associated abatement systems shall comply with Regulation 1 Rule 420 (d) Non-Combustion Sources- Particulate Matter; no person shall discharge particulate matter into the atmosphere from a non-combustion source in excess of 0.2 grains per cubic foot of exhaust gas or in total quantities in excess of the amount shown in Table I. (40 lb/hr) whichever is the more restrictive condition. ref. Rule 420(d)

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation of the PM discharge rate is based upon monthly total solids analyses and the cooling water flow rate. PM emission calculation is per Permit specified condition III.5. Calculations indicate that the plant was in compliance with this limit during the reporting period.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 17.0 tons per year particulate matter less than 10 microns in diameter (PM-10) and 12.0 tons per year particulate matter less than 2.5 microns in diameter (PM-2.5). ref. Rule 240(d).

<table>
<thead>
<tr>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate emission rate determined as required by III.5. The results of that determination are used to determine the annual emission. Total 2020 PM10 and PM 2.5 emissions calculations were 8.6 tons.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Emission Limits Specific to the Emergency Standby Wet-Down Pump Diesel Drive Engine**

1. Visible particulate emissions shall not exceed an opacity as to obscure an observer's view to a degree equal to or greater than Ringelmann 2.0 or 40 percent opacity for a period or periods exceeding 3 minutes in any one hour. ref. ATC/Temporary PTO 17-10.

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operators and maintenance personnel record startup and operating exhaust observations in J-5 log entries to identify exhaust opacity trouble for further evaluation and repair in the work order system.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Particulate emissions shall not exceed an emission rate of 0.15 g/bhp-hr. ref. ATC/Temporary PTO 17-10.

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine meets EPA Tier 3 emission standards and is rated below the permitted limits.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Combined non-methane hydrocarbons and nitrogen oxide emissions shall not exceed and emission rate of 3.0 g/bhp-hr. ref. ATC/Temporary PTO 17-10.

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine meets EPA Tier 3 emission standards and is rated below the permitted limits.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Carbon monoxide emissions shall not exceed an emission rate of 2.6 g/bhp-hr. <em>ref. ATC/Temporary PTO 17-10.</em></td>
<td>F</td>
<td>S</td>
</tr>
<tr>
<td>II. Operational Limits and Requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>The permit holder shall not operate the plant unless untreated vent gasses are vented to the Stretford Air Pollution Control System. The condensate H₂S abatement chemical feed system and the Stretford abatement system shall be kept in good working order and operated as necessary in order to limit H₂S and particulate emissions on a continuous basis from the power plant as specified in condition I.1, I.2, I.3, I.4, and I.5. <em>ref. Rule 240.d, PTO 82-45A Cond. 18, PSD SFB 81-03, 82-AFC-1 AQ-B8 Cond. 15.</em></td>
<td>F</td>
<td>S</td>
</tr>
<tr>
<td>2.</td>
<td>The secondary abatement solution storage tank shall have a minimum of 1000 gallons of abatement solution at all times when the plant is in operation. All continuously operated abatement solution feed pumps shall have a standby spare available, a readily accessible flowmeter readable in appropriate units and equipped with alarms signaling no or low flow. Flowmeter accuracy shall be plus or minus 10% of flow. <em>ref. PTO 82-45A Cond. 18</em></td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>3.</td>
<td>Except for justifiable reasons during performance testing or under operation of an ACP, for which the permit holder has received prior District written approval, the circulating water shall be kept to the following specification: Circulating water iron chelate (abatement solution) concentration shall be maintained at or above the ppmw concentration recommended in the power plant operating guidelines as necessary to abate H₂S emissions from the power plant to the emission limit specified in Condition I.1. <em>ref. PTO 82-45A Cond. 19</em></td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>4.</td>
<td>All the abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. All primary pressure gauges and flow meters associated with abatement equipment shall be readily identified, maintained in good operating condition and calibrated on a quarterly basis. Alarm systems associated with abatement equipment shall be tested on a quarterly basis. Calibration and maintenance shall be performed according to manufacturer’s recommendations or per the permit holder’s maintenance schedule as needed to maintain the equipment in good working order. <em>ref. PTO 82-45B Cond. 14.</em></td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>5.</td>
<td>All areas in the immediate vicinity and under the permit holder’s responsibility shall be properly treated to control fugitive dust. <em>ref. PTO 82-45B Cond. 17.</em></td>
<td>S</td>
<td>L</td>
</tr>
</tbody>
</table>
### 6. Fugitive Leaks

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
<td>A review of maintenance records indicated that the plant is in compliance. A review of daily compliance checklists indicated that the operators inspect the system for fugitive leaks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Plant operations and maintenance follow the procedure outlined in this permit condition to identify fugitive emissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintenance records are available to inspectors to verify that fugitive emissions are minimized and controlled in a timely manner.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fugitive leak inspections are performed more frequently than once per quarter. The operator conducts daily rounds to inspect the plant which include identifying any leaks and entering the information into the plant log and submitting a work order requesting repair.</td>
</tr>
</tbody>
</table>

#### a. Non-condensable gas leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent the emission of steam and non-condensable gases to the atmosphere. Valves, flanges and seals shall be tightened, adjusted, or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere.

Non-condensable gas leaks shall not (i) exceed (as measured within 1 cm of such leak) 1000 ppm (vol) H2S nor 10,000 ppm (vol) methane nor (ii) exceed emission limits of Rule 455. Such leaks shall be repaired within 24 hours, unless the leak is from essential equipment. If the leak is from essential equipment, the leak must be minimized within 24 hours using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the APCO.

Essential Equipment is defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.

Yes A review of maintenance records indicated that the plant is in compliance. A review of daily compliance checklists indicated that the operators inspect the system for fugitive leaks.

Plant operations and maintenance follow the procedure outlined in this permit condition to identify fugitive emissions.

Maintenance records are available to inspectors to verify that fugitive emissions are minimized and controlled in a timely manner.

Fugitive leak inspections are performed more frequently than once per quarter. The operator conducts daily rounds to inspect the plant which include identifying any leaks and entering the information into the plant log and submitting a work order requesting repair.

#### b. Steam and Condensate leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent the emission of steam and condensate to the atmosphere. Valves, flanges and seals shall be tightened, adjusted or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere. Valves, flanges drip legs, threaded fittings and seals on pipelines shall be maintained to prevent or reduce the emission of steam and condensate to the atmosphere as noted below:

Liquid leak rate in pressurized steam and condensate lines shall not exceed 20 ml in 3 minute. Liquid leak rates in excess of 20 ml in 3 minutes shall be repaired within 15 calendar days, excepting those leaks from essential equipment. If the leak is from essential equipment, the leak must be minimized within 15 days using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the APCO.

Essential Equipment is defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.
modern practices

The permit holder shall check the power plant for fugitive leaks at least once per quarter. *ref. PTO 82-45B Cond. 17.*

<table>
<thead>
<tr>
<th>7. Alternative Compliance Plan</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.2, I.4, I.6, and I.7. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.2, I.4, I.6, and I.7. The ACP shall list the specific operating conditions the ACP will supersede.</td>
<td>F S L</td>
</tr>
<tr>
<td>b. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.1 and I.3. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.1 and I.3. The ACP shall list the specific operating conditions the ACP will supersede.</td>
<td>S L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facilities Operation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8. All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of the Permit shall at all times be maintained in good working order. The equipment shall be operated in a manner necessary to meet all emission limits of the permit. <em>Ref. Rule 240(d), PSD SFB 81-03 Cond. III.</em></td>
<td>F S L</td>
</tr>
<tr>
<td>9. The cooling tower shall be maintained in good operating condition. The permit holder shall conduct an integrity inspection of the cooling tower during each scheduled plant overhaul and carry out any repairs necessary to correct all</td>
<td>S L</td>
</tr>
<tr>
<td>deficiencies encountered. ref. Rule 240(d)</td>
<td>review of plant overhaul work planning indicated that cooling tower repair work is included.</td>
</tr>
<tr>
<td>---</td>
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</tr>
</tbody>
</table>
| 10. The permit holder shall operate and maintain the following air pollution control equipment at the Unit 20 plant:  
   a. The non-condensable gas stream exiting from the surface condenser shall be ducted to an operating Stretford process unit.  
   b. Condensate exiting from the surface condenser shall be treated as necessary to reduce the levels of dissolved hydrogen sulfide. The permit holder shall use a secondary abatement system authorized by the NSCAPCD to accomplish this reduction.  
   c. The permit holder shall have installed drift controls on the power plant cooling tower to limit drift losses to 0.002 percent or better of the circulating water mass, thus minimizing emissions of particulate matter. ref. PSD SFB 81-03 Cond. IX.B. | F S L Yes  
   a. By design the non-condensable gasses are ducted to the Stretford system.  
   b. A secondary abatement system, including condensate re-route is in place, and is permitted by the NSCAPCD.  
   c. Based upon manufactures specifications, the cooling tower drift eliminators meet the requirement of this condition. |

| 11. The permit holder shall, in any 12-month period, limit unscheduled outages for Unit 20 to no more than a total of 12. The following shall not be used in computing the total outages.  
   a. scheduled outages (defined as outages with 24-hour advance notice between the steam supplier and permit holder, except in the case of Unit 20 outages resulting from an abundance of hydropower in which case a scheduled outage shall be defined as one-hour notice).  
   b. steam supplier induced outages (such as pressure surge, strainer plugging, etc.).  
   c. outages of less than 2 hours in duration.  
   d. outages which do not cause steam stacking.  
   
   A violation of the above performance standards is considered a violation of this condition.  
   
   The permit holder shall have on file with the District an approved operating protocol describing the methods that will be used to meet the 12 outages in 12 consecutive months’ performance standard. The protocol must include a description of the operational procedures between the steam supplier and permit holder, permit holder’s operational procedures, and equipment to meet the above standard. The terms and requirements of the protocol may be modified by the | F S L Yes  
   All occurrences meeting the condition criteria are reported to the District in the Quarterly Compliance Reports. A protocol is in place to meet the requirements of this condition. Steam lines interconnecting the power plants allow steam to be shifted to other operating plants if an outage occurs. No outages have resulted in steam stacking since interconnection of the steam lines was completed.  
   No stacking events occurred during this reporting period. |
Control Officer for good cause upon written request from the permit holder.

The permit holder shall allow the District to inspect all operating logs to verify the total outage hours. These requirements are in addition to the applicable requirements of rule 540.

In the event the permit holder is not able to meet the standards specified above, the following shall be required:

The permit holder shall prepare and submit a revised “plan” to the Control Officer, within 30 days of the end of the month in which the outage limit was exceeded, to achieve the outage standards set forth in this permit condition. At a minimum, the measures to be considered in the “plan” shall include: improved coordination of the power plant and steam field operations, improved alarming and control systems, increased duration of manned operation of the power plant, improved preventative maintenance and design modifications, retrofit of a 100% of steam flow turbine bypass, and retrofit of a 50% of steam flow turbine bypass. In evaluating measures to be taken to prevent future exceedances of the outage standard, outages of less than 2 hours shall be counted. This plan” shall also be submitted to EPA for approval if the outage standard is exceeded.

Within 30 days of receipt of the “plan” the Control Officer shall determine whether the “plan” is satisfactory and, if so, shall approve the “plan”. Upon approval, the revised “plan” shall supersede the old plan and become a part of the terms and conditions of this permit. \textit{ref. PSD SFB 81-03 Cond. IX.C., PTO-82-45A Cond. 18.}

### Emergency Standby Wet-Down Pump Diesel Drive Engine

12. Total operating hours used for testing and maintenance of S-6, emergency standby wet-down pump diesel drive engine, shall not exceed 50 hours in any consecutive 12-month period. The total hours of operation do not include use during emergencies. \textit{ATC/Temporary PTO 17-10.}

<table>
<thead>
<tr>
<th></th>
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<th>Yes</th>
<th>Operators log and track the recorded hours to ensure testing and maintenance diesel engine run time does not exceed 50 hours in any consecutive 12-month period.</th>
</tr>
</thead>
</table>

13. S-6, emergency standby wet-down pump diesel drive engine, shall only be used because of a failure or loss of all or part of normal electrical power service, except for testing and maintenance as defined in CA HSC 93115.4 (30). \textit{ATC/Temporary PTO 17-10.}

<table>
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<tr>
<th></th>
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<th>Yes</th>
<th>The generator purpose is to provide emergency electrical power for critical equipment and lighting for safety during failure or loss of all or part of normal electrical power service.</th>
</tr>
</thead>
</table>

14. S-6, emergency standby wet-down pump diesel drive engine, shall be equipped with a non-resettable hour counting meter to indicate the number of hours the engine is operated. \textit{ATC/Temporary PTO 17-10.}

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<tr>
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<th>Yes</th>
<th>The generator is equipped with a working non-resettable hour counting meter.</th>
</tr>
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</table>

15. S-6, emergency standby wet-down pump diesel drive engine, shall be operated exclusively on California Air Resources Board (CARB) Diesel Fuel.

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<tr>
<th></th>
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<th>Yes</th>
<th>The Geysers purchasing department contracts with fuel vendors who only supply Ultra-low Sulfur Diesel</th>
</tr>
</thead>
</table>
III. Monitoring, Testing and Analysis

Performance Tests

1. The permit holder shall, on a monthly basis, conduct a source test of the cooling tower to determine the H2S emission rate to verify compliance with condition I.1. A mass balance determination of total H2S to the cooling tower based on measured operating conditions may be used to document that the worst case possible H2S emission are less that the emission limit of the plant or District Method 102 shall be utilized to determine the H2S emission rate. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant, including periods when accessing the cooling tower is not possible, while maintaining compliance with all applicable emission limits of Condition I.1. The ACP shall list operating parameters such as power output (MW), target pH, abatement solution concentration levels, and burner/scrubber exit concentrations which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Condition I.1. The ACP shall list the specific operating conditions the ACP will supersede. ref. PTO 82-45A Cond. 22.

2. The permit holder shall conduct or cause to be conducted performance tests on the turbine exhaust system to determine the H2S emission rate to verify compliance with condition I.2. Performance tests shall be conducted in accordance with Northern Sonoma County APCD Method 102, unless otherwise specified by EPA. The permit holder shall furnish the Northern Sonoma County APCD, the California Air Resources Board and the EPA (Attn: Air-5) a written report of such tests. All performance tests shall be conducted at the maximum operating capacity of the plant. Performance tests shall be conducted at least on a yearly basis and at such times as shall be specified by EPA. ref. PSD SFB 81-03 Cond. IX.E.

3. The permit holder shall provide platforms, electrical power and safe access to sampling ports to enable representatives of the District, ARB and EPA to collect samples from the main steam supply, treated and untreated condensate, circulating water upstream of the cooling tower, cooling tower stacks, untreated F S L Yes Sample taps used by plant personnel for chemical sampling and analysis are also available for use by CARB and District personnel. Safety Orientations and Job Safety Analysis are available for District and ARB
and treated non-condensable gas stream to and from the Stretford abatement facility, any off gas bypass vents to the atmosphere and any Stretford tanks or evaporative coolers. *ref. PTO 82-45B Cond. 11, PSD SFB 81-03 Cond. IX E.3.*

| 4. | The permit holder, as requested by the Control Officer, shall conduct a District approved performance test for particulate matter (PM), H₂S, other species (i.e. benzene, mercury, arsenic, TRS, mercaptans, radon, other nitrogen compounds (amines) and compounds listed under NESHAPS and/or AB2588 from the power plant evaporative cooling tower and/or the Stretford evaporative cooling tower. Upon written request of the Control Officer, the permit holder shall submit to the District at least 45 days prior to testing a detailed performance test plan. The District shall approve, disapprove or modify the plan within 45 days of receipt of the plan. The permit holder shall incorporate the District’s comments or modifications to the plan which are required to assure compliance with the District’s regulations. The Control Officer shall be notified 15 days prior to the test date in order to arrange for an observer to be present for the test. The test results shall be provided to the District within 45 days of the test date unless a different submittal schedule is approved in advance by the Control Officer. *ref. PTO 82-45A Cond 9 &10.* | S | Yes | Tests for listed species are performed at the request of the District utilizing District approved methods and an approved test plan. No test requests by the District are currently active. |

| 5. | Compliance with the particulate mass emission limitation shall be estimated using calculations based on the evaporative cooling tower manufacturers design drift eliminator drift rate, 0.001 percent for the main cooling tower and 0.005% for the Stretford cooling tower, multiplied by the circulating water rate or Stretford solution circulating rate and, total dissolved solids (TDS) and total suspended solids (TSS). A circulating water sample shall be collected and analyzed for TDS and TSS on a monthly basis. *ref. PTO 82-45A Cond. 21* | S | Yes | Monthly analysis by plant chemical staff and calculations done in accordance with the condition. Calculation of the particulate emissions is based upon monthly samples and analysis of the cooling tower water TSS and TDS. These calculations indicate that the unit was in compliance with this condition during the reporting period. |

| 6. | Main steam supply H₂S concentrations shall be determined minimally on a weekly basis and any additional times as required by the operating protocol or ACP. *Ref. PTO 82-45A Cond.19.* | S | Yes | A protocol on file with the District describes the method used to determine H₂S concentration. A review of the records indicates that the requirements of this condition are being met. |

| 7. | The permit holder shall perform an abatement solution concentration test of the cooling tower circulating water once per operating shift when abatement solution is necessary in order to achieve compliance with Condition I.1. The testing equipment shall be kept calibrated per the manufacturer’s specifications. *ref. PTO 82-45A Cond.19.* | S | Yes | Operators perform tests required by this condition as a part of their daily routine. Iron concentration tests are validated by the plant chemistry staff using the “Hach” Ferreover colorimetric method. A review of the operating logs during this reporting period indicates compliance with this condition when circulating water abatement was in service. |
8. Instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations shall receive District approval prior to use. Test plans shall be submitted for District approval of instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations. *ref. Rule 240(d)*

**SL** Yes

The NSCAPCD has approved the following instruments that are used to measure H2S: ASI Model; 102, Jerome Instruments Model 631, "Dräger” brand sampling and analysis tubes. Organic gases are analyzed utilizing an “Aglient” Model 3000C G.C.

9. All sampling protocols, chemical feed charts, targets and operational guidelines for using said charts and targets, necessary to abate H2S emissions from the power plant to the emission limits specified in Conditions I.1 and I.2 must be developed using good engineering judgment and supporting data. The APCO may review such sampling protocols, chemical feed charts, targets and guidelines upon request. If the APCO determines that any of the protocols, feed charts, targets, or guidelines are not sufficient to maintain compliance with Conditions I.1 and I.2, the APCO shall require the permit holder to develop revised protocols, feed charts, targets and guidelines. *ref. Rule 240(d)*

**SL** Yes

Protocols related to this condition were submitted and approved by the District in the initial Title V application.

Plant unit engineers specify targets and guidelines based on good engineering judgment and recent chemical analyses. Targets and operating requirements are available electronically via the plant intranet and they are posted on an erasable board in the operating control room.

**Continuous Compliance Monitoring (CCM)**

10. The permit holder shall operate a continuous compliance monitor capable of measuring the concentrations of H2S in the exhaust stream from the Stretford absorber in order to verify compliance with conditions I.1 and I.3. The monitoring system must alarm the operator when H2S in the treated gas is in excess of 10 ppmv (dry basis). The permit holder shall respond to the alarm with appropriate mitigative measures. Mitigative measures taken shall be logged in the power plant abatement log book. In the event H2S concentrations are in excess of 10 ppmv and the range of the CCM is exceeded, the permit holder shall test for H2S using an approved alternative method (ex Draeger tester, wet chemical tests) once every hour during the excess. The monitor shall have a full range of at least 50 ppmv. The monitor shall meet the following operational specifications: an accuracy of plus or minus 10% of full scale, provide measurements at least every 3 minutes, provide a continuous strip chart record or a District approved alternative, and provide monthly data capture of at least 90%. The District must be notified when the concentration of H2S exceeds the hourly average limit of 10 ppmv.

A one-point calibration shall be performed at least once per week. A three-point calibration shall be performed at least once per quarter.

The Control Officer may allow modifications to the above specifications under an ACP upon written request with justification by the permit holder as long as emissions from the power plant do not exceed the “total” H2S emission limitations of condition I.1. Written notification from the Control Officer must be received by

**SL** Yes

A monitor meeting the requirements of this condition is in place and operational. Plant records indicate that the continuous monitor consistently meets the requirements of this condition. Verification of these requirements is sent to the NSCAPCD in the quarterly reports. There were no deviations from this condition during the reporting period. Plant records indicate that calibrations are performed as required.
the permit holder prior to any change in monitoring specifications. *Ref. PTO 82-45A Cond. 19.*

<table>
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<tr>
<th>Ambient Air Monitoring</th>
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<tr>
<td>11. The permit holder shall maintain and operate one ( \text{H}_2\text{S/meteorological monitoring station, PM-10 high volume station at a location approved in advance by the Control Officer for the life of the facility. The permit holder shall install and operate additional monitoring stations, such as a PM 2.5 monitoring station, if required by the Control Officer, California Air Resources Board or EPA. Participation by the permit holder in a joint air monitoring program, such as the Geysers Air Quality Monitoring Program (GAMP), shall be deemed to satisfy all ambient air quality monitoring requirements of this permit provided the term of monitoring is equivalent. The Control Officer can alter, suspend, or cancel this requirement provided no ambient air quality standard applicable to this facility is threatened or that sufficient other monitoring is available by the District, Lake County AQMD or other third party. <em>Ref. PTO 82-45A Cond. 22, PSD SFB 81-03, 82-AFC-1 Cond. 13 AQ-C11.</em>}</td>
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<tr>
<th>Emergency Standby Wet-Down Pump Diesel Drive Engine</th>
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<tr>
<td>12. At any time as specified by the Control Officer, the operator of this source shall conduct a District approved source test to determine ( \text{NOx and particulate emissions from the emergency standby wet-down pump diesel drive engine. The test results shall be provided to the District within 30 days of the test.}</td>
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<tr>
<th>IV. Record keeping</th>
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<tr>
<td>1. All records and logs shall be retained for a period of at least 5 years from the date the record or log was made and shall be submitted to the NSCAPCD upon request.</td>
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<tr>
<td>2. The permit holder shall maintain a weekly abatement solution inventory log available for on-site inspection. <em>Ref. Rule 240(d)</em></td>
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<tr>
<td>3. The permit holder shall maintain a strip chart or other District approved data recording device of ( \text{H}_2\text{S readings measured by the CCM. All measurements, records, and data shall be maintained by the permit holder for at least five (5) years. The permit holder shall report all exceedances of Condition 1.3 in the}</td>
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quarterly report as required in V.1. The report shall include a description of all measures taken to bring the Stretford system back into compliance with Condition I.3. The permit holder shall include in the report a copy of the output from the H₂S CCM or alternative District approved data during the upset condition. *ref. Rule 240(d)*

| All exceedances of Condition I.3 are reported in the quarterly reports. There were no reportable exceedances during this reporting period. |

4. The permit holder shall maintain copies of the source test results as required in condition III.1 for a minimum of 5 years. *ref. PTO 82-45A cond. 22.*

<table>
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<tr>
<th>S</th>
<th>L</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Source test data is available in the plant chemistry laboratory files on site, and in the plant archives.</td>
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5. Fugitive Leak Records

a. Any non-condensable gas leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. *Ref. PTO 82-45A cond. 20.*

<table>
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<tbody>
<tr>
<td>Operators conduct on-site inspections. Daily plant inspections by operators identify leaks described by this condition. Plant maintenance records are available upon request to verify leak identification and repair.</td>
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b. Any valve, flange, drip leg threaded fitting or seal on a pipeline or condensate collection system with a leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. *ref. PTO 82-45A cond. 20.*

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<tbody>
<tr>
<td>Operators conduct on-site inspections. Daily plant inspections by operators identify leaks described by this condition. Plant maintenance records are available upon request to verify leak identification and repair.</td>
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</table>

6. The permit holder shall maintain records detailing:
   a. any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action.
   b. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.3, and I.4.
   c. fugitive steam and non-condensable gas emission source inspections. Leak rates, repairs and maintenance.
   d. total dissolved solids and total suspended solids in the circulating water. *Ref. Rule 240(d)*

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7. The permit holder shall maintain records detailing:

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<tbody>
<tr>
<td>a. Plant logs and data acquisition system (J-5 and EDNA).</td>
</tr>
</tbody>
</table>
a. hours of operation.
b. types, concentrations and amounts of chemicals used for Stretford absorbing solution and used for condensate treatment including target levels for abatement solution concentration in the circulating water.
c. a summary of any irregularities that occurred with a continuous compliance monitor.
d. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.1, I.2.
e. periods of scheduled and unscheduled outages and the cause of the outages.
f. time and date of all pump and flowmeter calibrations required by this permit.
g. time and date of all alarm system tests.
h. leaking equipment awaiting repair; time and date of detection and final repair.
i. total H2S, PM-10 and PM 2.5 annual emissions to date.
ref. Rule 240(d)

Emergency Standby Wet-Down Pump Diesel Drive Engine

8. In order to demonstrate compliance with the above permit conditions, records shall be maintained in a District approved log, shall be kept on site, and made available for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information summarized on a monthly basis:

| a. Total engine operating hours. | L |
| b. Emergency use hours of operation. | F |
| c. Maintenance and testing hours of operation. | S |
| d. Hours of operation to comply with the requirements of NFPA 25. | L |
| e. Type and amount of fuel purchased. | S |

V. Reporting

1. A quarterly report shall be submitted to the District which contains the following information:

| a. CCM availability for the given quarter. | L |
| b. any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action taken. | F |
| c. Time and date of any monitor indicating an hourly average exceed of 10 ppmv of H2S. | S |
| d. Source test results. | L |
| e. Steam stacking events | S |

The quarterly report shall be submitted to the District within 30 days of the end of each quarter. The reports are due by May 1, August 1, November 1 and February
## Geysers Power Company LLC, Unit 20 Title V Operating Permit

### ANNUAL COMPLIANCE CERTIFICATION REPORT

01/01/20 through 12/31/20

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Compliance</th>
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| 1. An annual report shall be submitted to the District which contains the following information:  
   a. average mainsteam H₂S and ammonia concentrations.  
   b. average total dissolved and suspended solids and average flowrate of the cooling tower water.  
   c. annual ammonia emissions.  
   d. gross megawatt hours generated.  
   e. steaming rate, gross average (gross steam flow; lb/ gross MW).  
   f. update to any changes in operating protocols used to determine plant chemical feed charts and targets; calibration and maintenance programs.  
   g. total organic gasses emitted as methane.  
   h. hours of plant operation.  
   i. annual CO₂e emissions.  
   j. Annual H₂S, PM-10 and PM-2.5 emissions  
The annual report shall be submitted to the District within 45 days of the end of each calendar year.  
| 2. The permit holder shall submit reports to the California Air Resources Board (CARB) in accordance with provisions of CCR Title 17, Division 3, Chapter 1, Subchapter 10, Article 2, Regulation for Mandatory Reporting of Greenhouse Gas Emissions.  
Steam Stacking  
The permit holder shall, on a quarterly basis, provide a written report to the District with the outage events, cause of each outage and the balance of events for the year.  
The Control Officer may change the frequency of reporting.  
The permit holder shall inform the District when total outages have reached 12 in any consecutive 12 month period.  
The District shall be notified within 5 days of the 12th outage. | S  L  Yes  The 2020 report was submitted Cal-e-GGRT to CARB, Facility ARB ID:101527 on 4/8/2021 verification by the independent third party has been completed. |
| B. PLANT WIDE PERMIT CONDITIONS  
The plant shall comply with the following District regulations.  
The text of the referenced regulations can be found in Appendix A of this Title V Operating Permit.  
1. Regulation 1 Rule 400-General Limitations  
2. Regulation 1 Rule 410-Visible Emissions  
3. Regulation 1 Rule 430-Fugitive Dust Emissions  
4. Regulation 1 Rule 492 (40 CFR part 61 Subpart M)-Asbestos  
5. Regulation 1 Rule 540-Equipment Breakdown  
6. Regulation 2- Open Burning  
7. If in the event this stationary source, as defined in 40 CFR part 68.3, becomes | F  S  L  Yes  1-3 Reviewed Quarterly compliance reports and District Inspections.  
4. Reviewed Asbestos Notification letters.  
   Notifications were submitted as required during the reporting period.  
5. Reviewed Quarterly compliance records “Incidents Requiring Corrective Action”.  
6. No open burning is performed at this location. |
subject to part 68, this stationary source shall submit a risk management plan (RMP) by the date specified in part 68.10. As specified in Parts 68, 70 and 71, this stationary source shall certify compliance with the requirements of part 68 as part of the annual compliance certification required by 40 CFR part 70 or 71.

8. 40 CFR Part 82- Chlorinated Fluorocarbons
9. If in the event this stationary source, as defined in 40 CFR part 63, becomes subject to part 63, this stationary source shall notify the District within 90 days of becoming subject to the regulation. The stationary source shall identify all applicable requirements of part 63 and submit a plan for complying with all applicable requirements.

C. ADMINISTRATIVE REQUIREMENTS

Payment of Fees

1. This Permit shall remain valid during the 5-year term as long as the annual renewal fees are paid in accordance with Regulation 1 Rule 300 and Rule 360 of the District. Failure to pay these fees will result in forfeiture of this permit. Operation without a permit subjects the source to potential enforcement action by the District and the EPA pursuant to section 502(a) of the Clean Air Act. ref. Reg 5.670

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Right to Entry and Inspection

2. The Control Officer, the Chairman of the California Air Resources Board, The Regional Administrator of the EPA and/or their authorized representatives, upon the presentation of credentials, shall be permitted:
   A. to enter upon the premises where the source is located or areas in which any records are required to be kept under the terms and conditions of this Permit; and
   B. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Permit; and
   C. to inspect any equipment, operation, or method required in this Permit; and
   D. to sample emissions from the source. ref. Reg 5.610(e)

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<th>Yes</th>
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<tbody>
<tr>
<td></td>
<td>Agency representatives are admitted to the project upon presentation of credentials. After receiving a safety advisory no restrictions are placed on access to plant premises, sample locations and records.</td>
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Compliance with Permit Conditions

3. This Title V Operating Permit expires on August 8, 2021. The permit holder shall submit a complete application for renewal of this Title V Operating Permit no later than 6 months prior to expiration and no earlier than one year prior to expiration. If a complete application for renewal has not been submitted in accordance with these deadlines, the facility may not operate after August 7, 2021. Ref Reg 5.660

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<th>Yes</th>
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<tr>
<td></td>
<td>Application was submitted 6 months prior to expiration; ref. GPC-21-020 dated February 4, 2021. The current permit renewal was issued on August 8, 2021.</td>
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</table>
4. The permit holder shall comply with all conditions of this permit. Any non-compliance with the terms and conditions of this permit will constitute a violation of the law and may be grounds for enforcement action, including monetary civil penalties, permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.  *ref. Reg 5.610(f)(3)*

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<th></th>
<th>F</th>
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<th>L</th>
<th>Yes</th>
<th>No NOVs were issued to Unit 20 during this reporting period.</th>
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</table>

5. In the event any enforcement action is brought as a result of a violation of any term or condition of this permit, the fact that it would have been necessary for the permit holder to halt or reduce the permitted activity in order to maintain compliance with such term or condition shall not be a defense to such enforcement action. *ref. Reg 5.610(f)(4)*

|   | F  | S  | L  | Yes |

6. The filing of a request by the facility for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated non-compliance does not stay the applicability of any permit condition. *ref. Reg 5.610(f)(5)*

|   | F  | S  | L  | Yes |

7. This permit does not convey any property rights of any sort, nor any exclusive privilege. *ref. Reg 5.610(f)(2)*

|   | F  | S  | L  | Yes |

8. The permit holder shall supply within 30 days any information that the District requests in writing to determine whether cause exists, per Regulation 5.570, for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. *ref. Reg 1 Rule 200, Reg 5.430*

|   | F  | S  | L  | Yes | There are no active information requests. |

**Reporting**

9. All deviations from permit requirements, including those attributable to upset conditions (as defined in the permit) must be reported to the District at least once every six months. For emissions of a hazardous air pollutant (HAP) or a toxic air pollutant (as identified in an applicable regulation) that continue for more than an hour in excess of the permit requirements, the report must be made within 24 hours of the occurrence. For emissions of any regulated air pollutant, excluding those HAP emission requirements listed above, that continue for more than two hours in excess of permit requirements, the report must be made within 48 hours. All reports of deviation from permit requirements shall include the probable cause of the deviation and any preventative or corrective action taken. A progress report shall be made on a compliance schedule at least semi-annually and shall include the date when compliance will be achieved, an explanation of why compliance was not, or will not be, achieved by the scheduled date, and a log of any preventative or corrective action taken. The reports shall be certified by the

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
<th>There were no deviations to report during this period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No excess emissions occurred.</td>
</tr>
<tr>
<td><strong>Severability</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10. In the event that any provision of this permit is held invalid all remaining portions of the permit shall remain in full force and effect. <em>ref. Reg 5.610(g)</em></td>
<td>FSL</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Transfer of Ownership</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>11. In the event of any changes in control or ownership of facilities to be modified and/or operated, this Permit is transferable and shall be binding on all subsequent owners and operators. The permit holder shall notify the succeeding owner and operator of the existence of this Permit and its conditions by letter, a copy of which shall be forwarded to the Control Officer. <em>ref. Rule 240(j)</em></td>
<td>FSL</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Records</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Notwithstanding the specific wording in any requirement, all records for federally enforceable requirements shall be maintained for at least five years from the date of entry and shall include: date place and time of sampling, operating conditions at the time of sampling, date, place and method of analysis and the results of the analysis. <em>ref. Reg 5.615</em></td>
<td>FSL</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Emergency Provisions</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13. The permit holder may seek relief from enforcement action in the event of a breakdown, as defined by Regulation 1 Rule 540 of the District's Rules and Regulations, by following the procedures contained in Regulation 1, Rule 540 (b). The District will thereafter determine whether breakdown relief will be granted in accordance with Regulation 1, Rule 540 (b)(3). <em>ref. Reg 5.640</em></td>
<td>FSL</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| 14. The permit holder may seek relief from enforcement action for a violation of any of the terms and conditions of this permit caused by conditions beyond permit holders reasonable control by applying to the District's Hearing Board for a variance pursuant to Health and Safety Code Section 42350. The Hearing Board will determine after notice and hearing whether variance relief should be granted in accordance with the procedures and standards set forth in Health and Safety Code Section 42350 et seq. Any variance granted by the Hearing Board from any term or condition of this permit which lasts longer than 90 days will be subject to EPA approval. *ref. Reg 1 Rule 600* | FSL | Yes |

<p>| 15. Notwithstanding the foregoing, the granting by the District of breakdown relief or the issuance by the Hearing Board of a variance will not provide relief from federal | FS | Yes |</p>
<table>
<thead>
<tr>
<th></th>
<th>L</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>enforcement unless the Title V Operating Permit has been modified pursuant to Regulation 5 or other EPA approved process. ref. Reg 1 Rule 600</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Malfunction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. The Regional Administrator shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above allowable emissions limit stated in Condition I.2. In addition, the Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Condition I.2, and the methods utilized to restore normal operations. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or of any law or regulations, which such malfunction, may cause. ref. PSD SFB 81-03 Cond. IV.</td>
<td>F</td>
<td>Yes</td>
<td>NSCAPCD is notified for any such failures.</td>
</tr>
<tr>
<td><strong>Permit Posting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Operation under this permit must be conducted in compliance with all data specifications included in the application which attest to the operator’s ability to comply with District rules and regulations. This permit must be posted in such a manner as to be clearly visible and accessible at a location near the source. In the event that the permit cannot be so placed, the permit shall be maintained readily available at all times on the operating premises. ref. Rule 240(i)</td>
<td>S</td>
<td>Yes</td>
<td>Operators conduct on-site inspections. This permit is located in the Unit 20 control room and is available electronically to Operators in the control room.</td>
</tr>
<tr>
<td><strong>Compliance Certification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Compliance certifications shall be submitted annually by the responsible official of this facility to the Northern Sonoma County Air Pollution Control District and to the EPA. Each compliance certification shall be accompanied by a written statement from the responsible official which certifies the truth, accuracy, and completeness of the report. ref. Reg 5.650</td>
<td>F</td>
<td>Yes</td>
<td>This submittal includes the required Compliance Certification for this Permit. The cover page contains a written statement by the responsible official certifying truth, accuracy and completeness.</td>
</tr>
<tr>
<td>19. This Permit does not authorize the emission of air contaminants in excess of those allowed by the Health &amp; Safety Code of the State of California or the Rules and Regulations of the Northern Sonoma County Air Pollution Control District. This Permit cannot be considered as permission to violate existing laws,</td>
<td>F</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Permit Modification</td>
<td>F</td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>20. The permit holder shall comply with all applicable requirements in NSCAPCD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulation 1 Chapter II- Permits and New Source Review. ref. Regulation 1 Rule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONDITION OF CERTIFICATION
AQ-SC1

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
Letter: GPC-21-020

February 4, 2021

Alex Saschin
Air Quality Engineer
Northern Sonoma County Air Pollution Control District
150 Matheson Street
Healdsburg, CA 95448

Subject: Permits: Application for Unit 20 Title V Operating Permit Renewal

Dear Mr. Saschin:

Enclosed is Calpine’s application to renew the Title V Operating Permit for The Geysers Power Company LLC Unit 20 (Grant) Power Plant. Attached is Calpine Corporation’s payment in the amount of $1000.00 (check No.1000120045) for the application filing fee.

Please call me at (707) 431-6858 if you have any questions or need more information for this application.

Sincerely,

Sharon Peterson
EHS Air Compliance Manager, Geysers Region

Enclosure
UNIT 20
GEYSERS POWER PLANT

TITLE V PERMIT RENEWAL
APPLICATION

Submitted to the

Northern Sonoma County Air Pollution Control District

FEBRUARY 2021
Preamble with Introduction to Geysers Unit 20 Geothermal Power Plant
Geysers Project Power Plant Map

1 Application Forms XXX-
   - A1 & A2 Stationary Source Summary
   - B Total Stationary Source Emissions
   - F1a & F2a General Emission Unit: Cooling Tower
   - F1b & F2b General Emission Unit: Fugitive Emissions
   - F1c & F2c General Emission Unit: Stretford Cooler
   - G1 & G2 Emission Control Unit: H2S Abatement Systems
   - H Exempt Equipment
   - I1 & I2 Compliance Plan
   - J1 & J2 Compliance Plan Certification
   - M Certification Statement

2 Attachments to Forms:
   - Operating Scenario Descriptions, and Equipment Descriptions

3 Emission Inventory
   - Unit 20 Source Test Report, Modified Method 102, dated 12/09/2020
   - Emissions Inventory

4 Facility Schematics, Figures and Supporting Information
   - Key to Flow Diagram
   - Unit 20 Process Flow Diagram
   - Unit 20 Plot Plan

5 Supporting information for Forms XXX-I1 and XXX-J2
   - Applicable Requirements and Compliance Summary
   - Compliance Certification Report January 1, 2020 through December 31, 2020

6 Sample Emission Calculations and Methods

7 Mark up of Title V Operating Permit, effective date August 8, 2016 showing requested changes

8 Appendix
   - SIP Approved Rules: NSCAPCD Regulations 1 and 5
PREAMBLE
The Unit 20 Title V Operating Permit requires that Geysers Power Company LLC reapply for a Federal operating air permit for its Geysers Power Plant Unit 20 six months prior to its expiration on August 8, 2021. The Northern Sonoma County Air Pollution Control Districts' (NSCAPCD) Title V program requires the facility to submit a complete application, including a revised stationary source form, and an update of the initial application and forms where any information may need revision.

Several administrative changes and minor modifications have occurred at this facility since the original application was filed by Pacific Gas and Electric Company (PG&E) on May 29, 1996. The NSCAPCD issued a Title V Operating Permit to PG&E on March 24, 1999. Less than six months later, Calpine Corporation purchased this facility from PG&E. Responsibility for operation and compliance of the facility under the Title V Operating Permit was transferred to the Geysers Power Company LLC on June 15, 1999. Geysers Power Company LLC submitted the most recent renewal application for the Title V Operating Permit in July of 2010. The NSCAPCD issued the current Title V Operating Permit on December 19, 2010. Geysers Power Company LLC submitted a renewal application for the Title V Operating Permit in August of 2015. The NSCAPCD issued a Title V Operating Permit renewal to Geysers Power Company LLC on August 8, 2016.

The required compliance reports and certifications of compliance with all federally enforceable requirements\(^1\) have been submitted in accordance with the operating permit held by Geysers Power Company LLC.

In December of 2015, Geysers Power Company LLC submitted an application for an Authority to Construct Permit to replace the cooling tower destroyed by the Valley Fire. In the permit application, Geysers Power Company LLC voluntarily requested, and was granted by NSCAPCD, synthetic minor limits limiting H2S annual emission to 20.6 tons per year (tpy), PM-10 to 17.0 tpy, and PM-2.5 to 12.0 tons per year. The project evaluation provided in the application incorrectly used the actual-to-potential test for construction of new emission units in accordance with 40 Code of Federal Regulations (CFR) 52.21. The cooling tower replacement is an existing unit as defined in 40 CFR 52.21, and for this reason the applicable project evaluation test is the actual-to-projected applicability test for existing emissions units. The results of the actual-to-projected applicability test does not exceed the significant emission increase thresholds for H2S, PM-10, and PM-2.5. Geysers Power Company LLC requests removal of the H2S, PM-10, and PM-2.5 annual emission limitations, associated recordkeeping, and reporting requirements.

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\(^1\) Federally enforceable requirements include any limitations or conditions on operation, production or emissions that can be enforced by the EPA such as New Source Performance Standards (NSPS) and or any provision within an EPA-approved State Implementation Plan (SIP).
In November of 2017, Geysers Power Company LLC submitted an Authority to Construct and Temporary Permit to Operate application for an emergency standby wet-down pump diesel drive engine at the Unit 20 (Grant) Power Plant. The NSCAPCD issued an Authority to Construct/Temporary Permit to Operate #17-10 for the engine on December 8, 2017. The emergency standby wet-down diesel drive engine was commissioned and placed into service on August 17, 2020. No other modifications have occurred at the facility that change the nature of emissions since the last filing of the application for a Title V Operating Permit in August 2015.

Introduction to Geothermal Power and Unit 20

The Geysers is the largest geothermal powered electricity-producing site in the world. Geysers Power Company LLC, operates 19 geothermal powered generating units located at the Geysers in northern Sonoma and Lake Counties.

Geothermal steam is a naturally occurring resource that has been used to generate power at the Geysers Power Plant for over 50 years. Geysers steam contains many constituents that are transported, with the steam, through the power generating process. Steam is gathered from wells, transported to each generating unit through pipelines operated by the steam supplier, and expanded through steam turbines connected to large generators that produce electric power. The steam then passes through a condenser and is condensed into water. This water is used in the cooling tower as circulating water and is also injected back into the ground to replenish the steam field.

A small amount of gas transported with the steam does not condense and is called “non-condensable gas”. Constituents of the non-condensable gas stream include hydrogen sulfide (H₂S), which is regulated by NSCAPCD rules. Innovative methods have been developed to reduce H₂S emissions and comply with NSCAPCD requirements. The overall effectiveness of these control methods has reduced the amount of hydrogen sulfide being released to the air by more than 95 percent since the initial use of this naturally occurring steam supply.

Unit 20 reduces H₂S emissions using the following systems: The primary non-condensable gas H₂S abatement system is the Stretford non-condensable gas abatement system. When operating conditions necessitate, a circulating water abatement system injects an abatement solution of metal chelate or other effective substitute into the circulating water to reduce H₂S dissolved to various low volatility sulfur compounds. Together these systems represent the emissions control for the units.
I. FACILITY IDENTIFICATION

1. Facility Name: **Geyser Unit 20 (Grant)**
2. Four digit SIC Code: 4911
3. Parent Company (if different than Facility Name): **Calpine Corporation**
4. Mailing Address: **10350 Socrates Mine Road, Middletown CA, 95461**
5. Street Address or Source Location: **5000 John Kingcade Road 27 miles NE of Healdsburg, CA 95448**
6. UTM Coordinates (if required): **Not Applicable**
7. Source located within: 50 miles of the state line [ ] Yes [X] No
   50 miles of a Native American Nation [ ] Yes [ ] No [X] Not Applicable
8. Type of Organization: [X] Corporation [ ] Sole Ownership [ ] Government [ ] Partnership [ ] Utility Company
9. Legal Owner's Name: **Geyser Power Company LLC**
10. Owner's Agent Name (if any): **Not Applicable**
11. Responsible Official: **Robert Parker**
12. Plant Site Manager/Contact: **Mike Puccioni** Telephone: (707) 431-6781
13. Type of facility: **Electric Generating Facility**
14. General description of processes/products: Electric generating facility powered by geothermal steam and equipped with emission controls for naturally occurring H2S.
15. Does your facility store, or otherwise handle, greater than threshold quantities of any substance on the Section 112(r) List of Substances and their Thresholds (see attachment A)? [ ] Yes [X] No
16. Is a Federal Risk Management Plan pursuant to Section 112(r) required? [ ] Not Applicable [ ] Yes [X] No
   (If yes, attach verification that Risk Management Plan is registered with appropriate agency or description of status of Risk Management Plan submittal.)
### II. TYPE OF PERMIT ACTION

<table>
<thead>
<tr>
<th></th>
<th>CURRENT PERMIT (permit number)</th>
<th>EXPIRATION (date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>Initial Title V Application</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Permit Renewal</td>
<td>August 8, 2021</td>
</tr>
<tr>
<td>□</td>
<td>Significant Permit Modification</td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>Minor Permit Modification</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Administrative Amendment</td>
<td></td>
</tr>
</tbody>
</table>

### III. DESCRIPTION OF PERMIT ACTION

1. Does the permit action requested involve:  
   a: [ ] Portable Source [ ] Voluntary Emissions Caps  
   [ ] Acid Rain Source [ ] Alternative Operating Scenarios  
   [ ] Source Subject to MACT Requirements [Section 112]  
   
   b: [ X ] None of the options in 1a are applicable

2. Is source operating under Compliance Schedule?  
   [ ] Yes [X] No

3. For permit modifications, provide a general description of the proposed permit modification:
   - Requesting removal of synthetic minor permit limitations for H2S, PM-10, and PM-2.5.
   - Modifications are administrative in nature and are shown on the marked up copy of the existing Title V Operating Permit in TAB 7.
## TOTAL STATIONARY SOURCE EMISSIONS

**FORM XXX-B**

**DISTRICT:**
Northern Sonoma County Air Pollution Control District

**COMPANY NAME:**
Geysers Power Company LLC

**FACILITY NAME:**
Geysers Power Plant Unit 20 (Grant)

### I. TOTAL STATIONARY SOURCE EMISSIONS: Geysers Power Plant Unit 20

Provide a brief description of operating scenario: **See Attachment to Form XXX-B.**

<table>
<thead>
<tr>
<th>POLLUTANT* (name)</th>
<th>EMISSIONS (tons per year)</th>
<th>PRE-MODIFICATION EMISSIONS (tons per year)</th>
<th>EMISSIONS CHANGE (tons per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Sulfide (H₂S)¹</td>
<td>12.0</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Ammonia (NH₃)¹</td>
<td>53</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Particulate Matter (PM)</td>
<td>6.7</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Methane (CH₄)¹</td>
<td>32.9</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Hydrogen (H₂)¹</td>
<td>12.3</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Benzene (C₆H₆) ROG ²</td>
<td>0.11</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Toluene (C₆H₅CH₃) ROG ²</td>
<td>0.05</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Carbon Dioxide (CO₂)</td>
<td>1139</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Note: Only emissions over 0.01 tons per year are noted in this Table. Data year: 2019.

¹ These pollutants appear only on 112(r) list.
² These are Reactive Organic Gases (ROGs) that are present naturally in the non-condensable gas stream.
³ These hazardous air pollutants are included in the inventory as historical pollutants of concern or as pollutants that may be present in certain abatement solutions.

* Emissions for all pollutants that the source is major for and all regulated air pollutants must be reported.
GENERAL EMISSION UNIT  
(FORM XXX-F1a)

<table>
<thead>
<tr>
<th>DISTRICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Sonoma County Air Pollution Control District</td>
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</table>

<table>
<thead>
<tr>
<th>COMPANY NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geysers Power Company LLC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FACILITY NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

I. PERMIT NUMBER: PSD SFB 81-03 and NSCAPCD Permit to Operate No. 82-45A

II. EQUIPMENT DESCRIPTION: Unit 20 Cooling Tower

1. General process description: The cooling tower is designed to cool steam condensate for use as makeup cooling water.

2. Equipment type: See Attachment to Form XXX-F1a

3. Equipment description: See Attachment to Form XXX-F1a

4. Equipment make, model & serial number: See Attachment to Form XXX-F1a

5. Maximum design process rate or throughput: See Attachment to Form XXX-F1a

6. Control device(s) type and description (if any): See Attachments to Forms XXX-G1 and XXX-G2

III. OPERATIONAL INFORMATION

1. Operating schedule: Continuous 24 (hours/day) 8760 (hours/year)

2. Exhaust gas flow rate: N/ASCFM @N/A %H₂O

3. Raw products used and finished products produced: Geothermal steam is used to produce electricity.

<table>
<thead>
<tr>
<th>RAW PRODUCT USED (name)</th>
<th>CONSUMPTION (lbs/hr, gal/hr, etc.)</th>
<th>PRODUCTS PRODUCED (name)</th>
<th>PRODUCTION (lbs/hr, gal/hr, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
## GENERAL EMISSION UNIT
**FORM XXX-F2a**

**DISTRICT:**
Northern Sonoma County Air Pollution Control District

**COMPANY NAME:**
Geysers Power Company LLC

**FACILITY NAME:**
Geysers Power Plant Unit 20 (Grant)

### IV. UNIT EMISSIONS: Unit 20 Main Cooling Tower

#### CRITERIA POLLUTANT EMISSIONS (tons per year)

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th>Particulate Matter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>B. Pre-modification Emissions&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>C. Emission Change&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>D. Emission Limit&lt;sup&gt;c&lt;/sup&gt;</td>
<td>175.2 TPY**</td>
<td></td>
</tr>
</tbody>
</table>

#### OTHER REGULATED AIR POLLUTANT EMISSIONS (tons per year)

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th>Hydrogen Sulfide</th>
<th>Ammonia</th>
<th>Carbon Dioxide</th>
<th>Other Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td>1.0*</td>
<td>53*</td>
<td>1,139</td>
<td>See &quot;Regulated Air Pollutant Inventory&quot; in (Tab 3)</td>
</tr>
<tr>
<td>B. Pre-modification Emissions&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>C. Emission Change&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>D. Emission Limit&lt;sup&gt;c&lt;/sup&gt;</td>
<td>45.6 TPY***</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

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<sup>a</sup> For permit modifications only; emissions prior to project modification.

<sup>b</sup> Difference between Pre-Modification Emissions (Section B.) and Emissions (Section A.).

<sup>c</sup> For voluntary emissions cap and emission limits [i.e. expressed as parts per million (ppm) corrected for dilution air, pounds per hour (lbs/hr), pounds per million BTU (lb/MMBTU, etc.)] required by any applicable federal requirement.

* Estimated emissions based on mass balance calculation.

** Local Rule 420d Facility (combined cooling towers) PM limit is 40 lb/hr times the 8760 hr/Yr to equal 175.2 TPY.

*** H<sub>2</sub>S limit, 10.4 lb/hr per PSD SFB 81-03, is federally enforceable.

(10.4 lb/hr)(24 hr/day)(365 days/yr)(ton/2000 lb) = 45.6 TPY
**GENERAL EMISSION UNIT (FORM XXX-F1b)**

<table>
<thead>
<tr>
<th>DISTRICT:</th>
<th>DISTRICT USE ONLY</th>
<th>COMPANY NAME:</th>
<th>FACILITY NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Sonoma County Air Pollution Control District</td>
<td></td>
<td>Geysers Power Company LLC</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

I. PERMIT NUMBERS: NSCAPCD Permits to Operate No. 82-45A and 82-45B

II. EQUIPMENT DESCRIPTION: Fugitive Emissions - Unit 20
   1. General process description: Unit 20 geothermal powered equipment and Stretford auxiliary non-condensable gas abatement system occasionally leak condensate and/or non-condensable gases from pipes, flanges, seals, expansion joints, etc. See Attachment to Form XXX-F1b.
   2. Equipment type: See Attachment to Form XXX-F1d
   3. Equipment description: See Attachment to Form XXX-F1d
   4. Equipment make, model & serial number: N/A
   5. Maximum design process rate or throughput: N/A
   6. Control device(s) type and description (if any): N/A

III. OPERATIONAL INFORMATION
   1. Operating schedule: Equipment leaks occur randomly and intermittently. N/A (hours/day) N/A (hours/year)
   2. Exhaust gas flow rate: N/A SCFM @ N/A %H₂O
   3. Raw products used and finished products produced: Not Applicable

<table>
<thead>
<tr>
<th>RAW PRODUCT USED (name)</th>
<th>CONSUMPTION (lbs/hr, gal/hr, etc.)</th>
<th>PRODUCTS PRODUCED (name)</th>
<th>PRODUCTION (lbs/hr, gal/hr, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
### GENERAL EMISSION UNIT
**FORM XXX-F2b**

<table>
<thead>
<tr>
<th>DISTRICT:</th>
<th>Northern Sonoma County Air Pollution Control District</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPANY NAME:</td>
<td>Geysers Power Company LLC</td>
</tr>
<tr>
<td>FACILITY NAME:</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

#### IV. UNIT EMISSIONS: Fugitive Emissions - Unit 20

**CRITERIA POLLUTANT EMISSIONS (tons per year)**

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>B. Pre-modification Emissions&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>C. Emission Change&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>D. Emission Limit&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**OTHER REGULATED AIR POLLUTANT EMISSIONS (tons per year)**

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th>Ammonia</th>
<th>Hydrogen Sulfide</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td>0.0031</td>
<td>0.018</td>
</tr>
<tr>
<td>B. Pre-modification Emissions&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>C. Emission Change&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>D. Emission Limit&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

---

<sup>a</sup> For permit modifications only; emissions prior to project modification.

<sup>b</sup> Difference between Pre-Modification Emissions (Section B.) and Emissions (Section A.).

<sup>c</sup> For voluntary emissions cap and emission limits [i.e. expressed as parts per million (ppm) corrected for dilution air, pounds per hour (lbs/hr), pounds per million BTU (lb/MMBTU, etc.)] required by any applicable federal requirement.
GENERAL EMISSION UNIT  
(FORM XXX-F1c)

DISTRICT:  
Northern Sonoma County Air Pollution Control District

COMPANY NAME:  
Geysers Power Company LLC

FACILITY NAME:  
Geysers Power Plant Unit 20 (Grant)

I. PERMIT NUMBER: NSCAPCD Permit to Operate No. 82-45A

II. EQUIPMENT DESCRIPTION: Unit 20 Stretford Cooler

1. General process description: Stretford solution cooling tower is designed to cool stretford solution.
2. Equipment type: Evaporative Cooling tower
3. Equipment description: Stretford cooler circulating pump and back-up, Stretford solution cooling fan
4. Equipment make, model & serial number: Bingham-Willamette Co.
5. Maximum design process rate or throughput: 1100 gpm.
6. Control device(s) type and description (if any): 0.005% drift eliminators.

III. OPERATIONAL INFORMATION

1. Operating schedule: 12 (hours/day) during summer months, occasionally during winter months 0.3 x 8760 = ~2628 (hours/year)
2. Exhaust gas flow rate: Low: 25,000 DSCFM, High 50,000 DSCFM
3. Raw products used and finished products produced: Stretford Solution is used to abate H2S gases that are present in the geothermal steam used to produce electricity.

<table>
<thead>
<tr>
<th>RAW PRODUCT USED (name)</th>
<th>CONSUMPTION (lbs/hr, gal/hr, etc.)</th>
<th>PRODUCTS PRODUCED (name)</th>
<th>PRODUCTION (lbs/hr, gal/hr, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium ammonium vanadate (SAV),</td>
<td>1,000 kg/yr</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>ADA,</td>
<td>1,500 gal/yr</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>NaOH</td>
<td>364,920 lb/yr</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
### GENERAL EMISSION UNIT  
**FORM XXX-F2c**

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</table>

<table>
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<tr>
<th>COMPANY NAME:</th>
<th>FACILITY NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geysers Power Company LLC</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

### IV. UNIT EMISSIONS: Unit 20 Stretford Cooler

#### CRITERIA POLLUTANT EMISSIONS (tons per year)

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th>Particulate Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td>4.9 TPY</td>
</tr>
<tr>
<td>B. Pre-modification Emissions*</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>C. Emission Changeb</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>D. Emission Limitc</td>
<td>175.2 TPY**</td>
</tr>
</tbody>
</table>

#### OTHER REGULATED AIR POLLUTANT EMISSIONS (tons per year)

<table>
<thead>
<tr>
<th>POLLUTANTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Emissions</td>
<td></td>
</tr>
<tr>
<td>B. Pre-modification Emissionsa</td>
<td></td>
</tr>
<tr>
<td>C. Emission Changeb</td>
<td></td>
</tr>
<tr>
<td>D. Emission Limitc</td>
<td></td>
</tr>
</tbody>
</table>

*a* For permit modifications only; emissions prior to project modification.

*b* Difference between Pre-Modification Emissions (Section B.) and Emissions (Section A.).

*c* For voluntary emissions cap and emission limits [i.e. expressed as parts per million (ppm) corrected for dilution air, pounds per hour (lbs/hr), pounds per million BTU (lb/MMBTU, etc.) required by any applicable federal requirement.

* Estimated emissions based on mass balance calculation.

** Local Rule 420d Facility (combined cooling towers) PM limit is 40 lb/hr times the 8760 hr/Yr to equal 175.2 TPY.
EMISSION CONTROL UNIT  
(FORM XXX-G1a)

DISTRICT:  
Northern Sonoma County Air Pollution Control District  

COMPANY NAME:  
Geysers Power Company LLC  

FACILITY NAME:  
Geysers Power Plant Unit 20 (Grant)

I. PERMIT NUMBER: NSCAPCD Permit to Operate No. 82-45B

II. EQUIPMENT DESCRIPTION: Unit 20 H₂S Abatement System

1. General process description: See Attachment to Form XXX-G1
2. Equipment type: See Attachment to Form XXX-G1
3. Equipment description: See Attachment to Form XXX-G1
4. Equipment make, model & serial number: See Attachment to Form XXX-G1
5. Emission unit(s) served by this equipment: Unit 20 Cooling Tower
6. Maximum design or rated capacity: Stretford designed for 600 lbs/hr H₂S mass flow

III. EQUIPMENT DESIGN INFORMATION

1. Exhaust gas: Temperature: 90°-120° (F) {Based upon gas header temp}  Flow Rate: Variable (SCFM)
   Moisture: N/A (%)  
   CO₂: N/A (%)  
2. General: Manufacturer: Ralph M. Parsons Company  Pressure Drop: N/A (in-Hg)
   Inlet Temp.: 100°-150° (F)  Outlet Temp.: 90°-120° (F)  
3. Catalyst data: Catalyst Type/Material: N/A  Catalyst Life: N/A (years)  Volume: N/A (Ft3)
   Space Velocity: N/A (Ft³/Ft)  NH₃ inj. Rate: N/A (gal/hr)  
   NH₃ Inj. Temp.: N/A (F)  
4. Baghouse data: Design: [N/A]  Positive Pressure [N/A]  Negative Pressure
   Cleaning Method: N/A  Fabric Material: N/A
   Flow Rate: N/A (SCFM)  Air/Cloth Ratio: N/A  
5. ESP data: Number of fields: N/A  Cleaning Method: N/A
   Power Input: N/A  
6. Scrubber data: Type/design: Absorber column w/ random packed plastic rings.  Sorbent Type:
EMISSION CONTROL UNIT  
(FORM XXX-G2a)

<table>
<thead>
<tr>
<th>DISTRICT:</th>
<th>DISTRICT ID:</th>
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<tbody>
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<td>Northern Sonoma County Air Pollution Control District</td>
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</thead>
<tbody>
<tr>
<td>Geysers Power Company LLC</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

### IV. OPERATIONAL INFORMATION: Unit 20 H₂S Abatement System

1. Operating schedule: **Continuous** 24 (hours/day) 8760 (hours/year)
2. Raw products used by control device: Sodium ammonium vanadate (SAV), ADA, and NaOH
3. Operating information: See Attachment to Form XXX-G1a

### POLLUTANTS AND EMISSION CONTROL INFORMATION

<table>
<thead>
<tr>
<th>POLLUTANT (name)</th>
<th>INLET CONCENTRATION (ppm or gr/DSCF^a)</th>
<th>OUTLET CONCENTRATION (ppm or gr/DSCF^a or tons per year)</th>
<th>CONTROL EFFICIENCY (% weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Sulfide (H₂S)</td>
<td>20,000-50,000 ppm (venturis)</td>
<td>0-10 ppm (absorber)</td>
<td>99.9-100.0%</td>
</tr>
</tbody>
</table>
# EXEMPT EQUIPMENT

## FORM XXX-H

<table>
<thead>
<tr>
<th>DISTRICT:</th>
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<th>DISTRICT USE ONLY</th>
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<tbody>
<tr>
<td>COMPANY NAME:</td>
<td>Geysers Power Company LLC</td>
<td>DISTRICT ID:</td>
</tr>
<tr>
<td>FACILITY NAME:</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
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</table>

## 1. EQUIPMENT EXEMPT FROM DISTRICT PERMIT REQUIREMENTS

<table>
<thead>
<tr>
<th>EXEMPT EQUIPMENT</th>
<th>EQUIPMENT DESCRIPTION</th>
<th>BASIS FOR EXEMPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts Washing Station</td>
<td>See Attachment to Form XXX-H</td>
<td>NSCAPCD Rule 200(d)(8)</td>
</tr>
<tr>
<td>Painting Maintenance Outdoor Activities</td>
<td>See Attachment to Form XXX-H</td>
<td>NSCAPCD Rule 200(d)(8)</td>
</tr>
<tr>
<td>Wet-down Engine Diesel Storage Tank</td>
<td>250 Gallon Diesel Storage Tank</td>
<td>NSCAPCD Rule 200(d)(8)</td>
</tr>
<tr>
<td></td>
<td>See Attachment to Form XXX-H</td>
<td></td>
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</table>
# COMPLIANCE PLAN
## (FORM XXX-I1)

<table>
<thead>
<tr>
<th>DISTRICT:</th>
<th>COMPANY NAME:</th>
</tr>
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<tbody>
<tr>
<td>Northern Sonoma County Air Pollution Control District</td>
<td>Geysers Power Company LLC</td>
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<table>
<thead>
<tr>
<th>FACILITY NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geysers Power Plant Unit 20 (Grant)</td>
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</tbody>
</table>

## I. PROCEDURE FOR USING FORM XXX-I

This form shall be submitted as part of the Title V Application. The Responsible Official shall identify the applicable federal requirement(s) to which the source is subject. In the Compliance Plan (FORM XXX-I), a Responsible Official shall identify whether the source identified in the Title V Application currently operates in compliance with all applicable federal requirements.

## II. APPLICABLE FEDERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>APPLICABLE FEDERAL REQUIREMENT</th>
<th>EMISSION UNIT or PERMIT NUMBER</th>
<th>IN COMPLIANCE (yes/no/exempt(^1))</th>
<th>EFFECTIVE DATE(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>See attached Renewal Application: Applicable Requirements &amp; Compliance Summary (Tab 5)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) If exempt from applicable federal requirement, attach explanation for exemption.

\(^2\) Indicate the date during the permit term that the applicable federal requirement will become effective.
COMPLIANCE PLAN
(FORM XXX-12)

DISTRICT: Northern Sonoma County Air Pollution Control District

COMPANY NAME: Geysers Power Company LLC

FACILITY NAME: Geysers Power Plant Unit 20 (Grant)

III. COMPLIANCE CERTIFICATION

Under penalty of perjury, I certify the following:

☐ Based on information and belief formed after reasonable inquiry, the source identified in this application will continue to comply with the applicable federal requirement(s) with which the source is in compliance identified in form XXX-11;

☐ Based on information and belief formed after reasonable inquiry, the source identified in this application will comply with the future-effective applicable federal requirement(s) identified in form XXX-11, on a timely basis;

☐ Based on information and belief formed after reasonable inquiry, the source identified in this application is not in compliance with the applicable federal requirement(s), identified in form XXX-11, and I have attached a compliance plan schedule.

Signature of Responsible Official: ___________________________ Date: 2/3/21

1. Unless a more detailed schedule is expressively required by the applicable federal requirement.

2. At the time of expected permit issuance, if the source expects to be out of compliance with an applicable federal requirement, the applicant is required to provide a compliance schedule with this application, with the following exception. A source which is operating under a variance that is effective for less than 90 days need not submit a Compliance Schedule. For sources operating under a variance, which is in effect for more than 90 days, the Compliance Schedule is the schedule that was approved as part of the variance granted by the hearing board.

The compliance schedule shall contain a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with this applicable federal requirement. For sources operating under a variance, the compliance schedule is part of the variance granted by the hearing board. The compliance schedule shall resemble, and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject. For sources not operating under a variance, consult the Air Pollution Control Officer regarding procedures for obtaining a compliance schedule.
I. CERTIFICATION STATUS

1. Indicate the dates the applicant intends to submit the COMPLIANCE CERTIFICATION REPORT to the district during the entire permit term. The district federal operating permits rule requires the applicant to submit this report at least annually.

   Pursuant to NSCAPCD Regulation 5.650.a, the responsible official will submit an annual Compliance Certification Report to EPA and the District prior to April 1 of each year.

2. For sources required to have a schedule of compliance to remedy a violation, indicate the dates the applicant intends to submit CERTIFIED PROGRESS REPORTS to the district during the permit term. The district federal operating permits rule requires the applicant to submit this report at least semiannually.

   Certified progress reports will be submitted to coincide with scheduled quarterly report submittals as needed to meet the semiannual requirement to specify progress towards reaching compliance on all items determined to be out of compliance with Federally enforceable regulations.

3. Describe the compliance status of the source with respect to applicable enhanced monitoring, and compliance certification requirements of Section 114(a)(3) of the Clean Air Act:

   Not applicable
## COMPLIANCE PLAN CERTIFICATION
\(\text{FORM XXX-J2}\)

<table>
<thead>
<tr>
<th>DISTRICT:</th>
<th>Northern Sonoma County Air Pollution Control District</th>
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</thead>
<tbody>
<tr>
<td>COMPANY NAME:</td>
<td>Geysers Power Company LLC</td>
</tr>
<tr>
<td>FACILITY NAME:</td>
<td>Geysers Power Plant Unit 20 (Grant)</td>
</tr>
</tbody>
</table>

### II. CERTIFICATION INFORMATION

<table>
<thead>
<tr>
<th>EMISSION UNIT or PERMIT NUMBER:</th>
<th>APPLICABLE FEDERAL REQUIREMENT:</th>
</tr>
</thead>
</table>

**METHOD** | **DESCRIPTION OR REFERENCE METHOD**
---|---
Monitoring | See attached Renewal Application: Interim Compliance Certification Report for Federally Applicable Requirements (Tab 5)
| See attached Renewal Application: Applicable Requirements & Compliance Summary (Tab 5)
| See attached Title V Operating Permit (Tab 7)
Reporting | See attached Renewal Application: Interim Compliance Certification Report for Federally Applicable Requirements (Tab 5)
| See attached Renewal Application: Applicable Requirements & Compliance Summary (Tab 5)
| See attached Title V Operating Permit (Tab 7)
Record Keeping | See attached Renewal Application: Interim Compliance Certification Report for Federally Applicable Requirements (Tab 5)
| See attached Renewal Application: Applicable Requirements & Compliance Summary (Tab 5)
| See attached Title V Operating Permit (Tab 7)
Test Methods | See attached Title V Operating Permit (Tab 7)
CERTIFICATION STATEMENT
(FORM XXX-M)

| DISTRICT: Northern Sonoma County Air Pollution Control District | DISTRICT ID: |
| COMPANY NAME: Geysers Power Company LLC | FACILITY NAME: Geysers Power Plant Unit 20 (Grant) |

Identify, by checking off below, the forms and attachments that are part of your application. If the application contains forms or attachments that are not identified below, please identify these attachments in the blank space provided below. Review the instructions if you are unsure of the forms and attachments that need to be included in a complete application.

### Forms included with Application
- [x] Stationary Source Summary Form
- [x] Total Stationary Source Emission Form
- [x] Compliance Plan Form
- [x] Compliance Plan Certification Form
- [x] Exempt Equipment Form
- [x] Certification Statement Form
- [ ] Mark-up of existing Unit 20 Title V Operating Permit
- [ ] List other forms or attachments

### Attachments included with Application
- [x] Description of Operating Scenarios
- [x] Sample emission calculations
- [ ] Fugitive emission estimates
- [x] List of applicable requirements
- [x] Facility schematic showing emission points
- [ ] Discussion of units out of compliance
- [x] Facility schematic showing emission points
- [ ] Enhanced monitoring protocols
- [ ] Risk management verification per 112(r)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, that the information contained in this application, composed of the forms and attachments identified above, are true, accurate, and complete.

I certify that I am the responsible official, as defined in NSCAPCD's Title V permitting rule.

Signature of Responsible Official: Michael Puccioni  
Date: 2/3/21

Print Name of Responsible Official: Michael Puccioni

Title of Responsible Official and Company Name: General Manager, Geysers Power Company LLC
Stationary Source: Geysers Power Plant Unit 20

I: Steam Cycle

Geysers Power Company LLC Unit 20 Power Plant consists of a 119 megawatt turbine generator set and a cooling water system. Geothermal steam is supplied from wells also operated by Geysers Power Company LLC. The steam is transported from the field by means of pipelines to Unit 20 and provides motive energy to drive the turbine generator set. The steam design flow to the turbine generator sets are 1,905,550 pounds per hour for the two turbine configuration and 1,230,071 pounds per hour for the single turbine with jack shaft configuration. In addition, auxiliary plant equipment can use approximately 22,100 to 33,500 pounds per hour.

The steam exits the turbines and is condensed in the surface condenser by contacting tube bundles which contain cold circulating water pumped from the cooling tower basin. The cold circulating water gains heat in the tube bundles during the condensation process. The hot circulating water leaving the tube bundles travels to the top of the cooling tower. The hot circulating water is cooled by evaporation in the cooling tower and becomes cold circulating water by the time it reaches the cooling tower basin. The cooling tower is the only emission point in the circulating water cycle during normal operation.

The condenser normally functions at pressures below atmospheric to improve the turbine efficiency. A fraction of the steam does not condense and must be removed to maintain the partial vacuum. The non-condensable gases include the H₂S abated by the Stretford process. The abated non-condensable gas stream is scrubbed in the cooling tower rain before it is emitted to the atmosphere at that location. Unit 20 process flow diagram located in Tab 4 of this application illustrates the typical operating power cycle.

II: Chemical Behavior (Partitioning)

Geothermal steam contains naturally occurring non-condensable gases consisting mostly of carbon dioxide (CO₂), hydrogen sulfide (H₂S), ammonia (NH₃), methane (CH₄), hydrogen (H₂), nitrogen (N₂) and trace amounts of other gases, including reactive organic gases. The natural pH of condensed geothermal steam is slightly basic (>7.0) due to the presence of NH₃ in the steam.
Stationary Source: Geysers Power Plant Unit 20

After the steam passes through the turbines and begins to condense, a physical “partitioning” occurs. H₂S partitioning is the tendency for a portion of the H₂S to dissolve in the condensate instead of remaining as a gas. Partitioning is dependent upon the acidity (pH), temperature, pressure, and percent saturation of H₂S in the condensate. Approximately ninety (90) percent of the H₂S remains in the non-condensable gas stream from the main condenser. Since these gases do not condense, they must be removed from the condenser to maintain vacuum.

The remaining ten (10) percent of the H₂S is absorbed by the steam condensate and is pumped from the condenser hotwell to various locations in the circulating water system. A portion is routed back to the geothermal reservoir for direct injection. As the circulating water rains down inside the Unit cooling tower, any remaining unabated H₂S can be stripped from the condensate and is released to the atmosphere through the stacks on top of the cooling tower cells.

III: Emission Point Sources

A. Cooling Tower
During normal operation, Unit 20 non-condensable gases from the after condenser are routed to the Stretford H₂S abatement system. The non-condensable gases are processed by the Stretford system to remove most of the H₂S. The remaining gases flow to the cooling tower stacks where they are scrubbed by cooling tower rain and what remains is released to the atmosphere. The cooling tower stacks function as the main emissions point source for Unit 20. Thus, the stacks have been designated as one of the Unit 20 “emission units”. Operation of the cooling tower is described in an attachment to “General Emission Unit” Forms XXX-F1a and XXX-F2a.

B. Vent to Atmosphere
There is a gas release vent on the treated non-condensable gas header downstream of the absorber column. This vent is called the “vent to atmosphere” and functions only as an emergency gas release vent. It is automatically activated if excessive pressure builds up within the treated non-condensable gas header. The vent to atmosphere will remain closed during normal plant startup, operation, and shutdowns.
Stationary Source: Geysers Power Plant Unit 20

C. Stretford Non-Condensable Gas H₂S Abatement System and Circulating Water H₂S Abatement System

The H₂S abatement system for Unit 20 consisting of the Stretford system and a circulating water abatement system are provided to achieve compliance with H₂S emission limitations. Both systems are described in the following section. The Stretford cooler is a source of PM emissions. The evaporative cooling tower stack is designated as one of the Unit 20 “emission units”. Operation of the stretford cooler is described in an attachment to “General Emission Unit” Forms XXX-F1c and XXX-F2c.

IV: Emission Control Units

A. Stretford Non-Condensable Gas H₂S Abatement System

The Unit 20 Stretford H₂S abatement system uses chemical oxidation to reduce the amount of H₂S in the untreated non-condensable gas stream. The Stretford H₂S abatement system is placed in service before the start-up of the Unit. It remains in service throughout all ranges of Unit operation and is removed from service only after the Unit is shut down. This emission control unit allows the Plant to comply with various regulatory requirements including Northern Sonoma County Air Pollution Control District (NSCAPCD) emission limits.

The Stretford abatement system has been designated as another of the Unit 20 “emission units”. Operation of this Stretford system is discussed in greater detail in the attachments to “Emission Control Unit” Form XXX-G1 and Form XXX-G2. Unit 20 process flow diagram located in Tab 4 of this application illustrates the Stretford system.
Stationary Source: Geysers Power Plant Unit 20

B: Circulating Water H₂S Abatement System

The H₂S that is absorbed in the steam condensate as a result of partitioning mixes with the circulating water in the cooling tower basin. The H₂S is abated by the circulating water H₂S abatement system, which includes:

1. Steam condensate may be pumped to three locations in the circulating water system to better utilize “cooling tower natural abatement.”

2. When operating conditions necessitate, abatement solution is pumped into the circulating water volume. H₂S is abated by a series of chemical reactions that form various low volatility sulfur compounds.

This reaction and the natural abatement of the cooling tower removes most of the H₂S in the circulating water. Use of this system allows the Plant to comply with various regulatory requirements, including NSCAPCD permitted H₂S emission limits.
Emission Unit: Unit 20 Cooling Tower

II: Equipment Description

II-1: General Process Description

The Unit 20 cooling tower is an eleven (11) cell evaporative cooling system designed to cool the power cycle circulating water. Cooled circulating water is pumped by the Unit 20 circulating water pumps from the tower basin to the condenser. Hot circulating water is then routed to the cooling tower distribution trays that are just below the cooling tower fan deck.

There is one tray on each side of the cooling tower that runs the entire length of the tower. The hot circulating water is distributed from the trays to each of the eleven (11) cells, wherein it cascades downward. It flows through nozzles that are fixed to the trays and falls onto the fill material thereby creating rain as the water falls. The cooling tower fans create a horizontal draft of air providing a cross-flow path for the falling water. Evaporation cools the falling water which is collected in the basin as cold circulating water. It is pumped to the condenser tubes to condense steam from the turbine, repeating the cycle.

In normal operation, the condensate supply to the cooling tower exceeds the evaporation rate. Excess water overflows through a level control structure and is sent to the steam supplier who re-injects it back into the steam producing strata.

A. Drift Control

“Drift” is the amount of dissolved plus suspended solids contained in the cooling water emitted to the immediate surrounding area by the tower while it is in operation. The total solids in the “drift” from the tower stacks are measured as particulate matter (PM).

Each cooling tower cell is partitioned by slotted barriers. A walkway extends the length of the tower and passes through the middle of each cell. On both sides of the walkway in each cell is a barrier made of myriad close fitting “V” shaped devices called drift eliminators. When configured in such a manner these drift eliminators minimize the drift of cooling water that can be released from the tower while the water cascades downward counter to the air flow created by the fans.
Emission Unit: Unit 20 Cooling Tower

The Unit 20 cooling tower design drift rate is 0.002% of the total circulating water flow. The drift rate is that portion of the total circulating water flow rate that can be released from an operating cooling tower. The maximum drift rate is that rate guaranteed by the manufacturer not to be exceeded because of the design of the drift eliminators.

B. Treated Non-Condensable Gas
Treated non-condensable gas is piped from the Unit 20 H₂S Stretford system by means of a header to the top of the cooling tower at the hot circulating water deck level and released within each cooling tower cell. As the treated non-condensable gas enters into the cooling tower, it comes in contact with the cascading water inside the tower and is partially absorbed. The remaining treated non-condensable gas, which consist primarily of carbon dioxide (CO₂) and trace amounts of H₂S and other gases, including reactive organic gases (ROGs), is released to the atmosphere through the cooling tower stacks.

II-2: Equipment Type
The principal equipment for the Unit 20 cooling tower consists of the tower structure itself, including eleven (11) fans with motors, four (4) circulating water pumps with motors, and two (2) condensate pumps with motors.

II-3: Unit 20 Cooling Tower Equipment Description
The cooling tower for Unit 20 is a single structure that is a cross-flow mechanical draft type tower which is comprised of eleven (11) cells. The Unit 20 tower, by itself, is a structure that is approximately 79 feet wide by 353 feet long by 64 feet high. The basin inside dimensions are 56 feet wide by 354 feet long. The structure consists of eleven cells, each 32 feet long, and each cell has a fan, with a blade span of 28 feet, driven by a 200 horsepower electric motor. The fans are located on top of the tower (the fan deck) and are mounted inside fiberglass reinforced polyester, tapered cylinders known as fan stacks. Each cell has one stack.
Emission Unit: Unit 20 Cooling Tower

There are four (4) circulating water pumps that supply the condenser with cool circulating water from the cooling tower basin. Hot circulating water then travels from the condenser to the cooling tower hot water deck. These pumps are located at the base of the cooling tower. Each pump is designed to deliver 42,000 gallons per minute (gpm). With all pumps operating, they supply the designed 168,000 gpm flow to the cooling tower. The power plant typically operates using three (3) of the circulating water pumps providing an actual flow rate to the cooling tower on the order of 105,000 gpm.

There are also two (2) condensate pumps that remove the condensate from the condenser hotwell and transport it to the circulating water system. Each pump is designed to deliver 4,700 gallons per minute.

II-4: Equipment Make, Model, and Serial Number
Unit 20 cooling tower is a Marley, model number 674-5-11.

II-5: Maximum Design Process Rates
The following are the manufacturer’s maximum design criteria for the major components of the Unit 20 cooling tower.

- design mass water flow through the tower: 84,000,000 lb/hr
- design mass air flow through the tower: 67,200,000 lb/hr
- actual mass air flow through the tower: 64,350,000 lb/hr
- design drift rate (maximum): 0.002%
- design water inlet temperature: 105 °F
- design water outlet temperature: 80 °F
- design temperature differential: 25 °F

For purposes of this permit application, H₂S emissions from the Unit 20 cooling tower are considered to be only those H₂S emissions that result from air stripping of the circulating water.
Emission Unit: Unit 20 Cooling Tower

Since the Unit 20 cooling tower has been identified as a “general emission unit”, all such emissions from this source are inventoried on “General Emission Unit” Form XXX-F2a. The H₂S emissions from the Unit 20 cooling tower that are attributable to the Unit 20 H₂S Stretford system are listed on “Emission Control Unit” Form XXX-G2.
Control Unit: Unit 20 Fugitive Emissions

II: Equipment Description

II-1: General Process Description / 11-2 / 11-3

A. Fugitive Emissions Defined

The Unit 20 fugitive emissions are included with this permit application in the same manner as are stack emissions since it is required by 40 Code of Federal Regulations Part 70.3(d). These fugitive emissions are those emissions which cannot reasonably pass through the cooling tower stacks or any other functionally equivalent opening.

B. Fugitive Emissions Protocol

Nearly all of the emission of regulated air pollutants are released through the cooling tower stacks. The sources that release emissions through the tower stacks are the Stretford-auxiliary abatement system as well as the tower itself. The Stretford cooler and oxidizer tanks also release ammonia (NH₃) and, together, are considered as sources. The remainder of the emissions are attributed to fugitive emissions from various sources within the facility. The modeling protocol was approved by the District (NSCAPCD letter to PG&E, 14 December 1989).

C. Fugitive Emissions Assessment

These emissions have been assessed from actual test data, from a designated model unit similar in design to Unit 20, and from engineering calculations. Results of the estimates of fugitive emissions from steam traps, pipes, flanges, valves, and ducting systems were summed into a mass flow to determine a total fugitive emission rate. Emission rates were determined by using the Unit’s steam analysis and estimations were based upon engineering calculations. The description of the modeling process is included in the “Fugitive Emissions Estimate Protocol”.

Control Unit: Unit 20 Fugitive Emissions

D. Fugitive Emission Sources
There are pipes, valves, flanges, traps, duct systems, and seals and packing on pumps that are part of the Unit 20 operating equipment and of the Stretford system. These items can leak geothermal steam, condensate, and/or non-condensable gases because of corrosion, vibration, seal or gasket material failure or, as designed releases from such equipment as traps. Leaks from these sources can occur at any time and they are controlled as quickly as possible to minimize emissions.

E. Identification of Fugitive Emission Pollutants
Ammonia (NH₃) and hydrogen sulfide (H₂S) are the primary regulated air pollutants that comprise Unit 20 fugitive emissions. They are both present in the steam condensate and the non-condensable gases that are moving throughout Unit equipment during periods of unit operation. There are occasions when these gases can escape when the Unit is out of service (i.e., opening the condenser or the Stretford knockout drum). These two pollutants have specifically been identified as fugitive emissions and their annual mass emission amounts are listed on Form XXX-F2b “General Emission Unit” that is dedicated to fugitive emissions only and also on the Unit 20 Form XXX-B “Total Stationary Source Emissions” inventory.

Benzene, toluene, and xylenes are naturally present in the geothermal steam’s non-condensable gases. They have not been included in the inventory for fugitive emissions since the mass amounts emitted are insignificant. Their total mass emissions from the Unit are included in the Unit 20 Form XXX-B “Total Stationary Source Emissions” inventory.

Petroleum products used at Unit 20 have been determined not to emit any toxic substances including regulated air pollutants. This information has been declared by the various manufacturers’ product Material Safety Data Sheets.
Control Unit: Unit 20 Main H₂S Abatement System

II: Equipment Description

II-1: General Process Description / II-2: Equipment Type

Main H₂S Abatement

The non-condensable gas H₂S abatement system of the Unit 20 H₂S emission control unit is the Stretford non-condensable gas treatment system. The Stretford process removes H₂S from the non-condensable gases transported with the geothermal steam and converts it to molten sulfur. Untreated non-condensable gases from the after condenser of the main condenser are routed to the Stretford system where the H₂S gas is scrubbed into the Stretford solution. Elemental sulfur is produced and is separated from the solution.

The untreated non-condensable gases that enter the Stretford are composed of carbon dioxide (CO₂), hydrogen (H₂), nitrogen (N₂), methane (CH₄), oxygen (O₂), hydrogen sulfide (H₂S), and trace amounts of other non-condensable gases including ammonia (NH₃) and reactive organic gases (ROGs).

The Stretford generally removes more than 99.9 percent of the H₂S from the untreated non-condensable gas stream. Treated non-condensable gas exiting the Stretford consists primarily of CO₂, N₂, CH₄, H₂, NH₃, trace amounts of H₂S, ROGs, and other elements.

Emissions of all the regulated air pollutants are low and are within NSCAPCD permitted limits. They are listed in the Unit 20 “Emissions Inventory”.

The circulating water H₂S abatement system consists of:

1. Methods for routing steam condensate for natural abatement in the cooling tower.

2. A chemical storage tank and feed pumps used to pump abatement solution into the circulating water system to abate H₂S that is absorbed.
Control Unit: Unit 20 Main H$_2$S Abatement System

The two subsystems work together as the emission control unit for Unit 20. Their combined abatement of H$_2$S complies with NSCAPCD air quality permit conditions and regulatory requirements.

II-3: Equipment Description

A. Stretford Non-Condensable Gas H$_2$S Abatement System

The stream of untreated non-condensable gases vented from the Unit 20 after condenser is aspirated by two venturi scrubbers to the top of the Stretford absorber column. Stretford solution supplied by circulation pumps provide the motive force for the venturi scrubbers. Inside the two scrubbers, H$_2$S and Stretford solution interface and most of the H$_2$S is absorbed.

The scrubbers discharge into the lower section of the absorption tower where the gas disengages from the solution and ascends through the tower packing material counter-current to a secondary stream of Stretford solution flowing down through the packing.

The treated non-condensable gas, now containing trace amount of H$_2$S, is routed to the Unit 20 cooling tower through the treated non-condensable gas header. In the cooling tower, it is scrubbed by cooling tower rain before it is discharged through the tower stacks to atmosphere.

The Stretford cooling tower is mounted above the balance tank. A side stream of Stretford solution can be pumped over the cooling tower and cooled by evaporation as air is drawn in by a fan. This is done when necessary to remove the excess heat and water produced by the abatement reaction.

Stretford solution volume is maintained by water formed in the H$_2$S absorption process and on occasions makeup from a condensate line to the balance tank.
Control Unit: Unit 20 Main H$_2$S Abatement System

On occasion, it is necessary to replenish Stretford chemical loss. Chemical addition to the Stretford solution volume is done through a sump equipped with an agitator. The makeup solution is pumped from the sump directly to the balance tank.

Sodium hydroxide (caustic) is added for control of solution alkalinity. An additive pump takes suction from a storage tank and adds caustic to the circulating volume where alkalinity is adjusted.

In the rare event that the Stretford system would shut down, the Unit would immediately be shut down.

B. Circulating Water H$_2$S Abatement System

The circulating water H$_2$S abatement system consists of methods for routing untreated steam condensate for natural abatement of H$_2$S in the cooling tower.

It also consists of a chemical storage tank and feed pump. An abatement solution from the storage tank is injected into the circulating water system. The abatement solution oxidizes a portion of the absorbed H$_2$S into various low volatility sulfur compounds. A portion of the unabated H$_2$S that remains in the circulating water is stripped as it passes through the cooling tower.

Their combined abatement of H$_2$S maintains compliance with NSCAPCD emission limits.

C. Non-Condensible Gas H$_2$S Gas Monitor

Unit 20 Stretford has a treated non-condensable gas monitor that continuously samples the treated non-condensable gas stream from absorber to the cooling tower. The monitor indicates the approximate H$_2$S concentration in the treated non-condensable gas stream at programmed time intervals (updates).
Control Unit: Unit 20 Main H₂S Abatement System

The gas monitor indicates locally on a recording chart as ppm, and in the supervisory control and data acquisition (SCADA) as ppm. The gas monitor does not analyze total emissions from the cooling tower stacks.

II-4: Equipment Make and Model
The Unit 20 Stretford system is based upon a design by the Ralph M. Parsons Company. The Parsons Company supplied all of the components for the Stretford system.

Unit 20 process flow diagram located in Tab 4 of this application illustrates this equipment.

For purposes of this Title V permit application, the H₂S transported from the Unit 20 Stretford to the cooling tower by means of the common non-condensable gas header are attributed to the Unit 20 Stretford. The Unit 20 Stretford non-condensable gas H₂S abatement system has been identified as an “emission control unit”. The emissions inventory is listed on “Emission Control Unit” Form XXX-G2.
Description: Unit 20 and EGOC Equipment Exempt from District Permit Rules

I: District Rule for Exempting Equipment
Northern Sonoma County Air Pollution Control District (NSCAPCD) provides an exemption from obtaining permits from certain sources. The Control Officer can exercise discretion to grant such local exemptions as stated in Rule 200 (d)(8).

II: Exempt Equipment
II-1: Parts Washing Station
Self contained parts washing stations are used intermittently at Unit 20 for the removal of grease, grit, and other residue from parts and equipment. Petroleum naphtha solvent is used as the cleaning medium. The washing station sink basins are normally covered when not in operation. Emissions only occur during actual cleaning activities. The spent solvent is recovered and recycled by a state certified vendor.

It is estimated that 0.076 tons per year (151 pounds) of this solvent are emitted from each washing station. See the attached “Emissions Inventory” for the Unit 20 parts washing stations.

II-2: Painting Maintenance Outdoor Activities
Outdoor painting maintenance consists of painting the various Plant facilities and equipment that cannot be done in a spray paint booth. It is estimated that 400 gallons of water based coatings and 20 gallons of solvent based paint are applied to Unit 20 per year.

Water based coatings yield 0.54 tons per year (832 lb/yr) of VOC’s for Unit 20. Solvent based coatings release an additional 0.02 tons per year (41.6 lb/yr) of VOC emissions.

II-3: Wet-down Engine Diesel Storage Tank
Diesel fuel is used to supply the emergency standby wet-down diesel drive engine. There are no refueling and spillage emissions since the vapor pressure of diesel fuel is 0.25% that of gasoline. Hydrocarbon emissions are less than 0.001 Tons /year.
Plant: Grant - Calpine 20

Date: 12/9/2020  Time: 1030
Compliance Chemist: R. Wiley

Emission Rate: Method 102

- Actual: 0.0 kg/hr (0.00 lb/hr)
- Allowable: 4.7 kg/hr

Abatement System: Stratford

H2S (HAffA/STI): 0.1 ppmv (lab)

Turbine/Generator

- RATING: 113 MW
- Actual (Gross): 38.8 MW
- Main Cond Back Press: 1.10 inches Hg
- Steam Rate: 16.1 lb/kwhr

Weather: Scattered Clouds

- Barometer: 27.24 inches Hg
- Dry Bulb: deg F
- Wet Bulb: deg F

Circulating Water

- CT pH (lab): 7.10
- CT pH (ops):
  - MS Bicarbonate Alkalinity: 72 (as CaCO3)
  - MS pH: 5.32
  - Soluble Iron (lab): ppm
  - Soluble Iron (ops): ppm
  - Target Iron: ppm
  - Cooling Tower Ammonium: 78 mg/l
  - Main Steam Ammonium: 48 mg/l
  - Circ water supply: 60 deg F
  - Circ water return: 75 deg F
  - Inter Cond Tailpipe: deg F
  - After Cond Tailpipe: deg F
  - O2 Hot Well ppb: 90

Main Steam Gas Composition

- H2 %: 9.86
- O2 %: 13.82
- N2 %: 5.54
- CH4 %: 23.57
- CO2 %: 3.71
- H2S %: 50.22
- NH3 %: 3.12
- Molecular Weight: 35.83

Comment:

Hydrogen Sulfide

1st Main Steam H2S: 45 mg/l (dissolved in bomb 80.6)
2nd Main Steam H2S: 46 mg/l
Average Main Steam H2S: 45 mg/l
1st Hot Well H2S: 13.3 mg/l
2nd Hot Well H2S: 13.4 mg/l
Average HW H2S: 13.4 mg/l
Cooling Tower Desorption: 4 kg/hr (8.4 lb/hr)
Average H2S in Vent Gas: 0.0 kg/hr (0.0 lb/hr)
Split: 70 %

Plant Flows:

- Steam Flow: 283945 kg/hr (624880 lb/hr)
- Total Turbine NCG: 254 kg/hr (93.54 SCFM @STP)
- Average Vent Gas Flow: 267 kg/hr (108.4 SCFM @STP)
- Air Leakage: 63 kg/hr (28.5 SCFM @STP)
- Vent Gas Flow Meter: SCFM
- Dilution Ratio: 1.30
- Total Main Steam nCG ratio: 451 ppmv
- Jet nCG ratio: 523 ppmv (526 / 519)

Cooling Tower

- Number of Circ Pumps in Service: 2
- Condensate Reroute in Service: Yes
- Condensate bypass in Service: Yes (124 gpm)
- CT fans in Service: 11

Cooling Tower H2S Emissions

- Cell #: 2
  - 0.00 kg/hr (0.000 lb/hr)
- Cell #: 5
  - 0.00 kg/hr (0.000 lb/hr)
- Cell #: 7
  - 0.00 kg/hr (0.000 lb/hr)
- Calibration Gas Concentration: 0.497 ppmv
- Jerome #: 3025
- Response to STD Before Test: 0.519 ppmv
- Response to STD After Test: 0.48 ppmv
- H2S GSL: 7 ppmv

H2S balance %: 98.33
Mini estimate kg/hr: 0.0
Mini factor: 2.9017
## Regulated Air Pollutant Inventory

**Unit 20**

### Cooling Tower Emissions

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Emission Unit</th>
<th>Pollutant</th>
<th>CAS Number</th>
<th>Pollutant Class</th>
<th>Lb/Yr</th>
<th>Tn/Yr</th>
<th>Summary/Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Particulate Matter</td>
<td>N/A</td>
<td>Criteria</td>
<td>3,552</td>
<td>1.8</td>
<td>Criteria pollutant based upon year 2019 total solids data from monthly samples; Rule 420(d) limit is 40 lb/hr.</td>
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<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Ammonia</td>
<td>7664417</td>
<td>112(r)</td>
<td>106,000</td>
<td>53.0</td>
<td>NH₃ is that which naturally occurs in geothermal steam; Based upon averaged mass balance values reported in 2019 annual emission inventory.</td>
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<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Hydrogen Sulfide</td>
<td>7783064</td>
<td>112(r)</td>
<td>17,963</td>
<td>12.0</td>
<td>Based on 2019 annual averaged source test data.</td>
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<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Hydrogen</td>
<td>1333740</td>
<td>112(r)</td>
<td>24,677</td>
<td>12.3</td>
<td>Amount of H₂, from non-condensible gas, emitted when Stretford abatement in service. 2019 steam analysis data.</td>
</tr>
<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Copper</td>
<td>7440508</td>
<td>HAPs</td>
<td>0.03</td>
<td>0.00002</td>
<td>Data from '01 AB2588 inventory; Included here as emittent for which analysis of cooling tower water actually performed; Limit of Detectability (LOD) data used for calculations.</td>
</tr>
<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Arsenic</td>
<td>7440382</td>
<td>HAPs</td>
<td>0.84</td>
<td>0.00042</td>
<td>Data from '01 AB2588 inventory; Included here as historical emittent of concern only; Present in steam; analysis of cooling tower water performed.</td>
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<tr>
<td>20</td>
<td>Cooling Tower</td>
<td>Mercury</td>
<td>7439976</td>
<td>HAPs</td>
<td>0.02</td>
<td>0.00001</td>
<td>Data from '01 AB2588 inventory; Included here as historical emittent of concern only; Present in steam; analysis of cooling tower water performed.</td>
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</tbody>
</table>

### Stretford System Emissions

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Emission Unit</th>
<th>Pollutant</th>
<th>CAS Number</th>
<th>Pollutant Class</th>
<th>Lb/Yr</th>
<th>Tn/Yr</th>
<th>Summary/Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Stretford System</td>
<td>Particulate Matter</td>
<td>N/A</td>
<td>Criteria</td>
<td>9,790</td>
<td>4.9</td>
<td>PM value is for Stretford cooler; Based upon circulating flow of 500 gpm and fluid density of 10.6 lb/gallon; Total solids is actual data; Availability is 8760 hours per &quot;Criteria Pollutant Emissions Inventory&quot; 2019.</td>
</tr>
<tr>
<td>20</td>
<td>Stretford System</td>
<td>Methane (TOG)</td>
<td>74828</td>
<td>112(r)</td>
<td>65,876</td>
<td>32.9</td>
<td>Methane emitted when Stretford in service as a &quot;pass through&quot;; Actual emission point for Stretford is cooling tower stacks; Data is from 2019 inventory.</td>
</tr>
<tr>
<td>20</td>
<td>Stretford System</td>
<td>Benzene (ROG)</td>
<td>71432</td>
<td>HAPs</td>
<td>110.0</td>
<td>0.055</td>
<td>Data from '01 AB 2588 inventory;</td>
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<tr>
<td>20</td>
<td>Stretford System</td>
<td>Toluene (ROG)</td>
<td>108883</td>
<td>HAPs</td>
<td>56.0</td>
<td>0.028</td>
<td>Data from '01 AB 2588 inventory;</td>
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<td>20</td>
<td>Stretford System</td>
<td>Xylene (ROG)</td>
<td>1330207</td>
<td>HAPs</td>
<td>11.0</td>
<td>0.006</td>
<td>Data from '01 AB 2588 inventory;</td>
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</tbody>
</table>
GEYSERS POWER PLANT TITLE V PERMIT APPLICATION
Regulated Air Pollutant Inventory
Unit 20

<table>
<thead>
<tr>
<th>Unit Number</th>
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<th>Summary/Commentary</th>
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</thead>
<tbody>
<tr>
<td>20</td>
<td>Stretford System</td>
<td>Copper</td>
<td>7440508</td>
<td>HAPs</td>
<td>25.5</td>
<td>0.013</td>
<td>Only trace amount; Real data from ’93 FATES inventory; Included here as emittent for which analysis of cooling tower water actually performed; Limit of Detectability (LOD) data used for calculations.</td>
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**Fugitive Emissions**

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Emission Unit</th>
<th>Pollutant</th>
<th>CAS Number</th>
<th>Pollutant Class</th>
<th>Lb/Yr</th>
<th>Tn/Yr</th>
<th>Summary/Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Fugitive</td>
<td>Ammonia</td>
<td>7664417</td>
<td>HAPs</td>
<td>6.2</td>
<td>0.0031</td>
<td>Value based upon 1989 AB 2588 inventory.</td>
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<tr>
<td>20</td>
<td>Fugitive</td>
<td>Hydrogen Sulfide</td>
<td>7783064</td>
<td>HAPs</td>
<td>36.2</td>
<td>0.018</td>
<td>Value based upon 1989 AB 2588 inventory.</td>
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**Exempt Equipment Emission Sources**

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<tr>
<th>Unit Number</th>
<th>Emission Unit</th>
<th>Pollutant</th>
<th>CAS Number</th>
<th>Pollutant Class</th>
<th>Lb/Yr</th>
<th>Tn/Yr</th>
<th>Summary/Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Parts Washing Station</td>
<td>VOC’s</td>
<td>64742-47-8</td>
<td>HAPS</td>
<td>151</td>
<td>0.076</td>
<td>“Safety Kleen” parts washing station; Solvent is petroleum naphtha; Washing station is closed system except during use; Average use is four (4) hours per week; Serviced and recycled by vendor.</td>
</tr>
<tr>
<td>20</td>
<td>Building Paint Application</td>
<td>VOC’s</td>
<td>1330-20-7</td>
<td>HAPS</td>
<td>832</td>
<td>0.42</td>
<td>Painting activities for Unit 20 are estimated at 400 gallons per year of water based paint; Paint is applied by various means: brush, spray gun, roller; VOC emissions based upon 2.08 lb/gal VOC.</td>
</tr>
<tr>
<td>20</td>
<td>Building Paint Application</td>
<td>VOC’s</td>
<td>1330-20-7</td>
<td>HAPS</td>
<td>41.6</td>
<td>0.021</td>
<td>Painting activities for Unit 20 are estimated at 20 gallons per year of water based paint; Paint is applied by various means: brush, spray gun, roller; VOC emissions based upon solvent density of 2.08 pounds per gallon VOC, 100% emitted.</td>
</tr>
</tbody>
</table>

**NOTE:**

- Emission Unit 1 is the cooling tower and corresponds to HARP device 1.
- Emission Unit 2 is the Stretford system and corresponds to HARP device 2.
- Emissions from the Stretford cooler and oxidizers correspond to HARP device 3.
- Fugitive emissions correspond to HARP device 4.
### Process Flow Streams

<table>
<thead>
<tr>
<th>key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turbine steam supply</td>
</tr>
<tr>
<td>2</td>
<td>First stage auxiliary steam jet supply #1</td>
</tr>
<tr>
<td>3</td>
<td>First stage auxiliary steam jet supply #2</td>
</tr>
<tr>
<td>4</td>
<td>Second stage auxiliary steam jet supply</td>
</tr>
<tr>
<td>5</td>
<td>Third stage auxiliary steam jet supply</td>
</tr>
<tr>
<td>6</td>
<td>Main Condenser Cooling Water supply</td>
</tr>
<tr>
<td>7</td>
<td>Main condenser condensate</td>
</tr>
<tr>
<td>8</td>
<td>Condensate reroute</td>
</tr>
<tr>
<td>9</td>
<td>Condensate to direct Injection</td>
</tr>
<tr>
<td>10</td>
<td>Auxiliary cooling water supply</td>
</tr>
<tr>
<td>11</td>
<td>First inter condenser cooling water</td>
</tr>
<tr>
<td>12</td>
<td>Second inter condenser cooling water</td>
</tr>
<tr>
<td>13</td>
<td>After condenser Cooling Water supply</td>
</tr>
<tr>
<td>14</td>
<td>First inter condenser condensate</td>
</tr>
<tr>
<td>15</td>
<td>Second inter condenser condensate</td>
</tr>
<tr>
<td>16</td>
<td>After condenser condensate</td>
</tr>
<tr>
<td>17</td>
<td>Main condenser noncondensable gas exhaust</td>
</tr>
<tr>
<td>18</td>
<td>First inter condenser noncondensable gas exhaust</td>
</tr>
<tr>
<td>19</td>
<td>Second inter condenser noncondensable gas exhaust</td>
</tr>
<tr>
<td>20</td>
<td>After condenser noncondensable gas exhaust</td>
</tr>
<tr>
<td>21</td>
<td>Cooling tower stack air exhaust</td>
</tr>
<tr>
<td>22</td>
<td>Cooling tower blowdown to Injection</td>
</tr>
<tr>
<td>23</td>
<td>Iron Feed System</td>
</tr>
<tr>
<td>24</td>
<td>Stretford solution feed to venturi(s)</td>
</tr>
<tr>
<td>25</td>
<td>Stretford solution feed to absorber column</td>
</tr>
<tr>
<td>26</td>
<td>Treated noncondensible gas from Stretford</td>
</tr>
<tr>
<td>27</td>
<td>Air feed for oxidizer tanks</td>
</tr>
<tr>
<td>28</td>
<td>Sulfur slurry</td>
</tr>
<tr>
<td>29</td>
<td>Belt filter wash water</td>
</tr>
<tr>
<td>30</td>
<td>Belt wash return to cooling tower</td>
</tr>
<tr>
<td>31</td>
<td>Solution filtrate return</td>
</tr>
<tr>
<td>32</td>
<td>Sulfur cake</td>
</tr>
<tr>
<td>33</td>
<td>Solution to evaporative cooler</td>
</tr>
<tr>
<td>34</td>
<td>Vapor from evaporative cooler</td>
</tr>
<tr>
<td>35</td>
<td>Caustic feed</td>
</tr>
<tr>
<td>36</td>
<td>Vanadium and ADA make-up feed</td>
</tr>
</tbody>
</table>

### Compliance Monitoring Points

<table>
<thead>
<tr>
<th>key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMP1</td>
<td>Continuous Compliance Monitor (CCM) for H2S in Treated Vent Gas</td>
</tr>
<tr>
<td>CMP2</td>
<td>Modified Method 102 (H2S mass emissions monthly)</td>
</tr>
<tr>
<td>CMP3</td>
<td>Circ-water Chemistry / Cooling Tower Rain Sample (pH, [Fe] every shift, ([TDS], [TSS] monthly)</td>
</tr>
<tr>
<td>CMP4</td>
<td>Main Steam Sample ([H2S] weekly), (Non condensible gas ratio NCGR, monthly)</td>
</tr>
<tr>
<td>Key</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>-------------</td>
</tr>
<tr>
<td>AC</td>
<td>After condenser (train 20-1 shown, Train 20-2 is a two stage system)</td>
</tr>
<tr>
<td>CT</td>
<td>Cooling tower</td>
</tr>
<tr>
<td>IC1</td>
<td>Inter condenser 1 (train 20-1 shown)</td>
</tr>
<tr>
<td>IC2</td>
<td>Inter condenser 2 (train 20-1 shown)</td>
</tr>
<tr>
<td>J1</td>
<td>First stage gas removal steam jets (train 20-1 shown)</td>
</tr>
<tr>
<td>J2</td>
<td>Second stage gas removal steam jet (train 20-1 shown)</td>
</tr>
<tr>
<td>J3</td>
<td>Third stage gas removal steam jet (train 20-1 shown)</td>
</tr>
<tr>
<td>CWP</td>
<td>Circulating Water Pump(s)</td>
</tr>
<tr>
<td>CP</td>
<td>Condensate Pump(s)</td>
</tr>
<tr>
<td>ACSP</td>
<td>Auxiliary condensate spray pump</td>
</tr>
<tr>
<td>ACD</td>
<td>Auxiliary condensate drain</td>
</tr>
<tr>
<td>MC</td>
<td>Main condenser</td>
</tr>
</tbody>
</table>

### Stretford Vent Gas H₂S Abatement System

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Absorber column</td>
</tr>
<tr>
<td>OAB</td>
<td>Oxidizer air blowers</td>
</tr>
<tr>
<td>BF</td>
<td>Belt Filter</td>
</tr>
<tr>
<td>BT</td>
<td>Balance Tank</td>
</tr>
<tr>
<td>SCD</td>
<td>Sulfur cake dumpster</td>
</tr>
<tr>
<td>FT</td>
<td>Froth Tank</td>
</tr>
<tr>
<td>BWTT</td>
<td>Belt wash water transfer tank</td>
</tr>
<tr>
<td>OX1</td>
<td>Oxidizer tank 1</td>
</tr>
<tr>
<td>OX2</td>
<td>Oxidizer tank 2</td>
</tr>
<tr>
<td>RX</td>
<td>Reaction tank</td>
</tr>
<tr>
<td>P3</td>
<td>Main solution circulating pumps</td>
</tr>
<tr>
<td>P4</td>
<td>Cooler pumps</td>
</tr>
<tr>
<td>P5</td>
<td>Sulfur slurry pumps</td>
</tr>
<tr>
<td>P6</td>
<td>Filtrate solution return pumps</td>
</tr>
<tr>
<td>P7</td>
<td>Sulfur wash pump</td>
</tr>
<tr>
<td>P8</td>
<td>Caustic feed pump</td>
</tr>
<tr>
<td>P9</td>
<td>Chemical make-up sump feed pump</td>
</tr>
<tr>
<td>T5</td>
<td>Caustic storage tank</td>
</tr>
<tr>
<td>VS</td>
<td>Venturi scrubbers</td>
</tr>
<tr>
<td>HTR1</td>
<td>Solution heater #1</td>
</tr>
<tr>
<td>HTR2</td>
<td>Solution heater #2</td>
</tr>
<tr>
<td>SCT</td>
<td>Stretford Cooling Tower</td>
</tr>
<tr>
<td>V1</td>
<td>Treated vent to atmosphere</td>
</tr>
<tr>
<td>DWT</td>
<td>Domestic water tank</td>
</tr>
</tbody>
</table>

### Circulating Water H₂S Abatement Solution Feed System

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FE1</td>
<td>Flow element</td>
</tr>
<tr>
<td>P1</td>
<td>Abatement solution pump</td>
</tr>
<tr>
<td>P2</td>
<td>Back up abatement solution pump</td>
</tr>
<tr>
<td>PR1</td>
<td>Pressure regulator</td>
</tr>
<tr>
<td>PR2</td>
<td>Pressure regulator</td>
</tr>
<tr>
<td>T1</td>
<td>Abatement solution storage tank</td>
</tr>
<tr>
<td>T2</td>
<td>Draw down tank</td>
</tr>
<tr>
<td>T3</td>
<td>Pulsation dampener</td>
</tr>
<tr>
<td>T4</td>
<td>Pulsation dampener</td>
</tr>
</tbody>
</table>
Please Note: Compliance activities are still in progress for the 2020 annual period for Unit 2 where indicated in red text in this report. The final Compliance Certification Report will be certified and submitted upon completion.

ATTACHMENT

Geysers Power Company LLC,
Unit 20 Title V Operating Permit, Annual Compliance Certification Report
For The Period January 1, 2020 through December 31, 2020

I certify that all information submitted herein is true, accurate and complete. Based on belief formed after reasonable inquiry, the Geysers Power Company LLC, Unit 20 Geothermal Power Plant is in compliance with the applicable federal, state, and local requirement(s) as identified in the attached Geysers Power Company LLC, Unit 20 Title V Operating Permit Annual Compliance Certification Report.

Signature of Responsible Official
Michael Puccioni – General Manager

Date: 2/1/21
I. **Equipment List**
   A. Permitted Source List
   B. Abatement Device List

II. **Permit Conditions**
   A. Power Plant and abatement System Permit Conditions
   B. Plant Wide Permit Conditions
   C. Administrative Requirements

I. **EQUIPMENT LIST**

A. **PERMITTED SOURCE LIST**  Each of the following sources has been issued a Permit to Operate pursuant to the requirements of NSCAPCD Regulation 1, Chapter II Permits.

The equipment and capacities listed in Tables I.A and I.B are based on information provided by the permit holder. Routine maintenance, repair, or replacement with identical or equivalent equipment that does not result in an increase, or potential increase, in emissions of any air pollutant subject to District control does not require a permit modification. Replacement equipment that is within 5% of the listed capacity shall be considered equivalent for the purposes of this permit.

Pumps listed with a capacity range may be replaced with pumps within the listed range without notification to the District. Any replacement of pumps outside the listed range shall receive District approval prior to replacement;

<table>
<thead>
<tr>
<th>S-#</th>
<th>Grant Description</th>
<th>Capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steam Turbine</td>
<td>1,968,900 lb Steam/hr; maximum plant gross steam flow</td>
<td>No Changes</td>
</tr>
<tr>
<td>2</td>
<td>Generator</td>
<td>119 MW gross nameplate capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>3</td>
<td>Surface Condenser with Steam Operated 2 and 3 Stage Gas Ejector System</td>
<td>1,750,000,000 BTU/Hr Design Heat Load</td>
<td>No Changes</td>
</tr>
<tr>
<td>4</td>
<td>Cooling Tower, Cross Flow Mechanical Draft Type with 0.002% rated drift eliminators with 11x200 hp fans</td>
<td>168,000 gpm maximum 200 hp each</td>
<td>No Changes</td>
</tr>
<tr>
<td>5</td>
<td>Gland Seal Leak Off System</td>
<td></td>
<td>No Changes</td>
</tr>
</tbody>
</table>
### B. Abatement Device List

#### Hydrogen Sulfide Control System consisting of:

<table>
<thead>
<tr>
<th>A-#</th>
<th>Description</th>
<th>Nominal Capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stretford Air Pollution Control System consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Two Venturi Scrubbers</td>
<td>1,120 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>H₂S Absorber, 5'6&quot; D x 38' H</td>
<td>560 gpm</td>
<td>No Changes</td>
</tr>
<tr>
<td>C</td>
<td>Two Oxidizer Tanks 19’D x20’H, with 4 oxidizer blowers, 100 HP each</td>
<td>790 scfm air per blower</td>
<td>No Changes</td>
</tr>
<tr>
<td>D</td>
<td>Reaction Tank 19’D x 20’ H</td>
<td>42,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>E</td>
<td>Balance Tank, 24’ D x 18’ H</td>
<td>60,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>F</td>
<td>Froth Tank 12’ D x 12 H</td>
<td>15,000 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>G</td>
<td>Caustic Tank 12’ D x 12’ H</td>
<td>9,300 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>H</td>
<td>Condensate Tank 4’ D x 5’ H</td>
<td>450 gallon capacity</td>
<td>No Changes</td>
</tr>
<tr>
<td>I</td>
<td>Heat Exchangers consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Stretford Heater</td>
<td>3.0 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>b</td>
<td>Stretford Cooling Tower, 0.005% drift</td>
<td>5.3 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>c</td>
<td>Auxiliary Stretford Heater</td>
<td>1.75 MM BTU/hr</td>
<td>No Changes</td>
</tr>
<tr>
<td>J</td>
<td>Main Pumps Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>3 Stretford Circulating Pumps</td>
<td>1560 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>b</td>
<td>2 Stretford Cooler Circulating Pumps</td>
<td>1100 gpm each</td>
<td>No Changes</td>
</tr>
<tr>
<td>c</td>
<td>Caustic Additive Pump</td>
<td>15-100 gpm</td>
<td>No Changes</td>
</tr>
<tr>
<td>K</td>
<td>Stretford Treated Gas Analyzer and Alarm System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>One Sulfur Vacuum Filter Belt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Circulating Water H₂S Abatement Solution Injection (For H₂S Control) System Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Abatement Solution Storage Tanks</td>
<td>5,400 gallons minimum</td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>One Abatement Solution Feed Pump and One Spare Pump</td>
<td>0-100 gph range</td>
<td>No Changes</td>
</tr>
<tr>
<td>C</td>
<td>Mass Flow Meter and Flow Alarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mercury Removal System Consisting of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Vapor Liquid Separator Assembly</td>
<td></td>
<td>No Changes</td>
</tr>
<tr>
<td>B</td>
<td>Mercury Adsorption Vessel</td>
<td></td>
<td>No Changes</td>
</tr>
</tbody>
</table>
## II. PERMIT CONDITIONS

Permit conditions are designated federally (F), state (S), and/or locally (L) enforceable.

<table>
<thead>
<tr>
<th></th>
<th>POWER PLANT AND ABATEMENT SYSTEMS</th>
<th>Compliance</th>
<th>NOTES/MEANS/METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Emission Limits</td>
<td><strong>Emission Limits for H₂S</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>The Unit 20 power plant and associated abatement systems shall comply with Regulation 1 Rule 455 (b)-Geothermal Emission Standards. Total emissions of H₂S shall not exceed 4.7 kilograms averaged over any one-hour period. Total H₂S emissions shall be the cumulative emissions to the atmosphere from the power plant and associated abatement equipment. <strong>ref. Rule 455(b), PTO 82-45B Cond. 16.A.</strong></td>
<td>S L</td>
<td>Yes Source Tests are conducted monthly, as required in condition III.1 to verify compliance. Results of the NSCAPCD Method 102 source tests, as well as excursions and exceedances, are reported to the District in the quarterly compliance reports.</td>
</tr>
<tr>
<td>2.</td>
<td>The operator of this source shall not discharge or cause the discharge into the atmosphere of more than a total of 10.4 pounds/hour of H₂S from Geysers Unit 20. <strong>Ref. PSD SFB 81-03 Cond. IX.D.</strong></td>
<td>F S L</td>
<td>Yes Source Tests are conducted monthly, as required in condition III.1 to verify compliance. Results of the NSCAPCD Method 102 source tests, as well as excursions and exceedances, are reported to the District in the quarterly compliance reports.</td>
</tr>
<tr>
<td>3.</td>
<td>The exit concentration in the process piping leading from the Stretford System shall not exceed 10 ppmv H₂S (dry) averaged over any consecutive 60-minute period unless operating under a District approved Alternative Compliance Plan (ACP). <strong>ref. PTO 82-45B Cond. 16.B.</strong></td>
<td>S L</td>
<td>Yes Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during this reporting period.</td>
</tr>
<tr>
<td>4.</td>
<td>The exit concentration from the Stretford unit shall not exceed 125 ppmv or 0.5 lb/hr. <strong>ref. PSD 81-03, 82-AFC-1 Cond. 3.b</strong></td>
<td>F S L</td>
<td>Yes Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during this reporting period.</td>
</tr>
<tr>
<td>5.</td>
<td>Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 20.6 tons per year of hydrogen sulfide (H₂S). <strong>ref. Rule 240 (d)</strong></td>
<td>S L</td>
<td>Yes Source tests are performed monthly as required by Condition III.1 to determine the H₂S emission rate. The monthly emission rates are averaged and multiplied by the annual hours of operation to calculate the annual emissions. Total 2020 H₂S emissions calculations are in progress.</td>
</tr>
</tbody>
</table>
6. The power plant and associated abatement systems shall comply with Regulation 1 Rule 455 (a)-Geothermal Emission Standards; no person shall discharge into the atmosphere from any geothermal operation sulfur compounds, calculated as sulfur dioxide, in excess of 1,000 ppmv. ref. Rule 455(a)

|   |   | Yes | Plant systems that contain sulfur oxides are designed to limit emissions to concentrations less than the limit. Continuous monitoring of process piping gas concentration prior to release in the cooling tower is in service and maintained to verify compliance. No deviations to this condition occurred during the reporting period. |

| Emission Limits for Particulate Matter |

7. The power plant and associated abatement systems shall comply with Regulation 1 Rule 420 (d) Non-Combustion Sources- Particulate Matter; no person shall discharge particulate matter into the atmosphere from a non-combustion source in excess of 0.2 grains per cubic foot of exhaust gas or in total quantities in excess of the amount shown in Table I. (40 lb/hr) whichever is the more restrictive condition. ref. Rule 420(d)

|   |   | Yes | Calculation of the PM discharge rate is based upon monthly total solids analyses and the cooling water flow rate. PM emission calculation is per Permit specified condition III.5. Calculations indicate that the plant was in compliance with this limit during the reporting period |

8. Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 17.0 tons per year particulate matter less than 10 microns in diameter (PM-10) and 12.0 tons per year particulate matter less than 2.5 microns in diameter (PM-2.5). ref. Rule 240(d).

|   |   | Yes | Particulate emission rate determined as required by III.5. The results of that determination are used to determine the annual emission. Total 2020 PM emissions calculations are in progress. |

II. Operational Limits and Requirements

1. The permit holder shall not operate the plant unless untreated vent gasses are vented to the Stretford Air Pollution Control System. The condensate H₂S abatement chemical feed system and the Stretford abatement system shall be kept in good working order and operated as necessary in order to limit H₂S and particulate emissions on a continuous basis from the power plant as specified in condition I.1, I.2, I.3, I.4, and I.5. ref. Rule 240.d, PTO 82-45A Cond. 18, PSD SFB 81-03, 82-AFC-1 AQ-B8 Cond. 15.

|   |   | Yes | The H₂S abatement systems are operated and maintained in accordance with operating practices and a maintenance program described in the Title V application. |

2. The secondary abatement solution storage tank shall have a minimum of 1000 gallons of abatement solution at all times when the plant is in operation. All continuously operated abatement solution feed pumps shall have a standby spare available, a readily accessible flowmeter readable in appropriate units and equipped with alarms signaling no or low flow. Flowmeter accuracy shall be plus or minus 10% of flow. ref. PTO 82-45A Cond. 18.

|   |   | Yes | A program is in place to verify tank levels and to order and deliver chemicals prior to reaching the minimum level. Flowmeters and alarms are tested quarterly per permit condition II.4. A review of chemical tank sounding records indicates compliance with this condition. |

3. Except for justifiable reasons during performance testing or under operation of an

|   | Yes | Operating practices are in place to maintain the |
ACP, for which the permit holder has received prior District written approval, the circulating water shall be kept to the following specification: Circulating water iron chelate (abatement solution) concentration shall be maintained at or above the ppmw concentration recommended in the power plant operating guidelines as necessary to abate H₂S emissions from the power plant to the emission limit specified in Condition I.1. *ref. PTO 82-45A Cond. 19*

| L | circulating iron concentration when required. A review of the operator’s compliance check-off sheets and logs indicates that the requirement is consistently met when iron chelate is used. |

4. All the abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. All primary pressure gauges and flow meters associated with abatement equipment shall be readily identified, maintained in good operating condition and calibrated on a quarterly basis. Alarm systems associated with abatement equipment shall be tested on a quarterly basis. Calibration and maintenance shall be performed according to manufacturer’s recommendations or per the permit holder’s maintenance schedule as needed to maintain the equipment in good working order. *ref. PTO 82-45B Cond. 14.*

| S L | Yes | Maintenance practices are in place to ensure compliance with this condition. Flowmeters and alarms were tested as required during this reporting period. |

5. All areas in the immediate vicinity and under the permit holder’s responsibility shall be properly treated to control fugitive dust. *ref. PTO 82-45B Cond. 17.*

| S L | Yes | Fugitive dust is controlled with general clean-up and housekeeping. |

6. Fugitive Leaks

a. Non-condensable gas leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent the emission of steam and non-condensable gases to the atmosphere. Valves, flanges and seals shall be tightened, adjusted, or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere.

Non-condensable gas leaks shall not (i) exceed (as measured within 1 cm of suck leak) 1000 ppm (vol) H₂S nor 10,000 ppm (vol) methane nor (ii) exceed emission limits of Rule 455. Such leaks shall be repaired within 24 hours, unless the leak is from essential equipment. If the leak is from essential equipment, the leak must be minimized within 24 hours using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the APCO.

Essential Equipment I defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.

| F S | Yes | A review of maintenance records indicated that the plant is in compliance. A review of daily compliance checklists indicated that the operators inspect the system for fugitive leaks. Plant operations and maintenance follow the procedure outlined in this permit condition to identify fugitive emissions. Maintenance records are available to inspectors to verify that fugitive emissions are minimized and controlled in a timely manner. Fugitive leak inspections are performed more frequently than once per quarter. The operator conducts daily rounds to inspect the plant which include identifying any leaks and entering the information into the plant log and submitting a work order requesting repair. |

b. Steam and Condensate leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent

| S L | Yes | A review of maintenance records indicated that the plant is in compliance. A review of daily compliance |

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Page 6 of 20
the emission of steam and condensate to the atmosphere. Valves, flanges and seals shall be tightened, adjusted or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere. Valves, flanges, drip legs, threaded fittings and seals on pipelines shall be maintained to prevent or reduce the emission of steam and condensate to the atmosphere as noted below:

Liquid leak rate in pressurized steam and condensate lines shall not exceed 20 ml in 3 minutes. Liquid leak rates in excess of 20 ml in 3 minutes shall be repaired within 15 calendar days, excepting those leaks from essential equipment. If the leak is from essential equipment, the leak must be minimized within 15 days using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the APCO.

Essential Equipment is defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.

The permit holder shall check the power plant for fugitive leaks at least once per quarter. ref. PTO 82-45B Cond. 17.

| checklists indicated that the operators inspect the system for fugitive leaks. |
| **Plant operations and maintenance follow the procedure outlined in this permit condition to identify fugitive emissions.** |
| **Maintenance records are available to inspectors to verify that fugitive emissions are minimized and controlled in a timely manner.** |
| **Fugitive leak inspections are performed more frequently than once per quarter. The operator conducts daily rounds to inspect the plant which include identifying any leaks and entering the information into the plant log and submitting a work order requesting repair.** |

### 7. Alternative Compliance Plan

a. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.2, I.4, I.6, and I.7. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.2, I.4, I.6, and I.7. The ACP shall list the specific operating conditions the ACP will supersede.

<table>
<thead>
<tr>
<th>F</th>
<th>S</th>
<th>L</th>
<th>Yes</th>
<th>No ACPs are currently in place as allowed under this condition.</th>
</tr>
</thead>
</table>
b The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.1 and I.3. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.1 and I.3. The ACP shall list the specific operating conditions the ACP will supersede.

<table>
<thead>
<tr>
<th>Facilities Operation</th>
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<tbody>
<tr>
<td><strong>8.</strong> All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of the Permit shall at all times be maintained in good working order. The equipment shall be operated in a manner necessary to meet all emission limits of the permit.</td>
</tr>
<tr>
<td><strong>9.</strong> The cooling tower shall be maintained in good operating condition. The permit holder shall conduct an integrity inspection of the cooling tower during each scheduled plant overhaul and carry out any repairs necessary to correct all deficiencies encountered.</td>
</tr>
</tbody>
</table>
| **10.** The permit holder shall operate and maintain the following air pollution control equipment at the Unit 20 plant:
  a. The non-condensable gas stream exiting from the surface condenser shall be ducted to an operating Stretford process unit.
  b. Condensate exiting from the surface condenser shall be treated as necessary to reduce the levels of dissolved hydrogen sulfide. The permit holder shall use a secondary abatement system authorized by the NSCAPCD to accomplish this reduction.
  c. The permit holder shall have installed drift controls on the power plant cooling tower to limit drift losses to 0.002 percent or better of the circulating water mass, thus minimizing emissions of particulate matter.  | F | Yes | a. By design the non-condensable gasses are ducted to the Stretford system.
  b. A secondary abatement system, including condensate re-route is in place, and is permitted by the NSCAPCD.
  c. Based upon manufactures specifications, the cooling tower drift eliminators meet the requirement of this condition. |
11. The permit holder shall, in any 12-month period, limit unscheduled outages for Unit 20 to no more than a total of 12. The following shall not be used in computing the total outages:

a. scheduled outages (defined as outages with 24-hour advance notice between the steam supplier and permit holder, except in the case of Unit 20 outages resulting from an abundance of hydropower in which case a scheduled outage shall be defined as one-hour notice).

b. steam supplier induced outages (such as pressure surge, strainer plugging, etc.).

c. outages of less than 2 hours in duration.

d. outages which do not cause steam stacking.

A violation of the above performance standards is considered a violation of this condition.

The permit holder shall have on file with the District an approved operating protocol describing the methods that will be used to meet the 12 outages in 12 consecutive months’ performance standard. The protocol must include a description of the operational procedures between the steam supplier and permit holder, permit holder’s operational procedures, and equipment to meet the above standard. The terms and requirements of the protocol may be modified by the Control Officer for good cause upon written request from the permit holder.

The permit holder shall allow the District to inspect all operating logs to verify the total outage hours. These requirements are in addition to the applicable requirements of rule 540.

In the event the permit holder is not able to meet the standards specified above, the following shall be required:

The permit holder shall prepare and submit a revised “plan” to the Control Officer, within 30 days of the end of the month in which the outage limit was exceeded, to achieve the outage standards set forth in this permit condition. At a minimum, the measures to be considered in the “plan” shall include: improved coordination of the power plant and steam field operations, improved alarming and control systems, increased duration of manned operation of the power plant, improved preventative maintenance and design modifications, retrofit of a 100% of steam flow turbine bypass, and retrofit of a 50% of steam flow turbine bypass. In evaluating measures to be taken to prevent future exceedances of the outage standard, outages of less than 2 hours shall be counted. This plan” shall also be

| F | S | L | Yes | All occurrences meeting the condition criteria are reported to the District in the Quarterly Compliance Reports. A protocol is in place to meet the requirements of this condition. Steam lines interconnecting the power plants allow steam to be shifted to other operating plants if an outage occurs. No outages have resulted in steam stacking since interconnection of the steam lines was completed. No stacking events occurred during this reporting period. |
submitted to EPA for approval if the outage standard is exceeded.

Within 30 days of receipt of the “plan” the Control Officer shall determine whether the “plan” is satisfactory and, if so, shall approve the “plan”. Upon approval, the revised “plan” shall supersede the old plan and become a part of the terms and conditions of this permit. **ref. PSD SFB 81-03 Cond. IX.C., PT0-82-45A Cond.18.**

### III. Monitoring, Testing and Analysis

**Performance Tests**

1. The permit holder shall, on a monthly basis, conduct a source test of the cooling tower to determine the H2S emission rate to verify compliance with condition I.1. A mass balance determination of total H2S to the cooling tower based on measured operating conditions may be used to document that the worst case possible H2S emission are less that the emission limit of the plant or District Method 102 shall be utilized to determine the H2S emission rate. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant, including periods when accessing the cooling tower is not possible, while maintaining compliance with all applicable emission limits of Condition I.1. The ACP shall list operating parameters such as power output (MW), target pH, abatement solution concentration levels, and burner/scrubber exit concentrations which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Condition I.1. The ACP shall list the specific operating conditions the ACP will supersede. **ref. PTO 82-45A Cond. 22.**

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<tr>
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<th>S</th>
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<th>Yes NSCAPCD Approved version of Method 102 (Modified Method 102) Source tests were performed each month, and reported to the District in the quarterly reports. All test results and determinations indicated compliance with this condition.</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>F</td>
<td>S</td>
<td>An annual report including all Geysers plants with PSD permits is sent to the agencies listed in this condition. <strong>The preparation of the 2020 annual report is in progress.</strong></td>
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<td>F</td>
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Sample taps used by plant personnel for chemical sampling and analysis are also available for use by CARB and District personnel. **Safety Orientations and**
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<thead>
<tr>
<th>Section</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job Safety Analysis</td>
<td>Yes</td>
<td>Job Safety Analysis are available for District and ARB representatives and highly encouraged for sampling activities.</td>
</tr>
<tr>
<td>2.</td>
<td>Yes</td>
<td>Tests for listed species are performed at the request of the District utilizing District approved methods and an approved test plan. No test requests by the District are currently active.</td>
</tr>
<tr>
<td>3.</td>
<td>Yes</td>
<td>Monthly analysis by plant chemical staff and calculations done in accordance with the condition. Calculation of the particulate emissions is based upon monthly samples and analysis of the cooling tower water TSS and TDS. These calculations indicate that the unit was in compliance with this condition during the reporting period.</td>
</tr>
<tr>
<td>4.</td>
<td>Yes</td>
<td>A protocol on file with the District describes the method used to determine H₂S concentration. A review of the records indicates that the requirements of this condition are being met.</td>
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<tr>
<td>5.</td>
<td>Yes</td>
<td>Operators perform tests required by this condition as a part of their daily routine. Iron concentration tests are validated by the plant chemistry staff using the “Hach” Ferreover colorimetric method. A review of the operating logs during this reporting period indicates compliance with this condition when circulating water abatement was in service.</td>
</tr>
</tbody>
</table>
8. Instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations shall receive District approval prior to use. Test plans shall be submitted for District approval of instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations. ref. Rule 240(d)

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<tr>
<td></td>
<td>The NSCAPCD has approved the following instruments that are used to measure H2S: ASI Model; 102, Jerome Instruments Model 631, &quot;Dräger&quot; brand sampling and analysis tubes. Organic gases are analyzed utilizing an “Agilent” Model 3000C G.C.</td>
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</table>

9. All sampling protocols, chemical feed charts, targets and operational guidelines for using said charts and targets, necessary to abate H2S emissions from the power plant to the emission limits specified in Conditions I.1 and I.2 must be developed using good engineering judgment and supporting data. The APCO may review such sampling protocols, chemical feed charts, targets and guidelines upon request. If the APCO determines that any of the protocols, feed charts, targets, or guidelines are not sufficient to maintain compliance with Conditions I.1 and I.2, the APCO shall require the permit holder to develop revised protocols, feed charts, targets and guidelines. ref. Rule 240(d)

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<tr>
<td></td>
<td>Protocols related to this condition were submitted and approved by the District in the initial Title V application. Plant unit engineers specify targets and guidelines based on good engineering judgment and recent chemical analyses. Targets and operating requirements are available electronically via the plant intranet and they are posted on an erasable board in the operating control room.</td>
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</table>

**Continuous Compliance Monitoring (CCM)**

10. The permit holder shall operate a continuous compliance monitor capable of measuring the concentrations of H2S in the exhaust stream from the Stretford absorber in order to verify compliance with conditions I.1 and I.3. The monitoring system must alarm the operator when H2S in the treated gas is in excess of 10 ppmv (dry basis). The permit holder shall respond to the alarm with appropriate mitigative measures. Mitigative measures taken shall be logged in the power plant abatement log book. In the event H2S concentrations are in excess of 10 ppmv and the range of the CCM is exceeded, the permit holder shall test for H2S using an approved alternative method (ex Draeger tester, wet chemical tests) once every hour during the excess. The monitor shall have a full range of at least 50 ppmv. The monitor shall meet the following operational specifications: an accuracy of plus or minus 10% of full scale, provide measurements at least every 3 minutes, provide a continuous strip chart record or a District approved alternative, and provide monthly data capture of at least 90%. The District must be notified when the concentration of H2S exceeds the hourly average limit of 10 ppmv.

A one-point calibration shall be performed at least once per week. A three-point calibration shall be performed at least once per quarter.

The Control Officer may allow modifications to the above specifications under an ACP upon written request with justification by the permit holder as long as emissions from the power plant do not exceed the “total” H2S emission limitations.

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<th>Yes</th>
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<tr>
<td></td>
<td>A monitor meeting the requirements of this condition is in place and operational. Plant records indicate that the continuous monitor consistently meets the requirements of this condition. Verification of these requirements is sent to the NSCAPCD in the quarterly reports. There were no deviations from this condition during the reporting period. Plant records indicate that calibrations are performed as required.</td>
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of condition I.1. Written notification from the Control Office must be received by
the permit holder prior to any change in monitoring specifications. *Ref. PTO 82-45A Cond. 19.*

<table>
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<tr>
<th>Ambient Air Monitoring</th>
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</table>
| 11. The permit holder shall maintain and operate one H2S/meteorological monitoring
station, PM-10 high volume station at a location approved in advance by the
Control Officer for the life of the facility. The permit holder shall install and
operate additional monitoring stations, such as a PM 2.5 monitoring station, if
required by the Control Officer, California Air Resources Board or EPA.
Participation by the permit holder in a joint air monitoring program, such as the
Geysers Air Quality Monitoring Program (GAMP), shall be deemed to satisfy all
ambient air quality monitoring requirements of this permit provided the term of
monitoring is equivalent. The Control Officer can alter, suspend, or cancel this
requirement provided no ambient air quality standard applicable to this facility is
threatened or that sufficient other monitoring is available by the District, Lake
County AQMD or other third party. *Ref. PTO 82-45A Cond. 22, PSD SFB 81-03,
82-AFC-1 Cond. 13 AQ-C11.* |

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<tr>
<th>IV. Record keeping</th>
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</table>
| 1. All records and logs shall be retained for a period of at least 5 years from the date
the record or log was made and shall be submitted to the NSCAPCD upon
request. |
| 2. The permit holder shall maintain a weekly abatement solution inventory log
available for on-site inspection. *Ref. Rule 240(d)* |
| 3. The permit holder shall maintain a strip chart or other District approved data
recording device of H2S readings measured by the CCM. All measurements,
records, and data shall be maintained by the permit holder for at least five (5)
years. The permit holder shall report all exceedances of Condition I.3 in the
quarterly report as required in V.1. The report shall include a description of all
measures taken to bring the Stretford system back into compliance with Condition
I.3. The permit holder shall include in the report a copy of the output from the H2S
CCM or alternative District approved data during the upset condition. *Ref. Rule
240(d)* |
| 4. The permit holder shall maintain copies of the source test results as required in
condition III.1 for a minimum of 5 years. *Ref. PTO 82-45A cond. 22.* |

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<th>F</th>
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<tbody>
<tr>
<td>Yes</td>
<td>Geysers Power Company LLC participates in GAMP.</td>
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<tr>
<td>Yes</td>
<td>Records and Logs are retained for a minimum of 5 years and are submitted upon NSCAPCD request.</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Operators conduct on-site inspections. Weekly chemical inventory files are kept and available for inspection.</td>
<td></td>
</tr>
</tbody>
</table>
| Yes | The District has approved Digital strip chart recorders to archive data in electronic format for later retrieval and review of CCM measurements. These data are available in the plant file system.
All exceedances of Condition I.3 are reported in the quarterly reports. There were no reportable exceedances during this reporting period. |
| Yes | Source test data is available in the plant chemistry laboratory files on site, and in the plant archives. |
5. Fugitive Leak Records

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes/No</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Any non-condensable gas leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. <strong>Ref. PTO 82-45A cond. 20.</strong></td>
<td>F S L</td>
<td>Yes</td>
</tr>
<tr>
<td>b. Any valve, flange, drip leg threaded fitting or seal on a pipeline or condensate collection system with a leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. <strong>Ref. PTO 82-45A cond. 20.</strong></td>
<td>S L</td>
<td>Yes</td>
</tr>
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</table>

6. The permit holder shall maintain records detailing:

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<thead>
<tr>
<th>Condition</th>
<th>Yes/No</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action.</td>
<td>F S L</td>
<td>Yes</td>
</tr>
<tr>
<td>b. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.3, and I.4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. fugitive steam and non-condensable gas emission source inspections. Leak rates, repairs and maintenance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. total dissolved solids and total suspended solids in the circulating water. <strong>Ref. Rule 240(d)</strong></td>
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</table>

7. The permit holder shall maintain records detailing:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes/No</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hours of operation.</td>
<td>S L</td>
<td>Yes</td>
</tr>
<tr>
<td>b. types, concentrations and amounts of chemicals used for Stretford absorbing solution and used for condensate treatment including target levels for abatement solution concentration in the circulating water.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. a summary of any irregularities that occurred with a continuous compliance monitor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.1, I.2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. periods of scheduled and unscheduled outages and the cause of the outages.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Plant operating logs and maintenance records.</td>
<td></td>
<td></td>
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</table>
### V. Reporting

1. A quarterly report shall be submitted to the District which contains the following information:
   - CCM availability for the given quarter.
   - any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action taken.
   - Time and date of any monitor indicating an hourly average exceed of 10 ppmv of H2S.
   - Source test results.
   - Steam stacking events

   The quarterly report shall be submitted to the District within 30 days of the end of each quarter. The reports are due by May 1, August 1, November 1 and February 1 for each corresponding quarter. *ref. Rule 240(d)*

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<tr>
<th>S</th>
<th>L</th>
<th>Yes</th>
<th>Quarterly Reports were submitted as required or on a date agreed upon with NSCAPCD.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Ref. Geysers Power Company LLC letters: GPC-20-037, 1st Quarter 4/30/20</em></td>
</tr>
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<td></td>
<td>GPC-20-075, 2nd Quarter 7/29/20</td>
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<td>GPC-20-086, 3rd Quarter 10/28/20</td>
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<td></td>
<td>GPC-21-002, 4th Quarter - 1/26/21</td>
</tr>
</tbody>
</table>

2. An annual report shall be submitted to the District which contains the following information:
   - average mainsteam H2S and ammonia concentrations.
   - average total dissolved and suspended solids and average flow rate of the cooling tower water.
   - annual ammonia emissions.
   - gross megawatt hours generated.
   - steaming rate, gross average (gross steam flow; lb/ gross MW).
   - update to any changes in operating protocols used to determine plant chemical feed charts and targets; calibration and maintenance programs.
   - total organic gas emitted as methane.
   - hours of plant operation.
   - annual CO2e emissions.
   - Annual H2S, PM-10 and PM-2.5 emissions

   The annual report shall be submitted to the District within 45 days of the end of each calendar year. *ref. Rule 240(d)*

   | S | L | Yes  | Preparation of the 2020 annual Criteria Pollutants Inventory Report is in progress. |

3. The permit holder shall submit reports to the California Air Resources Board (CARB) in accordance with provisions of CCR Title 17, Division 3, Chapter 1, Subchapter 10, Article 2, Regulation for Mandatory Reporting of Greenhouse Gas Emissions.

   | S | L | Yes  | Preparation of the 2020 Cal e-GGRT report to CARB is in progress. |
### Steam Stacking

4. The permit holder shall, on a quarterly basis, provide a written report to the District with the outage events, cause of each outage and the balance of events for the year. The Control Officer may change the frequency of reporting. The permit holder shall inform the District when total outages have reached 12 in any consecutive 12 month period. The District shall be notified within 5 days of the 12th outage.

|  |  | Yes | The required outage information is included in the quarterly compliance reports. No stacking events occurred during this reporting period. |

### B. PLANT WIDE PERMIT CONDITIONS

The plant shall comply with the following District regulations. The text of the referenced regulations can be found in Appendix A of this Title V Operating Permit.

1. Regulation 1 Rule 400-General Limitations
2. Regulation 1 Rule 410-Visible Emissions
3. Regulation 1 Rule 430-Fugitive Dust Emissions
4. Regulation 1 Rule 492 (40 CFR part 61 Subpart M)-Asbestos
5. Regulation 1 Rule 540-Equipment Breakdown
6. Regulation 2- Open Burning
7. If in the event this stationary source, as defined in 40 CFR part 68.3, becomes subject to part 68, this stationary source shall submit a risk management plan (RMP) by the date specified in part 68.10. As specified in Parts 68, 70 and 71, this stationary source shall certify compliance with the requirements of part 68 as part of the annual compliance certification required by 40 CFR part 70 or 71.
8. 40 CFR Part 82- Chlorinated Fluorocarbons
9. If in the event this stationary source, as defined in 40 CFR part 63, becomes subject to part 63, this stationary source shall notify the District within 90 days of becoming subject to the regulation. The stationary source shall identify all applicable requirements of part 63 and submit a plan for complying with all applicable requirements.

|  |  | Yes | 1-3 Reviewed Quarterly compliance reports and District Inspections. 4. Reviewed Asbestos Notification letters. Notifications were submitted as required during the reporting period. GPC20-058, dated 12/15/2020. 5. Reviewed Quarterly compliance records “Incidents Requiring Corrective Action”. 6. No open burning is performed at this location. 7. The Plant is exempt from the Risk Management Plan because quantities of flammable hydrocarbons are less than 67,000 lbs. Ref.: EPA notice dated March 13, 2000. 8. All work performed on appliances containing chlorinated fluorocarbons is performed by HVAC Technicians certified through EPA approved training programs in accordance with the Clean Air Act Section 608 and 40 CFR part 82, Subpart F. |

### C. ADMINISTRATIVE REQUIREMENTS

#### Payment of Fees

1. This Permit shall remain valid during the 5-year term as long as the annual renewal fees are paid in accordance with Regulation 1 Rule 300 and Rule 360 of the District. Failure to pay these fees will result in forfeiture of this permit. Operation without a permit subjects the source to potential enforcement action by the District and the EPA pursuant to section 502(a) of the Clean Air Act. ref. Reg 5.670

|  |  | Yes | Geyssers Power Company LLC submitted the required Permit Fees: Payment of Annual Renewal Fees Fiscal Year 2020-2021, GPC-20-032, dated 8/24/20. Federal Program Fees for fiscal year 2020 / 2021 have not yet been invoiced. |

#### Right to Entry and Inspection
2. The Control Officer, the Chairman of the California Air Resources Board, The Regional Administrator of the EPA and/or their authorized representatives, upon the presentation of credentials, shall be permitted:
   A. to enter upon the premises where the source is located or areas in which any records are required to be kept under the terms and conditions of this Permit; and
   B. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Permit; and
   C. to inspect any equipment, operation, or method required in this Permit; and
   D. to sample emissions from the source. ref. Reg 5.610(e)

<table>
<thead>
<tr>
<th></th>
<th>F</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>Agency representatives are admitted to the project upon presentation of credentials. After receiving a safety advisory no restrictions are placed on access to plant premises, sample locations and records.</td>
<td></td>
</tr>
</tbody>
</table>

### Compliance with Permit Conditions

3. This Title V Operating Permit expires on August 8, 2021. The permit holder shall submit a complete application for renewal of this Title V Operating Permit no later than 6 months prior to expiration and no earlier than one year prior to expiration. If a complete application for renewal has not been submitted in accordance with these deadlines, the facility may not operate after August 7, 2021. Ref Reg 5.660

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>Prior application was submitted 6 months prior to expiration, ref. GPC-15-021 dated July 14, 2015. The permit renewal was issued on August 8, 2016 with an effective date of August 8, 2016. The current renewal application is being submitted 6 months prior to the expiration; ref. GPC-21-020 dated February 4, 2021.</td>
<td></td>
</tr>
</tbody>
</table>

4. The permit holder shall comply with all conditions of this permit. Any non-compliance with the terms and conditions of this permit will constitute a violation of the law and may be grounds for enforcement action, including monetary civil penalties, permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. ref. Reg 5.610(f)(3)

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<tr>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No NOVs were issued to Unit 20 during this reporting period.</td>
<td></td>
</tr>
</tbody>
</table>

5. In the event any enforcement action is brought as a result of a violation of any term or condition of this permit, the fact that it would have been necessary for the permit holder to halt or reduce the permitted activity in order to maintain compliance with such term or condition shall not be a defense to such enforcement action. ref. Reg 5.610(f)(4)

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<tbody>
<tr>
<td></td>
<td>Yes</td>
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</table>

6. The filing of a request by the facility for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated non-compliance does not stay the applicability of any permit condition. ref. Reg 5.610 f)(5)

<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
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</tbody>
</table>

7. This permit does not convey any property rights of any sort, nor any exclusive privilege. ref. Reg 5.610(f)(2)

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<tr>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
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</tbody>
</table>
8. The permit holder shall supply within 30 days any information that the District requests in writing to determine whether cause exists, per Regulation 5.570, for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. *ref. Reg 1 Rule 200, Reg 5.430*

<p>| | | |</p>
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<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>Yes</td>
<td>There are no active information requests.</td>
<td></td>
</tr>
</tbody>
</table>

**Reporting**

9. All deviations from permit requirements, including those attributable to upset conditions (as defined in the permit) must be reported to the District at least once every six months. For emissions of a hazardous air pollutant (HAP) or a toxic air pollutant (as identified in an applicable regulation) that continue for more than an hour in excess of the permit requirements, the report must be made within 24 hours of the occurrence. For emissions of any regulated air pollutant, excluding those HAP emission requirements listed above, that continue for more than two hours in excess of permit requirements, the report must be made within 48 hours. All reports of deviation from permit requirements shall include the probable cause of the deviation and any preventative or corrective action taken. A progress report shall be made on a compliance schedule at least semi-annually and shall include the date when compliance will be achieved, an explanation of why compliance was not, or will not be, achieved by the scheduled date, and a log of any preventative or corrective action taken. The reports shall be certified by the responsible official as true, accurate and complete. *ref. Reg 5.625*

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<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>Yes</td>
<td>Geysers Power Company LLC submitted the following deviation reports; to the NSCAPCD</td>
<td></td>
</tr>
</tbody>
</table>

There were no deviations to report during this period

No excess emissions occurred.

**Severability**

10. In the event that any provision of this permit is held invalid all remaining portions of the permit shall remain in full force and effect. *ref. Reg 5.610(g)*

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<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
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<tr>
<td>Yes</td>
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</tbody>
</table>

**Transfer of Ownership**

11. In the event of any changes in control or ownership of facilities to be modified and/or operated, this Permit is transferable and shall be binding on all subsequent owners and operators. The permit holder shall notify the succeeding owner and operator of the existence of this Permit and its conditions by letter, a copy of which shall be forwarded to the Control Officer. *ref. Rule 240(j)*

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</thead>
<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>Yes</td>
<td>No ownership changes occurred during this reporting period.</td>
<td></td>
</tr>
</tbody>
</table>

**Records**

12. Notwithstanding the specific wording in any requirement, all records for federally enforceable requirements shall be maintained for at least five years from the date of entry and shall include: date place and time of sampling, operating conditions at the time of sampling, date, place and method of analysis and the results of the analysis. *ref. Reg 5.615*

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<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>L</td>
</tr>
<tr>
<td>Yes</td>
<td>Site inspection. Plant policy requires files to be maintained to meet the requirements of this condition.</td>
<td></td>
</tr>
<tr>
<td>Emergency Provisions</td>
<td>FS L</td>
<td>Yes</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>13. The permit holder may seek relief from enforcement action in the event of a</td>
<td></td>
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<tr>
<td>breakdown, as defined by Regulation 1 Rule 540 of the District's Rules and Regulations,</td>
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<tr>
<td>by following the procedures contained in Regulation 1, Rule 540 (b).  The District</td>
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<tr>
<td>will thereafter determine whether breakdown relief will be granted in accordance with</td>
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<tr>
<td>Regulation 1, Rule 540 (b)(3).  ref. Reg 5.640</td>
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<tr>
<td>14. The permit holder may seek relief from enforcement action for a violation of any</td>
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<tr>
<td>of the terms and conditions of this permit caused by conditions beyond permit holders</td>
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<tr>
<td>reasonable control by applying to the District's Hearing Board for a variance pursuant</td>
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<tr>
<td>to Health and Safety Code Section 42350.  The Hearing Board will determine after</td>
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<tr>
<td>notice and hearing whether variance relief should be granted in accordance with the</td>
<td></td>
<td></td>
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<tr>
<td>procedures and standards set forth in Health and Safety Code Section 42350 et seq.</td>
<td></td>
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<tr>
<td>Any variance granted by the Hearing Board from any term or condition of this permit</td>
<td></td>
<td></td>
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<tr>
<td>which lasts longer than 90 days will be subject to EPA approval.  ref. Reg 1 Rule 600</td>
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<tr>
<td>15. Notwithstanding the foregoing, the granting by the District of breakdown relief or</td>
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<tr>
<td>the issuance by the Hearing Board of a variance will not provide relief from federal</td>
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<td></td>
</tr>
<tr>
<td>enforcement unless the Title V Operating Permit has been modified pursuant to Regulation 5 or other EPA approved process.  ref. Reg 1 Rule 600</td>
<td></td>
<td></td>
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<tr>
<td>Malfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. The Regional Administrator shall be notified by telephone within 48 hours</td>
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<tr>
<td>following any failure of air pollution control equipment, process equipment, or of a</td>
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<tr>
<td>process to operate in a normal manner which results in an increase in emissions above</td>
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<tr>
<td>allowable emissions limit stated in Condition 1.2.  In addition, the Regional</td>
<td></td>
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<tr>
<td>Administrator shall be notified in writing within fifteen (15) days of any such failure</td>
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<tr>
<td>This notification shall include a description of the malfunctioning equipment or</td>
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<tr>
<td>abnormal operation, the date of the initial failure, the period of time over which</td>
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<tr>
<td>emissions were increased due to the failure, the cause of the failure, the estimated</td>
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<tr>
<td>resultant emissions in excess of those allowed under Condition 1.2, and the methods</td>
<td></td>
<td></td>
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<tr>
<td>utilized to restore normal operations.  Compliance with this malfunction notification</td>
<td></td>
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<tr>
<td>provision shall not excuse or otherwise constitute a defense to any violation of this</td>
<td></td>
<td></td>
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<tr>
<td>permit or of any law or regulations, which such malfunction, may cause.  ref. PSD SFB</td>
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<td></td>
</tr>
<tr>
<td>81-03 Cond. IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permit Posting</td>
<td></td>
<td></td>
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<tr>
<td>-------------------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>17. Operation under this permit must be conducted in compliance with all data</td>
<td>S</td>
<td>Yes, Operators conduct on-site inspections. This permit is located in the Unit 20 control room and is available electronically to Operators in the control room.</td>
</tr>
<tr>
<td>specifications included in the application which attest to the operator’s ability to comply with District rules and regulations. This permit must be posted in such a manner as to be clearly visible and accessible at a location near the source. In the event that the permit cannot be so placed, the permit shall be maintained readily available at all times on the operating premises. ref. Rule 240(i)</td>
<td></td>
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</tr>
<tr>
<td>Compliance Certification</td>
<td></td>
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</tr>
<tr>
<td>18. Compliance certifications shall be submitted annually by the responsible official of this facility to the Northern Sonoma County Air Pollution Control District and to the EPA. Each compliance certification shall be accompanied by a written statement from the responsible official which certifies the truth, accuracy, and completeness of the report. ref. Reg 5.650</td>
<td>F</td>
<td>Yes, This submittal includes the required Compliance Certification for this Permit. The cover letter contains a written statement by the responsible official certifying truth, accuracy and completeness.</td>
</tr>
<tr>
<td>19. This Permit does not authorize the emission of air contaminants in excess of those allowed by the Health &amp; Safety Code of the State of California or the Rules and Regulations of the Northern Sonoma County Air Pollution Control District. This Permit cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other governmental agencies. ref. Rule 240(d)</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td>Permit Modification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. The permit holder shall comply with all applicable requirements in NSCAPCD Regulation 1 Chapter II- Permits and New Source Review. ref. Regulation 1 Rule 200</td>
<td>F</td>
<td>Yes, No permit modifications were initiated in 2020.</td>
</tr>
</tbody>
</table>
This document and the following Compliance Document for Federally Applicable Requirements discusses the applicable requirements for all emission sources. This document summarizes the applicable regulations, the standards used for the test methods, monitoring requirements to show compliance, reporting required to pertinent agencies, and records that need to be available for inspection. The following Compliance Document for Federally Applicable Requirements discusses in detail each rule and condition that applies to all emission sources. This and the following tables contain information requested on Title V Forms XXX-I1 and XXX-J2.

<table>
<thead>
<tr>
<th>SOURCE NAME</th>
<th>APPLICABLE REGULATIONS</th>
<th>FE TEST METHODS</th>
<th>MONITORING</th>
<th>REPORTING</th>
<th>RECORDKEEPING</th>
<th>COMPLIANCE (Y, N, N/A)</th>
<th>FUTURE EFFECTIVE DATE</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL SOURCES</td>
<td>NSCAPCD 1-300</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Fees</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-400.a</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Nuisance</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-410.a</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Visible emission limit</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-420.d</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Particulate matter limit</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-430</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Working practice for fugitive dust</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-485</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Architectural Coatings</td>
</tr>
<tr>
<td>UNIT 20 - Facility Permit Requirements</td>
<td>NSCAPCD 1-200.c</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Permitting - Authority to Construct</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-220</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Power Plant review Procedures</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 1-240</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Permitting - Permit to Operate</td>
</tr>
<tr>
<td></td>
<td>NSCAPCD 5</td>
<td>Y</td>
<td>N/A</td>
<td>As required by NSCAPCD Rule 5-460.a</td>
<td>As required by NSCAPCD Rule 5-460.a</td>
<td>Y</td>
<td>current rule</td>
<td>Federal operating permit</td>
</tr>
<tr>
<td></td>
<td>Title V Operating permit for Unit 20 40 CFR Part 70 (Title V)</td>
<td>Y</td>
<td>As shown in Title V Compliance Certification Document</td>
<td>As shown in Title V Compliance Certification Document</td>
<td>As shown in Title V Compliance Certification Document</td>
<td>Y</td>
<td>current rule</td>
<td>As shown in Title V Compliance Certification Document See NSCAPCD Reg 5</td>
</tr>
<tr>
<td>UNIT 20 – Cooling Tower and Vent to Atmosphere</td>
<td>NSCAPCD 1-455.a</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Sulfur dioxide emission limit</td>
</tr>
<tr>
<td>UNIT 20 – Cooling Tower and Vent to Atmosphere</td>
<td>NSCAPCD 1-455.b</td>
<td>N</td>
<td>District Method 102 or modified</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Hydrogen sulfide emission limit</td>
</tr>
<tr>
<td>UNIT 20 – Cooling Tower and Stretford Unit</td>
<td>NSCAPCD 1-540</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>As required by NSCAPCD Rule 540.c</td>
<td>As required by NSCAPCD Rule 1-540.b.2</td>
<td>Y</td>
<td>current rule</td>
</tr>
<tr>
<td>UNIT 20 – Emergency Standby Wet-Down Pump Diesel Drive Engine</td>
<td>Title 17, CA Code of Regulations §93115.4(29)</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Emergency Standby Engine</td>
</tr>
</tbody>
</table>
## TITLE V RENEWAL APPLICATION APPLICABLE REQUIREMENTS & COMPLIANCE SUMMARY

### BUSINESS NAME:  Geysers Power Company LLC, Geysers Power Plant Unit 20

<table>
<thead>
<tr>
<th>SOURCE NAME</th>
<th>APPLICABLE REGULATIONS</th>
<th>FE METHODS</th>
<th>TEST METHODS</th>
<th>MONITORING</th>
<th>REPORTING</th>
<th>RECORDKEEPING</th>
<th>COMPLIANCE (Y, N, N/A)</th>
<th>FUTURE EFFECTIVE DATE</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT 20 – Emergency Standby Wet-Down Pump Diesel Drive Engine</td>
<td>Title 17, CA Code of Regulations §93115.4(30)</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Emergency Use</td>
<td></td>
</tr>
<tr>
<td>UNIT 20 – Emergency Standby Wet-Down Pump Diesel Drive Engine</td>
<td>Title 17, CA Code of Regulations §93115.6(a)(3)(A)(1)</td>
<td>N</td>
<td>As required by District APCO</td>
<td>As required by District APCO</td>
<td>N/A</td>
<td>Y</td>
<td>current rule</td>
<td>Emission standards for new stationary emergency standby diesel-fueled CI engines</td>
<td></td>
</tr>
</tbody>
</table>

### Approval to Construct / Modify a Stationary Source Prevention of Significant Deterioration (PSD A-4-1,NSR4-4-3,SFB 81-03)

<table>
<thead>
<tr>
<th>Unit 20 - Facility</th>
<th>PSD A-4-1, NSR 4-4-3, SFB 81-03</th>
<th>Permit condition: I</th>
<th>Y</th>
<th>N/A</th>
<th>N/A</th>
<th>See Condition II</th>
<th>Y</th>
<th>Historical</th>
<th>Permit Expiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 20 - Facility</td>
<td>PSD A-4-1, NSR 4-4-3, SFB 81-03</td>
<td>Permit condition: II</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>As Specified</td>
<td>Y</td>
<td>Historical</td>
<td>Notification of Commencement of Construction</td>
</tr>
<tr>
<td>Unit 20 - Facility</td>
<td>PSD A-4-1, NSR 4-4-3, SFB 81-03</td>
<td>Permit condition: IV</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>As Specified</td>
<td>N/A</td>
<td>Y</td>
<td>current</td>
</tr>
<tr>
<td>Unit 20 - Facility</td>
<td>PSD A-4-1, NSR 4-4-3, SFB 81-03</td>
<td>Permit condition: V A-D</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>current</td>
<td>Right to Entry</td>
</tr>
<tr>
<td>Unit 20 - Facility</td>
<td>PSD A-4-1, NSR 4-4-3, SFB 81-03</td>
<td>Permit condition: VI</td>
<td>Y</td>
<td>N/A</td>
<td>N/A</td>
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<td>Permit conditions: IX.B.1</td>
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<td>Pollution Control Equipment -Stretford System</td>
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</tbody>
</table>
## Title V Renewal Application Applicable Requirements & Compliance Summary

### Business Name: Geysers Power Company LLC, Geysers Power Plant Unit 20

#### Unit 20 – Cooling Tower
- **Permit conditions:** IX.B.2
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** N/A
- **Reporting:** N/A
- **Recordkeeping:** N/A
- **Compliance:** Y
- **Future Effective Date:** current
- **Requirements:** Treat condensate as necessary to reduce dissolved H2S.

#### Unit 20 – Cooling Tower
- **Permit conditions:** IX.B.3
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** N/A
- **Reporting:** N/A
- **Recordkeeping:** N/A
- **Compliance:** Y
- **Future Effective Date:** current
- **Requirements:** Cooling Tower drift eliminators

### Source Name

#### Unit 20 - Facility
- **Permit conditions:** IX.C.1
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** N/A
- **Reporting:** N/A
- **Recordkeeping:** N/A
- **Compliance:** Y
- **Future Effective Date:** Historical
- **Requirements:** Power Plant Outages
  - See section “PSD amendment dated 11/12/83 DOC dated 9/16/82 (PSD/DOC 82-AFC-1)”

#### Unit 20 - Facility
- **Permit conditions:** IX.C.2
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** N/A
- **Reporting:** N/A
- **Recordkeeping:** N/A
- **Compliance:** Y
- **Future Effective Date:** current
- **Requirements:** Power Plant Outages
  - See section “Unions plans regarding steam gathering system, letter from Stephan Lipman, Union Geothermal to Harry M. Howe, PG&E

#### Unit 20 – Cooling Tower and Stretford Unit
- **Permit conditions:** IX.D
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** See Condition IX.E
- **Reporting:** See Condition IX.E
- **Recordkeeping:** See Condition IX.E
- **Compliance:** N/A
- **Future Effective Date:** Y
- **Requirements:** Emission Limits
  - H2S < 10.4 lb/hr

#### Unit 20 – Cooling Tower and Stretford
- **Permit conditions:** IX.E
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** Alternative Test Method approved by NSCAPCD in Letter dated 6/16/99
- **Reporting:** Performance tests conducted at least annually
- **Recordkeeping:** Test results provided to NSCAPCD quarterly, EPA annually
- **Compliance:** N/A
- **Future Effective Date:** Y
- **Requirements:** Performance Tests
  - H2S emission testing
  - Permit condition: IX.E EPA Approved amendment 4/18/2001 conditions 1, 2, and 3

#### Unit 20 - Facility
- **Permit conditions:** IX.F
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** As specified
- **Reporting:** As specified
- **Recordkeeping:** As specified
- **Compliance:** N/A
- **Future Effective Date:** Y
- **Requirements:** Testing program for steam constituents:
  - Replaced by NSCAPCD PTOs 82-45A (6/14/02) and 82-45B (3/13/01) and “NSCAPCD approved Modified Method -102”

#### Unit 20 - Facility
- **Permit conditions:** X
- **Application:** PSD A-4-1, NSR 4-4-3, SFB 81-03
- **Test Methods:** Y
- **Monitoring:** N/A
- **Reporting:** N/A
- **Recordkeeping:** As specified
- **Compliance:** N/A
- **Future Effective Date:** Y
- **Requirements:** Agency Notifications
## TITLE V RENEWAL APPLICATION APPLICABLE REQUIREMENTS & COMPLIANCE SUMMARY

**BUSINESS NAME:** Geysers Power Company LLC, Geysers Power Plant Unit 20

<table>
<thead>
<tr>
<th>SOURCE NAME</th>
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<th>TEST METHODS</th>
<th>MONITORING</th>
<th>REPORTING</th>
<th>RECORDKEEPING</th>
<th>COMPLIANCE (Y, N, N/A)</th>
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<th>REQUIREMENTS</th>
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<td>Limit of unscheduled outages</td>
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<td>See rule 540</td>
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<td>Limits use of off gas Vent to Atmosphere</td>
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<td>Refer to Compliance Document for Rule 1-540.c</td>
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<td>Change of design prior to commercial operation if different than proposed in the AFC</td>
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<td>Detailed plan for testing the performance of the Unit 20 power plant prior to commercial operation and initial performance testing.</td>
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<td>Participation in cooperative continuous emission monitor development program.</td>
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<td>Final report on availability of acceptable continuous monitors.</td>
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<td>Final report on availability of acceptable continuous monitors.</td>
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<td>Dispute resolution to be heard before NSCAPCD Hearing Board.</td>
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<td>File application for permit to operate</td>
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<td>N/A</td>
<td>Y</td>
<td>current</td>
<td>Properly maintain &amp; operate equipment</td>
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</table>

**PSD Amendment dated 11/2/83 Letter dated 7/28/83 from Stephan Lipman, Union Geothermal, to Harry Howe, PG&E**

| Unit 20 – Facility / Union Geothermal | Union Geothermal plans regarding steam gathering system | Y | N/A | N/A | N/A | N/A | Y | current | Supervisory Control system to control the Unit 20 Wells. Interconnection between the Uni18 and Unit 20 Pipeline systems |

**PSD Amendment dated 11/2/83 to Determination of Compliance dated 9/16/82 (PSD addendum / DOC 82-AFC-1)**

| Unit 20 - Facility | PSD addendum / DOC additional requirement 1 | Y | N/A | N/A | N/A | N/A | Y | Historical | Reporting to EPA if outage standard is exceeded |
| Unit 20 - Facility | PSD addendum / DOC additional requirement 2 | Y | N/A | N/A | N/A | N/A | Y | Historical | Amendments to the preliminary outage standard plan |
| Unit 20 - Facility | PSD addendum / DOC additional requirement 2 | Y | N/A | N/A | N/A | N/A | Y | Historical | Amendments to the outage standard plan if needed |
## TITLE V RENEWAL APPLICATION APPLICABLE REQUIREMENTS & COMPLIANCE SUMMARY

**BUSINESS NAME:** Geysers Power Company LLC, Geysers Power Plant Unit 20

<table>
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<tr>
<th>SOURCE NAME</th>
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<th>FE TEST METHODS</th>
<th>MONITORING</th>
<th>REPORTING</th>
<th>RECORDKEEPING</th>
<th>COMPLIANCE (Y, N, N/A)</th>
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<tr>
<td>Unit 20 Cooling Tower</td>
<td>CA Assembly Bill 2588 (CA Air Toxics &quot;Hot Spots&quot;)</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td>Report inventory as required</td>
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<td>Unit 20 Facility</td>
<td>40 CFR 63</td>
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<td>40 CFR 82 (Title VI)</td>
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<td>40 CFR 61.152</td>
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* Federally enforceable permit conditions are identified in the Unit 20 Title V Operating Permit (Tab 7) and in the Title V Compliance Certification Document (Tab 5).

** Title V Compliance Certification Document refers to the Compliance Document for Federally Applicable Requirements which is included with this document in Tab 5.

January 27, 2021

Date
Particulate matter (PM) emissions from geothermal cooling towers result from the cooling tower water total dissolved and suspended solids (TDS + TSS) being emitted in the water droplets that are ejected from the cooling tower stacks. The droplets are ejected as a result of the air drawn through the cooling tower for evaporative cooling of the circulating water. The amount of water ejected from the cooling tower stacks is called the “drift rate” and is expressed as a percentage of the cooling tower circulating water flow rate.

Particulate matter emissions for the cooling tower are calculated by multiplying the manufacturers’ guaranteed drift rate by the cooling tower circulating water flow and total solids concentration and converting the result to a mass emission rate on a dry basis.

Sample calculation of particulate matter (PM) emissions for a typical Unit cooling tower per Permit Condition.

Given:

- 154,000 gpm circulating water flow rate through cooling tower.
- 8.306 lb/gal H₂O @ 90° F (Perry’s Chemical Engineer’s Handbook)
- 0.002% cooling tower drift rate per maximum design by manufacturer
- 516 ppmw total solids (TDS+TSS) per analysis 1994 Criteria Pollutant Inventory
- 7445 hours total Unit operation time for 1994, per Plant generation reports

Calculations:

\[
154,000 \text{ gpm} \times 60 \text{ min/hr} \times 8.306 \text{ lb/gal} \times 0.002\% \times 516 \text{ ppmw} = 0.79 \text{ lb/hr}
\]

\[
1.98 \text{ lb/hr} \times 7445 \text{ hr/Yr} \div 2000 \text{ lb/Ton} = 2.95 \text{ ton/Yr}
\]

NOTE:

1. The calculations shown here are for example only. Values used in the example may not reflect actual values for a specific Unit.

2. Circulating water flow rate and drift rate are specified in Permit Conditions for verification. These specified rates are used in this example to calculate the PM emissions from the Unit cooling tower.
Particulate matter (PM) emissions from Stretford coolers are the Stretford solution total dissolved and suspended solids (TDS + TSS) being emitted in the solution droplets that are ejected from the cooler stack. The droplets are ejected as a result of the air drawn through the cooler for evaporative cooling of the solution. The amount of solution ejected from the cooler stack is called the “drift rate” and is expressed as a percentage of the cooler circulating solution flow. The particulate emission rate is determined by converting the result to a mass emission rate on a dry basis.

Particulate matter emissions for the cooler are calculated by multiplying the manufactures’ guaranteed drift rate\(^1\) by the cooler solution flow and total solids concentration and converting the result to a mass emission rate on a dry basis. The Stretford coolers are operated during the daytime 3 months of the year in the summer months to maintain cooler solution temperature flow and only occasionally during the winter months to evaporate excess moisture. The hours of operation are conservatively 30% (0.3 operation factor) of the total plant operation hours.

Sample calculation for a typical Unit Stretford cooler for normal and typical operating conditions (2012 base year):

*Given:*  
- 1100 gpm Stretford cooler circulating solution design rate  
- 330 gpm Stretford cooler circulating solution throttled operational flow rate (30% of design)  
- 0.002 % drift rate  
- 42.3% dry solids (2012 value) (TDS + TSS)  
- 7553.1 hours total plant operating hours  
- 2265.92 Stretford cooler operating hours 30% of operation time for 2012.

*Calculation:*

\[
330 \text{ gpm} \times 60 \text{ min/hr} \times 8.33 \text{ lb/gal} \times 0.002\% \text{ drift rate} \times 36.8\% \text{ dry solids} = 1.21 \text{ lb/hr}
\]

*Annual Emissions Calculation:*

\[
1.21 \text{ lb/hr} \times 2265.9 \text{ hr/yr} = 2750.6 \text{ lb/yr/yr} \div 2000 \text{ lb/Ton} = 1.38 \text{ Ton/yr}
\]

*NOTE:* The calculations shown here are for example only. Values used in the example may not reflect actual values for a specific Unit.

---

\(^1\) Ralph M. Parsons Mechanical Data Book, Volume II, Document No. 058986, Section 5.4 Guaranteed drift rate specification.
Sample Calculations  
Hydrogen (H₂) Emissions  
All Stretford Abatement System Units

Hydrogen (H₂) is one of the naturally occurring non-condensible gases contained in the supplied geothermal steam. During normal operation the hydrogen is emitted to the atmosphere via the treated gas line to the cooling tower. The hydrogen concentration and vent gas flow are typically measured during H₂S source tests.

To calculate the hydrogen emissions, the vent gas hydrogen concentration (volume %) is multiplied by the vent gas volumetric flow rate. Flows are converted to molar flows and then to mass flows. Assuming “Perfect Gas Law” behavior, volume percent is equal to mole percent.

Sample calculation of annual H₂ emissions for a typical Unit.

Given:
- 596 scfm vent gas flow rate *
- 10.14 % H₂ mole fraction *
- 379 ft³/lb mole at standard conditions.
- H₂ molecular weight = 2
- 7445 hours of operation.

Calculation:

\[
\text{596 scfm} \div \text{379 ft}^3/\text{lb mole} \times 10.14\% \times 2 = 0.32 \text{ lb/min}
\]

\[
0.32 \text{ lb/min} \times 60 \text{ min/hr} \times 7445 \text{ hours/Yr} \div 2000 \text{ lb/ton} = 71.2 \text{ Ton/Yr}
\]

*Sample data based on Unit 1994 average H₂S source test samples.

NOTE: The calculations shown here are for example only. Values used in the example may not reflect actual values for a specific Unit.
FUGITIVE EMISSIONS ESTIMATES

Fugitive Emissions
The vast majority regulated air pollutant emissions from the Geysers power plants are emitted from the cooling tower stacks. The sources that release emissions through the tower stacks are the burner/scrubber and the Stretford abatement systems, the backup abatement system, as well as the cooling tower itself. Emissions attributed to fugitive emissions from various sources within the facilities are minor but have been significantly reduced since 2000.

These data were used to develop the emission profiles that were utilized to comply with the California AB2588 Air Toxics Inventory prepared for the Northern Sonoma County Air Pollution Control District (NSCAPCD) in 1990 and updated in 1993. The original Inventory profiles were developed according to the protocol plan approved by the NSCAPCD in 1989 (Tolmasoff letter to PG&E, 14 December 89).

Fugitive Emissions Sources
The following sources were identified for their potential fugitive emissions:

- Steam traps and pipe flanges (ammonia, hydrogen sulfide) - Supplied steam samples.
- Vent gas blower seals (ammonia, hydrogen sulfide) - engineering calculations and gas concentration measurements.
- Hotwell leaks (ammonia, hydrogen sulfide) - engineering calculations
- Random leaks (ammonia, hydrogen sulfide) - engineering calculations

Fugitive Emissions Modeling
Even though the quantity of some regulated air pollutant emissions may vary from Unit to Unit, similarly designed Units have typical fugitive sources. Initially a representative Unit for each type of abatement system was selected that would function as a model for other Units similarly equipped. Stretford abatement based units typically included sulfur melter systems with much of the fugitive emissions resulting from steam leaks. These systems and resulting fugitives from steam leaks have been eliminated.

The estimation of fugitive emissions for each facility was determined by modeling the emissions of the facility that had the highest main steam H₂S concentration, and elevated NH₃. Unit 11 represented the Units equipped with burner/scrubber H₂S abatement systems. Initially Unit 17 represented the Units equipped with Stretford abatement system. Since the sulfur melters were eliminated from the Stretford units, fugitives emissions from Stretford Units are much less than had been previously reported.

Fugitive Emissions Estimates
The Unit model was developed by measuring actual leak flow rate over time. Estimates of fugitive mass emissions from steam traps and pipe flanges were based upon the steam being emitted from that leak and its measured emissions concentrations. Other emission rates were determined by engineering calculations, equipment design, vapor pressure, and other appropriate parameters. The mass emissions were then pooled and expressed as one total amount for a particular emitter.
Ammonia (NH₃) Emissions - All Units

Ammonia (NH₃) occurs naturally in geothermal steam supplied to the power plants at the Geysers. Ammonia emissions are estimated by mass balance. Knowing the supplied steam ammonia mass flow and the mass flow of ammonia leaving the system as reinjected circulating water, the amount of ammonia discharged to the atmosphere is determined by difference. That is:

\[ ((\text{Steam flow}) \times [\text{NH}_3]_{\text{in}}) - ((\text{Reinjection flow}) \times [\text{NH}_3]_{\text{out}}) = [\text{NH}_3]_{\text{mass emitted}}. \]

For Stretford equipped power plants where dry sodium ammonium vanadate make-up chemical is added, an additional amount of ammonia is emitted from the Stretford process tanks. The source of this ammonia is the addition of dry Stretford make-up chemicals (sodium ammonium vanadate). The ammonia is released from the Stretford cooler and the Stretford oxidizer tanks as a result of the pH of the solution and air moving though the solution in the tanks. Ammonia emission is based on the amount of sodium ammonium vanadate used.

Ammonia contained in the vent gas of Stretford equipped units is released through the cooling tower stacks by means of the “sweet gas” pipeline that connects the Stretford absorber column with the Unit’s cooling tower. Thus, this NH₃ was included in the calculation of the cooling tower emissions.

**NH₃ Emissions Methodology**

**Generation Load Determination**
The generation load, expressed as megawatts (MW), was used to calculate the supplied steam flow for the annual incoming NH₃ for each Unit. The normal load or average MW load for each Unit, which was the load at which the Unit was most commonly run, was derived from 2012 generation data.

**Main Steam NH₃**
The main steam NH₃ concentrations were determined from supplied steam sample data taken in 2012. These concentrations were averaged to develop a representative data set to be used to calculate the annual total amount of NH₃ emissions from the Geysers.

**Cooling Tower Blowdown Rates**
The total amount of cooling tower blowdown was determined using the total amount of injection volume measured at the injection wells minus volumes of water injected from other sources such as SRGRP and SESEP/Lacosan.

**Cooling Tower Ammonia**
The cooling tower ammonia concentrations were determined from cooling tower rain samples collected from each plant over the course of a year. These analysis were averaged and used to calculate the annual total amount of ammonia emissions from The Geysers.

**Analyses for NH₃**
The NH₃ analyses done by Calpine personnel were performed by chromatography. Calpine lab personnel used the “Lange” spectrophotometric method to determine the NH₃ concentrations. Both methods expressed the concentrations as NH₄⁺(ammonium). These values are then converted to express the concentrations as NH₃ by multiplying the ammonium concentration by the ratio of the differences in molecular weight.

**Calculation of Plants Ammonia Emissions**
Total ammonia emissions from the Geysers are calculated. Each plant is allocated a percentage of the Geysers total ammonia emissions as a proportion of its annual power generation to the Geysers total power generation.
There are several substances that occur naturally in geothermal steam supplied to the Geysers Power Plants. Abatement processes consume some of these substances. Other substances are formed when certain natural substances are thermally oxidized. Measurement of the concentrations of these substances has been made by either grab sample or sources tests. Estimates of their emissions are determined by the same equation:

\[
\text{Substance lb/hr} \times \text{Total Operation hr/Yr} \div 2000 \text{ lb/Tn} = \text{substance Tn/Yr emitted}
\]

**Sources of data used in calculating Air Toxics and Criteria Pollutant emissions**

**Given:** The gross generation data from generation reports.
- The gross steam flow rates from mineral royalty flow rate data.
- The Unit availability hours for each year per outage reports.
- The burner/scrubber availability from the plant data acquisition system.

**Criteria Pollutants Burner Units only:** SO\textsubscript{2}, NO\textsubscript{x}, and CO emissions data from Source Test Data. SO\textsubscript{2} emissions (flue gas) are scrubbed an additional 90% in cooling tower.

**Air Toxics:** Metals (As, Cd, Cr, Cu, Hg, and Ni) data from grab samples and source tests. Some of this data represent below limit of detection (lod) values.

**Hydrogen Sulfide and Methane:** H\textsubscript{2}S and CH\textsubscript{4} emissions data from source tests and mass balances.

**Reactive Organic Gases:** Benzene, toluene, and xylene (ROG’s) emissions data from 2006 grab samples.

**Emissions Estimation Methodology**

Annual emission rates of gasses are determined by mass balance where the total mass of steam supplied to the plant is determined from steam flow measurement devices located on steam supply lines. In some cases hourly average emission rates are determined from average hourly steam flow rates, determined from the annual total steam supplied divided by the annual service hours.

**Main Steam H\textsubscript{2}S**
The main steam H\textsubscript{2}S concentrations were determined from source test sample data. These concentrations were averaged to develop a representative data set to be used to calculate the annual total amount of H\textsubscript{2}S emissions from each Unit.

**Analyses for H\textsubscript{2}S**
The H\textsubscript{2}S analyses performed by plant personnel using recognized electro-chemical instruments.

**Sample calculation for annual H\textsubscript{2}S emissions (total from Unit cooling towers):**

**Given:**
- Average H\textsubscript{2}S = 12.3 lb/hr (5.6 kg/hr) at emission point
- Hours of operations = 7112

**Calculation:**

\[
12.3 \text{ lb/hr} \times 7112 \text{ hr/yr} \div 2000 \text{ lb/Tn} = 43.6 \text{ Tn/Yr.}
\]
TITLE V OPERATING PERMIT

Geysers Power Company, LLC
Geysers Power Plant
Unit 20 (Grant)

PLANT ADDRESS:

10350 Socrates Mine Road
Middletown, CA 95461
(707) 431-6051

MAILING ADDRESS:

10350 Socrates Mine Road
Middletown, CA 95461

Responsible Official - Robert Parker
Facility Contact- Michael Puccioni

Type of Facility: Geothermal Power Plant Issue Date: August 8, 2021
Primary SIC: 4911
Product: Electricity Expiration Date: August 8, 2026

ISSUED BY THE NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT

Rob Bamford, Air Pollution Control Officer Date
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I. EQUIPMENT LIST

A. PERMITTED SOURCE LIST Each of the following sources has been issued a Permit to Operate pursuant to the requirements of NSCAPCD Regulation 1, Chapter II Permits. The equipment and capacities listed in Tables I.A and I.B are based on information provided by the permit holder. Routine maintenance, repair, or replacement with identical or equivalent equipment that does not result in an increase, or potential increase, in emissions of any air pollutant subject to District control does not require a permit modification. Replacement equipment that is within 5% of the listed capacity shall be considered equivalent for the purposes of this permit.

Pumps listed with a capacity range may be replaced with pumps within the listed range without notification to the District. Any replacement of pumps outside the listed range shall receive District approval prior to replacement;

<table>
<thead>
<tr>
<th>S#</th>
<th>Description</th>
<th>Nominal Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steam Turbine</td>
<td>1,968,900 lb Steam/hr; maximum plant gross steam flow</td>
</tr>
<tr>
<td>2</td>
<td>Generator</td>
<td>119 MW gross nameplate capacity</td>
</tr>
<tr>
<td>3</td>
<td>Surface Condenser with Steam Operated 2 and 3 Stage Gas Ejector System</td>
<td>1,750,000,000 BTU/Hz</td>
</tr>
<tr>
<td>4</td>
<td>Cooling Tower, Cross Flow Mechanical Draft Type with 0.001% rated drift eliminators with 11 fans</td>
<td>168,000 gpm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 hp each</td>
</tr>
<tr>
<td>5</td>
<td>Gland Steam Seal Leakoff System</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Emergency Standby Wet-Down Pump Diesel Drive Engine</td>
<td>204 HP</td>
</tr>
</tbody>
</table>
B. ABATEMENT DEVICE LIST

<table>
<thead>
<tr>
<th>A#</th>
<th>Description</th>
<th>Capacity (Nominal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydrogen Sulfide Control System consisting of:</td>
<td>660 lb/hr H2S</td>
</tr>
<tr>
<td></td>
<td>A Two Venturi Scrubbers</td>
<td>1,120 gpm each</td>
</tr>
<tr>
<td></td>
<td>B H2S Absorber, 5'6&quot; D x 38' H.</td>
<td>560 gpm</td>
</tr>
<tr>
<td></td>
<td>C Two Oxidizer Tanks 19'D x 20'H, with 3 oxidizer blowers, 100 HP each</td>
<td>790 scfm air per blower tank</td>
</tr>
<tr>
<td></td>
<td>D Reaction Tank 19'D x 20' H</td>
<td>42,000 gallon</td>
</tr>
<tr>
<td></td>
<td>E Balance Tank, 24' D x 18' H</td>
<td>60,000 gallon</td>
</tr>
<tr>
<td></td>
<td>F Froth Tank 12' D x 18' H</td>
<td>15,000 gallon</td>
</tr>
<tr>
<td></td>
<td>G Caustic Tank 12' D x 12' H</td>
<td>9,300 gallon</td>
</tr>
<tr>
<td></td>
<td>H Condensate Tank 4' D x 5' H</td>
<td>450 gallon</td>
</tr>
<tr>
<td></td>
<td>J Heat Exchangers consisting of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a Stretford Solution Heater</td>
<td>3.0 MM BTU/hr</td>
</tr>
<tr>
<td></td>
<td>b Stretford Cooling Tower, 0.005% drift</td>
<td>5.3 MM BTU/hr</td>
</tr>
<tr>
<td></td>
<td>c Auxiliary Stretford Solution Heat</td>
<td>1.75 MM BTU/hr</td>
</tr>
<tr>
<td></td>
<td>J Main Pumps Consisting of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a 3 Stretford Circulating Pumps</td>
<td>1560 gpm each</td>
</tr>
<tr>
<td></td>
<td>b 2 Stretford Cooler Circulating Pumps</td>
<td>1100 gpm each</td>
</tr>
<tr>
<td></td>
<td>c Caustic Additive Pump</td>
<td>15-100 gph</td>
</tr>
<tr>
<td>2</td>
<td>Circulating Water H2S Abatement Solution Injection (For H2S Control) System Consisting of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Abatement Solution Storage Tanks</td>
<td>5,400 gallons</td>
</tr>
<tr>
<td></td>
<td>B One Abatement Solution Feed Pump and One Spare Pump</td>
<td>0-100 gph range</td>
</tr>
<tr>
<td></td>
<td>C Mass Flow Meter and Flow Alarm</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mercury Removal System Consisting of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Vapor Liquid Separator Assembly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B Mercury Adsorption Vessel</td>
<td></td>
</tr>
</tbody>
</table>
II. PERMIT CONDITIONS

Permit conditions are designated federally (F), state (S), and/or locally (L) enforceable. Where a condition references a specific District regulation, the text of the referenced regulation can be found in Appendix A.

A. POWER PLANT AND ABATEMENT SYSTEMS

1. Emission Limits

   Emission Limits for H2S

   1. The Unit 20 power plant and associated abatement systems shall comply with Regulation 1 Rule 455 (b)-Geothermal Emission Standards. Total emissions of H2S shall not exceed 4.7 kilograms averaged over any one hour period. Total H2S emissions shall be the cumulative emissions to the atmosphere from the power plant and associated abatement equipment. ref. Rule 455(b), PTO 82-45B Cond. 16.A.

   2. The operator of this source shall not discharge or cause the discharge into the atmosphere of more than a total of 10.4 pounds/hour of H2S from Geysers Unit 20. Ref. PSD SFB 81-03 Cond. IX.D.

   3. The exit concentration in the process piping leading from the Stretford System shall not exceed 10 ppmv H2S averaged over any consecutive 60 minute period unless operating under a District approved Alternative Compliance Plan (ACP). ref. PTO 82-45B Cond. 16.B.

   4. The exit concentration from the Stretford unit shall not exceed 125 ppmv or 0.5 lb/hr. ref. PSD 81-03, 82-AFC-1 Cond. 3.b

   Emission Limits for Particulate Matter

   5. The power plant and associated abatement systems shall comply with Regulation 1 Rule 420 (d)-Non-Combustion Sources- Particulate Matter; no person shall discharge particulate matter into the atmosphere from a non-combustion source in excess of 0.2 grains per cubic foot of exhaust gas or in total quantities in excess of the amount shown in Table I. (40 lb/hr) whichever is the more restrictive condition. ref. Rule 420(d).¶

   6. Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 20.6 tons per year of hydrogen sulfide (H2S). ref. Rule 240(d).¶

   7. Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 17.0 tons per year particulate matter less than 10 microns in diameter (PM-10) and 12.0 tons per year particulate matter less than 2.5 microns in diameter (PM-2.5). ref. Rule 240(d).

   Deleted: 5.
   Deleted: 6.
   Deleted: 7.
   Deleted: 8.

   Emission Limits Specific to the Emergency Standby Wet-Down Pump Diesel Drive Engine

   1. Visible particulate emissions shall not exceed an opacity as to obscure an observer's view to a degree equal to or greater than Ringelmann 2.0 or 40 per cent opacity for a period or periods exceeding 3 minutes in any one hour. ref. ATC/Temporary PTO 17-10.

   2. Particulate emissions shall not exceed an emission rate of 0.15 g/bhp-hr. ref. ATC/Temporary PTO 17-10.
3. Combined non-methane hydrocarbons and nitrogen oxide emissions shall not exceed an emission rate of 3.0 g/bhp-hr. ref. ATC/Temporary PTO 17-10.

4. Carbon monoxide emissions shall not exceed an emission rate of 2.6 g/bhp-hr. ref. ATC/Temporary PTO 17-10.

II. Operational Limits and Requirements

1. The permit holder shall not operate the plant unless untreated vent gasses are vented to the Stretford Air Pollution Control System. The condensate H2S abatement chemical feed system and the Stretford abatement system shall be kept in good working order and operated as necessary in order to limit H2S and particulate emissions on a continuous basis from the power plant as specified in condition I.1, I.2, I.3, I.4, and I.5. ref. Rule 240.d, PTO 82-45A Cond. 18, PSD SFB 81-03, 82-AFC-1 Cond. 15.

2. The secondary abatement solution storage tank shall have a minimum of 1000 gallons of abatement solution at all times when the plant is in operation. All continuously operated abatement solution feed pumps shall have a standby spare available, a readily accessible flowmeter, readable in appropriate units and equipped with alarms signaling no or low flow. Flowmeter accuracy shall be plus or minus 10% of flow. ref. PTO 82-45A Cond. 18.

3. Except for justifiable reasons during performance testing or under operation of an ACP, for which the permit holder has received prior District written approval, the circulating water shall be kept to the following specification: Circulating water iron chelate (abatement solution) concentration shall be maintained at or above the ppmw concentration recommended in the power plant operating guidelines as necessary to abate H2S emissions from the power plant to the emission limit specified in Condition I.1. ref. PTO 82-45A Cond. 19.

4. All the abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. All primary pressure gauges and flow meters associated with abatement equipment shall be readily identified, maintained in good operating condition and calibrated on a quarterly basis. Alarm systems associated with abatement equipment shall be tested on a quarterly basis. Calibration and maintenance shall be performed according to manufacturer’s recommendations or per the permit holder’s maintenance schedule as needed to maintain the equipment in good working order. ref. PTO 82-45B Cond. 14.

5. All areas in the immediate vicinity and under the permit holder’s responsibility shall be properly treated to control fugitive dust. ref. PTO 82-45B Cond. 17.

6. Fugitive Leaks
   a. Noncondensible gas leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent the emission of non-condensable gases to the atmosphere. Valves, flanges and seals shall be tightened, adjusted, or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere.

   Non-condensable gas leaks shall not (i) exceed (as measured within 1 cm of such leak) 1000 ppm(vol) H2S nor 10,000 ppm(vol) methane nor (ii) exceed emission limits of Rule 455. Such leaks shall be repaired within 24 hours, unless the leak is from essential equipment. If the leak is from essential equipment, the leak must be minimized within 24 hours using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the...
Essential Equipment is defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.

b. Steam and Condensate leaks: Valves, flanges, seals on pumps and compressors, piping and duct systems shall be inspected, maintained and repaired to prevent the emission of steam and condensate to the atmosphere. Valves, flanges and seals shall be tightened, adjusted, or have gasket material added using the best modern practices for the purpose of stopping or reducing leakage to the atmosphere. Valves, flanges, drip legs, threaded fittings and seals on pipelines shall be maintained to prevent or reduce the emission of steam and condensate to the atmosphere as noted below:

Liquid leak rate in pressurized steam and condensate lines shall not exceed 20 ml in 3 minute. Liquid leak rates in excess of 20 ml in 3 minutes shall be repaired within 15 calendar days, excepting those leaks from essential equipment. If the leak is from essential equipment, the leak must be minimized within 15 days using best modern practices and eliminated at the next prolonged outage of the process unit unless an extension is approved by the APCO.

Essential Equipment is defined as equipment which cannot be taken out of service without shutting down the process unit which it serves.

Leak Minimization is defined as the tightening, adjusting, or addition of packing material which surrounds the leak, or the replacement of the valve or flange for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.

The permit holder shall check the power plant for fugitive leaks at least once per quarter. ref. PTO 82-45B Cond. 17.

7. Alternative Compliance Plan

a. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.2, I.4., I.6., and I.7. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.2, I.4., I.6., and I.7. The ACP shall list the specific operating conditions the ACP will supersede.

b. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions I.1. and I.3. The ACP shall list operating parameters such as power output (MW) and abatement solution concentration levels which shall be met in order to meet all applicable emission limits.
limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.1, and I.3. The ACP shall list the specific operating conditions the ACP will supersede.

Facilities Operation

8. All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this Permit shall at all times be maintained in good working order. The equipment shall be operated in a manner necessary to meet all emission limits of the permit. Ref. Rule 240(d), PSD SFB 81-03 Cond. III.

9. The cooling tower shall be maintained in good operating condition. The permit holder shall conduct an integrity inspection of the cooling tower during each scheduled plant overhaul and carry out any repairs necessary to correct all deficiencies encountered. Ref. Rule 240(d)

10. The permit holder shall operate and maintain the following air pollution control equipment at the Unit 20 plant:

a. The non-condensable gas stream exiting from the surface condenser shall be ducted to an operating Stretford process unit.

b. Condensate exiting from the surface condenser shall be treated as necessary to reduce the levels of dissolved hydrogen sulfide. The permit holder shall use a secondary abatement system authorized by the NSCAPCD to accomplish this reduction.

c. The permit holder shall have installed drift controls on the power plant cooling tower to limit drift losses to 0.002 percent or better of the circulating water mass, thus minimizing emissions of particulate matter. Ref. PSD SFB 81-03 Cond. IX.B.

11. The permit holder shall, in any 12 month period, limit unscheduled outages for Unit 20 to no more than a total of 12. The following shall not be used in computing the total outages.

a. scheduled outages (defined as outages with 24 hour advance notice between the steam supplier and permit holder, except in the case of Unit 20 outages resulting from an abundance of hydropower in which case a scheduled outage shall be defined as one hour notice).

b. steam supplier induced outages (such as pressure surge, strainer plugging, etc.).

c. outages of less than 2 hours in duration.

d. outages which do not cause steam stacking.

A violation of the above performance standards is considered a violation of this condition.

The permit holder shall have on file with the District an approved operating protocol describing the methods that will be used to meet the 12 outages in 12 consecutive months performance standard. The protocol must include a description of the operational procedures between the steam supplier and permit holder, permit holder’s operational procedures, and equipment to meet the above standard. The terms and requirements of the protocol may be modified by the Control Officer for good cause upon written request from the permit holder.

The permit holder shall allow the District to inspect all operating logs to verify the total outage hours. These requirements are in addition to the applicable requirements of rule 540.
In the event the permit holder is not able to meet the standards specified above, the following shall be required:

The permit holder shall prepare and submit a revised “plan” to the Control Officer, within 30 days of the end of the month in which the outage limit was exceeded, to achieve the outage standards set forth in this permit condition. At a minimum, the measures to be considered in the “plan” shall include: improved coordination of the power plant and steam field operations, improved alarming and control systems, increased duration of manned operation of the power plant, improved preventative maintenance and design modifications, retrofit of a 100% of steam flow turbine bypass, and retrofit of a 50% of steam flow turbine bypass. In evaluating measures to be taken to prevent future exceedances of the outage standard, outages of less than 2 hours shall be counted. This plan shall also be submitted to EPA for approval if the outage standard is exceeded.

Within 30 days of receipt of the “plan” the Control Officer shall determine whether the “plan” is satisfactory and, if so, shall approve the “plan”. Upon approval, the revised “plan” shall supersede the old plan and become a part of the terms and conditions of this permit.

ref. PSD SFB 81-03 Cond. IX.C., PTO-82-45A Cond.18.

Emergency Standby Wet-Down Pump Diesel Drive Engine Operation

12. Total operating hours used for testing and maintenance of S-6, emergency standby wet-down pump diesel drive engine, shall not exceed 50 hours in any consecutive 12-month period. The total hours of operation do not include use during emergencies. ATC/Temporary PTO 17-10.

13. S-6, emergency standby wet-down pump diesel drive engine, shall only be used because of a failure or loss of all or part of normal electrical power service, except for testing and maintenance as defined in CA HSC 93115.4 (30). ATC/Temporary PTO 17-10.

14. S-6, emergency standby wet-down pump diesel drive engine, shall be equipped with a non-resettable hour counting meter to indicate the number of hours the engine is operated. ATC/Temporary PTO 17-10.

15. S-6, emergency standby wet-down pump diesel drive engine, shall be operated exclusively on California Air Resources Board (CARB) Diesel Fuel. ATC/Temporary PTO 17-10.

16. S-6, emergency standby wet-down pump diesel drive engine, shall be operated according to manufacturer specifications. ATC/Temporary PTO 17-10.

III. Monitoring, Testing and Analysis

Performance Tests

1. The permit holder shall, on a monthly basis, conduct a source test of the cooling tower to determine the H2S emission rate to verify compliance with condition I.1. A mass balance determination of total H2S to the cooling tower based on measured operating conditions may be used to document that the worst case possible H2S emission are less than the emission limit of the plant or District Method 102 shall be utilized to determine the H2S emission rate. The permit holder may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant, including periods when accessing the cooling tower is not possible, while maintaining compliance with all applicable emission limits of Conditions I.1. The ACP shall list operating parameters such as power.
output (MW), target pH, abatement solution concentration levels, and burner/scrubber exit concentrations which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO approved ACP shall consist of all parametric operating guidelines which shall be used to determine compliance with Conditions I.1. The ACP shall list the specific operating conditions the ACP will supersede.

ref. PTO 82-45A Cond. 22.

2. The permit holder shall conduct or cause to be conducted performance tests on the turbine exhaust system to determine the H2S emission rate to verify compliance with condition I.2. Performance tests shall be conducted in accordance with Northern Sonoma County APCD Method 102, unless otherwise specified by EPA. The permit holder shall furnish the Northern Sonoma County APCD, the California Air Resources Board and the EPA (Attn: Air-5) a written report of such tests. All performance tests shall be conducted at the maximum operating capacity of the plant. Performance tests shall be conducted at least on a yearly basis and at such times as shall be specified by EPA.

ref. PSD SFB 81-03 Cond. IX.E.

3. The permit holder shall provide platforms, electrical power and safe access to sampling ports to enable representatives of the District, ARB and EPA to collect samples from the main steam supply, treated and untreated condensate, circulating water upstream of the cooling tower, cooling tower stacks, untreated and treated non-condensable gas stream to and from the Stretford abatement facility, any off gas bypass vents to the atmosphere and any Stretford tanks or evaporative coolers.

ref. PTO 82-45B Cond. 11, PSD SFB 81-03 Cond. IX.E.3.

4. The permit holder, as requested by the Control Officer, shall conduct a District approved performance test for particulate matter (PM), H2S, other species (i.e. benzene, mercury, arsenic, TRS, mercaptans, radon, other nitrogen compounds (amines) and compounds listed under NESHAPS and/or AB2588 from the power plant evaporative cooling tower and/or the Stretford evaporative cooling tower. Upon written request of the Control Officer, the permit holder shall submit to the District at least 45 days prior to testing a detailed performance test plan. The District shall approve, disapprove or modify the plan within 45 days of receipt of the plan. The permit holder shall incorporate the District’s comments or modifications to the plan which are required to assure compliance with the District’s regulations. The Control Officer shall be notified 15 days prior to the test date in order to arrange for an observer to be present for the test. The test results shall be provided to the District within 45 days of the test date unless a different submittal schedule is approved in advance by the Control Officer. ref. PTO 82-45A Cond 9 &10.

5. Compliance with the particulate mass emission limitation shall be estimated using calculations based on the evaporative cooling tower manufacturers design drift eliminator drift rate, 0.001 percent for the main cooling tower and 0.005% for the Stretford cooling tower, multiplied by the circulating water rate or Stretford solution circulating rate and, total dissolved solids (TDS) and total suspended solids (TSS). A circulating water sample shall be collected and analyzed for TDS and TSS on a monthly basis. ref. PTO 82-45A Cond. 21

6. Main steam supply H2S concentrations shall be determined minimally on a weekly basis and any additional times as required by the operating protocol or ACP. Ref. PTO 82-45A Cond.19.

7. The permit holder shall perform an abatement solution concentration test of the cooling tower circulating water once per operating shift when abatement solution is necessary in
order to achieve compliance with Condition I.1. The testing equipment shall be kept calibrated per the manufacturer’s specifications. ref. PTO 82-45A Cond. 19.

8. Instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations shall receive District approval prior to use. Test plans shall be submitted for District approval of instruments used for the measurement of H2S or Total Organic Gases to satisfy District permit conditions or regulations. ref. Rule 240(d)

9. All sampling protocols, chemical feed charts, targets and operational guidelines for using said charts and targets, necessary to abate H2S emissions from the power plant to the emission limits specified in Conditions I.1 and I.2 must be developed using good engineering judgment and supporting data. The APCO may review such sampling protocols, chemical feed charts, targets and guidelines upon request. If the APCO determines that any of the protocols, feed charts, targets, or guidelines are not sufficient to maintain compliance with Conditions I.1 and I.2, the APCO shall require the permit holder to develop revised protocols, feed charts, targets and guidelines. ref. Rule 240(d)

Continuous Compliance Monitoring (CCM)

10. The permit holder shall operate a continuous compliance monitor capable of measuring the concentrations of H2S in the exhaust stream from the Stretford absorber in order to verify compliance with conditions I.1 and I.3. The monitoring system must alarm the operator when H2S in the treated gas is in excess of 10 ppmv. The permit holder shall respond to the alarm with appropriate mitigative measures. Mitigative measures taken shall be logged in the power plant abatement log book. In the event H2S concentrations are in excess of 10 ppmv and the range of the CCM is exceeded, the permit holder shall test for H2S using an approved alternative method (ex Draeger tester, wet chemical tests) once every hour during the excess. The monitor shall have a full range of at least 50 ppmv. The monitor shall meet the following operational specifications: an accuracy of plus or minus 10% of full scale, provide measurements at least every 3 minutes, provide a continuous strip chart record or a District approved alternative, and provide monthly data capture of at least 90%. The District must be notified when the concentration of H2S exceeds the hourly average limit of 10 ppmv.

A one point calibration shall be performed at least once per week. A three point calibration shall be performed at least once per quarter.

The Control Officer may allow modifications to the above specifications under an ACP upon written request with justification by the permit holder as long as emissions from the power plant do not exceed the “total” H2S emission limitations of condition I.1. Written notification from the Control Officer must be received by the permit holder prior to any change in monitoring specifications. Ref. PTO 72-45B Cond. 19.

Ambient Air Monitoring

11. The permit holder shall maintain and operate one H2S/meteorological monitoring station, PM-10 high volume station at a location approved in advance by the Control Officer for the life of the facility. The permit holder shall install and operate additional monitoring stations, such as a PM 2.5 monitoring station, if required by the Control Officer, California Air Resources Board or EPA. Participation by the permit holder in a joint air monitoring program, such as the Geysers Air Quality Monitoring Program (GAMP), shall be deemed to satisfy all ambient air quality monitoring requirements of this permit provided the term of monitoring is equivalent. The Control Officer can alter, suspend, or cancel this requirement provided no ambient air quality standard applicable to this facility is
threatened or that sufficient other monitoring is available by the District, Lake County AQMD or other third party. ref. PTO 82-45A Cond. 22, PSD SFB 81-03, 82-AFC-1 Cond. 13.

**Emergency Standby Wet-Down Pump Diesel Drive Engine**

12. At any time as specified by the Control Officer, the operator of this source shall conduct a District approved source test to determine NOx and particulate emissions from the emergency standby wet-down pump diesel drive engine. The test results shall be provided to the District within 30 days of the test.

**IV. Recordkeeping**

1. All records and logs shall be retained for a period of at least 5 years from the date the record or log was made and shall be submitted to the NSCAPCD upon request.

2. The permit holder shall maintain a weekly abatement solution inventory log available for on-site inspection. ref. Rule 240(d)

3. The permit holder shall maintain a strip chart or other District approved data recording device of H2S readings measured by the CCM. All measurements, records, and data shall be maintained by the permit holder for at least five (5) years. The permit holder shall report all exceedances of Condition I.3 in the quarterly report as required in V.1. The report shall include a description of all measurements taken to bring the Stretford system back into compliance with Condition I.3. The permit holder shall include in the report a copy of the output from the H2S CCM or alternative District approved data during the upset condition. ref. Rule 240(d)

4. The permit holder shall maintain copies of the source test results as required in condition III.1 for a minimum of 5 years. ref. PTO 82-45A cond. 22.

5. Fugitive Leak Records
   a. Any noncondensible gas leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. ref. PTO 82-45A cond. 20.
   b. Any valve, flange, drip leg threaded fitting or seal on a pipeline or condensate collection system with a leak in excess of the limitations of condition II.12 which has been detected by the permit holder and is awaiting repair shall be identified in a manner which is readily verifiable by a District inspector. Any leak in the above listed pieces of equipment exceeding the limitations of II.7 and not identified by the permit holder and which is found by the District shall constitute a violation of this Permit. The permit holder shall maintain a current listing of such leaks awaiting repair and shall make this list available to the District upon request. ref. PTO 82-45A cond. 20.

6. The permit holder shall maintain records detailing:
   a. any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action.
   b. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.3, and I.4.
   c. fugitive steam and non-condensable gas emission source inspections, leak rates, repairs and maintenance.
7. The permit holder shall maintain records detailing:
   a. hours of operation.
   b. types, concentrations and amounts of chemicals used for Stretford absorbing solution and used for condensate treatment including target levels for abatement solution concentration in the circulating water.
   c. a summary of any irregularities that occurred with a continuous compliance monitor.
   d. the dates and hours in which the emission rates were in excess of the emission limitations specified in permit conditions I.1, and I.2.
   e. periods of scheduled and unscheduled outages and the cause of the outages.
   f. time and date of all pump and flowmeter calibrations required by this permit.
   g. time and date of all alarm system tests
   h. leaking equipment awaiting repair; time and date of detection and final repair.

   Ref. Rule 240(d)

8. In order to demonstrate compliance with the above permit conditions, records shall be maintained in a District approved log, shall be kept on site, and made available for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information summarized on a monthly basis:
   a. Total engine operating hours.
   b. Emergency use hours of operation.
   c. Maintenance and testing hours of operation.
   d. Hours of operation to comply with the requirements of NFPA 25.
   e. Type and amount of fuel purchased.

   V. Reporting

1. A quarterly report shall be submitted to the District which contains the following information:
   a. CCM availability for the given quarter.
   b. any periods of significant abatement equipment malfunction, reasons for malfunctions and corrective action taken.
   c. Time and date of any monitor indicating an hourly average exceed of 10 ppmv of H2S.
   d. Source test results.
   e. Steam stacking events

   The quarterly report shall be submitted to the District within 30 days of the end of each quarter. The reports are due by May 1, August 1, November 1 and February 1 for each corresponding quarter.

   ref. Rule 240(d)

2. An annual report shall be submitted to the District which contains the following information:
   a. average mainsteam H2S and ammonia concentrations.
   b. average total dissolved and suspended solids and average flowrate of the cooling tower water.

   Deleted: i. total H2S, PM-10 and PM 2.5 annual emissions to date
c. annual ammonia emissions.
d. gross megawatt hours generated.
e. steaming rate, gross average (gross steam flow; lb/ gross MW).
f. update to any changes in operating protocols used to determine plant chemical feed charts and targets; calibration and maintenance programs.
g. total organic gasses emitted as methane.
h. hours of plant operation.
i. annual CO2e emissions

The annual report shall be submitted to the District within 45 days of the end of each calendar year.

Ref. Rule 240(d)

3. The permit holder shall submit reports to the California Air Resources Board (CARB) in accordance with the provisions of CCR Title 17, Division 3, Chapter 1, Subchapter 10, Article 2, Regulation for Mandatory Reporting of Greenhouse Gas Emissions.

Steam Stacking

The permit holder shall, on a quarterly basis, provide a written report to the District with the outage events, cause of each outage and the balance of events for the year. The Control Officer may change the frequency of reporting. The permit holder shall inform the District when total outages have reached 12 in any consecutive 12 month period. The District shall be notified within 5 days of the 12th outage.

B. PLANT WIDE PERMIT CONDITIONS

The plant shall comply with the following District regulations. The text of the referenced regulations can be found in Appendix A of this Title V Operating Permit.

1. Regulation 1 Rule 400-General Limitations
2. Regulation 1 Rule 410-Visible Emissions
3. Regulation 1 Rule 430-Fugitive Dust Emissions
4. Regulation 1 Rule 492 (40 CFR part 61 Subpart M)-Asbestos
5. Regulation 1 Rule 540-Equipment Breakdown
6. Regulation 2- Open Burning
7. If in the event this stationary source, as defined in 40 CFR part 68.3, becomes subject to part 68, this stationary source shall submit a risk management plan (RMP) by the date specified in part 68.10. As specified in Parts 68, 70 and 71, this stationary source shall certify compliance with the requirements of part 68 as part of the annual compliance certification required by 40 CFR part 70 or 71.
8. 40 CFR Part 82- Chlorinated Fluorocarbons
9. If in the event this stationary source, as defined in 40 CFR part 63, becomes subject to part 63, this stationary source shall notify the District within 90 days of becoming subject to the regulation. The stationary source shall identify all applicable requirements of part 63 and submit a plan for complying with all applicable requirements.
C. ADMINISTRATIVE REQUIREMENTS

Payment of Fees

1. This Permit shall remain valid during the 2-year term as long as the annual renewal fees are paid in accordance with Regulation 1 Rule 300 and Rule 360 of the District. Failure to pay these fees will result in forfeiture of this permit. Operation without a permit subjects the source to potential enforcement action by the District and the EPA pursuant to section 502(a) of the Clean Air Act. ref. Reg 5.670

Right to Entry and Inspection

2. The Control Officer, the Chairman of the California Air Resources Board, The Regional Administrator of the EPA and/or their authorized representatives, upon the presentation of credentials, shall be permitted:
   A. to enter upon the premises where the source is located or areas in which any records are required to be kept under the terms and conditions of this Permit; and
   B. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Permit; and
   C. to inspect any equipment, operation, or method required in this Permit; and
   D. to sample emissions from the source. ref. Reg 5.610(e)

Compliance with Permit Conditions

3. This Title V Operating Permit expires on August 8, 2026. The permit holder shall submit a complete application for renewal of this Title V Operating Permit no later than 6 months prior to expiration and no earlier than one year prior to expiration. If a complete application for renewal has not been submitted in accordance with these deadlines, the facility may not operate after August 7, 2026. ref Reg 5.660

4. The permit holder shall comply with all conditions of this permit. Any non-compliance with the terms and conditions of this permit will constitute a violation of the law and may be grounds for enforcement action, including monetary civil penalties, permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. ref. Reg 5.610(f)(3)

5. In the event any enforcement action is brought as a result of a violation of any term or condition of this permit, the fact that it would have been necessary for the permit holder to halt or reduce the permitted activity in order to maintain compliance with such term or condition shall not be a defense to such enforcement action. ref. Reg 5.610(f)(4)

6. The filing of a request by the facility for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated non-compliance does not stay the applicability of any permit condition. ref. Reg 5.610(f)(5)

7. This permit does not convey any property rights of any sort, nor any exclusive privilege. ref. Reg 5.610(f)(2)

8. The permit holder shall supply within 30 days any information that the District requests in writing to determine whether cause exists, per Regulation 5.570, for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. ref. Reg 1 Rule 200, Reg 5.430

Reporting
9. All deviations from permit requirements, including those attributable to upset conditions (as defined in the permit) must be reported to the District at least once every six months. For emissions of a hazardous air pollutant (HAP) or a toxic air pollutant (as identified in an applicable regulation) that continue for more than an hour in excess of the permit requirements, the report must be made within 24 hours of the occurrence. For emissions of any regulated air pollutant, excluding those HAP emission requirements listed above, that continue for more than two hours in excess of permit requirements, the report must be made within 48 hours. All reports of deviation from permit requirements shall include the probable cause of the deviation and any preventative or corrective action taken. A progress report shall be made on a compliance schedule at least semi-annually and shall include the date when compliance will be achieved, an explanation of why compliance was not, or will not be, achieved by the scheduled date, and a log of any preventative or corrective action taken. The reports shall be certified by the responsible official as true, accurate and complete.

ref. Reg 5.625

Severability

10. In the event that any provision of this permit is held invalid all remaining portions of the permit shall remain in full force and effect. ref. Reg 5.610(g)

Transfer of Ownership

11. In the event of any changes in control or ownership of facilities to be modified and/or operated, this Permit is transferable and shall be binding on all subsequent owners and operators. The permit holder shall notify the succeeding owner and operator of the existence of this Permit and its conditions by letter, a copy of which shall be forwarded to the Control Officer. ref. Rule 240(jj)

Records

12. Notwithstanding the specific wording in any requirement, all records for federally enforceable requirements shall be maintained for at least five years from the date of entry and shall include: date, place and time of sampling, operating conditions at the time of sampling, date, place and method of analysis and the results of the analysis. ref. Reg 5.615

Emergency Provisions

13. The permit holder may seek relief from enforcement action in the event of a breakdown, as defined by Regulation 1 Rule 540 of the District's Rules and Regulations, by following the procedures contained in Regulation 1, Rule 540 (b). The District will thereafter determine whether breakdown relief will be granted in accordance with Regulation 1, Rule 540 (b)(3). ref. Reg 5.640

14. The permit holder may seek relief from enforcement action for a violation of any of the terms and conditions of this permit caused by conditions beyond permit holders reasonable control by applying to the District's Hearing Board for a variance pursuant to Health and Safety Code Section 42350. The Hearing Board will determine after notice and hearing whether variance relief should be granted in accordance with the procedures and standards set forth in Health and Safety Code Section 42350 et seq. Any variance granted by the Hearing Board from any term or condition of this permit which lasts longer than 90 days will be subject to EPA approval. ref. Reg 1 Rule 600

15. Notwithstanding the foregoing, the granting by the District of breakdown relief or the issuance by the Hearing Board of a variance will not provide relief from federal...
enforcement unless the Title V Operating Permit has been modified pursuant to Regulation 5 or other EPA approved process.  ref. Reg 1 Rule 600

Malfunction

16. The Regional Administrator shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above allowable emissions limit stated in Condition I.2. In addition, the Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Condition I.2, and the methods utilized to restore normal operations. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or of any law or regulations which such malfunction may cause.  ref. PSD SFB 81-03 Cond. IV.

Permit Posting

17. Operation under this permit must be conducted in compliance with all data specifications included in the application which attest to the operator’s ability to comply with District rules and regulations. This permit must be posted in such a manner as to be clearly visible and accessible at a location near the source. In the event that the permit cannot be so placed, the permit shall be maintained readily available at all times on the operating premises.  ref. Rule 240(i)

Compliance Certification

18. Compliance Report and certifications shall be submitted annually by the responsible official of this facility to the Northern Sonoma County Air Pollution Control District and to the EPA. Each compliance certification shall be accompanied by a written statement from the responsible official which certifies the truth, accuracy, and completeness of the report.  ref. Reg 5.650

19. This Permit does not authorize the emission of air contaminants in excess of those allowed by the Health & Safety Code of the State of California or the Rules and Regulations of the Northern Sonoma County Air Pollution Control District. This Permit cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other governmental agencies.  ref. Rule 240(d)

Permit Modification

20. The permit holder shall comply with all applicable requirements in NSCAPCD Regulation 1 Chapter II- Permits and New Source Review.  ref. Regulation 1 Rule 200

III. APPLICABLE EMISSION LIMITS & COMPLIANCE MONITORING REQUIREMENTS SUMMARY

The following table provides an informational summary of the permit terms and conditions specified in Part II, Permit Conditions.
## SOURCES: POWER PLANT (S-1 THROUGH S-4)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Emission Limit</th>
<th>Emission Limit/ Citation</th>
<th>Monitoring Type</th>
<th>Monitoring Frequency</th>
<th>Monitoring Requirement Citation</th>
<th>FE Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Sulfide</td>
<td>50 g/hr/GMW</td>
<td>Regulation 1 Rule 455(b)</td>
<td>Source Test</td>
<td>Monthly</td>
<td>Permit Condition III.1</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>4.7 kg/hr</td>
<td>Permit Condition I.1</td>
<td>Source Test</td>
<td>Monthly</td>
<td>Permit Condition III.1</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>4.7 kg/hr</td>
<td>Permit Condition I.1</td>
<td>Main Steam H2S</td>
<td>Weekly</td>
<td>Permit Condition III.1</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>10.4 lb/hr</td>
<td>Permit Condition I.1</td>
<td>Source Test</td>
<td>Annual</td>
<td>Permit Condition III.1</td>
<td>Y</td>
</tr>
<tr>
<td>exit conc. From Stretford Absorber shall not exceed 10 ppmv H2S averaged over 60 minutes</td>
<td>Permit Condition I.3</td>
<td>CCM</td>
<td>Continuous</td>
<td>Permit Condition III.1</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>exit conc. From Stretford Absorber shall not exceed 125 ppmv H2S</td>
<td>Permit Condition I.4</td>
<td>CCM</td>
<td>Continuous</td>
<td>Permit Condition III.1</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>PM2.5</td>
<td>0.20 grains/scf</td>
<td>Regulation 1 Rule 420(d)</td>
<td>Source Test</td>
<td>As Requested</td>
<td>Permit Condition III.1</td>
<td>N/A</td>
</tr>
<tr>
<td>PM10</td>
<td>40 lb/hr from cooling tower</td>
<td>Permit Condition I.6</td>
<td>TDS &amp; TSS Sample</td>
<td>Monthly</td>
<td>Permit Condition III.4</td>
<td>Y</td>
</tr>
<tr>
<td>Visible Emissions</td>
<td>Ringlemann 2</td>
<td>Regulation 1 Rule 410</td>
<td>VEE</td>
<td>As Requested</td>
<td>Permit Condition III.5</td>
<td>Y</td>
</tr>
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</table>

### Commented [SP1]:
Request to delete synthetic minor permit condition. Refer to preamble for more detailed explanation.

### Commented [SP2]:
Request to delete synthetic minor permit condition. Refer to preamble for more detailed explanation.
IV. Test Methods

The following table indicates the test methods associated with emission limits referenced in Section V, Applicable Emission Limits and Compliance Monitoring Requirements:

<table>
<thead>
<tr>
<th>Applicable Requirement</th>
<th>Description of Requirement</th>
<th>Acceptable Test Methods</th>
<th>SIP-Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation 1 Rule 455</td>
<td>Geothermal Emission Standards</td>
<td>NSCAPCD Approved Modified Method 102</td>
<td>No</td>
</tr>
</tbody>
</table>
V. GLOSSARY

Abatement Solution
Iron chelate or any other District approved compound used to chemically treat H2S in the steam condensate

ACP
Alternative Compliance Plan. A list of all parametric monitoring data to be collected and recorded as a means of determining compliance with the H2S emission limits.

APCO
Air Pollution Control Officer

BACT
Best Available Control Technology

CAA
The federal Clean Air Act

CCM
Continuous Compliance Monitor

CCM Availability
Hours CCM is in operation divided by the hours the primary abatement system is in service.

CEQA
California Environmental Quality Act

CFR
The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

Cold Startup
Starting the power plant from inactive status

District
The Northern Sonoma County Air Pollution Control District

EPA
The federal Environmental Protection Agency

Federally Enforceable, FE
All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60, (NSPS), Part 61, (NESHAPs), Part 63 (HAP), and Part 72 (Permits Regulation, Acid Rain).

GPH
Gallons per hour
HAP
Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by both 40 CFR Part 63, and District Regulation 2, Rule 5.

Irregularity
Period of time a CCM monitor reading is not consistent with other verifiable data or information.

Low Flow
The flowrate below 10% of the required flowrate of the back-up caustic scrubber pumps.

Major Facility
A facility with potential emissions of regulated air pollutants greater than or equal to 100 tons per year, greater than or equal to 10 tons per year of any single hazardous air pollutant, and/or greater than or equal to 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity as determined by the EPA administrator.

MW
Megawatts

N/A
Not Applicable

NESHAPs
National Emission Standards for Hazardous Air Pollutants contained in 40 CFR Part 61

NSCAPCD
Northern Sonoma County Air Pollution Control District

NMHC
Non-methane Hydrocarbons

NSR
New Source Review. A federal program for preconstruction review and permitting of new and modified sources of air pollutants for which the District is classified "non-attainment". Mandated by Title I of the Clean Air Act and implemented by 40 CFR Parts 51 and 52 as well as District Regulation 1, Rule 220.

PM
Total Particulate Matter

PM10
Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns.

Primary Pressure Gauges and Flowmeters
All pressure gauges and flow meters used for parametric compliance verification.
Prolonged Outage
The scheduled shutdown of a unit lasting longer than 1 week.

PSD
Prevention of Significant Deterioration. A federal program for permitting new and modified sources of air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 1, Rule 220.

SIP
State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Ambient Air Quality Standards. Mandated by Title I of the Act.

Standby Spare
A back-up piece of equipment available for use in the event the primary piece of equipment fails.

Sulfur Compounds
Any inorganic compound containing sulfur

Sulfur Oxides calculated as Sulfur Dioxide
Oxides of sulfur normalized to the molecular weight of sulfur dioxide.

Title V
Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOG
Total Organic Gasses

TDS
Total Dissolved Solids

TRS
Total Reduced Sulfur

TSS
Total Suspended Solids
Units of Measure:

ft³ = cubic feet

g = grams

gal = gallon

hr = hour

lb = pound

in = inches

psia = pounds per square inch, absolute

ppmv = parts per million, volume

scfm = standard cubic feet per minute

yr = year

VEE
Visible Emissions Evaluation
VI. Appendix A

The following applicable regulations are referenced in Section II; Permit Conditions.
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<th>RULE NO.</th>
<th>RULE TITLE</th>
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**Appendix B to Regulation 1 - Continuous Monitoring**** All | 13-Oct & 4-Nov-77 | Approval | 43FR59488 | 21-Dec-78 | 22-Jan-79 | Federally Enforceable |
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GEYSERS POWER COMPANY LLC  
STEAMFIELD TITLE V PERMIT APPLICATION  
Northern Sonoma County Air Pollution Control District  
Regulations I 5

NOTES

* Rule 410(c) eventually changed to 410(b)(1) through (6), all of which were never federally approved.

** Rules 490 and 492 were neither approved nor disapproved. However, US EPA has delegated authority to the NSCAPCD to enforce these rules (43FR36248).

*** On April 13, 1982, (47FR15784), US EPA approved several NSCAPCD Rules under Regulation 2 - Open Burning Regulations. These approved Rules, although federally enforceable, should not apply to Geothermal Title V Permit applications, with the exception of save Rule 220.

**** Appendix D to Regulation I, “Continuous Monitoring”, is, in fact, Appendix B to Regulation 1, “Continuous Monitoring” (43FR59488). US EPA made an error. However, it is listed in detail in the event interpretation may apply it to the “continuous parametric monitors”.

By virtue of their incorporation into the SIP, all the above listed rules are federally enforceable. However, for Title V permit application purposes, only those rules that directly relate to the operation of the sources are included in the Title V permit application.

The following list of SIP incorporated federally enforceable NSCAPCD rules are applicable for the sources listed in the Geysers Power Company LLC Title V Permit application.

200, 220, 240, 300(a), 310(f), 400(b), 410(a), 420, 430, 440, 455(a), 490, 492, 500, 540, Regulation 5, and 40 CFR Part 82 (Ozone, Refrigeration). Enforceable conditions from ATC’s included where required.

In addition to SIP incorporated NSCAPCD rules, the following NSCAPCD rules, which are not federally enforceable, are listed for Title V permit application purposes.

Rule 140 - Emergency Conditions

Rule 230 - Action on Applications

Rule 250 - Appeals

Rule 260 - Exclusions

Rule 370 - Air Toxics “Hot Spots” Assessment

Rule 455(b)&(c) - Geothermal Emission Standards

Rule 616 - Interim Variance

Rule 618 - Modification of Increments of Progress

NOTE: Rule 220 is the basis for BACT making H2S and other mass emission limits federally enforceable per NSCAPCD NSRS review.
CONDITION OF CERTIFICATION
BIOLOGICAL RESOURCES 5-1a

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
Injun Mine pond below Unit 16 (road down to pond is inaccessible)
Replacement guzzler above Unit 16
Guzzler below Unit 17
Reconstructed "Joe Guzzler" above Unit 18
Replacement guzzler east of Unit 18
Replacement guzzler east of Unit 18
Pond between Post 3 and Unit 18
Pond below Unit 20
Outlet of pond below Unit 20
CONDITION OF CERTIFICATION
BIOLOGICAL RESOURCES 5-1b

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.
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2020 Final Monitoring Report

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EXECUTIVE SUMMARY

The state endangered plant Geysers panicum (*Panicum acuminatum* var. *thermale*¹) was monitored from 2012 through 2020 at the Geysers geothermal area in Sonoma County according to the Memorandum of Understanding (MOU) between Calpine Corporation and the California Department of Fish and Wildlife (CDFW) dated November 20, 2012. Geysers panicum has been monitored since 1982 at The Geysers as a requirement by the California Energy Commission (CEC) for the operation of Geysers Geothermal Power Plant Unit 20.

The monitoring activities during the period of the current MOU, which spans 2012-2021, follow the methods described in the MOU’s Exhibit 1: Monitoring Plan for Geysers Dichanthelium (*Dichanthelium thermale* var. *acuminatum*). Monitoring occurred at three-year intervals in 2014, 2017, and 2020 at the ten populations (corresponding with seven known occurrences of Geysers panicum tracked in the California Natural Diversity Database (CNDDDB)) present at the Geysers geothermal area. The results of the 2014 and 2017 monitoring events were presented in letter reports to CDFW at the end of those years, and population trends were compared with 2008 monitoring data which were used as a baseline.

Results from 2020 monitoring are presented in this final report along with summaries and analysis from across the monitoring period (2012-2021). Smaller population sizes were observed in 2014 and 2020- both years were dry with precipitation around 50 percent of normal, and with preceding dry years. In contrast, population sizes in 2017 were larger than previous years, most likely due to above- average rainfall in 2017 and average rainfall in 2016. Population 2 declined in size in 2020 while populations 4 and 6 show trends of increasing over the monitoring period. Population 3 seems to show a general trend towards decline; however, in 2017 the total number of plants (70) was the largest since 2005. Over the monitoring period there has been no evidence of vehicles accessing abandoned roads within or near populations 2 and 8, or vehicles driving off the paved roadbed at populations 1, 2, and 4 where Geysers panicum grows on slopes on either side of the road.

Geothermal surface manifestations fluctuated in intensity as well as size and spatial distribution at some of the populations while geothermal surface activity remained fairly constant at others. At the locations where changes were observed, the distribution of Geysers panicum also shifted- in most cases resulting in a similar overall population size. Over the course of the monitoring period there were also several fires that burned through a handful of the Geysers panicum populations. Fortunately, being a perennial grass Geysers panicum appears to have been largely unaffected by

¹ The synonymy recognized by Jepson Flora Project editors and the California Native Plant Society Inventory of Rare and Endangered Plants for Geysers panicum has changed since the start of the MOU monitoring period. At the time of preparation of this report, the accepted taxonomy was *Panicum acuminatum* Sw. var. *thermale* (Bol.) Wipff.
the fires and in some areas new seedlings were observed where the fires eliminated competing vegetation.

While four decades of periodic monitoring have documented the Geysers panicum population changes over time, concluding that all monitored populations are extant and have not seen major decline as a result of operations and maintenance activities (or for any other reason), continued monitoring of these populations is recommended at an interval of once every four years. ESA further recommends incorporating phytosanitary best management practices into ongoing monitoring to prevent the inadvertent introduction or spread of invasive plants and pathogens, and recommends alternative methods for estimating population sizes for accessible and inaccessible populations, respectively.
CHAPTER 1

Introduction

1.1 Purpose

Environmental Science Associates (ESA) prepared this final monitoring report on behalf of Calpine Corporation in accordance with the Memorandum of Understanding (MOU) by and between Geysers Power Company, LLC. and the California Department of Fish and Wildlife (CDFW), and the Monitoring Plan for Geysers Dichanthelium (Dichanthelium acuminatum subsp. thermale) that is included as Attachment 1 to the MOU (monitoring plan). This report documents the results of the 2020 monitoring of Geysers panicum (Panicum acuminatum var. thermale\(^2\)) and summarizes the results from across the monitoring period of the MOU which covers 2012-2021. In accordance with the MOU and associated monitoring plan, ten populations of Geysers panicum, located at The Geysers in Sonoma County, California, were monitored once every three years from 2012 through 2021.

The purpose of ongoing monitoring is to document and assess trends, changes, and threats to the existing populations of Geysers panicum at The Geysers.

1.2 Regulatory Requirements

In 1982 the California Energy Commission (CEC) and CDFW were concerned that the construction and operation of Geysers Geothermal Power Plant Unit 20 (Unit 20) could adversely affect the population of Geysers panicum at Little Geysers (California Natural Diversity Database (CNDDB) occurrence 3, population 7). Geysers panicum is listed as endangered under the California Endangered Species Act and is considered a species of concern by the U.S. Fish and Wildlife Service. Pacific Gas and Electric Company (PG&E) agreed to monitor the grass as part of the licensing agreement for Unit 20 (Condition Bio 5-3). The Little Geysers population of Geysers panicum has been monitored and researched since 1982 (see Research and Monitoring History below), and the results indicate that fluctuations in the plant populations are affected by variations in annual rainfall and not by geothermal development activities (PG&E, 2000). However, CEC and CDFW were concerned that populations of this plant would be vulnerable to unintentional habitat degradation or destruction because they are accessible by roads, and in some cases are located adjacent to roads. The monitoring program covered by the 2012 MOU along with monitoring from the previous two decades were designed to detect unintentional habitat degradation.

\(^2\) The synonymy recognized by Jepson Flora Project editors and the California Native Plant Society Inventory of Rare and Endangered Plants for Geysers Panicum has changed since the start of the MOU monitoring period. At the time of preparation of this report, the accepted taxonomy was Panicum acuminatum Sw. var. thermale (Bol.) Wipff.
1.3 Research and Monitoring History


1.3.1 Summary of Research and Monitoring Results

Monitoring and research of Geysers panicum starting in 1982 have focused on the demography, physiological ecology, population dynamics, and geographic distribution of Geysers panicum. Initial studies conducted by PG&E (de Becker, 1990) from 1982 to 1989 focused on investigating various methods for detecting population change of Geysers panicum, measuring soil and tissue boron concentrations, and preliminary plant water relationships. De Becker (1990) concluded that before a meaningful monitoring program could be designed, an understanding of the unique ecology of Geysers panicum was needed.

From 1992 to 1994 Gerrit Platenkamp with Jones & Stokes and Bruce Pavlik with Mills College continued the monitoring program and studied the effects of environmental factors on the physiology and population ecology of Geysers panicum under contract with PG&E. The results of that study (PG&E, 1995; Pavlik and Enberg, 2001; Pavlik, 2001) indicated that soil temperature and soil moisture dynamics associated with surface geothermal manifestations strongly affect germination, growth, and survival of Geysers panicum. Elevated temperatures near fumaroles causes higher germination rates, lower seedling mortality rates, and higher growth rates than at locations further away from fumaroles. Optimum average soil temperatures for these processes range from 20 to 30°C. Rain storms strongly affect soil temperatures; therefore, the amount and distribution of precipitation are likely to have an indirect effect on population dynamics. Ambient temperatures were shown to affect soil temperatures at 10 centimeters depth. Boron deposition did not appear to affect the plant, and little evidence was found for a competitive effect from the nonnative grass broomsedge (*Andropogon virginicus*) at Little Geysers.

From 1995 to 1999, population size and soil temperature at Little Geysers were measured annually and precipitation data were compiled for Geysers Power Plant Unit 13 (PG&E, 2000). The status of all known occurrences of Geysers panicum were assessed at three-year intervals. The results of the study (PG&E, 2000) combined with those of the previous years as well as monitoring and research between 2000 and 2011 showed that population size fluctuations are largely caused by changes in population density and that only small changes in patch size occurred (Platenkamp and deBecker, 2011). Population density fluctuations are strongly dependent on precipitation occurring two winters prior to the density measurement (PG&E, 2000), due to effects of rainfall on emergence and survival. Regression analysis showed that when the effect of rainfall is removed, no trend over time in the residual population size could be discerned.
CHAPTER 2
Methods

2.1 Monitoring Dates and Staff

On September 29, 2020 ESA botanists Rachel Brownsey and Joe Sanders visited three of the ten populations of Geysers panicum at The Geysers in Sonoma County; populations 1, 7, and 10 (Figure 1). CDFW staff Jeb Bjerke and Raffica La Rosa attended the monitoring visits at population 7 (CNDDB occurrence 3) and population 1 (CNDDB occurrence 1). Due to hazardous air quality conditions resulting from the nearby Glass fire, the September monitoring visit was cut short and rescheduled. The subsequent survey was conducted on October 29, 2020 by ESA botanist Rachel Brownsey and biologist Julie McNamara. The remaining seven populations were monitored on this date; populations 2, 3, 4, 5, 6, 8, and 9.

2.2 Geysers Panicum Population Monitoring

Each of the ten Geysers panicum populations was visited in 2020 and population size, geographic distribution, plant health, and population age distribution were assessed at a qualitative level, and in comparison with previous monitoring site visits. The following qualitative data were recorded for each population:

- Habitat assessment, including extent and activity of surface geothermal features;
- Apparent threats to the Geysers panicum population, if any;
- Occurrence of significant land use changes or incidents in the vicinity of the population that could have an effect on the plant’s habitat, and;
- General status of the Geysers panicum population.

This information is included in Chapter 3 (Results) as well as on the CNDDB forms contained in Appendix A.

In 2020, ESA mapped the extent of existing populations using global positioning system (GPS) with sub-meter accuracy (Trimble R1 GNSS receiver with Esri’s ArcGIS Collector application) or hand-recorded on aerial images of the population using a mobile device (tablet computer or smartphone) in order to update the population figure (Figure 1). The boundaries shown on Figure 1 correspond with the outside limit of the populations; all populations have a patchy distribution corresponding with the geothermal conditions of suitable microsites within the larger population area. ESA also carried out a more localized count of individuals within population patches at populations 2, 3, 4, 5, and 8 because these populations are accessible or partially accessible, such that monitors can see individual plants and make an informed estimate.
2. Methods

Populations 1, 9, and 10 are inaccessible and were estimated at a distance based on previous estimates. Population 7 (Little Geysers) is accessible and a localized count of individuals within population patches is recommended for any future monitoring.

2.3 Photo Documentation

A permanent photograph location was established in 2008 at each population at a point where a typical portion of the Geysers panicum population was visible. In 2008, a photograph was taken at each point with a Pentax Optio W30 digital camera in wide angle setting with focal length = 6.3 mm (equivalent to a focal length of 38 mm of a 35 mm camera) on a tripod. Since 2011 higher resolution photographs were taken with digital single-lens reflex (DSLR cameras) set at approximately 21 - 38 mm focal length (depending on site conditions). The height of the optical axis of the lens was approximately 54 inches.

In 2008, the photograph locations were marked with a non-corroding plastic resin core plant stake with an aluminum tree tag. The coordinates of the location (latitude and longitude in decimal degrees, NAD83) were recorded with a GPS unit and compass bearing from camera to subject (optical axis) was also recorded (declination = 15°) (Table 1). Coordinates were differentially corrected. In 2020, the monitoring points were relocated with a EOS Arrow global positioning system (GPS) unit with submeter accuracy. Many of the original stakes were relocated while a few located in stream channels, in active geothermal locations, or on shallow rocky substrate were not found. Hardcopy prints of the 2008, 2011, 2014, and 2017 photographs were used to match the viewfinder image on the camera in 2020. In some cases, new growth of trees and shrubs, or steam, blocked part of the images in 2020.

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Geyser's Panicum (Panicum acuminatum var. thermale) Populations

Photodocumentation Points

See Inset 1

See Inset 2

See Inset 3

See Inset 4

See Inset 5

See Inset 6

Inset 1

Inset 2

Inset 3

Inset 4

Inset 5

Inset 6

Population 1

Population 2

Population 3

Population 4

Population 5

Population 6

Population 7

Population 8

Population 9

Population 10

CNDDB Occurrence #1 (n=50,000)

CNDDB Occurrence #2 (n=2,255)

CNDDB Occurrence #3 (n=101,254)

CNDDB Occurrence #4 (n=3,415)

CNDDB Occurrence #7 (n=369)

CNDDB Occurrence #10 (n=1,850)

CNDDB Occurrence #1 (n=50,000)

CNDDB Occurrence #2 (n=2,255)

CNDDB Occurrence #3 (n=101,254)

CNDDB Occurrence #4 (n=3,415)

CNDDB Occurrence #7 (n=369)

CNDDB Occurrence #10 (n=1,850)
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In 2017, a photopoint was added at population 8 (CNDDB occurrence 10), and designated as Point 8B. This photo location shows the presence and distribution of Geysers panicum plants along the slope to the east of that shown from photo monitoring location 8. Plants shown in photos at monitoring location 8 have died or been washed downslope with eroded material since 2008 and oak trees have grown up to block much of the photo frame. The original photo at population 8 should continue to be taken through the end of the monitoring period; however, its utility in representing this population is expected to continue to be limited in future years.

Figure 1 shows the location of the monitored populations, the corresponding CNDDB occurrence number, and estimated population size. Photographs taken at the permanent monitoring locations in 2008 and 2020 are provided in Appendix B.
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CHAPTER 3
Results

This section discusses the results of 2020 monitoring and compares them with the results from previous monitoring to discuss overall population and habitat status and trends. Monitoring reports from 2014 and 2017 are included as Appendices C and D, respectively; all other research documentation and earlier reports can be provided upon request.

Local climate conditions in 2020 were substantially drier than average. A total of 26.80 inches of precipitation was measured at the Whispering Pines CDEC station [http://cdec.water.ca.gov] between October 2019 and October 2020. This total is around 53 percent of average. Previous studies have shown that the amount of rainfall can strongly affect population size in Geysers panicum (Platenkamp 2005; Platenkamp and De Becker 2011). Drier conditions have the result that at the end of the dry season less meteoric (rain- and snow-derived) water is available in the soil and therefore less geothermal steam will be observed at the surface.

Several populations of Geysers panicum have been affected by wildfires during the monitoring period. Populations 5, 6, and 7 were affected by the Valley Fire that occurred in September 2015 and burned a substantial part of the Geysers area. The fire burned trees and shrubs at these sites. The 2019 Kincade Fire burned areas around populations 1 and 2; and the downstream (western) extent of population 4 was heavily burned. The effects of these wildfires on the individual populations are discussed below.

3.1 Population and Habitat Status and Trends

Occurrence 1 – Historic Geysers Resort Site, Population #1

This large population (50,000 plants) is in stable condition and the habitat has not substantially changed over the monitoring period. Upslope of the road, a small eroded area was evident in 2017, and in 2020 many of the plants upslope of the road appeared to be stressed (very little green vegetation was observed). Most plants downslope of the road appear to be in good health with green leaves sprouting from the base of the plant. No dead plants were observed.

Occurrence 2 – Hot Springs Creek, Populations #2 and #3

Population 2 had a total of 2,255 plants in 2020. There was a steep drop in the total number of plants on the upslope side of the road (east), and also several areas of mortality downslope of the road (west). In previous years, population 2 supported around 10,000 plants. Very few plants (around 50) were observed growing along Hot Springs Creek upslope of the road, whereas in previous years there were hundreds of plants in the creek bed and along the north bank of the creek. There are Geysers panicum plants growing in the roadside ditch upslope of Burned
3. Results

Mountain Road and along the roadcut, both north and south of Hot Springs Creek. Plants in the roadside ditch and adjacent slope are healthy and there are some seedlings.

There was quite a bit of mortality observed downslope of Burned Mountain Road (see additional photo of population 2 following the photos from established photopoints). There was some isolated mortality of plants at the active geothermal feature shown in the photo. This feature has eroded since 2014 causing some plants along the banks to loose substrate.

Hot Springs Creek continues to support a diverse suite of wetland plants including many non-natives such as Bermuda grass (*Cynodon dactylon*) and watergrass (*Echinochloa* sp.), as well as native cattails (*Typha* sp.) and smartweed (*Persicaria* sp.). The areas downslope of Burned Mountain Road have abundant geothermal activity, which, in combination with the dry conditions in 2020 could be part of the reason for the many patches of mortality at this site.

Although population 3 showed an upward population trend in 2017 (23 plants), it has generally been in decline since 2008 when 70 plants were observed. In 2020, a total of 12 individuals were observed, in two discrete patches- one at the photo point location (7 plants) and the other around 50 feet downstream (5 plants). Only three living plants were observed in 2014 while 21 plants were observed in 2011. Population 3 occurs on a dry rocky slope where there has been some localized erosion. It is also an increasingly shaded channel; the effect of canopy cover is unknown. Bermuda grass appears to be increasing in and adjacent to the channel, and smilo grass (*Stipa miliacea*) was observed for the first time in this channel in 2020.

**Occurrence 3 – Little Geysers Area, Populations #6 and #7**

Population 6 has been steadily increasing over the past decade, with 854 plants in 2020; double the number from the 2017 monitoring event. The largest area of increase is at the eastern extent where there is a now a large floodplain terrace dominated by Geysers panicum. Three-hundred fifty plants were observed in 2017, 400 in 2014, 200 in 2011, 180 plants in 2008, and 120 plants in 2005. The population increase could be the result of erosion of the creek banks that provides new substrate for the Geysers panicum plants. Several years ago Calpine enlarged the culvert under the road downstream of the population. The original undersized culvert had caused substantial upstream deposition and that process has now been reversed, and apparently has benefitted the Geysers panicum.

The hillslopes along both sides of the creek at Population 6 burned in 2015 during the Valley Fire. There is quite a bit of downed woody material on the slopes but so far no erosion or deposition of large wood debris has been observed in this creek segment in or around the Geysers panicum patches. Shrub regeneration on the slopes to the north by bush poppy (*Dendromecon rigida*), yerba santa (*Eriodictyon californicum*), and re-sprouting oak trees may be providing soil stability.

Population 7 is the Little Geysers population that has remained in stable condition over the past several years. The total number of individuals is estimated at 100,400. The distribution has shifted slightly with some areas declining and other areas increasing, but overall the population size has remained stable. In 2020 there were small areas of localized mortality, mainly associated
with areas of greater geothermal surface activity, including many vents, but overall the patches appeared to be multi-aged with some seedlings scattered throughout.

The Little Geysers area burned during the Valley Fire in 2015. The fire killed many of the knobcone pine (*Pinus attenuata*), McNab cypress (*Hesperocyparis macnabiana*) and manzanita (*Arctostaphylos* sp.) at the Little Geysers which is apparent in monitoring photos (Appendix B). There is no evidence that Geysers panicum plants were burned, and in 2017 monitors observed some seedlings on the bare substrate under the shrubs adjacent to existing Geysers panicum patches. The exotic grass broomsedge bluestem (*Andropogon virginicus* var. *virginicus*) has a very patchy distribution at this site and is mainly located near the streams. It also did not show any evidence of adverse effects from the fire.

**Occurrence 4 – USGS Bench Mark 2163, Population #5**

Geysers panicum plants at population 5 appeared to be stressed in 2020 but still had some green vegetation and were therefore considered “alive.” This is consistent with what was observed in 2017 when most of the plants appeared dormant. The total number of plants in 2020 was estimated at 3,415, down from 4,000 in 2017. Around 4,100 plants were observed in 2014 and 4,500 in both 2008 and 2005. Mudpots, fumaroles, and vents were very active during monitoring events in 2014, 2017, and 2020, and this surface activity may be related to the change in population size over the monitoring period.

**Occurrence 7 – Big Sulphur Creek Rd., Population #4**

Population 4 has increased over the monitoring period, though the 369 total plants observed in 2020 is down from the 500 plants were observed in 2017. Around 435 plants were observed in 2014, 300 in 2011, and 200 in 2008.

Part of the population decrease from 2017 could be attributed to relatively drier conditions; however, only five individuals were observed at the upstream (upslope) location in 2020, and none of these are visible in the monitoring photo from 2020. The upstream location does not appear to have much geothermal activity and over the monitoring period has filled in with upland annual grasses, primarily wild oats (*Avena barbata*).

The downstream location has seen an increase in plant numbers over the monitoring period as well as an increase in extent (now extending further downstream) and all plants in the channel appear to be vigorous with many young plants. The 2019 Kincade Fire burned portions of the downstream extent, and Geysers panicum may be responding positively to the decrease in canopy cover which was quite dense prior to the fire. Currently there is no evidence of erosion in this portion of the creek channel as a result of fire.

**Occurrence 10 – Sulphur Bank Drive Area, Populations #8, #9, and #10**

Populations 8, 9, and 10 collectively remain stable with approximately 1,850 plants. This is a drop from the 2,000 plants observed in 2017, 2014, and 2008, but 2020 was substantially drier than 2017. There was some mortality of plants on the west end of population 8 just upslope of the road and this is evident in the site photo; most of the plants present along the slope in the photo foreground have either died or slid downslope with eroded material. Due to this population shift,
along with two growing oak trees that now obscure part of the monitoring photo, ESA established another photo location: 8b. Photo 8b faces the same slope and is located further to the east (Appendix B). In addition, in 2017 monitors observed vigorous young plants and many seedlings spreading in the abandoned roadbed while in 2020 the roadbed appeared to be invaded by Bermuda grass. The decrease in the size of population 8 is the source of population size change for CNDDB occurrence 10.

Population 9 is considered stable. Most plants appear to be healthy and have green leaves at the base. No mortality was observed and the population extent does not appear to have decreased.

Population 10a had very vigorous growth in 2020 and appears to have increased over the monitoring period (see population 10a monitoring photo; Appendix B). Several seedlings were observed on the slope and mature plants are green and vigorous. Population 10b is now somewhat difficult to assess from the monitoring photo because of the trees and shrubs that obscure the view of this inaccessible slope. While many of the plants in population 10B appear stressed, they have green leaves at the base, and no change in population extent was evident.

### 3.2 Additional CNDDB Occurrence Information

Based on information from the 2005 monitoring report (Platenkamp, 2005), which draws on earlier monitoring and research information, the following useful notes are included about Geysers panicum populations and CNDDB occurrence numbers:

- More than one population described in the first PG&E report (1995) are grouped together into CNDDB occurrences that are less than 0.25 miles apart. There are no CNDDB occurrences #5 and #9 probably as a result of combining populations into occurrences that are less than 0.25 miles apart.
- CNDDB occurrence #6 has not been found since it was first reported in 1977, and is presumed extirpated.
- CNDDB occurrence #8 is most likely identical to CNDDB occurrence #4, but was probably given incorrect coordinates when it was initially reported. Based on the description of the location of these CNDDB occurrences, they should be considered identical.
CHAPTER 4
Conclusions and Recommendations

The monitoring of Geysers panicum during the monitoring period of the current MOU (2012-2021) has successfully documented habitat and population changes over time. Similar to earlier monitoring periods, the current monitoring period has observed trends that are consistent with the research conducted in the 1990’s and 2000’s. Population sizes tend to be lower in dry years and higher in years with above-average precipitation. Mortality is often observed in association with shifting surface activity of geothermal features, and with natural erosion on steep slopes. No damage or destruction of Geysers panicum or its habitat were observed during the monitoring period, and no evidence of human use was observed at any of the populations.

Wildfires within and adjacent to Geysers panicum populations do not appear to have negatively affected the populations, potentially as a result of the fact that this perennial grass often has substantial living vegetation during the fire season (late summer-fall) and grows in areas that are not densely vegetated and therefore do not carry groundfires. Invasive plants are persistent at several populations (populations 2 and 7), and Bermuda grass appears to be expanding at populations 3 and 8.

Monitoring results spanning four decades have documented the population changes over time, concluding that all monitored populations are extant and have not seen major decline. However, continued monitoring of these populations is recommended, at an interval of once every four years. A reduced interval is proposed based on the results of studies and monitoring of stable populations, Calpine’s demonstrated success in avoiding impacts to roadside populations 1, 2, and 4 during road and infrastructure maintenance activities, and to further minimize the potential effects of monitoring activities on the Geysers panicum habitat conditions.

In order to address a number of monitoring challenges, as well as to ensure the continued protection of Geysers panicum populations, ESA presents the following recommendations for future monitoring:

1. Implement phytosanitary best management practices (BMPs) during monitoring work to prevent the introduction and spread of introduced plants and pathogens. Human access to populations of Geysers panicum is extremely limited. While Calpine Corporation has no control over spread of propagules by deer and other wildlife, spread resulting from future population monitoring and from vehicle use on paved roads should avoid inadvertent introductions, to the greatest extent feasible. Future monitoring should emphasize monitoring roadsides near Geysers panicum populations for new weed introductions, and include management recommendations. Weeds such as sweet clover (Melilotus spp.) and stinkwort (Dittrichia graveolens) have been observed along roadsides on Big Sulphur Creek Road and
Burned Mountain Road and may tolerate moderate levels of boron and other extreme soil conditions associated with geothermal surface manifestations.

2. Monitor patch sizes at populations 2, 3, 4, 5, 6, 7, 8, and 10a where access is feasible and safe. This will allow for a more precise tabulation of population size. GPS technology can be utilized to map and track individual patches within these populations. Research by de Becker and Platenkamp (2011) demonstrated that population sizes fluctuate over time due to increases or decreases in number of individuals within patches while patch sizes remain relatively constant.

3. Utilize drone-based aerial photography methods to monitor inaccessible populations 1, 9, and 10b.
CHAPTER 5

References


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Appendix A
CNDDDB Forms
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Date of Field Work (mm/dd/yyyy): 09/29/2020

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐

Total No. Individuals: 50,000

Subsequent Visit? Yes ☐ No ☐ Unk. ☐

Is this an existing NDDB occurrence? Yes, Occ. #

Collection? If yes: no ☐ Yes, Occ. # ☐ No ☐ Unk. ☐

Report: Rachel Brownsey, Joseph Sanders

Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816
E-mail Address: rbrownsey@esassoc.com
Phone: 916.564.4500

Plant Information

Phenology: % vegetative ☐ % flowering ☐ % fruiting ☒

Animal Information

# adults ☐ # juveniles ☐ # larvae ☐ # egg masses ☐ # unknown ☐

wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other ☐

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma
Landowner / Mgr: Private

Quad Name: The Geysers
Elevation: 1600’

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐
Source of Coordinates (GPS, topo. map & type): GPS

Horizontal Accuracy: 1 m meters/feet

 Geographic (Latitude & Longitude) ☐

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐

Coordinates: Photo monitoring point 38.8002777, -122.8052216

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:
Annual grassland and bare, steep eroded slope on geothermally altered soil, mostly facing south.

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances: many plants upslope of the road appeared to have very minimal green vegetation; no additional erosion since 2017

Comments: This occurrence is in stable condition. Generally plants appear to be in good health with green leaves sprouting from the base of the plants. Several of the plants upslope of the road appeared to be stressed (very little green vegetation) but still alive.

Determination: (check one or more, and fill in blanks)
Keyed (site reference): ☐
Compared with specimen housed at: ☐
Compared with photo / drawing in: ☐
By another person (name): ☐
Other: previous identification

Photographs: (check one or more)
Plant / animal ☐
Habitat ☐
Diagnostic feature ☐

May we obtain duplicates at our expense? ☐ yes ☐ no
Date of Field Work (mm/dd/yyyy): 10/29/2020

California Native Species Field Survey Form

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐ If not found, why?

Total No. Individuals: 2,255 Subsequent Visit? Yes ☐ No ☐

Is this an existing NDDB occurrence? 2 ☐ No ☐ Unk.

Collection? If yes: no ☐ Number ☐ Museum / Herbarium

Reporter: Rachel Brownsey, Julie McNamara
Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816
E-mail Address: rbrownsey@esassoc.com
Phone: 916.564.4500

Plant Information

Phenology: 100

  % vegetative  % flowering  % fruiting

Animal Information

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma ☐ Landowner / Mgr: Private

Quad Name: The Geysers ☐ Elevation: 1900’

T _____ R _____ Sec _____, 1/4 of _____ 1/4, Meridian: H O M O S O Source of Coordinates (GPS, topos. map & type): GPS

T _____ R _____ Sec _____, 1/4 of _____ 1/4, Meridian: H O M O S O GPS Make & Model: Trimble R1

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy: 1 m meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐

Coordinates: Photo monitoring point for population #2: 38.78915787, -122.7792587 Photo monitoring point for population #3: 38.788080596, -122.782111575

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perchering, roosting, etc., especially for avifauna):

Population #2: steep drop in number of plants from 2017 on the upslope (east) and downslope (west) of the side of the road; growing with diverse wetland vegetation, including non-natives such as Bermuda grass (Cynodon dactylon), watergrass (Echinochloa sp.), native cattails (Typha sp.) and smartweed (Persicaria sp.). Area is highly geothermally active.

Population #3: plants observed in two discrete patches along a dry rocky slope with some localized erosion and an increasingly shaded channel; Bermuda grass also appears to be increasing, along with smilo grass (Stipa milacea).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances: Erosion of active geothermal feature (population #2)

Threats: Erosion and competition with Bermuda grass

Comments: This occurrence is comprised of populations #2 and #3. Both populations 2 and 3 had many fewer plants than previous years. The size of population 3 has fluctuated quite a bit over the monitoring period; this population has experienced some erosion, and is located in a steep, shaded canyon.

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference):

☐ Compared with specimen housed at: ____________________________

☐ Compared with photo / drawing in: ____________________________

☐ By another person (name): ____________________________

☐ Other: previous identification

Photographs: (check one or more)

☐ Plant / animal

☐ Habitat

☐ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no

CDFW/BBDB/1747 Rev. 7/15/2015
Date of Field Work (mm/dd/yyyy): 10/29/2020

Scientific Name: *Panicum acuminatum* var. *thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐ If not found, why?

Total No. Individuals: 101,254 Subsequent Visit? Yes ☐ No ☐

Is this an existing NDDB occurrence? 3 ☐ No ☐ Unk.

Collection? If yes: No ☐ Number ☐ Museum / Herbarium ☐

Plant Information

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<tr>
<th>Phenology</th>
<th>% vegetative</th>
<th>% flowering</th>
<th>% fruiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
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<td></td>
<td></td>
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</tbody>
</table>

Animal Information

- # adults
- # juveniles
- # larvae
- # egg masses
- # unknown

- wintering □ breeding □ nesting □ rookery □ burrow site □ lek □ other □

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma Landowner / Mgr: Private

Quad Name: The Geysers Elevation: 2700’

T ___ R ___ Sec ___, ___ 1/4 of ___ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T ___ R ___ Sec ___, ___ 1/4 of ___ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Trimble R1

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy: 1 m meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐

Coordinates: Photo monitoring point for population #6: 38.772460937500, -122.752235412597

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Plants growing in a variety of geothermally altered habitats, along streams, on slopes of various exposures, surrounded by annual grassland. A 2015 fire killed many of the McNab cypress (Hesperocyparis macnabiana) and manzanita shrubs (Arctostaphylos sp.). The exotic grass broomsedge bluestem (Andropogon virginicus var. virginicus) has a very patchy distribution at this site and is mainly located near the stream. Shrub regeneration along the slopes to the north by bush poppy (Dendromecon rigidia), yerba santa (Eriodictyon californicum), and resprouting oak trees may be providing soil stability.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): Excellent ☐ Good ☐ Fair ☐ Poor ☐

Immediate AND surrounding land use: Geothermal development

Visible disturbances: Flooding of Little Geysers Creek causes some erosion and deposition of geothermal materials (population #6).

Threats:

Comments: Although the population declined slightly in 2017 from 400 in 2014 to 350 in 2017, Population #6 is steadily increasing, with 854 plants in 2020. Population #7 has remained stable, with the total number of individuals estimated at 100,400, although in 2020 there were a few areas of localized mortality around geothermal features.

Determination: (check one or more, and fill in blanks)

- Keyed (cite reference):
- Compared with specimen housed at:
- Compared with photo / drawing in:
- By another person (name): ________________
- Other: previous identification

Photographs: (check one or more)

- Plant / animal
- Habitat
- Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no
Date of Field Work (mm/dd/yyyy): 10/29/2020

California Native Species Field Survey Form

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found?  Yes  No  If not found, why?  

Total No. Individuals: 3,415  Subsequent Visit?  Yes  No

Is this an existing NDDB occurrence?  

Collection? If yes: No  Number  Museum / Herbarium

Report: Rachel Brownsey, Julie McNamara

Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816

E-mail Address: rbrownsey@esassoc.com

Phone: 916.564.4500

Plant Information

Phenology: % vegetative  % flowering  % fruiting

Animal Information

# adults  # juveniles  # larvae  # egg masses  # unknown

- wintering
- breeding
- nesting
- rookery
- burrow site
- lek
- other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma  Landowner / Mgr: Private

Quad Name: The Geysers  Elevation: 2054'

DATUM: NAD27  NAD83  WGS84  Horizontal Accuracy: 1 m

Coordinate System: UTM Zone 10  UTM Zone 11  OR

Coordinates: Photo monitoring point for population #5: 38.78323746, -122.7701416

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil surrounded by annual grassland. Mostly on south-facing slope 5-15% in full sun. Extremely active mudpots, fumaroles, and vents.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population):  Excellent  Good  Fair  Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances:  

Threats: Increased natural geothermal activity

Comments: Population #5 appeared to be stressed with very little green vegetation, and may be affected by increased natural geothermal activity in the area. This was consistent with what was observed in 2017 when most of the plants appeared dormant.

Determination: (check one or more, and fill in blanks)

□ Keyed (site reference):
□ Compared with specimen housed at:
□ Compared with photo / drawing in:
□ By another person (name):
□ Other: previous identification

Photographs: (check one or more)

Plant / animal
Habitat
Diagnostic feature

May we obtain duplicates at our expense?  Yes  No

CDFW/BDB/1747 Rev. 7/15/2015
Date of Field Work (mm/dd/yyyy): 09/29/2020

**California Native Species Field Survey Form**

**Scientific Name:** *Panicum acuminatum var. thermale*

**Common Name:** Geysers panicum

**Species Found?**
- [ ] Yes
- [ ] No

**Total No. Individuals:** 369

**Is this an existing NDDB occurrence?**
- [ ] Yes
- [ ] No

**Plant Information**

**Phenology:**
- [ ] 100%

**Habitat Description (plants & animals):**
On geothermally altered soil near thermal hot springs along creek. The upstream location does not appear to have much geothermal activity and has filled in with upland annual grasses, primarily wild oats (*Avena barbata*). Plants also grow on bare soil. Downstream extent of the area was recently burned in 2019 during the Kincade Fire and Geysers panicum responding positively to decrease in canopy cover. Plants are growing on bare soil along the stream channel.

**Animal Information**

**Location Description** (please attach map AND/OR fill out your choice of coordinates, below)

**County:** Sonoma

**Quad Name:** The Geysers

**Elevation:** 1900’

**Datum:** NAD27

**Horizontal Accuracy:** 1 m

**Source of Coordinates (GPS, topo. map & type):** GPS

**GPS Make & Model:** Trimble R1

**Coordinate System:** UTM Zone 10

**Geographic (Latitude & Longitude):**

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<th>Coordinates</th>
<th>Photo monitoring point for population #4: 38.78530121, -122.7749481</th>
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</thead>
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**Habitat Description (plants & animals):**

Plant communities, dominants, associates, substrates, soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil near thermal hot springs along creek. The upstream location does not appear to have much geothermal activity and has filled in with upland annual grasses, primarily wild oats (*Avena barbata*). Plants also grow on bare soil. Downstream extent of the area was recently burned in 2019 during the Kincade Fire and Geysers panicum responding positively to decrease in canopy cover. Plants are growing on bare soil along the stream channel.

Please fill out separate form for other rare taxa seen at this site.

**Site Information**

Overall site/occurrence quality/viability (site + population):
- [ ] Excellent
- [ ] Good
- [ ] Fair
- [ ] Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances: Natural erosion at upstream location in 2017

Threats: relatively drier conditions

Comments:

Population #4 has been increasing in recent years (since 2008 estimate of 200 plants), but has decreased from 500 in 2017 to 369 in 2020. Downstream patches along the creek have increased in extent and all plants in the stream channel appear to be vigorous with many young plants.

**Determination:**

- [ ] Keyed (cite reference):
- [ ] Compared with specimen housed at:
- [ ] Compared with photo / drawing in:
- [ ] By another person (name):
- [x] Other: previous identification

**Photographs:**

- [ ] Slide
- [ ] Print
- [ ] Digital

**Plant / animal**

**Habitat**

**Diagnostic feature**

May we obtain duplicates at our expense? [ ] yes [ ] no
**Date of Field Work (mm/dd/yyyy):** 09/29/2020

### Scientific Name: *Panicum acuminatum var. thermale*

### Common Name: Geysers panicum

<table>
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<tr>
<th>Species Found?</th>
<th>Yes</th>
<th>No</th>
<th>If not found, why?</th>
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<tr>
<td>Total No. Individuals:</td>
<td>1,850</td>
<td>Subsequent Visit?</td>
<td>Yes</td>
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<td>Is this an existing NDDB occurrence?</td>
<td>10</td>
<td>No</td>
<td>Unk.</td>
</tr>
<tr>
<td>Collection? If yes:</td>
<td>no</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Plant Information

- **Phenology:**
  - % vegetative: 99
  - % flowering: 1

### Animal Information

- **# adults:**
  - wintering
  - breeding
  - nesting
  - rookery
- **# egg masses:**
  - burrow site
  - lek
  - other

### Location Description (please attach map AND/OR fill out your choice of coordinates, below)

- **County:** Sonoma
- **Landowner / Mgr:** Private
- **Quad Name:** The Geysers
- **Elevation:** 1650’
- **Source of Coordinates (GPS, topo. map & type):** GPS
- **GPS Make & Model:** Trimble R1
- **Horizontal Accuracy:** 1 m
- **Coordinate System:** UTM Zone 10
- **OR Geographic (Latitude & Longitude):**

#### Habitat Description (plants & animals)

**Animal Behavior** (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Annual grassland around bare geothermally active areas with steam vents. Associated with typical grassland species, e.g., Italian ryegrass (*Festuca perennis*) and soft chess (*Bromus hordeaceus*), and non-native perennial Bermuda grass.

Please fill out separate form for other rare taxa seen at this site.

### Site Information

- **Overall site/occurrence quality/viability (site + population):** Excellent
- **Immediate AND surrounding land use:** Geothermal development
- **Visible disturbances:** natural erosion
- **Threats:**
- **Comments:** Population #8, 9 and 10 remain stable, with some mortality on the west end of population #8, since most of the plants along the slope have either dried or slid downslope, an additional population (#8b) was established further to the east. Pop. #10a has increased with vigorous growth, and Pop. #10b appears somewhat stressed.

### Determination

- **Keyed (cite reference):**
- **Compared with specimen housed at:**
- **Compared with photo / drawing in:**
- **By another person (name):**
- **Other:** previous identification

### Photographs

- **Plant / animal**
- **Habitat**
- **Diagnostic feature**

May we obtain duplicates at our expense? **Yes**

[Manuscript PDF]
Appendix B

Geysers Panicum Monitoring Photos
Population 1- Occurrence 1 – Historic Geysers Resort Area

2008

2020
Appendix B
Geysers Panicum Monitoring Photos

Population 2- Occurrence 2 – Hot Springs Creek

2008

2020
Appendix B

Geysers Panicum Monitoring Photos

Population 3 Occurrence 2 – Hot Springs Creek

2008

2017
Population 4 Occurrence 7 – Big Sulphur Creek Road

0.3 miles south of Burned Mountain Road

2008

2020
Appendix B
Geysers Panicum Monitoring Photos

Population 5 Occurrence 4 – USGS Bench Mark 2163

2008

2020

2020
Population 6 Occurrence 3 – Little Geysers Creek

2008

2020
Population 7 Occurrence 3 – Little Geysers

2008

2020
Population 8 Occurrence 10 – Sulphur Bank Drive Area

2008

2020
Population 8 Occurrence 10 – Sulphur Bank Drive Area
New Photo Point 8B

2017

2020
Appendix B
Geysers Panicum Monitoring Photos

Population 9 Occurrence 10 – Sulphur Bank Drive Area

2008

2020
Population 9 Occurrence 10 – Sulphur Bank Drive Area (zoomed in)

2008

2020
Appendix B
Geysers Panicum Monitoring Photos

Population 10A Occurrence 10 – Sulphur Bank Drive Area

2008

2020
Appendix B
Geysers Panicum Monitoring Photos

Population 10B Occurrence 10 – Sulphur Bank Drive Area

2008

2020
Population 2, view facing downslope from Burned Mountain Road. 
Areas of mortality are circled in pink.
Appendix C

2014 Geysers Dichanthelium Monitoring Report
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November 4, 2014

Cherilyn Burton  
Habitat Conservation Branch  
Department of Fish and Wildlife  
1416 9th Street, Suite 1260  
Sacramento, CA 95814

Subject: 2014 Geysers Dichanthelium Monitoring Report

Dear Ms. Burton:

This memorandum documents the results of the 2014 monitoring of Geysers dichanthelium (Dichanthelium acuminatum ssp. thermale). Ten populations of Geysers dichanthelium, located at The Geysers in Sonoma County, California, are being monitored once every three years from 2008 through 2022 in accordance with the Memorandum of Understanding (MOU) by and between Geysers Power Company, LLC. and the California Department of Fish and Wildlife and the Monitoring Plan for Geysers Dichanthelium (Dichanthelium acuminatum subsp. thermale) that is included as an attachment to the MOU. The purpose of this monitoring is to document and assess trends, changes, and threats to the existing populations of Geysers dichanthelium at The Geysers.

On September 29-30, 2014 ESA botanists Gerrit Platenkamp and Rachel Brownsey visited the ten populations of Geysers dichanthelium at The Geysers in Sonoma County. These populations correspond with six known California Natural Diversity Database (CNDDB) occurrences in this area and have been monitored and studied since the 1980s.


**Standardized Photograph Monitoring Methods**

A permanent photograph location was established in 2008 at each population at a point where a typical portion of the dichanthelium population was visible. In 2008 a photograph was taken at each point with a Pentax Optio W30 digital camera in wide angle setting with focal length = 6.3 mm (equivalent to a focal length of 38 mm of a 35 mm camera) on a tripod. In 2011 and 2014 higher resolution photographs were taken with a Canon EOS Digital SLR set at approximately 38 mm focal length. The height of the optical axis of the lens was approximately 54 inches.
In 2008, the photograph locations were marked with a non-corroding plastic resin core plant stake with an aluminum tree tag. The coordinates of the location (latitude and longitude in decimal degrees, NAD83) were recorded with a GPS unit and compass bearing from camera to subject (optical axis) was also recorded (declination = 15°) (Table 1). Coordinates were differentially corrected. In 2014, the monitoring points were located with a Trimble GeoXT global positioning system (GPS) unit with submeter accuracy. Hardcopy prints of the 2008 and 2011 photographs were used to match the viewfinder image on the camera in 2014 to the 2008 and 2011 images. In some cases new growth of trees and shrubs, or steam, blocked part of the images in 2011 and 2014.

Photographs taken at the permanent monitoring locations for 2008 and 2014 are provided in Figure 1 (attached).

Table 1. Permanent Photograph Monitoring Locations

<table>
<thead>
<tr>
<th>Population Number</th>
<th>CNDDDB Occurrence</th>
<th>Description</th>
<th>Easting</th>
<th>Northing</th>
<th>Bearing (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Occ 1</td>
<td>Historic Geysers Resort Area</td>
<td>-122.805221557617</td>
<td>38.800277709961</td>
<td>122</td>
</tr>
<tr>
<td>2</td>
<td>Occ 2</td>
<td>Hot Springs Creek</td>
<td>-122.779258728027</td>
<td>38.789157867432</td>
<td>226</td>
</tr>
<tr>
<td>3*</td>
<td>Occ 2</td>
<td>Hot Springs Creek (canyon)</td>
<td>-122.781865000000</td>
<td>38.788423000000</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Occ 7</td>
<td>Big Sulphur Creek Rd. 0.3 mi S of Burned Mtn. Rd.</td>
<td>-122.774948120117</td>
<td>38.785301208496</td>
<td>92</td>
</tr>
<tr>
<td>5</td>
<td>Occ 4</td>
<td>USGS Bench Mark 2163</td>
<td>-122.770141601562</td>
<td>38.783237457275</td>
<td>318</td>
</tr>
<tr>
<td>6</td>
<td>Occ 3</td>
<td>Little Geysers Creek</td>
<td>-122.752235412597</td>
<td>38.772460937500</td>
<td>312</td>
</tr>
<tr>
<td>7</td>
<td>Occ 3</td>
<td>Little Geysers</td>
<td>-122.749748229980</td>
<td>38.773571014404</td>
<td>85</td>
</tr>
<tr>
<td>8</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (west)</td>
<td>-122.826438903808</td>
<td>38.807334899902</td>
<td>86</td>
</tr>
<tr>
<td>9</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (central)</td>
<td>-122.822990417480</td>
<td>38.805946350098</td>
<td>280</td>
</tr>
<tr>
<td>10A</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (east)</td>
<td>-122.821418762207</td>
<td>38.806983947754</td>
<td>285</td>
</tr>
<tr>
<td>10B</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (far east)</td>
<td>-122.821418762207</td>
<td>38.806983947754</td>
<td>102</td>
</tr>
</tbody>
</table>

Note: * In steep canyon: no GPS reading possible, coordinates based on aerial image (Google Earth)

Population and Habitat Status and Trends

Natural geothermal surface manifestations continue to fluctuate in intensity throughout the property. Although precipitation for the 2014 water year (October 2013 – September 2014) was far below average (26.4 inches or 53.2% of average at the Whispering Pines CDEC station [http://cdec.water.ca.gov]), the precipitation in the previous two water years was close to average (44.8 and 51.7 inches, or 90.1 and 104.0% of average, respectively). Previous studies have shown that the amount of rainfall can strongly affect population size in Geysers dichanthelium (Platenkamp 2005; Platenkamp and De Becker 2011). Drier conditions have the result that at the end of the dry season less meteoric (rain- and snow-derived) water is available in the soil and therefore less geothermal steam will be observed at the surface.
The following is a summary of the assessments recorded on the CNDDB field survey forms for all known occurrences of Geysers dichanthelium at The Geysers (Attached).

Occurrence 1 – Historic Geysers Resort Site, Population #1

This large population is in stable condition and the habitat has not changed since the site visit in 2011. Most plants appear to be in good health and there are many flowering stalks present from this year. Some erosion has occurred on the slope above the road.

Occurrence 2 – Hot Springs Creek, Populations #2 and #3

Population 2 is in stable condition with plants downslope of Burned Mountain road appearing very healthy and vigorous near the active geothermal features and along the northwest-facing slope on the opposite side of the creek. Hot Springs Creek, upstream of the road, supports dense cover of Bermuda grass (*Cynodon dactylon*) and only a few Geysers dichanthelium plants were observed at the upstream part of the creek after it leaves the wooded area. Upslope of Burned Mountain road there are also a few patches of Geysers dichanthelium along a dirt road that parallels the creek and along the slope that leads down to the creek.

Population 3 has declined over the past several years. Only three living plants were observed in 2014 while 21 plants were observed in 2011 and 70 were observed in 2008. All vegetation cover on the steep south-facing slope where Geysers dichanthelium occurs has declined since the previous monitoring events; this effect is evident in the photo (Figure 1). The south-facing slope where Geysers dichanthelium plants are rooted appeared to be very dry though there is evidence of geothermal activity (salt crust along the slope).

Occurrence 3 – Little Geysers Area, Populations #6 and #7

Population 6 has been steadily increasing over the past decade. Four-hundred plants were observed in 2014, 200 plants in 2011, 180 plants in 2008, and 120 plants in 2005. The population increase could be the result of deposition of geothermal materials on the creek banks from flooding and erosion that could be providing new substrate for the plants.

Population 7 is the Little Geysers population that has remained in stable condition over the past several years. The total number of individuals is estimated at 100,000, an approximately 10% decline compared to 2011. In 2014, plants appeared to be experiencing drought stress evident by much dead above-ground material, few vigorous green leaves, and very few seedlings. Densities for most patches appeared to be lower than in previous years, except on north-facing slopes. The exotic grass broomsedge bluestem (*Andropogon virginicus* var. *virginicus*) has a very patchy distribution at this site and is mainly located near the stream.

Occurrence 4 – USGS Bench Mark 2163, Population #5

Geysers dichanthelium plants at population 5 appeared to be mostly dormant at the time of monitoring in 2014. Although very few plants were observed to be dead, most plants had little green foliage and much dead above-ground material. There were few plants at this site that could be described as vigorous. Some erosion was observed at this site that was not present during previous visits. The total number of plants in 2014 is estimated at
4,100, a decrease from the 5,000 observed in 2011, though not much different from the 4,500 plants observed in 2008 and 2005.

**Occurrence 7 – Big Sulphur Creek Rd., Population #4**
Population 4 has been increasing in recent years. Approximately 435 plants were observed in 2014, up from 300 in 2011, and 200 in 2008. Plants in drier sites appear to be mostly dormant, while plants closer to the geothermal features are vigorous with plenty of green leaves.

**Occurrence 10 – Sulphur Bank Drive Area, Populations #8, #9, and #10**
Populations 8, 9, and 10 collectively remain stable with approximately 2,000 plants. There was some mortality of plants on the west end of population 8 just upslope of the road while vigorous young plants are spreading in the abandoned roadbed. This population shift is evident in the site photo (Figure 1). Population 9 is considered stable. Most plants appear to be healthy despite the dry conditions. Plants of population 10 appeared to be mostly dormant due to drought this year, but most plants have some green leaves and mortality was not observed at this site. The fig trees (*Ficus carica*) and Himalayan blackberry (*Rubus armeniacus*) thickets along the road leading to population 8 have continued to expand making it difficult to access this population.

**Conclusion**
The recent drought conditions appear to have impacted density and dormancy status at some, but not all populations. In cases where population reductions were observed (populations 3 and 8), it is likely that a reduction in the availability of meteoric water (originating from rainfall) is the main cause of plant mortality. Overall, population numbers have remained stable in 2014 when compared with previous monitoring events (2011 and 2008).

Invasive plants, including Bermuda grass and broomsedge bluestem, continue to occupy large areas at populations 2 and 7, respectively. Natural erosion along steep slopes and creek channels where Geysers dichanthelium plants are present could result in plant mortality. However, natural erosion has been limited in extent during the recent monitoring periods, as can be seen in the photo comparisons (Figure 1). At population 6 a substantial increase in population size was observed within an area of active deposition and erosion of sediment.

**References**


Sincerely,

Rachel Brownsey, Project Manager

Attachments:  Figure 1 (photographs)
              California Native Field Survey Forms

cc: Ms. Andrea Martine (CEC)
    Mr. Jeb Bjerke (CDFW)
    Ms. Kristi Lazar (CDFW)
    Mr. Bruce Carlsen (Calpine)
    Ms. Jody Spooner (Calpine)
Population 1- Occurrence 1 – Historic Geysers Resort Area
Population 2- Occurrence 2 – Hot Springs Creek

2008

2014
Population 3 Occurrence 2 – Hot Springs Creek

2008

2014
Population 4 Occurrence 7 – Big Sulphur Creek Road
0.3 miles south of Burned Mountain Road

2008

2014
Population 5 Occurrence 4 – USGS Bench Mark 2163

2008

2014
Population 6 Occurrence 3 – Little Geysers Creek

2008

2014
Population 7 Occurrence 3 – Little Geysers

2008

2014
Population 8 Occurrence 10 – Sulphur Bank Drive Area

2008

2014
Population 9 Occurrence 10 – Sulphur Bank Drive Area

2008

2014
Population 9 Occurrence 10 – Sulphur Bank Drive Area (zoomed in)
Population 10A Occurrence 10 – Sulphur Bank Drive Area

2008

2014
Population 10B Occurrence 10 – Sulphur Bank Drive Area

2008

2014
Determination: 

Photographs:

Dichanthelium acuminatum subsp. thermale

Geysers dichanthelium

Species Found? Yes ☐ No ☐ If not found, why?

Total No. Individuals: 50,000

Subsequent Visit? Yes ☐ ☐ No ☐

Is this an existing NDDB occurrence? 1 ☐ ☐ No ☐ Unk.

Collection? If yes: no ☐ Number ☐ Museum / Herbarium ☐

Plant Information

Phenology:

% vegetative % flowering % fruting

0 0 100

Animal Information

# adults # juveniles # larvae # egg masses # unknown

wintering breeding nesting rookery burrow site lek other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma

Landowner / Mgr: Private

Quad Name: The Geysers

Elevation: 1600’

T ___ R ___ Sec ___ , ___ 1/4 of ___ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topos. map & type): GPS

T ___ R ___ Sec ___ , ___ 1/4 of ___ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Trimble GH

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy: ______________ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐

Coordinates: Photo monitoring point 38.80027771, -122.8052216

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope: Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Annual grassland and bare, steep eroded slope on geothermally altered soil, mostly facing south.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances: some natural erosion on slope above the road.

Threats:

Comments: This occurrence is in stable condition. Plants appear to be in good health and many flowering stalks are present from this year.

Determination: (check one or more, and fill in blanks)

Keyed (cite reference):

Compared with specimen housed at:

Compared with photo / drawing in:

By another person (name):

Other: previous identification

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ Habitat ☐ Diagnostic feature ☐

May we obtain duplicates at our expense? ☐ yes ☐ no

Sonoma Private

0 0 100

p

Geysers dichanthelium

Dichanthelium acuminatum subsp. thermale

Sacramento, CA 95816

Prepared by: Gerrit Platenkamp, Rachel Brownsey

Address: ESA 2600 Capitol Ave, suite 200

E-mail Address: rbrownsey@esassoc.com

Phone: 916.564.4500

California Natural Diversity Database

California Dept. of Fish & Wildlife

1807 13th Street, Suite 202

Sacramento, CA 95811

Fax: (916) 324-0475
e-mail: CNDDB@wildlife.ca.gov

1807 13th Street, Suite 202

California Native Species Field Survey Form

Sacramento, CA 95811

09/30/2014

Date of Field Work (mm/dd/yyyy): 09/30/2014
Date of Field Work (mm/dd/yyyy): 09/30/2014

California Native Species Field Survey Form

Scientific Name: Dichanthelium acuminatum subsp. thermale
Common Name: Geysers dichanthelium

Species Found?  Yes ☐ No ☐
Total No. Individuals: 10,000
Subsequent Visit? Yes ☐ No ☐
Is this an existing NDDB occurrence? 2 Yes, Occ. #
Collection? If yes: no ☐

Animal Information

# adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma  Landowner / Mgr: Private
Quad Name: The Geysers  Elevation: 1900’
T ___ R ___ Sec ____, 1/4 of ___ 1/4, Meridian: H O M O S O Source of Coordinates (GPS, topo. map & type): GPS
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy: ______________________ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐
Coordinates: Photo monitoring point for population #2: 38.78915787, -122.7792587
Photo monitoring point for population #3: 38.78915787, -122.7792587

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:
Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Population #2: Growing along stream in annual grassland, with monkeyflower (Mimulus guttatus) and broomsedge (Andropogon virginicus var. virginicus). Bermuda grass (Cynodon dactylon) is very dense and may be expanding. Area is highly geothermally active.
Population #3: Three plants growing along canyon wall on geothermally altered soil near seeps and geothermal springs in the creek. Plants are growing in the shade of riparian trees and exotic fig (Ficus carica).

Please fill out separate form for other rare taxa seen at this site.

Site Information  Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Geothermal development

Visible disturbances:

Threats: competition with Bermuda grass (population #2), scour from high water (population #3)

Comments: This occurrence is comprised of populations #2 and #3. Population #2 is stable with approximately 10,000 plants. Population #3 has steadily declined over the past several years with only three living plants observed in 2014.

Determination: (check one or more, and fill in blanks)
☐ Keyed (cite reference): __________________________
☐ Compared with specimen housed at: __________________________
☐ Compared with photo / drawing in: __________________________
☐ By another person (name): __________________________
☐ Other: previous identification

Photographs: (check one or more)
☐ Plant / animal  ☐ Habitat  ☒ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no
Determination: Photographs:

Site Information

Animal Behavior

Habitat Description (plants & animals)

Plants growing in a variety of geothermally altered habitats, along streams, on slopes of various exposures. Surrounded by annual grassland, knobcone pine (Pinus attenuata), McNab cypress (Hesperocyparis macnabiana), manzanita (Arctostaphylos sp.), and interior live oak (Quercus wislizenii). The non-native large rattlesnake grass (Briza maxima) noted in 2005 is still present.

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Population #6 is increasing while population #7 shows 10% reduction. Population #7 shows reduced density.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Comments: Population #6 is increasing while population #7 shows 10% reduction. Population #7 shows reduced density. Many plants in population #7 appeared to be dormant, particularly those along the stream which was dry at the time of the survey. Several young plants were observed on the N. facing slope along the creek at population #7.
Scientific Name: Dichanthelium acuminatum subsp. thermale

Common Name: Geysers dichanthelium

Species Found? Yes ☐ No ☐ If not found, why?
Total No. Individuals: 4,100 Subsequent Visit? Yes ☐ No ☐
Is this an existing NDDB occurrence? 4  ☐ No ☐ Unk.
Collection? If yes:  ☐ Number  ☐ Museum / Herbarium

Phenology:

<table>
<thead>
<tr>
<th>% vegetative</th>
<th>% flowering</th>
<th>% fristing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Animal Information

# adults  # juveniles  # larvae  # egg masses  # unknown
wintering  breeding  nesting  rookery  burrow site  lek  other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma  Landowner / Mgr: Private
Quad Name: The Geysers  Elevation: 2054′
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Source of Coordinates (GPS, topo. map & type): GPS
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR GPS Make & Model: Trimble GH
Horizontal Accuracy: 3 meters/feet

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope: On geothermally altered soil surrounded by annual grassland. Mostly on south-facing slope 5-15% in full sun.

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil surrounded by annual grassland. Mostly on south-facing slope 5-15% in full sun.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Geothermal development
Visible disturbances: Natural erosion is increasing
Threats: 
Comments: The estimated number of plants at population #6 has decreased from previous years (5,000 in 2011, 4,500 in 2008 and 2005), and 4,100 in 2014. Plants appear dormant this year with very few green plants.

Determination: (check one or more, and fill in blanks)
☐ Keyed (site reference):
☐ Compared with specimen housed at:
☐ Compared with photo / drawing in:
☐ By another person (name):
☐ Other: previous identification

Photographs: (check one or more)
☐ Slide ☐ Print ☐ Digital
☐ Plant / animal ☐ Habitat ☐ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no

California Native Species Field Survey Form

Date of Field Work (mm/dd/yyyy): 09/29/2014

Clear Form  Print Form

For Office Use Only

Source Code:  Quad Code:  
Elm Code:  Occ Code:  
EO Index:  Map Index:  

Reporter: Gerrit Platenkamp, Rachel Brownsey
Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816
E-mail Address: rbrownsey@esassoc.com
Phone: 916.564.4500

Plant Information

Common Information

Site Information

Animal Information

Determination:

Other:

Plant Information

Habitat Description (plants & animals)

Animal Behavior

Location Description

Date of Field Work (mm/dd/yyyy): 09/29/2014

California Native Species Field Survey Form

For Office Use Only

Source Code:  Quad Code:  
Elm Code:  Occ Code:  
EO Index:  Map Index:  

Reporter: Gerrit Platenkamp, Rachel Brownsey
Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816
E-mail Address: rbrownsey@esassoc.com
Phone: 916.564.4500

Plant Information

Common Information

Site Information

Animal Information

Determination:

Other:
Date of Field Work (mm/dd/yyyy): 09/29/2014

California Native Species Field Survey Form

Scientific Name: Dichanthelium acuminatum subsp. thermale

Common Name: Geysers dichanthelium

Species Found? Yes ☐ No ☐ If not found, why?
Total No. Individuals: 435 Subsequent Visit? Yes ☐ No ☐
Is this an existing NDDB occurrence? ☐ Yes, Occ. # No ☐ Unk.
Collection? If yes: no ☐

Plant Information
Phenology:

<table>
<thead>
<tr>
<th>% vegetative</th>
<th>% flowering</th>
<th>% fruiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Animal Information

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil near thermal hot springs along creek. Associated species include broomsedge, yerba santa (Eriodictyon californicum), and monkeyflower. Plants also grow on bare soil. Area burned in 1991. Plants are also growing on bare soil on eroding banks.

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

On geothermally altered soil near thermal hot springs along creek. Associated species include broomsedge, yerba santa (Eriodictyon californicum), and monkeyflower. Plants also grow on bare soil. Area burned in 1991. Plants are also growing on bare soil on eroding banks.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Geothermal development
Visible disturbances: 
Threats: 
Comments: Population 4 appears to be increasing in recent years. Approximately 435 plants were observed in 2014, up from 300 in 2011 and 200 in 2008. Plants in drier sites appear to be dormant, while plants closer to the geothermal features show plenty of green leaves.

Determination: (check one or more, and fill in blanks)
☐ Keyed (cite reference): 
☐ Compared with specimen housed at: 
☐ Compared with photo / drawing in: 
☐ By another person (name): 
☒ Other: previous identification

Photographs: (check one or more)
☐ Plant / animal 
☐ Habitat ☐ Diagnostic feature 

May we obtain duplicates at our expense? ☐ yes ☐ no
Date of Field Work (mm/dd/yyyy): 09/30/2014

California Native Species Field Survey Form

Scientific Name: Dichanthelium acuminatum subsp. thermale

Common Name: Geysers dichanthelium

Species Found? Yes ☐ No ☐ If not found, why? Subsequent Visit? Yes ☐ No ☐

Total No. Individuals: 2,000

Is this an existing NDDB occurrence? 10

Collection? If yes: no Number Museum / Herbarium

Plant Information

Phenology:

% vegetative % flowering % fructing

Animal Information

# adults # juveniles # larvae # egg masses # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma Quad Name: The Geysers Landowner / Mgr: Private

Elevation: 1650’

T ____ R ____ Sec ____ __1/2 of ____ __1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T ____ R ____ Sec ____ __1/2 of ____ __1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Trimble GH

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Geographic Accuracy: _________________________ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR

Coordinates: Photo monitoring point for population #8: 38.8073349, -122.8264389; population #9: 38.80594635, -122.8214188

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:
Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Annual grassland around bare geothermally active areas with steam vents. Associated with typical grassland species, e.g., Italian ryegrass (Festuca perennis) and soft chess (Bromus hordeaceus), and non-native perennial Bermuda grass.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Geothermal development

Visible disturbances: natural erosion

Threats: 

Comments: Populations #8, #9, and #10 collectively remain stable with approximately 2,000 plants. Some mortality was observed at Population #8 just upslope of the road and there is no evidence of recent road maintenance at this site.

Determination: (check one or more, and fill in blanks)

☐ Keyed (site reference):

☐ Compared with specimen housed at:

☐ Compared with photo / drawing in:

☐ By another person (name):

☐ Other: previous identification

Photographs: (check one or more)

☐ Slide ☐ Print ☐ Digital

☐ Plant / animal ☐ Habitat ☐ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no
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Appendix D

2017 Geysers Panicum Monitoring Report
December 20, 2017

Cherilyn Burton
Habitat Conservation Branch
Department of Fish and Wildlife
1416 9th Street Suite 1260
Sacramento, CA 95814

Subject: 2017 Monitoring of Geysers Panicum Populations at The Geysers

Dear Ms. Burton:

Environmental Science Associates (ESA) is submitting this monitoring report on behalf of Geysers Power Company LLC. in accordance with the Memorandum of Understanding (MOU) by and between Geysers Power Company, LLC. and the California Department of Fish and Wildlife, and the Monitoring Plan for Geysers Dichanthelium (Dichanthelium acuminatum subsp. thermale) that is included as an attachment to the MOU. This report documents the results of the 2017 monitoring of Geysers panicum (Panicum acuminatum var. thermale\(^1\)). Ten populations of Geysers panicum, located at The Geysers in Sonoma County, California, are being monitored once every three years from 2008 through 2022 in accordance with the MOU. The purpose of this monitoring is to document and assess trends, changes, and threats to the existing populations of Geysers panicum at The Geysers.

On November 1 and 2, 2017 ESA botanists Gerrit Platenkamp and Rachel Brownsey visited the ten populations of Geysers panicum at The Geysers in Sonoma County. These populations correspond with six known California Natural Diversity Database (CNDDB) occurrences in this area and have been monitored and studied since the 1980s. The monitoring period in 2017 was postponed from early October 2017 due to local wildfires which created unsafe conditions and poor air quality.


**Standardized Photograph Monitoring Methods**

A permanent photograph location was established in 2008 at each population at a point where a typical portion of the panicum population was visible. In 2008 a photograph was taken at each point with a Pentax Optio W30

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\(^{1}\) The synonymy recognized by Jepson Flora Project editors and the California Native Plant Society Inventory of Rare and Endangered Plants for Geysers Panicum has changed since the start of the MOU monitoring period. At the time of preparation of this letter, the accepted taxonomy was *Panicum acuminatum* Sw. var. *thermale* (Bol.) Wipff.
digital camera in wide angle setting with focal length = 6.3 mm (equivalent to a focal length of 38 mm of a 35 mm camera) on a tripod. Since 2011 higher resolution photographs were taken with a Canon EOS Digital SLR set at approximately 21 - 38 mm focal length (depending on site conditions). The height of the optical axis of the lens was approximately 54 inches.

In 2008, the photograph locations were marked with a non-corroding plastic resin core plant stake with an aluminum tree tag. The coordinates of the location (latitude and longitude in decimal degrees, NAD83) were recorded with a GPS unit and compass bearing from camera to subject (optical axis) was also recorded (declination = 15°) (Table 1). Coordinates were differentially corrected. In 2017, the monitoring points were relocated with a Trimble GeoXT global positioning system (GPS) unit with submeter accuracy. Many of the original stakes were relocated while a few located in stream channels, in active geothermal locations, or on shallow rocky substrate were not found. New stakes with tree tags were placed at photopoint locations lacking a stake in 2017. Hardcopy prints of the 2008, 2011, and 2014 photographs were used to match the viewfinder image on the camera in 2017. In some cases, new growth of trees and shrubs, or steam, blocked part of the images in 2017.

In 2017 a photopoint was added at population 8 (CNDDB occurrence 10), and designated Point 8B. This photo location shows the presence and distribution of Geysers panicum plants along the slope to the east of that shown from photo monitoring location 8. Plants shown in photos at monitoring location 8 have died or been washed downslope with eroded material since 2008 and oak trees have grown up to block much of the photo frame. The original photo at population 8 should continue to be taken through the end of the monitoring period; however, its utility in representing this population is expected to continue to be limited in future years.

Photographs taken at the permanent monitoring locations in 2008 and 2017 are provided in Figure 1 (attached). Figure 2 shows the location of the monitored populations, and the corresponding CNDDB occurrence number.

### Table 1. Permanent Photograph Monitoring Locations

<table>
<thead>
<tr>
<th>Population Number</th>
<th>CNDB Occurrence</th>
<th>Description</th>
<th>Easting</th>
<th>Northing</th>
<th>Bearing (o)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Occ 1</td>
<td>Historic Geysers Resort Area</td>
<td>-122.805221557617</td>
<td>38.800277709961</td>
<td>122</td>
</tr>
<tr>
<td>2</td>
<td>Occ 2</td>
<td>Hot Springs Creek</td>
<td>-122.779258728027</td>
<td>38.789157867432</td>
<td>226</td>
</tr>
<tr>
<td>3</td>
<td>Occ 2</td>
<td>Hot Springs Creek (canyon)</td>
<td>-122.78211157500</td>
<td>38.78808059600</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Occ 7</td>
<td>Big Sulphur Creek Rd. 0.3 mi S of Burned Mtn. Rd.</td>
<td>-122.774948120117</td>
<td>38.785301208496</td>
<td>92</td>
</tr>
<tr>
<td>5</td>
<td>Occ 4</td>
<td>USGS Bench Mark 2163</td>
<td>-122.770141601562</td>
<td>38.783237457275</td>
<td>318</td>
</tr>
<tr>
<td>6</td>
<td>Occ 3</td>
<td>Little Geysers Creek</td>
<td>-122.752235412597</td>
<td>38.772460937500</td>
<td>312</td>
</tr>
<tr>
<td>7</td>
<td>Occ 3</td>
<td>Little Geysers</td>
<td>-122.749748229980</td>
<td>38.773571014404</td>
<td>85</td>
</tr>
<tr>
<td>8</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (west)</td>
<td>-122.826438903808</td>
<td>38.807334899902</td>
<td>86</td>
</tr>
<tr>
<td>8b</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (west)</td>
<td>-122.82615775200</td>
<td>38.80721979500</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (central)</td>
<td>-122.822990417480</td>
<td>38.805946350098</td>
<td>280</td>
</tr>
<tr>
<td>10A</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (east)</td>
<td>-122.821418762207</td>
<td>38.806983947754</td>
<td>285</td>
</tr>
<tr>
<td>10B</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (far east)</td>
<td>-122.821418762207</td>
<td>38.806983947754</td>
<td>102</td>
</tr>
</tbody>
</table>
Population and Habitat Status and Trends

Precipitation during water year 2017 was unusually high at the Geysers as well as throughout the state of California. The Whispering Pines CDEC station [http://cdec.water.ca.gov] recorded 94 inches for water year 2017, which is 188 percent of normal. The water year 2016 total precipitation was 58 inches which is around 116 percent of normal; much closer to the average than water year 2017. Previous studies have shown that the amount of rainfall can strongly affect population size in Geysers panicum (Platenkamp 2005; Platenkamp and De Becker 2011) with greater population densities occurring in the year following a wet year. Seedlings were observed at many populations in 2017, and most mature plants had some green leaves. Flowers were observed only on one plant at Population 8; mature plants had dispersed their seeds earlier in the year. High levels of precipitation also affect the abundance and total biomass of annual vegetation. As evident in many of the 2017 photos, there was abundant cover of annual vegetation in 2017. It should be noted that the heavy rainfall in 2017 also appeared to have resulted in substantial erosion of hill slopes with exposed geothermally altered soils, which affected some of the populations, as described below.

In addition, three sites (Populations 5, 6, and 7) were affected by the Valley Fire that occurred in September 2015 and burned a substantial part of the Geysers area. The fire burned trees and shrubs at these sites, but no direct impacts of the fire on Geysers panicum plants was observed. No burned remnants of plants were evident. The appearance of some of the plants two years after the fire suggests that by removing trees and shrubs that shaded some plants, plants may have benefitted indirectly from the additional exposure to sun light.

The following is a summary of the assessments recorded on the CNDDB field survey forms for all known occurrences of Geysers panicum at The Geysers (Attached).

**Occurrence 1 – Historic Geysers Resort Site, Population #1**

This large population (50,000 plants) is in stable condition and the habitat has not substantially changed since the site visit in 2014, except that at one small area near the road a new eroded area was evident. However, most plants upslope of the road are robust. Most plants downslope of the road appear to be in good health with green leaves sprouting from the base of the plant. No dead plants were observed.

**Occurrence 2 – Hot Springs Creek, Populations #2 and #3**

Population 2 is in stable condition with an approximate population size of 10,000 plants. Plants downslope of Burned Mountain Road appeared very healthy and vigorous. There was some isolated mortality of plants at the active geothermal feature shown in the photo. This feature has eroded since 2014 causing some plants along the banks to loose substrate. Hot Springs Creek continues to support a diverse suite of wetland plants including many non-natives such as Bermuda grass (Cynodon dactylon) and watergrass (Echinochloa sp.). There are patches of Geysers panicum adjacent to the creek, and along the steep northwest-facing eroded banks of the slope.

Upslope of Burned Mountain Road Hot Springs Creek has been downcut on the left bank since monitoring in 2014. This did not affect Geysers panicum plants growing along the steep right bank of the creek, just upslope of the road. These plants are healthy. There are Geysers panicum plants growing in the roadside ditch upslope of Burned Mountain Road, both north and south of Hot Springs Creek. Plants in the roadside ditch are healthy and there are many seedlings. Plants grow along the roadcut above the ditch appeared quite vigorous.
Population 3 had been in decline from 2008 to 2014, but numbers have increased since 2014. In 2017 nine plants were observed on the slope shown in the photo, with an additional 14 plants on the same slope about 30 feet downstream (23 plants total). No mortality was observed and the downstream individuals are very vigorous. Only three living plants were observed in 2014 while 21 plants were observed in 2011 and 70 were observed in 2008. The increase in numbers and individual plant vigor in 2017 likely has to do with the wet conditions over the past year. Population 3 occurs on a dry rocky slope, and this population likely declined during the drought conditions over the past decade. Population 3 is likely showing recovery in response to the high rainfall of 2017.

**Occurrence 3 – Little Geysers Area, Populations #6 and #7**

Population 6 has been steadily increasing over the past decade, although the total number is down slightly in 2017 to 350 from the 400 plants in 2014, and approximately 25 dead individuals were observed. Two-hundred plants were observed in 2011, 180 plants in 2008, and 120 plants in 2005. The population increase could be the result of erosion of the creek banks that provides new substrate for the Geysers panicum plants. Several years ago Calpine enlarged the culvert under the road downstream of the population. The original undersized culvert had caused substantial upstream deposition and that process has now been reversed, and apparently has benefitted the Geysers panicum.

Population 7 is the Little Geysers population that has remained in stable condition over the past several years. The total number of individuals is estimated at 100,000. The distribution has shifted slightly with some areas declining and other areas increasing, but overall the population size has remained stable. This area burned during the Valley Fire in 2015. The fire killed many of the knobcone pine, McNab cypress and manzanita at the Little Geysers and this can be seen in the 2017 photo. There is no evidence that Geysers panicum plants were burned, and some seedlings were observed on the now bare substrate under the shrubs- adjacent to existing Geysers panicum patches. The exotic grass broomsedge bluestem (*Andropogon virginicus* var. *virginicus*) has a very patchy distribution at this site and is mainly located near the streams, it also did not show any evidence of adverse effects from the fire.

**Occurrence 4 – USGS Bench Mark 2163, Population #5**

Geysers panicum plants at population 5 appeared to be mostly dormant at the time of monitoring in 2017, and they could be in slow decline due to increased geothermal activity in this area. Mudpots, fumaroles, and vents were very active during monitoring in 2017. Although few plants were observed to be dead, most plants had little green foliage and much dead above-ground material. The total number of plants in 2017 is estimated at 4,000, just somewhat lower than the 4,100 plants observed in 2014 and lower than population numbers in 2008 and 2005 (4,500 plants).

**Occurrence 7 – Big Sulphur Creek Rd., Population #4**

Population 4 has been increasing in recent years. Approximately 500 plants were observed in 2017, up from 435 in 2014, 300 in 2011, and 200 in 2008. Plants at the drier upstream site (shown in photo) are difficult to see due to the dense annual vegetation; however, many seedlings were observed (25 seedlings) and mature plants (50 individuals) persist. A portion of the slope shown in the photo has eroded since 2014 and Geysers panicum plants either washed down the slope where they remained rooted in the eroded material or died. Overall, the population size estimate was not affected by this event because of substantial recruitment, which increased the overall
population size. Downstream patches along the creek have expanded. Mature plants are robust with many green leaves, and seedlings are dispersed throughout the area.

**Occurrence 10 – Sulphur Bank Drive Area, Populations #8, #9, and #10**

Populations 8, 9, and 10 collectively remain stable with approximately 2,000 plants. There was some mortality of plants on the west end of population 8 just upslope of the road while vigorous young plants and many seedlings are spreading in the abandoned roadbed. This population shift is evident in the site photo (Figure 1); most of the plants present along the slope in the photo foreground have either died or slid downslope with eroded material. Due to this population shift, along with two growing oak trees that now obscure part of the photo, ESA established another photo location: 8b. Photo 8b faces the same slope and is located further to the east.

Population 9 is considered stable. Most plants appear to be healthy and have green leaves at the base. No mortality was observed and the population extent does not appear to have decreased. Plants of population 10 (photo 10A) are healthy and this patch appears to have expanded during the past two years. Several seedlings were observed on the slope and mature plants are green and vigorous. Population 10B appears stable; most plants have green leaves at the base, and no change in population extent was evident. The dense annual vegetation and growth of trees downslope make this population difficult to see in the photo.

**Conclusion**

Average and well above-average precipitation over the past several years has helped maintain healthy populations at all locations. Very little mortality was observed in 2017, with dead plants only in small areas of shifting geothermal activity (Population 5) or recent erosion (Population 8). The Valley Fire of 2015 did not negatively affect populations of Geysers panicum at the Little Geysers (Population 7) Little Geysers Creek (Population 6), or USGS Bench Mark 2163 (Population 5). All other sites were outside of the burned area. Seedlings were observed at many populations and nearly all mature plants had at least some green leaves. Overall, population numbers have remained relatively stable in 2017 when compared with previous monitoring events (2014, 2011 and 2008).

**References**


Ms. Burton  
December 20, 2017  
Page 6


Sincerely,

Rachel Brownsey, Project Manager

Gerrit Platenkamp, Ph.D., Senior Ecologist

Attachments:  Figure 1 (photographs)  
Figure 2 (Known Occurrences of Geysers Dichanthelium)  
California Native Species Field Survey Forms  
Memorandum of Understanding (MOU)

CC:  Bill King, Calpine  
Bruce Carlsen, Calpine  
Eric Veerkamp, California Energy Commission  
Andrea Stroud, California Energy Commission
Population 1- Occurrence 1 – Historic Geysers Resort Area

2008

2017
Population 2- Occurrence 2 – Hot Springs Creek

2008

2017
Population 3 Occurrence 2 – Hot Springs Creek

2008

2017
Population 4 Occurrence 7 – Big Sulphur Creek Road
0.3 miles south of Burned Mountain Road

2008

2017
Population 5 Occurrence 4 – USGS Bench Mark 2163

2008

2017
Population 6 Occurrence 3 – Little Geysers Creek

2008

2017
Population 7 Occurrence 3 – Little Geysers

2008

2017
Population 8 Occurrence 10 – Sulphur Bank Drive Area
Population 8 Occurrence 10 – Sulphur Bank Drive Area
New Photo Point 8B

2017
Population 9 Occurrence 10 – Sulphur Bank Drive Area

2008

2017
Population 9 Occurrence 10 – Sulphur Bank Drive Area (zoomed in)
Population 10A Occurrence 10 – Sulphur Bank Drive Area

2008

2017
Population 10B Occurrence 10 – Sulphur Bank Drive Area

2008

2017
Figure 2.
Known Occurrences of Geysers Dichanthelium

Legend

- Geyser Dichanthelium
- CNDDB Occurrence Number
- Population Number

Moore lacofane Goltsman Inc.
Date of Field Work (mm/dd/yyyy): 11/01/2017

California Native Species Field Survey Form

Scientific Name: *Panicum acuminatum* var. *thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐

Total No. Individuals: 50,000

Is this an existing NDDB occurrence? Yes ☐ No ☐ Unk. ☐

Collection? If yes: Yes, Occ. # ☐ No ☐ Unk. ☐

Plant Information

Phenology:

- % vegetative: 100
- % flowering: 0
- % fruiting: 0

Animal Information

- # adults: 0
- # juveniles: 0
- # larvae: 0
- # egg masses: 0
- # unknown: 0

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma

Landowner / Mgr: Private

Quad Name: The Geysers

Elevation: 1600’

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR

Photo monitoring point 38.80027771, -122.8052216

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Annual grassland and bare, steep eroded slope on geothermally altered soil, mostly facing south.

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perchong, roosting, etc., especially for avifauna):

Places, behavioral observations: Geothermal development

Site Information Overall site/occurrence quality/viability (site + population): Excellent ☐ Good ☐ Fair ☐ Poor ☐

Immediate AND surrounding land use: Geothermal development

Visible disturbances: some natural erosion on slope above the road; no new erosion since 2014.

Threats: 

Comments: This occurrence is in stable condition. Plants appear to be in good health with green leaves sprouting from the base of the plants.

Determination: (check one or more, and fill in blanks)

- Keyed (site reference):
- Compared with specimen housed at:
- Compared with photo / drawing in:
- By another person (name):
- Other: previous identification

Photographs: (check one or more)

- Plant / animal:
- Habitat:
- Diagnostic feature:

May we obtain duplicates at our expense? Yes ☐ No ☐

Gerrit Platenkamp, Rachel Brownsey

Address: ESA 2600 Capitol Ave, suite 200

Sacramento, CA 95816

E-mail Address: rbrownsey@esassoc.com

Phone: 916.564.4500

Panicum acuminatum var. thermale

Geysers panicum

Sacramento, CA 95816
Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐ If not found, why?

Total No. Individuals: 10,023

Is this an existing NDDB occurrence? 2 Yes, Occ. # ☐ No ☐ Unk.

Collection? If yes: no ☐

Number ☐ Museum / Herbarium ☐

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma ☐ Landowner / Mgr: Private ☐

Quad Name: The Geysers ☐ Elevation: 1900’ ☐

T _____ R _____ Sec _____, 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐

Source of Coordinates (GPS, topo. map & type): GPS ☐

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Horizontal Accuracy: 1m ☐

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR ☐

GPS ☐ Geographic (Latitude & Longitude) ☐

Coordinates: Photo monitoring point for population #2: 38.78915787, -122.7792587

Photo monitoring point for population #3: 38.788080596, -122.782111575

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Population #2: Growing along stream in annual grassland, with diverse wetland vegetation, including non-natives such as Bermuda grass (Cynodon dactylon) and watergrass (Echinochloa sp.). Area is highly geothermally active.

Population #3: Plants are growing on the dry, rocky slope of a stream bank in the shade of riparian trees and exotic fig (Ficus carica).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐

Immediate AND surrounding land use: Geothermal development ☐

Visible disturbances: Erosion of active geothermal feature (population #2) ☐

Threats: Erosion and competition with Bermuda Grass (population #2) ☐

Comments: This occurrence is comprised of populations #2 and #3. Population #2 is stable with approximately 10,000 plants. Population #3 has steadily declined over the past several years, though numbers have increased since 2014, with 23 plants observed in 2017. Increase in vigor likely due to wet conditions over the past year.

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference):

☐ Compared with specimen housed at:

☐ Compared with photo / drawing in:

☐ By another person (name):

☐ Other: previous identification ☐

Photographs: (check one or more)

Slide ☐ Print ☐ Digital ☐

Plant / animal ☐ Habitat ☐

Diagnostic feature ☐

May we obtain duplicates at our expense? ☐ yes ☐ no ☐
Date of Field Work (mm/dd/yyyy): 11/01/2017

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? ☐ Yes ☐ No

Total No. Individuals: 100,350

Is this an existing NDDB occurrence? ☐ Yes ☐ No ☐ Unk.

Collection? If yes: ☐ No ☐ Number ☐ Museum / Herbarium

Plant Information

Habitat Description (plants & animals)

Plants growing in a variety of geothermally altered habitats, along streams, on slopes of various exposures. Surrounded by annual grassland. A 2016 fire killed many of the McNab cypress (*Hesperocyparis macnabiana*) and manzanita shrubs (*Arctostaphylos sp.*). The exotic grass broomsedge bluestem (*Andropogon virginicus* var. *virginicus*) has a very patchy distribution at this site and is mainly located near the stream.

Animal Information

Animal Behavior

Geothermal development

Floating of Little Geysers Creek causes some erosion and deposition of geothermal materials (population #6).

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Population #6 has remained stable, with the total number of individuals estimated at 100,000, although distribution has shifted slightly in some areas.

Determination: (check one or more, and fill in blanks)

☐ Keyed (citate reference):

☐ Compared with specimen housed at:

☐ Compared with photo / drawing in:

☐ By another person (name):

☐ Other: previous identification

Photographs: (check one or more)

☐ Plant / animal

☐ Habitat

☐ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☐ no
Date of Field Work (mm/dd/yyyy): 11/01/2017

California Native Species Field Survey Form

Scientific Name: Panicum acuminatum var. thermale

Common Name: Geysers panicum

Species Found? ☐ Yes ☐ No
If not found, why?
Total No. Individuals: 4,000
Subsequent Visit? ☐ Yes ☐ No

Is this an existing NDDB occurrence? 4 ☐ Yes, Occ. # ☐ No ☐ Unk.

Collection? If yes: no ☐ Number ☐ Museum / Herbarium

Report: Gerrit Platenkamp, Rachel Brownsey
Address: ESA 2600 Capitol Ave, suite 200
Sacramento, CA 95816
E-mail Address: rbrownsey@esassoc.com
Phone: 916.564.4500

Phenology:

100 % vegetative % flowering % fruiting

Animal Information

# adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma ☐ ☐ Landowner / Mgr: Private
Quad Name: The Geysers ☐ ☐ Elevation: 2054'

T ___ R ___ Sec ___, __¼ of ___ ___ ¼, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS
T ___ R ___ Sec ___, __¼ of ___ ___ ¼, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Trimble GeoXT

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy: 1 m ☐ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐
Coordinates: Photo monitoring point for population #5: 38.78323746, -122.7701416

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil surrounded by annual grassland. Mostly on south-facing slope 5-15% in full sun. Extremely active mudpots, fumaroles, and vents.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Geothermal development
Visible disturbances:
Threats: Increased natural geothermal activity
Comments: Population #5 appeared to be mostly dormant at time of monitoring, and may be affected by increased natural geothermal activity in the area.

Determination: (check one or more, and fill in blanks)
☐ Keyed (cite reference):
☐ Compared with specimen housed at:
☐ Compared with photo / drawing in:
☐ By another person (name):
☐ Other: previous identification

Photographs: (check one or more) Slide Print Digital
Plant / animal ☐ ☐ ☐ Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐
May we obtain duplicates at our expense? ☐ yes ☐ no

CDFW/BDB/1747 Rev. 7/15/2015
Date of Field Work (mm/dd/yyyy): 11/01/2017

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? Yes ☐ No ☐ If not found, why? 

Total No. Individuals: 500 Subsequent Visit? Yes ☐ No ☐

Is this an existing NDDB occurrence? Yes, Occ. # 7 ☐ No ☐ Unk. ☐

Collection? If yes: no ☐

Scientific Name: *Panicum acuminatum var. thermale*

Common Name: Geysers panicum

Species Found? Yes ☒ No ☐ If not found, why? 

Total No. Individuals: 500 Subsequent Visit? Yes ☐ No ☐

Is this an existing NDDB occurrence? Yes, Occ. # 7 ☐ No ☐ Unk. ☐

Collection? If yes: no ☐

California Native Species Field Survey Form

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On geothermally altered soil near thermal hot springs along creek. Associated species include broomsedge, yerba santa (*Eriodictyon californicum*), and monkeyflower. Plants also grow on bare soil. Area burned in 1991. Plants are also growing on bare soil on eroding banks.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: ☐ Geothermal development

Visible disturbances: ☐ Natural erosion at upstream location in 2017

Threats: 

Comments: Population #4 has been increasing in recent years. Plants at drier upstream site are difficult to see due to dense annual vegetation. Slumping of bank in this area does not appear to have affected plants. Downstream patches along the creek have expanded.

Determination: (check one or more, and fill in blanks)

☐ Keyed (site reference):

☐ Compared with specimen housed at:

☐ Compared with photo / drawing in:

☐ By another person (name):

☒ Other: previous identification

Photographs: (check one or more)

☐ Plant / animal

☐ Habitat

☒ Diagnostic feature

May we obtain duplicates at our expense? ☐ yes ☒ no

Reported by: Gerrit Platenkamp, Rachel Brownsey

Address: ESA 2600 Capitol Ave, suite 200

Sacramento, CA 95816

E-mail Address: rbrownsey@esassoc.com

Phone: 916.564.4500
Date of Field Work (mm/dd/yyyy): 11/01/2017

California Native Species Field Survey Form

Scientific Name: *Panicum acuminatum var. thermale*

**Common Name:** Geysers panicum

<table>
<thead>
<tr>
<th><strong>Species Found?</strong></th>
<th>Yes</th>
<th>No</th>
<th>If not found, why?</th>
</tr>
</thead>
</table>

Total No. Individuals: 2,000  Subsequent Visit: Yes  No

<table>
<thead>
<tr>
<th><strong>Is this an existing NDDB occurrence?</strong></th>
<th>Yes, Occ. #</th>
<th>No</th>
<th>Unk.</th>
</tr>
</thead>
</table>

Collection? If yes: no

**Reporter:** Gerrit Platenkamp, Rachel Brownsey
**Address:** ESA 2600 Capitol Ave, suite 200
SACRAMENTO, CA 95816
**E-mail Address:** rbrownsey@esassoc.com
**Phone:** 916.564.4500

**Plant Information**

<table>
<thead>
<tr>
<th><strong>Phenology</strong></th>
<th>99</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>% vegetative</td>
<td>% flowering</td>
<td>% frutiting</td>
</tr>
</tbody>
</table>

**Animal Information**

<table>
<thead>
<tr>
<th><strong># adults</strong></th>
<th><strong># juveniles</strong></th>
<th><strong># larvae</strong></th>
<th><strong># egg masses</strong></th>
<th><strong># unknown</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>wintering</td>
<td>breeding</td>
<td>nesting</td>
<td>rookery</td>
<td>burrow site</td>
</tr>
</tbody>
</table>

**Location Description** (please attach map AND/OR fill out your choice of coordinates, below)

County: Sonoma  Landowner / Mgr: Private
Quad Name: The Geysers  Elevation: 1650’

T ___ R ___ Sec ___ P ___ 1/4 of ___ 1/4, Meridian: H  M  S Source of Coordinates (GPS, topo. map & type): GPS

**DATUM:** NAD27  WGS84  NAD83  OR  Geographic (Latitude & Longitude) Coordinate System: UTM Zone 10  UTM Zone 11 Horizontal Accuracy: 1 m meters/feet

Coordinates: Photo monitoring point for population #8: 38.8073349, -122.8264389; population #9: 38.80594635, -122.8229904; population #10: 38.80698395, -122.8214188

**Habitat Description (plants & animals)** plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna): Annual grassland around bare geothermally active areas with steam vents. Associated with typical grassland species, e.g., Italian ryegrass (Festuca perennis) and soft chess (Bromus hordeaceus), and non-native perennial Bermuda grass.

Please fill out separate form for other rare taxa seen at this site.

**Site Information** Overall site/occurrence quality/viability (site + population): Excellent  Good  Fair  Poor
Immediate AND surrounding land use: Geothermal development

Visible disturbances: natural erosion

Threats:

Comments: Population #8, 9 and 10 remain stable, with some mortality on the west end of population #8, while new plants were observed in the abandoned roadbed. Population #10 may have expanded. A few flowering individuals were observed in population #8 but not in other populations.

**Determination:** (check one or more, and fill in blanks)

- Keyed (cite reference):
- Compared with specimen housed at:
- Compared with photo / drawing in:
- By another person (name):
- Other: previous identification

**Photographs:** (check one or more)

- Plant / animal
- Habitat
- Diagnostic feature

May we obtain duplicates at our expense? Yes  No
November 20, 2012

Mr. Bruce Carlsen  
Environmental Health and Safety Manager  
Geysers Power Company, LLC  
10350 Socrates Mine Road  
Middletown, CA 95461

Dear Mr. Carlsen:

Enclosed please find a fully-signed copy of the Memorandum of Understanding between the Geysers Power Company, LLC and the Department of Fish and Game, for monitoring of Geysers dichanthelium (*Dichanthelium lanuginosum* var. *thermale*), a State-listed plant species, at Geysers Geothermal Power Plant Unit 20. This MOU authorizes monitoring activities through 2021.

If you have any questions, please contact Cherilyn Burton at (916) 651-6508, or by e-mail at cburton@dfg.ca.gov.

Sincerely,

Susan R. Ellis, Program Manager  
Native Plant Program  
Habitat Conservation Planning Branch

Enclosures
MEMORANDUM OF UNDERSTANDING

BY AND BETWEEN

GEYSERS POWER COMPANY, LLC

AND

CALIFORNIA DEPARTMENT OF FISH AND GAME

This Memorandum of Understanding ("MOU") is made and entered into by and between Geysers Power Company, LLC and the California Department of Fish and Game ("Department").

The purpose of this MOU is to provide for the continued monitoring of Geysers dichanthelium (Dichanthelium lanuginosum var. thermale = Dichanthelium acuminatum ssp. thermale) ("Dichanthelium"), a State-designated Endangered plant. The California Energy Commission ("CEC") required this monitoring as part of the licensing conditions for Geyser's Unit 20. Results of the monitoring and research which is authorized by this MOU will expand our understanding of the habitat requirements of the taxon.

WITNESSETH:

WHEREAS, Geysers Power Company has submitted a proposal to continue their monitoring and research on the Dichanthelium which is classified as an endangered plant by the California Fish and Game Commission; AND

WHEREAS, the Department desires to encourage monitoring and research that will further our knowledge of rare plant species and their conservation; AND

WHEREAS, the parties hereto desire to cooperate in a project as above by means of this MOU.

NOW, THEREFORE, it is mutually agreed and understood as follows:

1. The attached Monitoring Plan (Exhibit 1) details the specific nature of the research that is governed by this Memorandum of Understanding, including the purpose, location, schedule of work, methods, products to be provided to the Department, and impacts to the species of concern.

2. Exceptions and additional conditions are as follows:

   a. Geysers Power Company shall invite staff of the CEC, and the Department's Native Plant Program and Bay Delta Region office to visit the site during at
least one season of the monitoring program, in order to demonstrate the locations, methods, and results of the monitoring and research activities.

b. If, as a result of Geysers Power Company activities, significant changes in land use or habitat quality occur, or substantial decreases are seen in population size (i.e., 30% lower than lowest known levels), the Department may request that additional monitoring surveys be conducted.

3. This MOU does not authorize the investigators to conduct field activities on private land without written landowner permission, nor to conduct activities on other lands covered by other agency permits.

4. The Department recognizes Bruce Carlsen, Environmental Health and Safety Manager, as the Principal Investigator. A list of additional investigators will be supplied to the Department within two months of the beginning of fieldwork. No other person may handle *Dichanthelium* plants or plant parts without prior approval of the Department.

5. An Annual Report shall be provided to the Department by December 31 of each year that monitoring is conducted, beginning in 2014, which shall include:

   a. A description of the population size and status, a habitat assessment, and an evaluation of land use changes and potential threats to *Dichanthelium* at each occurrence using California Natural Diversity Data base (CNDDB) field survey forms;

   b. Photographs from photo points at each occurrence; and

   c. A 1- to 2-page letter report discussing implications of the results of this study for the protection and management of the *Dichanthelium*.

The last Annual Report shall also be the Final Report and shall be provided to the Department within 30 days of the conclusion of the study or within 30 days of the termination of the MOU, whichever date is sooner. The Final Report shall include an assessment of trends in the plant populations and habitat of the occurrences, as well as implications of the results of this study for the protection and management of the *Dichanthelium*.

6. The Department reserves the right to terminate this MOU if at any time it deems that the Investigators have not complied with its terms and conditions.

7. The Department shall incur no fiscal obligation under this MOU.

8. A Copy of this MOU shall be in the possession of the Investigators whenever activities authorized by this MOU are being conducted.
9. Unless terminated sooner by either party giving 30 days notice of such termination, this MOU shall commence on the date of the final signing below and terminate on January 31, 2022, subject to renewal with the approval of both parties prior to the termination date.

This MOU has been executed by and on behalf of the parties hereto, as of the last date signed below:

GEYSERS POWER COMPANY, LLC

SIGNED:

Bruce Carlsen
Environmental Health and Safety Manager
Geysers Power Company, LLC
Middletown, California

Date: 11/12/2012

DEPARTMENT OF FISH AND GAME

SIGNED:

Susan R. Ellis
Environmental Program Manager
Habitat Conservation Planning Branch
Department of Fish and Game
Sacramento, California

Date: 11/20/2012
Purpose

This monitoring plan describes the procedures that will be followed by Geysers Power Company to monitor the State-listed endangered plant Geysers dichanthelium (*Dichanthelium acuminatum* subsp. *thermale*) in the Sulphur Creek watershed of Sonoma County, California, as a continuation of the ongoing Geysers dichanthelium monitoring work. The methods in this plan are similar to those incorporated in the 2006 “Memorandum of Understanding by and between Geysers Power Company, LLC. and California Department of Fish and Game (…) to provide for the continued monitoring of Geysers dichanthelium”, dated January 2008, and the therein referenced “Monitoring Plan for Geysers Dichanthelium (*Dichanthelium acuminatum* subsp. *thermale*)” dated July 29, 2006.

Background

In 1982, the California Energy Commission (CEC) and California Department of Fish and Game (DFG) were concerned that the construction and operation of Geysers Geothermal Power Plant Unit 20 (Unit 20) could adversely affect the Little Geysers population of Geysers dichanthelium. Geysers dichanthelium is listed as endangered under the California Endangered Species Act and is considered a species of concern by the U.S. Fish and Wildlife Service. Pacific Gas & Electric Company (PG&E) agreed to monitor the grass as part of the licensing agreement for Unit 20 (Condition Bio 5-3). The Little Geysers population of Geysers dichanthelium has been monitored since 1982, and the results of the annual monitoring indicate that fluctuations in population size are affected by variations in annual rainfall and not by geothermal development activities (Pacific Gas and Electric Company 2000, Platenkamp and De Becker 2011). However, CEC and DFG remain concerned that populations of this plant are vulnerable to unintentional habitat degradation or destruction because they are accessible and/or located near roads. The monitoring activities described in this plan address these concerns.

Geysers Power Company intends to implement this monitoring plan to achieve continued protection of Geysers dichanthelium.
Monitoring Program

Population and Habitat Assessment

At 3-year intervals, beginning in 2014, a qualified biologist with experience in identifying Geysers dichanthelium and assessing its habitat will visit all occurrences of Geysers dichanthelium (see Figure 1).

The field visits will be made at the end of the growing season, in August or September, to be consistent with previously collected data. The biologist will make the following assessments and report them using the standard Field Survey Forms of the California Natural Diversity Database (CNDDB):

- habitat assessment, including extent and activity of surface geothermal features,
- apparent threats to the Geysers dichanthelium population, if any,
- occurrence of significant land use changes or incidents in the vicinity of the population that could have an effect on the plant’s habitat, and
- general status of the Geysers dichanthelium population.

The CNDDB field survey forms will be submitted to DFG within 2 months of the field visit.

The forms will also be included in Geysers Power Company’s annual compliance report to CEC.

Photographic Documentation

Permanent photographic documentation locations (photo points) will be established at the following six occurrences of Geysers dichanthelium:

- Historic Geysers Resort Area (CNDDB Occurrence #1; Population #1) – the large type locality, from where the plant was first described
- Hot Springs Creek (CNDDB Occurrence #2; Populations #2 and #3) – Population #2 is along Burned Mountain Road with Bermuda grass (Cynodon dactylon) and Population #3 is along a canyon wall in the shade of riparian trees
- Little Geysers Creek (CNDDB Occurrence #3; Populations #6 and #7) – Population #6 is along creek between forested area and foot bridge and Population #7 is at Little Geysers studied since 1982
- At USGS Bench Mark 2163 (CNDDB Occurrence #4; Population #5) – on intermittent tributary to Big Sulphur Creek
Exhibit 1

- Along Big Sulphur Creek Road 0.3 Miles South of Big Sulphur Creek Road (CNDDB Occurrence #7; Population #4) – population with abundant broom sedge (Andropogon virginicus)
- Sulphur Bank Drive Area (CNDDB Occurrence #10; Populations #8, #9, and #10) – three populations near Sulphur Bank Drive (west, central, and east)

Table 1. Permanent Photograph Monitoring Locations

<table>
<thead>
<tr>
<th>Population Number</th>
<th>CNDDB Occurrence</th>
<th>Description</th>
<th>Easting</th>
<th>Northing</th>
<th>Bearing (º)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Occ 1</td>
<td>Historic Geysers Resort Area</td>
<td>-122.805221557617</td>
<td>38.80027770961</td>
<td>122</td>
</tr>
<tr>
<td>2</td>
<td>Occ 2</td>
<td>Hot Springs Creek</td>
<td>-122.779258728027</td>
<td>38.789157867432</td>
<td>226</td>
</tr>
<tr>
<td>3*</td>
<td>Occ 2</td>
<td>Hot Springs Creek (canyon)</td>
<td>-122.781885000000</td>
<td>38.788423000000</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Occ 7</td>
<td>Big Sulphur Creek Rd. 0.3 mi S of Burned Mtn. Rd.</td>
<td>-122.774948120117</td>
<td>38.785301208496</td>
<td>92</td>
</tr>
<tr>
<td>5</td>
<td>Occ 4</td>
<td>USGS Bench Mark 2163</td>
<td>-122.770146101562</td>
<td>38.793237457275</td>
<td>318</td>
</tr>
<tr>
<td>6</td>
<td>Occ 3</td>
<td>Little Geysers Creek</td>
<td>-122.752235412897</td>
<td>38.774609375000</td>
<td>312</td>
</tr>
<tr>
<td>7</td>
<td>Occ 3</td>
<td>Little Geysers</td>
<td>-122.740748229880</td>
<td>38.773571014404</td>
<td>85</td>
</tr>
<tr>
<td>8</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (west)</td>
<td>-122.826436890808</td>
<td>38.807348989002</td>
<td>66</td>
</tr>
<tr>
<td>9</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (central)</td>
<td>-122.822960417480</td>
<td>38.808566550068</td>
<td>280</td>
</tr>
<tr>
<td>10A</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (east)</td>
<td>-122.821418726207</td>
<td>38.808983947754</td>
<td>285</td>
</tr>
<tr>
<td>10B</td>
<td>Occ 10</td>
<td>Sulphur Bank Drive Area (far east)</td>
<td>-122.821418762207</td>
<td>38.809863947754</td>
<td>102</td>
</tr>
</tbody>
</table>

Note:
* In steep canyon: no GPS reading possible, coordinates based on aerial image (Google Earth)

The photo points were established in 2008 and were marked with a permanent marker. The location of the marker was recorded with GPS coordinates (Table 1). During each 3-year monitoring visit a photograph will be taken that is representative of the occurrence at a standard height of 5 feet, and in a standard compass direction and using a standard focal length lens setting. The photographs will be sent to the CNDDB accompanying the Field Data Forms. The photographs will also be included in Geysers Power Company’s annual report to the CEC.

References


Figure 1
Known Occurrences of Geysers
Dichanthelium

Legend
- Geysers
- Dichanthelium
- 4 CNDDB Occurrence Number
- 7 Population Number
CONDITION OF CERTIFICATION
COMPLIANCE-5

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
<table>
<thead>
<tr>
<th>Technical Area</th>
<th>No.</th>
<th>Facility Status</th>
<th>Report</th>
<th>Condition of Certification</th>
<th>Compliance Verification</th>
<th>Timeframe</th>
<th>Submitted Required</th>
<th>Status</th>
<th>2020 Annual Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ</td>
<td>A1</td>
<td>Operations/</td>
<td>Ongoing</td>
<td>The project and associated abatement systems shall comply with Regulation 1 Rule 455(b) - Geothermal Emission Standards. Total emissions of hydrogen sulfide (H2S) shall not exceed 4.7 kilograms averaged over any one-hour period. Total H2S emissions shall be the cumulative emissions to the atmosphere from the power plant and associated abatement equipment. [Ref. Rule 455(b), PTO 82-45B Cond. 16(A)]</td>
<td>The project owner shall verify compliance by conducting a monthly source test on the cooling tower system to determine the H2S emission rate as required in AQ-C2.</td>
<td>Ongoing</td>
<td>Source tests are conducted monthly, as required in AQ-C1, to verify compliance with this condition. Results of the NSCAPCD Method 102 source tests, as well as excursions and exceedances, are reported to the District in the quarterly compliance reports.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Ongoing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQ</td>
<td>A2</td>
<td>Operations/</td>
<td>Annual test</td>
<td>The project owner shall not discharge or cause the discharge into the atmosphere of more than a total of 10.4 pounds per hour of H2S from the project. [Ref. PSD SFB 81-03 Cond. IX.D.1]</td>
<td>The project owner shall verify compliance by operating a continuous compliance monitor as required in AQ-C10.</td>
<td>Ongoing</td>
<td>Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ongoing</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>AQ</td>
<td>A3</td>
<td>Operations/</td>
<td>Ongoing</td>
<td>The exit concentration in the process piping leading from the Stretford system shall not exceed 10 ppmv H2S averaged over any consecutive 60-minute period unless operating under a District-approved Alternative Compliance Plan (ACP). [Ref. PTO 82-45B Cond. 16.B.]</td>
<td>The project owner shall verify compliance by operating a continuous compliance monitor as required in AQ-C10.</td>
<td>Ongoing</td>
<td>Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during the reporting period.</td>
<td></td>
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<td></td>
<td></td>
<td>Ongoing</td>
<td></td>
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<tr>
<td>AQ</td>
<td>A4</td>
<td>Operations/</td>
<td>Ongoing</td>
<td>The exit concentration of H2S from the Stretford unit shall not exceed 125 ppmv or 0.5 lb/hr [Ref. PSD 81-03, 82-AFC-1 Cond. 3.b]</td>
<td>The project owner shall verify compliance by operating a continuous compliance monitor as required in AQ-C10.</td>
<td>Ongoing</td>
<td>Continuous monitoring is in service and maintained to verify compliance. An automatic alarm notifies the operator prior to exceeding the limit. Excursions and exceedances are documented in follow-up reports and in the quarterly compliance reports. No deviations to this condition occurred during the reporting period.</td>
<td></td>
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<td></td>
<td></td>
<td>Ongoing</td>
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<tr>
<td>AQ</td>
<td>A5</td>
<td>Operations/</td>
<td>Records/Summary</td>
<td>Excess emissions from the cooling tower shall not exceed 125 ppmv of H2S per year of hydrogen sulfide (H2S).</td>
<td>The project owner shall perform monthly source tests as required by AQ-C1, and an annual summation from January to December.</td>
<td>Ongoing</td>
<td>GPC is in compliance. Source tests are performed monthly as required by AQ-A5 to determine the H2S emission rate. The monthly emission rates are averaged and multiplied by the annual hours of operation to calculate the annual emissions. Total 2020 H2S emissions were 14.9 tons.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ongoing</td>
<td></td>
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<tr>
<td>AQ</td>
<td>A6</td>
<td>Operations/</td>
<td>Ongoing</td>
<td>The project owner shall comply with Regulation 1 Rule 455(a) - Geothermal Emission Standards; no person shall discharge into the atmosphere from any geothermal operation sulfur compounds, calculated as sulfur dioxide, in excess of 1.000 ppmv. [Ref. Rule 455(a)]</td>
<td>The project owner shall verify compliance by adhering to all monitoring and testing requirements.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
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<td>Ongoing</td>
<td></td>
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<tr>
<td>AQ</td>
<td>A7</td>
<td>Operations/</td>
<td>Records</td>
<td>The project owner shall operate the power plant and associated abatement systems in compliance with Regulation 1 Rule 420(d)(2) Non-Combustion Sources-Particulate Matter; no person shall discharge particulate matter into the atmosphere from a non-combustion source in excess of 0.5 grains per cubic foot of exhaust gas or in total quantities in excess of the amount shown in Table I (40 lb/hr) whichever is the more restrictive condition. [Ref. Rule 420(d)]</td>
<td>The project owner shall perform a source test to determine compliance as requested by the NSCAPCD or CPW. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Calculation of the PM discharge rate is based upon monthly total solids analysis and the cooling water flow rate. PM emission calculation is per Permit specified condition IX.A. Calculations indicate that the plant was in compliance with this limit during the reporting period.</td>
<td></td>
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<td></td>
<td></td>
<td>Ongoing</td>
<td></td>
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<td>Condition of Certification</td>
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<td>Timeframe</td>
<td>Submittal Required</td>
<td>Status</td>
<td>2020 Annual Compliance Report</td>
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<tr>
<td>AQ A8</td>
<td>Ongoing</td>
<td>Annual Report</td>
<td>Annual emissions from the cooling tower shall not exceed, on a calendar year basis, 17.0 tons per year particulate matter less than 10 microns in diameter (PM10) and 12.0 tons per year particulate matter less than 2.5 microns in diameter (PM-2.5).</td>
<td>The project owner shall verify compliance through monitoring as indicated in AQ-C5. The project owner shall maintain records according to AQ-D6 and AQ-D7 and submit reports as indicated in AQ-E2. Records shall be based on required sampling and an annual summation from January through the end of December.</td>
<td>Ongoing</td>
<td>EPA is in compliance. Particulate emission rate determined as required by AQ-C5. The results of that determination are used to determine the annual emission. Total 2020 PM10 and PM 2.5 emissions calculations were 8.6 tons.</td>
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<tr>
<td>AQ AE1</td>
<td>Ongoing</td>
<td>Records</td>
<td>Visible particulate emissions shall not exceed an opacity as to obscure an observer’s view to a degree equal to or greater than Ringelmann 2.0 or 40 percent opacity for a period or periods exceeding 3 minutes in any one hour [ref. PTD 17-10 Cond. B1]</td>
<td>The project owner shall perform a Visible Emissions Evaluation to determine compliance as requested by the NSCAPCD or CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>No request has been made to perform testing</td>
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<td>AQ AE2</td>
<td>Ongoing</td>
<td>Records</td>
<td>Particulate emissions shall not exceed an emission rate of 0.15 g/bhp-hr [ref. PTD 17-10 Cond. B2]</td>
<td>The project owner shall verify compliance according to Condition AQ-CE1. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Engine meets EPA Tier 3 emission standards and is rated below the permitted limits.</td>
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<tr>
<td>AQ AE3</td>
<td>Ongoing</td>
<td>Records</td>
<td>Combined non-methane hydrocarbons and nitrogen oxide emissions shall not exceed an emission rate of 3.0 g/bhp-hr. [ref. PTD 17-10 Cond. B3]</td>
<td>The project owner shall perform a source test to verify compliance with the emission rate upon request of the District or CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Engine meets EPA Tier 3 emission standards and is rated below the permitted limits.</td>
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<tr>
<td>AQ AE4</td>
<td>Ongoing</td>
<td>Records</td>
<td>Carbon monoxide emissions shall not exceed an emission rate of 2.6 g/bhp-hr. [ref. PTD 17-10 Cond. B4]</td>
<td>The project owner shall perform a source test to verify compliance with the emission rate upon request of the District or CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Engine meets EPA Tier 3 emission standards and is rated below the permitted limits.</td>
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<tr>
<td>AQ B1</td>
<td>Ongoing</td>
<td>Records</td>
<td>The project owner shall not operate the plant unless untreated vent gases are vented to the Stretford Air Pollution Control System. The condensate H2S abatement chemical feed system and the Stretford abatement chemical feed system and the Stretford abatement system shall be kept in good working order and operated as necessary in order to limit H2S and particulate emissions on a continuous basis from the power plant as specified in conditions AQ-A1, AQ-A2, AQ-A3, AQ-A4, and AQ-A6. [ref. Rule 240.d, PTO 82-45A Cond. 18, PSD SFB 81-03, 82-AFC-1 Cond. 15]</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>The H2S abatement systems are operated and maintained in accordance with operating practices and a maintenance program described in the Title V application.</td>
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<tr>
<td>AQ B10</td>
<td>Ongoing</td>
<td>Records</td>
<td>The project owner shall operate and maintain the following air pollution control equipment: a. The non-condensable gas stream exiting from the surface condenser shall be ducted to an operating Stretford process unit. b. Condensate exiting from the surface condenser shall be treated as necessary to reduce the levels of dissolved hydrogen sulfide. The project owner shall use a secondary abatement system authorized by the NSCAPCD to accomplish this reduction. c. The project owner shall have installed drift controls on the power plant cooling tower to limit drift losses to 0.002 percent or better of the circulating water mass, thus minimizing emissions of particulate matter. [ref. PSD SFB 81-03 Cond. IV.B.]</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>GPC is in compliance with items A–C. Records are available upon request.</td>
<td></td>
<td></td>
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</tbody>
</table>
The project owner shall submit revised plans to the CPM for review. The project owner shall submit any plan approved, disapproved or plan modification to the CPM in the following quarterly report. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

Quarterly  Ongoing  All occurrences meeting the condition criteria are reported to the District in the Quarterly Compliance Reports. A protocol is in place to meet the requirements of this condition. Steam lines interconnecting the power plants allow steam to be shifted to other operating plants if an outage occurs. No outages have resulted in steam stacking since interconnection of the steam lines was completed. No stacking events occurred during this reporting period.

AQ  B1  Operations/ Ongoing  Programs/Records  The project owner shall, in any 12-month period, limit unscheduled outages for the project to no more than a total of 12. The following shall not be used in computing the total outages:

a. Scheduled outages (defined as outages with 24-hour advance notice between the steam supplier and project owner, except in the case of project outages resulting from an abundance of hydropower in which case a scheduled outage shall be defined as on-hour notice).

b. Steam supplier induced outages (such as pressure surge, scram valve plugging, etc.).

c. Outages of less than 2 hours in duration.

d. Outages which do not cause steam stacking.

A violation of the above performance standards is a violation of this condition.

The project owner shall have on file with the District an approved operating protocol describing the methods that will be used to meet the 12 outages in 12 consecutive months performance standard. The protocol must include a description of the operational procedures between the steam supplier and project owner, project owner’s operational procedures, and equipment to meet the above standard. The terms and requirements of the protocol may be modified by the Air Pollution Control Officer for good cause upon written request from the project owner.

The project owner shall allow the District and CPM to inspect all operating logs to verify the total outage hours. These requirements are in addition to the applicable requirements of rule 540:

In the event the project owner is not able to meet the standards specified above, the following shall be required:

The project owner shall prepare and submit a revised ‘plan’ to the Air Pollution Control Officer and CPM, within 30 days of the end of the month in which the outage limit was exceeded, to achieve the outage standards set forth in this permit condition. At a minimum, the measures to be considered in the ‘plan’ shall include: improved coordination of the power plant and steam field operations, improved alarming and control systems, increased duration of manned operation of the power plant, improved preventative maintenance and design modifications, retrofit of a 100% of steam flow turbine bypass, and retrofit of a 50% of steam flow turbine bypass. In evaluating measures to be taken to prevent future exceedances of the outage standard, outages of less than 2 hours shall be counted. This ‘plan’ shall also be submitted to EPA for approval if the outage standard is exceeded.

Within 30 days of receipt of the ‘plan’ the Air Pollution Control Officer shall determine whether the ‘plan’ is satisfactory and, if so, shall approve the ‘plan’. Upon approval, the revised ‘plan’ shall supersede the old plan and become a part of the terms and conditions of this permit.

[ref. PSD SFB 81-03 Cond. IX.B.4, PTO-82-45A Cond.18]

AQ  B2  Operations/ Ongoing  Records  The secondary abatement solution storage tank shall hold a minimum of 1,500 gallons of abatement solution at all times when the plant is in operation. All continuously operated abatement solution feed pumps shall have a standby spare available, a readily accessible flowmeter readable in appropriate units and equipped with alarms signaling no or low flow. Flowmeter accuracy shall be plus or minus 10% of flow. [ref. PTO 82-45A Cond. 18]

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

The project owner shall prepare and submit a revised “plan” to the Air pollution Control Officer and CPM, within 30 days of the end of the month in which the outage limit was exceeded, to achieve the outage standards set forth in this permit condition. At a minimum, the measures to be considered in the “plan” shall include: improved coordination of the power plant and steam field operations, improved alarming and control systems, increased duration of manned operation of the power plant, improved preventative maintenance and design modifications, retrofit of a 100% of steam flow turbine bypass, and retrofit of a 50% of steam flow turbine bypass. In evaluating measures to be taken to prevent future exceedances of the outage standard, outages of less than 2 hours shall be counted. This “plan” shall also be submitted to EPA for approval if the outage standard is exceeded.

[ref. PSD SFB 81-03 Cond. IX.C., PTO-82-45A Cond.18]

AQ  B3  Operations/ Ongoing  Records  All the abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. All primary pressure gauges and flowmeters associated with abatement equipment shall be readily identified, maintained in good operating condition and calibrated on a quarterly basis. Alarm systems associated with abatement equipment shall be tested on a quarterly basis. Calibration and maintenance shall be performed according to manufacturer’s recommendations or per the project owner’s maintenance schedule as needed to maintain the equipment in good working order. [ref. PTO 82-45B Cond. 14]

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

[ref. PTO 82-45B Cond. 14]

AQ  B4  Operations/ Ongoing  Records  Flowmeters and alarms were tested as required during this reporting period.

All areas in the immediate vicinity and under the project owner’s responsibility shall be properly treated to control fugitive dust. [ref. PTO 82-45B Cond. 17]

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

Maintenance practices are in place to maintain the circulating iron concentration when required. Records are available on request.

[ref. PTO 82-45B Cond. 14]

AQ  B5  Operations/ Ongoing  Records  A program is in place to verify tank levels and to order and deliver chemicals prior to reaching the minimum level. Flowmeters and alarms are tested quarterly per permit Title V condition I.I.4. Records available upon request.

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

Maintenance practices are in place to maintain the circulating iron concentration when required. Records are available on request.

[ref. PTO 82-45B Cond. 17]

[ref. PTO 82-45B Cond. 14]
<table>
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<tr>
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<th>Submitted Required</th>
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<tr>
<td>AQ B6</td>
<td>B6</td>
<td>Ongoing</td>
<td>Records</td>
<td>Ongoing A &amp; B. Records of compliance in</td>
<td>Ongoing</td>
<td>GPC verifies</td>
<td>ongoing</td>
<td>Ongoing</td>
<td>Records of compliance in</td>
</tr>
</tbody>
</table>

AQ B7 Operations/ Ongoing

Plant

Alternative Compliance Plan: A. The project owner may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions AQ-A1, AQ-A4, AQ-A6, and AQ-A7. The ACP shall be submitted to the APCO for approval. An ACP shall approve, disapprove or modify the plan within 30 days. ACP shall list all parametric operating guidelines which shall be used to determine compliance with Conditions AQ-A1, AQ-A4, AQ-A6, and AQ-A7. ACP shall list specific operating conditions the ACP will supersede. B. The project owner may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant while maintaining compliance with all applicable emission limits of Conditions AQ-A1 and AQ-A3. The ACP shall list specific operating conditions the ACP will supersede.

AQ B8 Operations/ Ongoing

Records

All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this license shall at all times be maintained in good working order. The project owner shall maintain records according to Condition AQ-DE1. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B9 Operations/ Ongoing

Records

The generator is equipped with a working non-resettable hour counting meter.

AQ BE1 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ BE2 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ BE3 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ BE4 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ BE5 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ BE6 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B1 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B2 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B3 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B4 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.

AQ B5 Operations/ Ongoing

Records

The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.
<table>
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<tr>
<th>Technical Area</th>
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<tr>
<td><strong>AQ</strong></td>
<td>B83</td>
<td>Ongoing</td>
<td>Records</td>
<td>8-1. emergency standby wet-dump diesel drive engine, shall be operated exclusively on California Air Resources Board (CARB) Diesel Fuel. [ref. PTO 17-10 Cond. C3]</td>
<td>The project owner shall maintain records according to Condition AQ-E1. The project owner shall make the site records and reports available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>AD-E1 references AQ-E1, which requires quarterly reports to the District to be submitted to the CPM.)</td>
<td>Ongoing</td>
<td>Maintenance is a contracted service with the supplier of the generator performed at intervals per the manufacturer’s recommendation</td>
</tr>
<tr>
<td><strong>AQ</strong></td>
<td>B84</td>
<td>Ongoing</td>
<td>Records</td>
<td>8-1. emergency standby wet-dump diesel drive engine, shall be operated according to manufacturer specifications [ref. PTO 17-10 Cond. C4]</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>AD-E1 references AQ-E1, which requires quarterly reports to the District to be submitted to the CPM.)</td>
<td>Ongoing</td>
<td>Maintenance is a contracted service with the supplier of the generator performed at intervals per the manufacturer’s recommendation</td>
</tr>
<tr>
<td><strong>AQ</strong></td>
<td>B85</td>
<td>Ongoing</td>
<td>Records</td>
<td>Total operating hours used for testing and maintenance of 8-1. emergency standby wet-dump diesel drive engine, shall not exceed 50 hours in any consecutive 12-month period. The total hours of operation do not include use during emergencies. [ref. PTO 17-10 Cond. A1]</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>AD-E1 references AQ-E1, which requires quarterly reports to the District to be submitted to the CPM.)</td>
<td>Ongoing</td>
<td>Maintenance is a contracted service with the supplier of the generator performed at intervals per the manufacturer’s recommendation</td>
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<tr>
<td><strong>AQ</strong></td>
<td>C1</td>
<td>Ongoing</td>
<td>Test/Results/ Plan</td>
<td>The project owner shall, on a monthly basis, conduct a source test of the cooling tower to determine the H2S emission rate to verify compliance with condition AQ-A1. A mass balance determination of total H2S to the cooling tower based on measured operating conditions may be used to document that the worst case possible H2S emissions are less than the emission limit of the plant or District Method 102 shall be utilized to determine the H2S emission rate. The project owner may propose an Alternative Compliance Plan (ACP) which allows for operating flexibility of the power plant, including periods when accessing the cooling tower is not possible, while maintaining compliance with all applicable emission limits of Condition AQ-A1. The ACP shall list operating parameters such as power output (MW), target pH, abatement solution concentration levels, and burner/muffler exhaust concentration which shall be met in order to meet all applicable emission limits listed above. The ACP shall be submitted to the APCO for approval. The APCO shall approve, disapprove or modify the plan within 30 days of receipt of the ACP. An APCO-approved ACP shall consist of all numeric operating guidelines which shall be used to determine compliance with Condition AQ-A1. The ACP shall list the specific operating conditions the ACP will supersede. [ref. PTO 82-45A Cond. D2]</td>
<td>The project owner shall submit source test results according to Condition AQ-E1. The project owner shall submit any ACP to the CPM for review. The project owner shall provide the District with a summary of the monitor’s availability and any irregularities that occurred with the continuous monitor. The summary shall be provided to the CPM in the quarterly reports required by Condition AQ-E1.</td>
<td>Quarterly</td>
<td>ACP-E1 requires the project owner to provide the CPM quarterly reports submitted to the District( )</td>
<td>Ongoing</td>
<td>NSEAPCO Approved version of Method 102 (Modified Method 102) Source tests were performed each month, and reported to the District in the quarterly reports. All test results and determinations indicated compliance with this condition.</td>
</tr>
<tr>
<td><strong>AQ</strong></td>
<td>C10</td>
<td>Ongoing</td>
<td>Summary</td>
<td>Continuous Compliance Monitoring (CCM)</td>
<td>The project owner shall provide the CPM with a summary of the monitor’s availability and any irregularities that occurred with the continuous monitor. The summary shall be provided to the CPM in the quarterly reports required by Condition AQ-E1.</td>
<td>Quarterly</td>
<td>CPM-E1 report</td>
<td>Ongoing</td>
<td>The continuous compliance monitor meeting the requirements of this condition is in place and operational. Plant records indicate no deviations from this condition during the reporting period. Quarterly reports are submitted in accordance with AQ-C10.</td>
</tr>
<tr>
<td><strong>AQ</strong></td>
<td>C11</td>
<td>Ongoing</td>
<td>Plan</td>
<td>Ambient Air Monitoring</td>
<td>The project owner shall conduct or cause to be conducted performance tests on the turbine exhaust system to determine the H2S emission rate to verify compliance with Condition AQ-A2. Performance tests shall be conducted in accordance with Northern Sonoma County APCD Method 102, unless otherwise specified by the U.S. EPA. The project owner shall furnish the Northern Sonoma County APCD, the ARB, and the U.S. EPA, a written report of such tests. All performance tests shall be conducted at the maximum operating capacity of the plant. Performance tests shall be conducted at least on a yearly basis and at such times as shall be specified by the U.S. EPA. [ref. PSD 81-03 Cond. 1X E]</td>
<td>The project owner shall submit source test results according to Condition AQ-E1.</td>
<td>Ongoing</td>
<td>ACP-E1 requires the project owner to provide the CPM quarterly reports submitted to the District( )</td>
<td>Ongoing</td>
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<td>Technical Area</td>
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<tr>
<td>AQ</td>
<td>C3</td>
<td>Operations/ Ongoing</td>
<td>Records</td>
<td>The project owner shall provide platforms, electrical power, and safe access to sampling ports to enable representatives of the District, ARB and EPA to collect samples from the main steam supply, treated and untreated condensate, circulating water upstream of the cooling tower, cooling tower stacks, untreated and treated non-condensable gas stream to and from the Stretford abatement facility, any off gas bypass vents to the atmosphere and any Stretford tanks or evaporative coolers. [ref. PTO 82-45B Cond.11, PSD SFB-81-03 Cond. 9.3 X.3]</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Site and records used by plant personnel for chemical sampling and analyses are also available for use by CARB and District personnel. Safety Orientations and Job Safety Analysis are available for District and ARB representatives and highly encouraged for sampling activities.</td>
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<tr>
<td>AQ</td>
<td>C4</td>
<td>Operations/ Ongoing</td>
<td>Test/ Results</td>
<td>The project owner, as requested by the Air Pollution Control Officer or CPM, shall conduct a requestor-approved performance test for particulate matter (PM), H2S, other species (e.g. boron, mercury, arsenic, TWA, nitrates, nitrates, other nitrogen compounds (ammonia) and compounds listed under NESHAPS and/or AB2588 from the power plant evaporative cooling tower and/or the Stretford evaporative cooling tower. Upon written request, the project owner shall submit to the Requestor at least 45 days prior to testing a detailed performance test plan. The requestor shall approve, disapprove or modify the plan within 45 days of receipt of the plan. The project owner shall incorporate the requestor’s comments or modifications to the plan which are required to assure compliance with the requestor’s regulations. The Air Pollution Control Officer shall be notified 15 days prior to the test date in order to arrange for an observer to be present for the test. The test results shall be provided to the District and CPM within 45 days of the test date unless a different submittal schedule is approved in advance. [ref. PTO 79-29a Cond. 9 and 10]</td>
<td>The project owner shall conduct performance tests as requested by the Air Pollution Control Officer or CPM. The project owner shall submit results to the CPM within 45 days if the test was requested by the CPM in the quarterly reports according to Condition AQ-E1 if the test was requested by the Air Pollution Control Officer.</td>
<td>Either 45 days after test or quarterly</td>
<td>AQ-E2 requires annual reports to be submitted to the CPM within 45 days at the end of each calendar year or other approved timeframe.</td>
<td>No requests to perform testing were requested during the reporting period.</td>
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<tr>
<td>AQ</td>
<td>C5</td>
<td>Operations/ Ongoing</td>
<td>Report/ Records</td>
<td>Compliance with the particulate mass emission limitations shall be estimated using calculations based on the evaporative cooling tower manufacturers design drift eliminator drift rate, 0.001 percent for the main cooling tower and 0.005% for the Stretford cooling tower, multiplied by the circulating water rate or Stretford solution circulating rate, and total dissolved solids (TDS) and total suspended solids (TSS). A circulating water sample shall be collected and analyzed for TDS and TSS on a monthly basis. [ref. PTO 82-45A Cond. 21]</td>
<td>The project owner shall maintain records according to Conditions AQ-E6 and AQ-E7 and submit reports as indicated in Condition AQ-E2.</td>
<td>Annually</td>
<td>AQ-E2 requires annual reports to be submitted to the CPM within 45 days of the end of each calendar year or other approved timeframe.</td>
<td>Ongoing</td>
<td>Calculations indicate that the plant was in compliance with this condition during the reporting period. Reports are submitted in accordance to AQ-E2.</td>
</tr>
<tr>
<td>AQ</td>
<td>C6</td>
<td>Operations/ Ongoing</td>
<td>Records/ Reports</td>
<td>Main steam supply THC concentrations shall be determined trimetrically on a weekly basis and any additional time, as required by the operating protocol or AOP. [ref. PTO 82-45A Cond. 19]</td>
<td>The project owner shall maintain records according to Conditions AQ-E6 and AQ-E7 and submit reports as indicated in Conditions AQ-E1 and AQ-E2.</td>
<td>Quarterly and Annually</td>
<td>AQ-E1 is the condition for providing the CPM with quarterly reports, and AQ-E2 requires submission to the CPM of annual reports.</td>
<td>Ongoing</td>
<td>A protocol on file with the District describes the method used to determine H2S concentration. A review of the records indicates that the requirements of this condition are being met.</td>
</tr>
<tr>
<td>AQ</td>
<td>C7</td>
<td>Operations/ Ongoing</td>
<td>Records/ Reports</td>
<td>The project owner shall perform an abatement solution concentration test of the cooling tower circulating water once per operating shift when abatement solution is necessary in order to achieve compliance with Condition AQ-A1. The testing equipment shall be kept calibrated per the manufacturer’s specifications. [ref. PTO 82-45A Cond. 19]</td>
<td>The project owner shall maintain records according to Conditions AQ-E6 and AQ-E7 and submit reports as indicated in Conditions AQ-E1 and AQ-E2. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Quarterly</td>
<td>With quarterly reports</td>
<td>Ongoing</td>
<td>Operators perform tests required by this condition as part of their daily routine. Iron concentration tests are validated by the plant chemistry staff using the &quot;Hash&quot; Farness colorimetric method. A review of the operating logs during this reporting period indicates compliance with this condition when circulating water abatement was in service.</td>
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<td>Technical Area</td>
<td>No.</td>
<td>Facility Status</td>
<td>Report</td>
<td>Condition of Certification</td>
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<td>AQ</td>
<td>05</td>
<td>Operational</td>
<td>Records</td>
<td>The project owner shall maintain records detailing:</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>No request has been made to perform emissions testing of the emergency engine.</td>
<td>GPC is in compliance. Records satisfying A-0 are available upon request.</td>
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<td>Ongoing</td>
<td>Records</td>
<td>for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information summarized on a monthly basis:</td>
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<td>e. Total H2S, PM-10 and PM-2.5 annual emissions to date.</td>
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<td>07</td>
<td>Operational</td>
<td>Records</td>
<td>The project owner shall maintain records detailing:</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>No request has been made to perform emissions testing of the emergency engine.</td>
<td>GPC is in compliance. Records satisfying A-1 are available upon request.</td>
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<td>Ongoing</td>
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<td>for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information summarized on a monthly basis:</td>
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<td>09</td>
<td>Operational</td>
<td>Records</td>
<td>Emergency Engine</td>
<td>The project owner shall submit the quarterly reports to the CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Quarterly</td>
<td>The project owner shall report hours of operation, identifying the reason for operation, to the CPM in the quarterly reports required by Condition AQ-A1.</td>
<td>Ongoing</td>
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<td>Ongoing</td>
<td>Records</td>
<td>In order to demonstrate compliance with the above permit conditions, records shall be maintained in a District-approved log, shall be kept on site, and made available for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information:</td>
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<td>a. CCM availability for the given quarter</td>
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<td>b. Any periods of significant abatement equipment malfunction, reasons for malfunctions, and corrective action taken</td>
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<td>c. Time and date of any monitor indicating an hourly average exceedance of 10 ppm of H2S</td>
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<td>10</td>
<td>Operational</td>
<td>Records</td>
<td>Emergency Engine</td>
<td>The project owner shall submit the annual reports to the CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Within 45 days of the end of each calendar year.</td>
<td>The project owner shall submit the annual reports to the CPM. The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA, and Energy Commission upon request.</td>
<td>Ongoing</td>
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<td>Ongoing</td>
<td>Records</td>
<td>In order to demonstrate compliance with the above permit conditions, records shall be maintained in a District-approved log, shall be kept on site, and made available for District inspection for a period of 5 years from the date on which a record is made. The records shall include the following information:</td>
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<td>a. Average main steam H2S and ammonia concentrations</td>
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<td>b. Average total dissolved and suspended solids and average flowrate of the cooling tower water</td>
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<td>k. Hours of operation for the emergency engine. The hours of operation shall be reported according to total use, emergency use, and maintenance and testing.</td>
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<td>q. Hours of plant operation</td>
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<td>u. Hours of operation for the emergency engine. The hours of operation shall be reported according to total use, emergency use, and maintenance and testing.</td>
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</table>
Ongoing The required outage information is included in the quarterly compliance reports. No stacking events occurred during this reporting period.

AQ F1 Operational/ Ongoing Records Payment of Fees
The operating permits shall remain valid as long as the annual renewal fees are paid in accordance with the District Rules and Regulations and permit conditions are met.

AQ F10 Operational/ Ongoing Records Permit Posting
Permit Posting

AQ F11 Operational/ Ongoing Reports/Certifications/Written Statement Compliance Certification
Compliance reports and certifications shall be submitted annually by the project owner to the facility to the Sonoma County Air Pollution Control District and CPM. Each compliance certification shall be accompanied by a written statement from the responsible official which certifies the truth, accuracy, and completeness of the report. [Ref. Regulation 5 Rule 650]

AQ F12 Operational/ Ongoing Records Permit Modification
The project owner shall comply with all applicable requirements in NSCAPC/Regulation 1 Rule 8- Permits and New Source Review. [Ref. Regulation 1 Rule 200]

AQ F4 Operational/ Ongoing Reports/Records Reporting
All deviations from permit requirements, including those attributable to upset conditions (as defined in the permit) must be reported to the District and CPM at least once every six months. For emissions of a hazardous air pollutant (HAP) or a toxic air pollutant (as identified in any applicable regulation) that continue for more than one hour in excess of the permit requirements, the report must be made within 24 hours of the occurrence. For emissions of any regulated air pollutant, excluding those HAP emission requirements listed above, that continue for more than two hours in excess of permit requirements, the report must be made within 48 hours. All reports of deviation from permit requirements shall include the probable cause of the deviation and any preventative or corrective action taken. A progress report shall be made on a compliance schedule at least semi-annually and shall include the date when compliance will be achieved, an explanation of why compliance was not, or will not be, achieved by the scheduled date, and a log of any preventative or corrective action taken. The reports shall be certified by the responsible official as true, accurate and complete. [Ref. Reg 5.625]
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<th>Technical Area</th>
<th>No.</th>
<th>Facility Status</th>
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<th>Compliance Verification</th>
<th>Timeframe</th>
<th>Submitted Required</th>
<th>Status</th>
<th>2020 Annual Compliance Report</th>
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<tbody>
<tr>
<td>AQ F7 Operations/Ongoing</td>
<td>F3</td>
<td>Ongoing</td>
<td>AEA</td>
<td>GPC is in compliance</td>
<td>No verification required</td>
<td>Ongoing</td>
<td>GP is in compliance</td>
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<td>AQ F7 Operations/Ongoing</td>
<td>F6</td>
<td>Ongoing</td>
<td>Letter</td>
<td>In the event of any changes in control or ownership of facilities to be modified and/or operated, the operating permits are transferable and shall remain binding on all subsequent owners and operators. The project owner shall notify the succeeding owner and operator of the existence of the operating permits and the conditions by letter, a copy of which shall be forwarded to the Air Pollution Control Officer. (MAGCAPPCD Rule 240)</td>
<td>The project owner shall provide a copy of the letter of notification to the CPM in the following quarterly report.</td>
<td>Quarterly</td>
<td>Audit and report</td>
<td>Ongoing</td>
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<tr>
<td>AQ F7 Operations/Ongoing</td>
<td>F7</td>
<td>Ongoing</td>
<td>Records/Records</td>
<td>Records shall be updated with specific wording in any requirement; all records for federally enforceable requirements shall be maintained for at least five years from the date of entry and shall include: date, place, and time of sampling, operating conditions at the time of sampling, date, place, and method of analysis and the results of the analysis. (Ref. Reg 5.615)</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon request.</td>
<td>Ongoing</td>
<td>Records and logs are retained for a minimum of five years and available upon request.</td>
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<tr>
<td>AQ F8 Operations/Ongoing</td>
<td>F6</td>
<td>Ongoing</td>
<td>Reports</td>
<td>Emergency Provisions</td>
<td>The project owner may seek relief from enforcement action in the event of a breakdown, as defined by Regulation 1 Rule 540 of the District's Rules and Regulations, by following the procedures contained in Regulation 1, rule 540 (b). The District will thereafter determine whether breakdown relief will be granted in accordance with Regulation 1, Rule 540 (b)(3). The project owner may seek relief from enforcement action for a violation of any of the terms and conditions of this permit caused by conditions beyond the project owner’s reasonable control by applying to the District’s Hearing Board for a variance pursuant to Health and Safety Code Section 42350. The Hearing Board will determine after notice and hearing whether variance relief should be granted in accordance with the procedures and standards set forth in Health and Safety Code Section 42350 at any. Any variance granted by the Hearing Board from any term of this permit which lasts longer than 90 days will be subject to EPA approval. (Ref. Reg 1 Rule 600)</td>
<td>The project owner shall notify the CPM of any breakdown, as defined by Regulation 1 Rule 540 of the District’s Rules and Regulations, within the timeframes outlined in Regulation 1 Rule 540 of the District’s Rules and Regulations. The project owner shall submit the required breakdown reports and report any variance to the CPM in the next quarterly report. The project owner shall make the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon receipt.</td>
<td>Quarterly</td>
<td>Audit and notification to the District under District Rules</td>
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<td>AQ F9 Operations/Ongoing</td>
<td>F9</td>
<td>Ongoing</td>
<td>Records/Maintenance</td>
<td>The Regional Administrator shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above allowable emissions limit stated in Condition AQ-A2. In addition, the Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Condition AQ-A2, and the methods utilized to restore normal operation. Compliance with the malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or of any law or regulations which such malfunction may cause. (Ref. PSD SFR 81-03 Cond. V)</td>
<td>The project owner shall submit malfunction reports to the CPM in the quarterly reports. The project owner makes the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon request.</td>
<td>Quarterly</td>
<td>Audit and reports</td>
<td>Ongoing</td>
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<td>AQ G1 Operations/Ongoing</td>
<td>G1</td>
<td>Ongoing</td>
<td>Records</td>
<td>The project owner shall comply with the following District regulations: a. Regulation 1 Rule 410-General Limitations b. Regulation 1 Rule 411-Volatile Emissions c. Regulation 1 Rule 412-Volatile Organic Emissions d. Regulation 1 Rule 413-Volatile Organic Emissions e. Regulation 1 Rule 414-Pollutant Emissions f. Regulation 1 Rule 415-Pollutant Emissions g. Regulation 1 Rule 416-Pollutant Emissions h. Regulation 1 Rule 417-Pollutant Emissions i. Regulation 1 Rule 418-Pollutant Emissions j. Regulation 1 Rule 419-Pollutant Emissions k. Regulation 1 Rule 420-Pollutant Emissions</td>
<td>The project owner shall make the site and records available for inspection by representatives of the District, ARB, U.S. EPA and Energy Commission upon request.</td>
<td>Annual compliance within 90 days of becoming subject to regulation</td>
<td>Ongoing</td>
<td>1-3 reviewed quarterly, compliance reports and District Inspections. 4. Reviewed Adequacy Notification Letters-Notifications were submitted as required during the reporting period. GPC/CPD-2016, dated 12/19/2016. 5. Reviewed Quarterly Site Compliance Records. 6. No open burning is performed at this location. 7. The Plant is exempt from the Risk Management Plan because quantities of flammable hydrocarbons are less than 67,000 lbs. Ref. EPA notice-dated March 12, 2000. 8. All work performed on appliances containing chlorinated fluorocarbons is performed by HVAC Technicians certified through EPA approved training programs in accordance with the Clean Air Act Section 80B and 40 CFR part 82, Subpart F. 9. Maintenance is a contracted service with the supplier of the generator performed at intervals per the manufacturer’s recommendation.</td>
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<td>Technical Area</td>
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<td>AQ</td>
<td>0C1</td>
<td>Ongoing</td>
<td>Air permits</td>
<td>The project owner shall provide the compliance project manager (CPM) copies of any Northern Sonoma County Air Pollution Control District (NSCAPCD or District) issued project air permit for the facility. The project owner shall submit any request or application for a new project air permit or project air permit modification to the CPM.</td>
<td>The project owner shall submit any request or application for a new project air permit or project air permit modification to the CPM at the time of its submission to the permitting agency. The project owner shall provide the CPM a copy of all issued air permits, including all modified air permits, to the CPM within 30 days of finalization.</td>
<td>Same day</td>
<td>Submittal to CPM required</td>
<td>Ongoing</td>
</tr>
<tr>
<td>AQ</td>
<td>0C2</td>
<td>Ongoing</td>
<td>Quarterly/annual reports</td>
<td>The project owner shall provide the CPM with copies of summaries of the quarterly and annual reports submitted to the District, U.S. EPA, or ARB. The project owner shall submit to the CPM in the required quarterly reports a summary of any notices of violation and reports, and complaints relating to the project.</td>
<td>The project owner shall provide the CPM with the reports to the CPM within the timeframes required in the conditions of certification.</td>
<td>Quarterly and annually</td>
<td>Ongoing</td>
<td>See attachment AQ 0C2 for quarterly reports submitted during the reporting period.</td>
</tr>
<tr>
<td>AQ</td>
<td>0C3</td>
<td>Ongoing</td>
<td>Report</td>
<td>The project owner shall provide the project owner shall provide the CPM with an Annual Compliance Report demonstrating compliance with all the conditions of certification as required in the General Provisions of the Compliance Plan for the facility.</td>
<td>The project owner shall provide the Annual Compliance Report to the CPM within 45 calendar days after the end of the reporting period or a later date as approved by the CPM.</td>
<td>End of the reporting period</td>
<td>Ongoing</td>
<td>CPM is in compliance with all the conditions of certification as required in the General Provisions of the Compliance Plan.</td>
</tr>
<tr>
<td>AQ</td>
<td>0C4</td>
<td>Ongoing</td>
<td>Records</td>
<td>The project owner shall maintain a current equipment list for the facility.</td>
<td>The project owner shall provide the CPM with the equipment list upon request.</td>
<td>Ongoing</td>
<td>CPM is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Biological Resources</td>
<td>S-1</td>
<td>Ongoing</td>
<td>Statement</td>
<td>The project owner shall submit an annual compliance statement to CEC to notify them of the status of each of the above items. CEC may, at its discretion, choose to inspect the power plant site for compliance and effectiveness.</td>
<td>The project owner shall submit an annual compliance statement to CEC to notify them of the status of each of the above items. CEC may, at its discretion, choose to inspect the power plant site for compliance and effectiveness.</td>
<td>Ongoing</td>
<td>CPM is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Biological Resources</td>
<td>S-3</td>
<td>Ongoing</td>
<td>Reports</td>
<td>The project owner shall maintain a photo record of the vegetation surrounding the Unit 20 power plant by using close color infrared aerial photography. PG&amp;E shall photograph annually for the first three years of operation and every five years thereafter or until PG&amp;E can demonstrate that the aerial photography shows that Unit 20 is not having a visible effect on the surrounding vegetation. If photography is discontinued because PG&amp;E has demonstrated that no significant impacts are occurring and after termination of the aerial photography, significant changes are noted in the vegetation by PG&amp;E or the CPM, a new set of aerial photographs shall be taken the following fall.</td>
<td>The project owner shall maintain a photo record of the vegetation surrounding the Unit 20 power plant by using close color infrared aerial photography. PG&amp;E shall photograph annually for the first three years of operation and every five years thereafter or until PG&amp;E can demonstrate that the aerial photography shows that Unit 20 is not having a visible effect on the surrounding vegetation. If photography is discontinued because PG&amp;E has demonstrated that no significant impacts are occurring and after termination of the aerial photography, significant changes are noted in the vegetation by PG&amp;E or the CPM, a new set of aerial photographs shall be taken the following fall.</td>
<td>Ongoing</td>
<td>CPM is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Biological Resources</td>
<td>S-5</td>
<td>Ongoing</td>
<td>Records</td>
<td>The project owner shall maintain a photo record of the vegetation surrounding the Unit 20 power plant by using close color infrared aerial photography. PG&amp;E shall photograph annually for the first three years of operation and every five years thereafter or until PG&amp;E can demonstrate that the aerial photography shows that Unit 20 is not having a visible effect on the surrounding vegetation.</td>
<td>The project owner shall maintain a photo record of the vegetation surrounding the Unit 20 power plant by using close color infrared aerial photography. PG&amp;E shall photograph annually for the first three years of operation and every five years thereafter or until PG&amp;E can demonstrate that the aerial photography shows that Unit 20 is not having a visible effect on the surrounding vegetation.</td>
<td>Ongoing</td>
<td>CPM is in compliance.</td>
<td></td>
</tr>
</tbody>
</table>
### Technical Status Report Condition of Certification Compliance Verification

<table>
<thead>
<tr>
<th>Technical Area</th>
<th>No.</th>
<th>Facility Status</th>
<th>Report</th>
<th>Condition of Certification</th>
<th>Compliance Verification</th>
<th>Timeframe</th>
<th>Submitted Required</th>
<th>Status</th>
<th>2020 Annual Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Resources</td>
<td>3-5</td>
<td>Ongoing</td>
<td>Verification</td>
<td>Presently shall mitigate wildlife habitat loss by the following enhancement measures as specified in the Mitigating and Mitigation Plan (MMP), Appendix J (pp. 21-26):</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
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<td></td>
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<td></td>
<td>a. Prescribed burns (to be initiated the first fall season following power plant certification) or participation in the California Department of Forestry Chaparral Management Plan.</td>
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<td>b. Development of three springs.</td>
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<td>c. Development of a wildlife guzzler with annual maintenance and inspection during dry periods to ensure a year-round water supply.</td>
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<td>d. Revegetation with wildlife food and cover plants.</td>
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<td>e. Construction of two riparian ponds.</td>
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<td>Presently shall submit an annual compliance statement to the CEC to notify them of the completion of the above tasks each year until the work is completed. CEC may, at its option, inspect for mitigation implementation.</td>
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<tr>
<td>COM</td>
<td>1</td>
<td>Ongoing</td>
<td>Unrestricted Access</td>
<td>The project owner shall ensure that the CPM, responsible staff, and delegate agencies are granted unrestricted access to the facility site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting facility audits, surveys, inspections, or general or closure-related site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time, whether such visits are by the CPM in person or through representatives from staff, delegated agencies, or consultants.</td>
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<td></td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
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<td>COM</td>
<td>2</td>
<td>Ongoing</td>
<td>Compliance Report</td>
<td>The project owner shall maintain electronic copies of all project files and submittals on-site, or at an alternative site approved by the CPM for the operational life and closure of the project. The files shall also contain at least:</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
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<td>1. the facility’s Application for Certification, if available;</td>
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<td>2. all amendment petitions, staff approvals and CEC orders;</td>
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<td>3. all site-related environmental impact and survey documentation;</td>
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<td>4. all appraisal, assessments, and studies for the project;</td>
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<td>5. all finalized original and amended design plans and “as-built” drawings for the entire project;</td>
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<td>6. all citations, warnings, violations, or corrective actions applicable to the project, and</td>
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<td>7. the most current versions of any plans, manuals, and training documentation required by the conditions of certification or applicable LORS.</td>
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<td>Staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.</td>
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<tr>
<td>COM</td>
<td>3</td>
<td>Ongoing</td>
<td>Unrestricted Access</td>
<td>The project owner shall maintain electronic copies of all project files and submittals on-site, or at an alternative site approved by the CPM for the operational life and closure of the project. The files shall also contain at least:</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
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<td>Presently shall submit an annual compliance statement to the CEC to notify them of the completion of the above tasks each year until the work is completed. CEC may, at its option, inspect for mitigation implementation.</td>
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<tr>
<td>COM</td>
<td>4</td>
<td>Pre-con</td>
<td>Monthly Compliance Report</td>
<td>During the construction of approved project modifications requiring construction of 6 months or more, the project owner or authorized agent shall submit an electronic searchable version of the MCR to the CPM within 10 business days after the end of each reporting month. No MCR shall be required for maintenance and repair activities, regardless of duration. MCRs shall be submitted each month until construction is complete, and the final certificate of occupancy is issued by the DCBO. MCRs shall be clearly identified for the month being reported. The MCR shall contain, at a minimum:</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
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<td>1. a summary of the current project construction status, a reassembled schedule if there are significant delays, and an explanation of any significant changes to the schedule;</td>
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<td>2. Construction submittals pending approval, including those under review, and comments issued, and those approved since last MCR;</td>
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<td>3. A project of project compliance activities (compliance submittals, etc.) scheduled during the next 2 (two) months, the project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;</td>
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<td>4. A listing of incidents (safety, etc.), complaints, inspections (status and those requested), notices of violation, official warnings, training administered, and citations received during the month; a list of any incidents that occurred during the month, a description of the actions, taken to date to resolve the issue, and the status of any unresolved actions noted in the previous MCRs;</td>
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<td>5. Documents required by specific conditions (if any) to be submitted along with each MCR. Each of these items shall be identified in the transmittal letter, as well as the conditions they satisfy, and submitted as attachments to the MCR;</td>
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<td>6. A list of conditions (if any) that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;</td>
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<td>7. A listing of the month’s additions to the Compliance Record.</td>
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</tr>
<tr>
<td>Technical Area</td>
<td>No.</td>
<td>Facility Status</td>
<td>Condition of Certification</td>
<td>Compliance Verification</td>
<td>Timeframe</td>
<td>Submitted Required</td>
<td>Status</td>
<td>2020 Annual Compliance Report</td>
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</tr>
<tr>
<td>COM 6</td>
<td>Operations/ Ongoing</td>
<td>PCR/ACR</td>
<td>Ongoing</td>
<td>The Compliance Plan has been updated for all applicable verification items for the applicable time frame in 2020.</td>
<td>AS of time specified by CPM or CEC</td>
<td>Ongoing</td>
<td>The Compliance Plan has been updated for all applicable verification items for the applicable time frame in 2020.</td>
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<td></td>
</tr>
</tbody>
</table>

**ACR or PCR Ongoing** The Compliance Plan has been updated for all applicable verification items for the applicable time frame in 2020.

### Periodic and Annual Compliance Reports
- Ongoing disciplines. ACRs shall be completed for each year of commercial operation and are due each year on a date agreed to by the CPM. Other PCR may be filed on an electronic storage medium or by e-mail, subject to CPM approval. Each ACR must include the AFC number, identify the reporting period, and contain the following:
  1. an updated list showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
  2. a summary of the current project operating status and an explanation of any significant changes to facility operating status during the year;
  3. documents required by specific conditions to be submitted along with the ACR; each of these items shall be identified in the transmittal letter with the conditions it satisfies, and submitted as an attachment to the ACR;
  4. a cumulative list of all known post-certification changes approved by the CEC or the CPM;
  5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
  6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;
  7. a projection of project compliance activities scheduled during the next year;
  8. a listing of complaints, incidents, notices of violation, official warnings, and citations received during the year, a description of how the issues were resolved, and the status of any unresolved complaints.

### Written Request for Confidential Designation
- Any information that the project owner designates as confidential shall be submitted to the CEC’s Executive Director with an application for confidentiality, pursuant to Title 20, California Code of Regulations, section 2505(a).

### Annual Energy Facility Compliance Fee
- Pursuant to the provisions of section 25806 (b) of the Public Resources Code, the project owner shall continue paying an annual compliance fee which is adjusted annually, due by July 1 of each year in which the facility retains its certification.

### Petition to Amend a CEC Decision
- The project owner shall petition the CEC, pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project or linear facilities, or to transfer ownership or operational control of the facility. Section 1769 details the required contents for a Petition to Amend a CEC Decision.
- A project owner is required to submit a five thousand ($5,000.00) dollar fee for every Petition to Amend a previously certified facility, pursuant to Public Resources Code section 25806(e).
- If the actual amendment processing costs exceed $5,000.00, the total Petition to Amend reimbursement fees owed by a project owner will not exceed seven hundred fifty thousand dollars ($750,000), adjusted annually.

### Incident-Reporting Requirements
- Within 24 hours of its occurrence, the project owner shall report to the CPM any safety-related incident. Such reporting shall include any incident that has resulted in death to a person, an injury or illness to a person requiring overnight hospitalization, a report to Cal/OSHA, OSHA, or other regulatory agency; or damage to the property of the project owner or another person of more than $50,000. If not initially provided, a written report also will be submitted to the CPM within five business days of the incident. The report will include copies of any reports concerning the incident that have been submitted to other governmental agencies.

### Notice Non-Operation and Restoration Plans
- If the facility ceases operation temporarily because it is physically unable to operate (excluding maintenance or repair) for longer than three (3) months (or other CPM-approved date), the project owner shall notify the CPM. Notice of planned non-operation, excluding maintenance or repair, shall be given at least two (2) weeks prior to the scheduled date. Notice of unplanned non-operation shall be provided no later than one (1) week after non-operation begins.

### Facility Closure Planning
- The project owner shall coordinate with the CEC to plan and prepare for eventual permanent closure and license termination by filing a Facility Closure Plan. The Facility Closure Plan shall be filed 90 days before the commencement of closure activities or at such other time agreed to between the CPM and the project owner. The Facility Closure Plan shall include the information set forth in Title 20, California Code of Regulations, section 1769, but shall not be subject to the fee set forth in Public Resources Code section 25806(e).
<table>
<thead>
<tr>
<th>Technical Area</th>
<th>No.</th>
<th>Facility Status</th>
<th>Report</th>
<th>Condition of Certification</th>
<th>Compliance Verification</th>
<th>Timeframe</th>
<th>Submitted Required</th>
<th>Status</th>
<th>2020 Annual Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural Resources</td>
<td>4-2</td>
<td>Operational</td>
<td>Ongoing</td>
<td>Preservation shall continue to maintain the existing fencing around the archaeological site identified as CA-SON-793, located approximately one and one-half miles ENE of the proposed Unit 20 project site.</td>
<td>Geneal: shall annually submit a statement verifying that the fencing around the site has remained intact.</td>
<td>annually</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>GPC is in compliance. See addendum April 2021. Guzzler and Sediment Pond inspection pictures under Biological Resources 5-1e. Fence is intact.</td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td>1</td>
<td>Operations/ Design</td>
<td>Ongoing</td>
<td>The project owner shall notify and submit design drawings to the compliance project manager (CPM) for any planned modifications that would materially change the design, operation, or performance of the fire protection or fire alarm systems.</td>
<td>The project owner shall provide the CPM with an updated Basis of Design document within 30 days of completing any changes to fire protection or fire alarm systems that result in changes to the Basis of Design.</td>
<td>30 days</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>No modifications made during this reporting period.</td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td>2</td>
<td>Operations/ Design</td>
<td>Ongoing</td>
<td>The project owner shall maintain and update, as appropriate, the fire protection Basis of Design documents and appendices to ensure that the fire protection and fire alarm systems are documented and accurately depicted on drawings for the project site.</td>
<td>The project owner shall provide the CPM with copies of the completed ITM reports for the project’s fire protection systems and fire alarm systems within 15 days of receiving the ITM reports. The ITM reports shall be submitted quarterly for the first two years following approval of this condition, then all ITM reports shall be submitted annually thereafter.</td>
<td>15 days</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>ITMs were completed and reported per December 2020 Recommissioning report dated 1/8/21, TN# 240528.</td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td>3</td>
<td>Operations/ Design</td>
<td>Ongoing</td>
<td>The project owner shall ensure that all required inspections, testing, and maintenance (ITM) are performed on the project’s fire protection systems as specified and in the frequencies set forth in Title 19, California Code of Regulations, section 904(a) and on the project’s fire alarm systems as specified in the applicable edition of the National Fire Protection Association (NFPA) 72 National Fire Alarm and Signaling Code.</td>
<td>The project owner shall provide the CPM with the information from (a)-(c) within 15 days of receiving the ITM reports.</td>
<td>15 days</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>No impairments were discovered during the reporting period.</td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td>4</td>
<td>Operations/ Design</td>
<td>Ongoing</td>
<td>Information on the results of fire protection system impairment, as defined in the latest applicable edition of NFPA-20, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, California Edition, that would prevent the proper functioning of any portion of the fire protection or fire alarm systems during a fire event, the project owner shall inform the CPM of the impairment along with the following information:</td>
<td>The project owner shall provide the CPM with the information from (a)-(c) within 15 days of receiving the ITM reports.</td>
<td>15 days</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>ITMs are in compliance.</td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td>5</td>
<td>Operations/ Design</td>
<td>Ongoing</td>
<td>Information on the results of fire protection system impairment, as defined in the latest applicable edition of NFPA-20, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, California Edition, that would prevent the proper functioning of any portion of the fire protection or fire alarm systems during a fire event, the project owner shall inform the CPM of the impairment along with the following information:</td>
<td>The project owner shall provide the CPM with the information from (a)-(c) within 15 days of receiving the ITM reports.</td>
<td>2 business days</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>ITMs are in compliance.</td>
</tr>
</tbody>
</table>
approved the installation of a stationary permanent emergency diesel-driven engine for the cooling tower wet-down system to aid in fire prevention, per order #18-1210-2. Documents were submitted by the DCBO to the CEC.

30 days following

Area No. Facility

Required Status 2020 Annual Compliance Report

GEN 1 Operations/Ongoing

Statement: Wherever material modifications to the facility are planned, the project owner shall design, construct, and inspect project modifications in accordance with the applicable version of the California Building Standards Code (CBS Code), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering laws, ordinances, regulations and standards (LORS) in effect at the time initial design plans are submitted to the chief building official (CBO) for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that the provisions of the above applicable codes are enforced during the construction, addition, alteration, or demolition of the modifications.

Where, in any specific case, different applicable sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed, and materials supplied comply with the codes listed above.

Within 30 days following receipt of the certificate of occupancy (if one is required by the CBO) for any material project modification completed after the effective date of this condition, the project owner shall submit to the compliance project manager (CPM), a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the CEC’s decision have been met in the area of facility design. The project owner shall also provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO. Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, or demolition to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

Within 90 days after the plant reaches its rated power generation capacity and construction is complete, PG&E shall conduct a noise survey at 500 feet from the generating station or at a point acceptable to PG&E, CEC and Sonoma County Planning Department. The survey will cover a 24-hour period with results reported in terms of the Leq (L50, L100, and L90). PG&E shall prepare a report of the survey that will be used to determine the plants conformance with county standards. In the event that county standards are being exceeded, the report shall also contain a mitigation plan and a schedule to correct the noncompliance.

No additional noise surveys of off-site operational noise are required unless the public registers complaints or the noise from the project is suspected of increasing due to a change in the operation of the facility.
### Public Health

#### 2-1 Ongoing
- **Facility**: No complaints were received during the reporting period.
- **Survey**: The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, CAC, Article 105. The survey results shall be used to determine the magnitude of employee noise exposure. If employee complaints of excessive noise areas during the life of the project, CAL/OSHA, Department Of Industrial Relations, shall make a compliance determination.

#### 2-2 Ongoing
- **Report**: Weekly, we provide annual reports to CDHS/RHS (with an informational copy to the CEC) which will comply in format and content with the most recent CDHS/RHS reporting requirements.
- **Sampling of radon-222 steam concentrations either: (1) in noncondensable gases entering the power plant in incoming steam; (2) in vent orifice (3) in the condensate, in accordance with the most recent California Department of Health Services, Radiologic Health Service (CDHS/RHS) requirements for monitoring and reporting on radon-222. The radon-222 steam monitoring program will be conducted for at least the first three years of commercial operation. If monitoring results indicate that the radon-222 release from Unit 20 is well within applicable standards, the monitoring program may be modified, reduced in scope, or eliminated, provided PG&E obtains the permission of CDHS/RHS. (with an informational copy to the CEC) which will comply in format and content with the most recent CDHS/RHS reporting requirements. Public Health 2-1. There was no exceedance of 3.0 pCi/l during the reporting period.

#### 2-3 Ongoing
- **Report**: The radon-222 steam monitoring program will be conducted for at least the first three years of commercial operation. If monitoring results indicate that the radon-222 release from Unit 20 is well within applicable standards, the monitoring program may be modified, reduced in scope, or eliminated, provided PG&E obtains the permission of CDHS/RHS. (with an informational copy to the CEC) which will comply in format and content with the most recent CDHS/RHS reporting requirements. Public Health 2-1. There was no exceedance of 6.0 pCi/l during the reporting period.

#### 2-4 Ongoing
- **Notice or Plan**: If the radon-222 concentrations exceed 6.0 pCi/l in the cooling tower exhaust, PG&E shall provide an advisory report to CDHS/RHS and the CEC within 30 days outlining corrective actions taken. PG&E shall provide a written report of sample results to CDHS/RHS within 30 days of confirmation of levels in excess of 3.0 pCi/liter radon-222 in the cooling tower exhaust. If PG&E does not participate in GAMP, PG&E shall submit to the NSCAPCO, CARB, and CEC, for their review, a detailed ambient monitoring plan at least 60 days before monitoring begins.

#### 2-5 Complete - report only for 2020
- **Report**: PG&E shall design and perform a program of quarterly steam analysis for ammonia, arsenic, mercury, silica, boron, and radon-222 for a one year period before initial operation and one year after initial operation, at Anderson Springs in an equivalent manner to that in the Geysers Air Monitoring Program (GAMP). This program may be reduced in scope upon agreement by CEC, NSCAPCO, and PG&E. PG&E can participate in the GAMP, if it is implemented, to meet this requirement. If the GAMP ends before completing the equivalent of the above, the NSCAPCO and CEC can require PG&E to continue monitoring to meet the requirement.

#### 2-6 Complete - report only for 2020
- **Report**: PG&E shall design and perform a program of quarterly steam analysis for radon-222, ammonia, arsenic, mercury, silica, boron, and radon-222 for a one year period before initial operation and one year after initial operation, at Anderson Springs in an equivalent manner to that in the Geysers Air Monitoring Program (GAMP). This program may be reduced in scope upon agreement by CEC, NSCAPCO, and PG&E. PG&E can participate in the GAMP, if it is implemented, to meet this requirement. If the GAMP ends before completing the equivalent of the above, the NSCAPCO and CEC can require PG&E to continue monitoring to meet the requirement.

#### 2-8 Complete - report only for 2020
- **Report**: PG&E shall design and perform a program of quarterly steam analysis for radon-222, ammonia, arsenic, mercury, silica, boron, and radon-222 for a one year period before initial operation and one year after initial operation, at Anderson Springs in an equivalent manner to that in the Geysers Air Monitoring Program (GAMP). This program may be reduced in scope upon agreement by CEC, NSCAPCO, and PG&E. PG&E can participate in the GAMP, if it is implemented, to meet this requirement. If the GAMP ends before completing the equivalent of the above, the NSCAPCO and CEC can require PG&E to continue monitoring to meet the requirement.

#### 2-9 Complete - report only for 2020
- **Report**: PG&E shall design and perform a program of quarterly steam analysis for radon-222, ammonia, arsenic, mercury, silica, boron, and radon-222 for a one year period before initial operation and one year after initial operation, at Anderson Springs in an equivalent manner to that in the Geysers Air Monitoring Program (GAMP). This program may be reduced in scope upon agreement by CEC, NSCAPCO, and PG&E. PG&E can participate in the GAMP, if it is implemented, to meet this requirement. If the GAMP ends before completing the equivalent of the above, the NSCAPCO and CEC can require PG&E to continue monitoring to meet the requirement.

### Noise

- **Facility Status**: Ongoing
- **Report**: Within 180 days after the start of commercial operation, PG&E shall prepare a noise survey report for the receiver/residence areas in the facility. The survey should be conducted by a qualified person in accordance with the provisions of Title 8, CAC, Article 105. The survey results will be used to determine the magnitude of employee noise exposure. If employee complaints of excessive noise areas during the life of the project, CAL/OSHA, Department Of Industrial Relations, shall make a compliance determination.

### Public Health

#### 2-1 Ongoing
- **Report**: PG&E shall conduct quarterly sampling and analysis of radon-222 concentrations either: (1) in noncondensable gases entering the power plant in incoming steam; (2) in vent orifice (3) in the condensate, in accordance with the most recent California Department of Health Services, Radiologic Health Service (CDHS/RHS) requirements for monitoring and reporting on radon-222. The radon-222 steam monitoring program will be conducted for at least the first three years of commercial operation. If monitoring results indicate that the radon-222 releases from Unit 20 is well within applicable standards, the monitoring program may be modified, reduced in scope, or eliminated, provided PG&E obtains the permission of CDHS/RHS. Changes may be made to the program as new information and techniques become available.

#### 2-2 Ongoing
- **Report**: PG&E shall provide a written report of sample results to CDHS/RHS within 30 days of confirmation of levels in excess of 3.0 pCi/liter radon-222 in the cooling tower exhaust. PG&E shall submit the program design to the NSCAPCO, CARB, and CEC, for their review, a detailed ambient monitoring plan at least 60 days before monitoring begins.

#### 2-3 Ongoing
- **Report**: PG&E shall provide a written report of sample results to CDHS/RHS within 30 days of confirmation of levels in excess of 3.0 pCi/liter radon-222 in the cooling tower exhaust. PG&E shall submit the program design to the NSCAPCO, CARB, and CEC, for their review, a detailed ambient monitoring plan at least 60 days before monitoring begins.

#### 2-4 Ongoing
- **Report**: Any questions or complaints that the air quality is worsening or becoming a nuisance or unhealthful should be directed to: Northern Sonoma County Air Pollution Control Officer 118 North Street Healdsburg, CA 95448 (707) 433-5911
<table>
<thead>
<tr>
<th>Technical Area</th>
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</thead>
</table>
| Pwr Plant Efficiency and Reliability | 17-2 | Ongoing         | Data   | PGandE shall continuously obtain performance-related data over the life of the plant for the following operating parameters:  
a. Main condenser absolute pressure,  
b. Turbine inlet steam pressure, and  
c. Plant generation capacity as net and gross megawatts.  
PGandE shall start obtaining the above data on the first day of plant operation which attains at least 90 percent of the net rated electrical power output at the plant busbar for a minimum of 48 hours of continuous steady state operation.  
Steady state operation is defined as sustained operation of the plant, wherein the net electrical power output at the plant output busbar does not vary by more than plus or minus 5 percent over one-hour time period.  
If the monitoring instrumentation systems are off-line for more than 24 hours, PGandE shall manually collect sufficient data as defined above in order to provide the required performance-related data.  
PGandE shall submit to the CEC, at least 45 days prior to scheduled operation, a letter describing the instrumentation, its accuracy, and the intended frequency of calibration. |
| Pwr Plant Efficiency and Reliability | 17-3 | Ongoing         | Records| PGandE shall retain the plant performance-related data for each five years of plant operation or as required by the FERC or the CPUC or until the CEC has given its approval to dispose of the data. Further, PGandE shall provide a representative of the CEC, upon reasonable notice, access to the performance-related data at the plant site.  
PGandE shall inform the CEC of the location of the performance-related data in a periodic compliance report. |
| Pwr Plant Efficiency and Reliability | 17-5 | Ongoing         | Data   | PGandE shall collect the routine performance-related data defined in requirement 17-2.  
The power plant performance test results for the Geysers 20 power plant will include, but not be limited to information on the following parameters:  
a. Mass-flow rate of inlet steam,  
b. Steam temperatures and pressures,  
c. Power plant auxiliary usage in Megawatts,  
d. Power plant Output at the busbar in megawatts,  
e. Power plant auxiliary steam flow,  
f. Turbine steam inlet pressure, and  
g. Main condenser absolute pressure.  
PGandE shall file the data with the CEC in a periodic compliance report. |
| Pwr Plant Efficiency and Reliability | 17-6 | Ongoing         | Results| After each overhaul of the Geysers 20 plant (estimated to be after 24 months of operation) or major emergency overhaul or repairs, PGandE shall undertake a post overhaul power plant performance test.  
The power plant performance test results for the Geysers 20 power plant will include, but not be limited to information on the following parameters:  
a. Mass-flow rate of inlet steam,  
b. Steam temperatures and pressures,  
c. Power plant auxiliary usage in Megawatts,  
d. Power plant Output at the busbar in megawatts,  
e. Power plant auxiliary steam flow,  
f. Turbine steam inlet pressure, and  
g. Main condenser absolute pressure.  
PGandE shall submit the results of this test to the CEC within 60 days of test completion.  
PGandE shall provide CEC staff with access, upon reasonable notice, to this data at the plant site.  
Within 60 days of detecting a significant degradation of the performance, PGandE shall submit a plan for corrective action to the CEC. CEC staff may be referred to the CEC for resolution under the procedures contained in the Compliance Plan Dispute Resolution Procedures. If PGandE so requests, the CEC will solicit comments from the CPUC concerning the rate impacts of any such plan, and, in any event, shall forward its final determination on this matter to the CPUC. |
| Pwr Plant Efficiency and Reliability | 17-7 | Ongoing         | Data   | Information regarding the following parameters, at a minimum, will be available to the CEC staff for review at the power plant site upon request:  
a. Mass-flow rate of steam,  
b. Steam temperature and pressures,  
c. Power plant auxiliary usage in Megawatts,  
d. Power plant electrical generation output at the busbar,  
e. Power plant auxiliary steam flow,  
f. Turbine steam inlet pressure, and  
g. Main condenser absolute pressure.  
Within 60 days of detecting a significant degradation of the performance, PGandE shall submit a plan for corrective action to the CEC. CEC staff may be referred to the CEC for resolution under the procedures contained in the Compliance Plan Dispute Resolution Procedures. If PGandE so requests, the CEC will solicit comments from the CPUC concerning the rate impacts of any such plan, and, in any event, shall forward its final determination on this matter to the CPUC. |
| Pwr Plant Efficiency and Reliability | 17-8 | Ongoing         | Plan   | If the routine data defined in requirement 17-2 indicates a significant degradation (defined as plant electrical output dropping 15 percent below the month to month levels indicated in the figure below) in performance prior to a regularly scheduled maintenance overhaul, PGandE shall develop and submit to the CEC a plan to restore performance to a level comparable to that indicated by the immediately preceding post-overhaul test results unless limited by economics or replacement parts availability.  
Within 60 days of detecting a significant degradation of the performance, PGandE shall submit a plan for corrective action to the CEC. CEC staff may be referred to the CEC for resolution under the procedures contained in the Compliance Plan Dispute Resolution Procedures. If PGandE so requests, the CEC will solicit comments from the CPUC concerning the rate impacts of any such plan, and, in any event, shall forward its final determination on this matter to the CPUC.  
Within 60 days of detection of degradation of performance in performance prior to a regularly scheduled maintenance overhaul, PGandE shall develop and submit to the CEC a plan to restore performance to a level comparable to that indicated by the immediately preceding post-overhaul test results unless limited by economics or replacement parts availability.  
Within 60 days of detecting a significant degradation of performance, PGandE shall submit a plan for corrective action to the CEC. CEC staff may be referred to the CEC for resolution under the procedures contained in the Compliance Plan Dispute Resolution Procedures. If PGandE so requests, the CEC will solicit comments from the CPUC concerning the rate impacts of any such plan, and, in any event, shall forward its final determination on this matter to the CPUC. |

CEC Ongoing  
GPE is in compliance, no significant degradation occurred during the reporting period. Records available on request.
<table>
<thead>
<tr>
<th>Technical Area</th>
<th>No.</th>
<th>Facility Status</th>
<th>Report</th>
<th>Condition of Certification</th>
<th>Compliance Verification</th>
<th>Timeframe</th>
<th>Submitted Required</th>
<th>Status</th>
<th>2020 Annual Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>12-14</td>
<td>Ongoing</td>
<td>ACR</td>
<td>Puget Sound and the California Department of Forestry shall annually re-examine the fire protection plan.</td>
<td>Monthly</td>
<td>Ongoing</td>
<td>A meeting was held in June, 2020 to discuss improvement plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>12-15</td>
<td>Ongoing</td>
<td>ACR</td>
<td>On-site worker safety inspections shall be conducted by the CAL/OSHA (California Division of Occupational Safety and Health) during construction and operation of the facility of when an employee complaint has been received.</td>
<td>CAL/OSHA</td>
<td>Ongoing</td>
<td>The CAL/OSHA inspects and acts on its periodic compliance reports.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>12-8</td>
<td>Ongoing</td>
<td>Records</td>
<td>Prior to commercial operation, PG&amp;E shall notify CAL/OSHA and the CEC of the availability of the documents.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soils</td>
<td>8-4</td>
<td>Ongoing</td>
<td>AR</td>
<td>PG&amp;E or its contractor shall implement erosion and sediment control measures at the power plant site and the alternate fill disposal site equivalent to those described in the AFC.</td>
<td>Upon reasonable notice, CEC compliance and monitoring staff shall be allowed access to the power plant site and the alternate fill disposal site by PG&amp;E or its contractor to verify that the mitigation measures are in place and effective.</td>
<td>Ongoing</td>
<td>No inspections were performed by CEC during the reporting period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soils</td>
<td>8-5</td>
<td>Ongoing</td>
<td>Correspondence</td>
<td>PG&amp;E shall comply with NCRWQCB's discharge specifications governing freeboard for sediment ponds.</td>
<td>Ongoing</td>
<td>No correspondence with NCRWQCB relating to the sediment pond freeboard during the reporting period.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soils</td>
<td>8-6</td>
<td>Ongoing</td>
<td>Data</td>
<td>PG&amp;E shall continue to monitor streambed sediment composition for the power plant site and the alternate fill disposal site equivalent to those described in the AFC.</td>
<td>PG&amp;E shall either continue to submit ARM monitoring data to CEC or the results of an independent, site monitoring effort.</td>
<td>Ongoing</td>
<td>Compliance Verification for the measure continues, on a triennial basis, as a focused perennia (perennia acuminate var. thermal) monitoring program. Refer to attachment Biological Resources 5-1b: Geysers Panicum Monitoring Report.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste Management</td>
<td>11-1</td>
<td>Ongoing</td>
<td>Records</td>
<td>PG&amp;E shall ensure that any hazardous waste hauler employed by PG&amp;E has a certificate of registration from the California Department of Health Services (CDHHS), Hazardous Materials Management Section.</td>
<td>PG&amp;E shall keep a letter on file verifying that hazardous waste haulers for the Geysers 20 project have valid CDHHS certificates or registration.</td>
<td>Ongoing</td>
<td>All waste haulers are in compliance and on file in the DTSC database.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste Management</td>
<td>11-2</td>
<td>Ongoing</td>
<td>Manifests</td>
<td>The Stratford process waste include a sulfur and a Stratford purge stream. PG&amp;E shall ensure that the sulfur is properly stored in accordance with CDHHS regulations, and removed periodically to be sold or to be disposed at a site approved for such wastes. Any sludge which accumulates in the cooling tower basins will be removed and hauled by a registered hazardous waste hauler to an approved disposal site.</td>
<td>PG&amp;E shall submit final design plans and &quot;as built&quot; drawings to the Sonoma County CBO incorporating these storage design features. In addition, PG&amp;E shall each month submit completed hazardous waste manifests to CDHHS in compliance with Section 66475 to Title 22, CAC.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste Management</td>
<td>11-3</td>
<td>Ongoing</td>
<td>Manifests</td>
<td>PG&amp;E shall ensure that hazardous waste are taken to a facility permitted by DTSC to accept such wastes.</td>
<td>PG&amp;E shall notify the CEC, DTSC, and solid waste management board of the selected disposal site. Any notice of change in disposal sites will be submitted as changes occur.</td>
<td>Ongoing</td>
<td>GPC is in compliance. No update to changes in approved disposal sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste Management</td>
<td>11-4</td>
<td>Ongoing</td>
<td>Data</td>
<td>PG&amp;E shall ensure that the requirements of a hazardous waste facility permit have been satisfied.</td>
<td>PG&amp;E abides by DTSC, CEC, if it has an in-lieu application with CDHHS for the operation of a hazardous waste facility.</td>
<td>Ongoing</td>
<td>GPC abides by DTSC, CEC, if it has an in-lieu application with CDHHS for the operation of a hazardous waste facility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Area</td>
<td>No.</td>
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<tr>
<td>Wastewater Management</td>
<td>11-7</td>
<td>Ongoing</td>
<td>Records</td>
<td>GPC should comply with all applicable provisions of the Resource Conservation and Recovery Act (RCRA) and the California hazardous waste laws. Copies of all required documents under RCRA and the California Hazardous Waste Laws will be kept on file at the plant.</td>
<td>Ongoing</td>
<td>10 days</td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
</tr>
<tr>
<td>Wastewater Management</td>
<td>11-8</td>
<td>Ongoing</td>
<td>Notice</td>
<td>PG&amp;E shall notify the CEC of any known enforcement actions against PG&amp;E, the waste hauler, or the disposal site operator.</td>
<td>Ongoing</td>
<td>10 days</td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
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<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>13-2</td>
<td>Ongoing</td>
<td>Notice</td>
<td>PG&amp;E shall construct, operate, and maintain the transmission lines in accordance with Title 14, California Administrative Code, Sections 1254 - 1256, and Public Resources Code, Sections 4202 - 4206.</td>
<td>Ongoing</td>
<td>DTSC</td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
</tr>
<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>13-3</td>
<td>Ongoing</td>
<td>Records</td>
<td>In the event of complaints regarding induced currents from vehicles, portable objects, large metallic roofs, fences, gullies, or other objects, PG&amp;E shall investigate and take all reasonable measures at its own expense to correct the problem for valid complaints, provided that: (a) the object is located outside the right-of-way; or (b) the object is within the right-of-way and existed prior to right-of-way acquisition. For objects constructed, installed, or otherwise placed within the right-of-way after right-of-way acquisition, PG&amp;E shall notify the owner of the object that it should be grounded. In this case, running is the responsibility of the property owner. PG&amp;E shall advise the property owner of this responsibility in writing prior to signing the right-of-way agreement.</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
</tr>
<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>13-4</td>
<td>Ongoing</td>
<td>Records</td>
<td>On-site worker safety inspections may be conducted by the California Division of Occupational Safety and Health (CAL/OSHA) during construction and operation of the transmission lines or when an employee complaint has been received. PG&amp;E shall notify the CEC in writing in the event of a violation if such violation may delay the transmission line construction schedule.</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
</tr>
<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>13-5</td>
<td>Ongoing</td>
<td>Records</td>
<td>PG&amp;E shall make every reasonable effort to locate and correct, on a case-by-case basis, all causes of radio interference and television interference attributed to the transmission line facilities, including, if necessary, modifying-receivers and furnishing and installing antennas. In addition, PG&amp;E shall take reasonable care to prevent the conductors from being scratched or abraded.</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
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<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>13-6</td>
<td>Ongoing</td>
<td>Report</td>
<td>Within seven days of a serious accident (as defined under State Labor Code) or fatality, PG&amp;E shall file a report by telephone with the CEC.</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td>Ongoing</td>
<td>DTSC discovered minor violations of the Hazardous Waste Control Law upon inspection March 4-5, 2020 and April 10, 2020 at Chemical Waste Management, GPC’s TSDF. Findings are available on Envirostor under site ID# CAT000646117</td>
</tr>
<tr>
<td>Technical Area</td>
<td>No.</td>
<td>Facility Status</td>
<td>Report</td>
<td>Condition of Certification</td>
<td>Compliance Verification</td>
<td>Timeframe</td>
<td>Submitted Required</td>
<td>Status</td>
<td>2020 Annual Compliance Report</td>
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<tr>
<td>Transmission Line Safety and Nuisance</td>
<td>1-3</td>
<td>Operations/ Ongoing</td>
<td>BPA</td>
<td>This will be in accordance to the California Public Utilities Commission (CPUC) regulations and the conditions adopted by the CEC.</td>
<td>Must be submitted within 30 days of the CPCN decision.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance. No revisions to the CPCN have been made.</td>
<td></td>
</tr>
<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-1</td>
<td>Operations/ Ongoing</td>
<td>RWA</td>
<td>If PG&amp;E uses an H2S abatement system, PG&amp;E shall ensure that all chemicals will be stored within the bermed area of the plant site.</td>
<td>Must be submitted within 30 days of the CPCN decision.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-12</td>
<td>Operations/ Ongoing</td>
<td>Notice</td>
<td>PG&amp;E shall provide, to all of its contractors working on Geysers Unit 20, a letter documenting the necessary procedures to be followed if any material is spilled into Anderson Creek or Gunning Creek. These procedures are to be immediately:</td>
<td>All revisions to the CPCN, and a copy of the CPUC decision with all attachments.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-14</td>
<td>Operations/ Ongoing</td>
<td>Notice</td>
<td>In the event that any vehicle used during the construction process or operating process of Unit No. 20 spills or releases matter into the waters of Anderson or Gunning Creeks or impedes the natural flow of Anderson or Gunning Creeks, thereby causing adverse impacts to the ASCSD, PG&amp;E shall notify the CEC immediately following an accidental discharge into Anderson or Gunning Creeks.</td>
<td>All revisions to the CPCN, and a copy of the CPUC decision with all attachments.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-11</td>
<td>Operations/ Ongoing</td>
<td>Notice</td>
<td>PG&amp;E and its contractor(s) shall divert water from the Geysers Development Corporation (GDC) Pond whenever feasible. PG&amp;E or its contractors may divert additional water from Big Sulphur Creek only, consistent with water rights, for the period of construction of the Geysers 20 power plant. The flow rates shall not be greater than 0.07 ft³/sec (31.4 gpm), as measured by an accurate and reliable in-line water meter, which shall be installed prior to PG&amp;E removing water from Big Sulphur Creek.</td>
<td>All revisions to the CPCN, and a copy of the CPUC decision.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
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<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-2</td>
<td>Operations/ Ongoing</td>
<td>RWA</td>
<td>To prevent spills of steam condensate and other materials from leaving the site, PG&amp;E shall construct an impermeable concrete or asphaltic concrete retention barrier around the plant. PG&amp;E shall also pave the site with 2 inches of asphaltic concrete and attain a permeability of at least 1 x 10^-6 cm/sec. As a result of this construction, the paved area of the plant site will serve as a spill retention basin. PG&amp;E shall design the proposed retention basin referring to the Sonoma County Water Agency &quot;Flood Control Design Criteria,&quot; revised April 1973, to determine the rain fall recurrence interval. The basin will be capable of retaining the maximum condensate spill expected to occur before plant personnel can reach the cause of the spill. In addition, the design shall accommodate the runoff from a 100-year storm in 30-minute duration.</td>
<td>Must be submitted within 30 days of the CPCN decision.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
</tr>
<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-4</td>
<td>Operations/ Ongoing</td>
<td>RWA</td>
<td>PG&amp;E shall ensure that any seawater entering the Strieford process area will not enter surface water or groundwater. PG&amp;E shall use the seawater in the Strieford process or pump it to the cooling tower overflow structure. PG&amp;E shall use the seawater condensate from the plant for cooling water and reinject any excess into the geothermal reservoir.</td>
<td>Must be submitted within 30 days of the CPCN decision.</td>
<td>Ongoing</td>
<td>Submit CPUC decision</td>
<td>GPC is in compliance.</td>
<td></td>
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<tr>
<td>Technical Area</td>
<td>No.</td>
<td>Facility Status</td>
<td>Condition of Certification</td>
<td>Compliance Verification</td>
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<td>2020 Annual Compliance Report</td>
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<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-5</td>
<td>Ongoing</td>
<td>To minimize the potential adverse impacts of storm runoff on the water quality of the area, PG&amp;E shall route plant site runoff to the cooling tower basin for subsequent injection into the geothermal reservoir. When the capacity of the return system is exceeded, the runoff will be released. Under such conditions, the impacts on water quality should be minimal due to pollutant material dilution from heavy rainfall.</td>
<td>PG&amp;E shall submit final design plans and as-built drawings to the Sonoma County CBO incorporating this design requirement.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
<td></td>
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<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-6</td>
<td>Ongoing</td>
<td>PG&amp;E shall dispose of domestic waste water by injection into the re-injection system or other appropriate method. PG&amp;E shall treat the waste in a septic tank to remove solids and then discharge it to the re-injection line at a point between the cooling tower basin and the re-injection well, or implement such other discharge method as is appropriate and in conformity with all applicable laws.</td>
<td>PG&amp;E shall obtain an in-lieu sanitation permit in accordance with Sonoma County ordinances and shall provide final design plans and &quot;as-built&quot; drawings to the Sonoma County CBO incorporating this design requirement for the domestic waste disposal system.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
<td></td>
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<tr>
<td>Water Quality/ Hydrology/ Water Resources</td>
<td>6-9</td>
<td>Ongoing</td>
<td>During heavy rainfall, when the water level in the retention basin continues to rise to a level that could inundate the road within the yard, PG&amp;E shall be allowed to open the valve and drain the site water into Calm Creek.</td>
<td>PG&amp;E shall forward to the CEC a copy of the waste discharge permit issued by the NCRWQCB.</td>
<td>Ongoing</td>
<td>GPC is in compliance.</td>
<td></td>
<td></td>
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<tr>
<td>Worker Safety</td>
<td>1</td>
<td>Complete - report only for 2020</td>
<td>The project owner shall physically disconnect the piping connection between the cooling tower wet-down system and the plant's fire protection system unless the integrated wet down/fire protection system is approved by the CPM. Completion of the commissioning of the integrated system terminates the requirement to disconnect the system.</td>
<td>The project owner shall complete the physical disconnection of the cooling tower wet-down system from the plant's fire protection system no later than June 1, 2019, or a later date agreed upon by the CPM, unless the CPM has approved a commissioned, integrated system. Within 10 days after the disconnection, the project owner shall submit a letter stating that the physical disconnection has occurred and provide a photograph showing the disconnection. The CPM shall be notified at least 30 days prior to the current disconnection date if the project owner wishes to seek an extension to the current disconnection date.</td>
<td>10 days letter and photo</td>
<td>Complete</td>
<td>Condition is complete and will no longer be provided to the CEC in the ACR.</td>
<td></td>
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<tr>
<td>Worker Safety</td>
<td>2</td>
<td>Complete - report only for 2020</td>
<td>The project owner shall physically label the diesel engine and wet down pump and the pump house with clear signage so that it would not be mistakenly identified as an emergency fire pump by plant personnel or first responders during an emergency.</td>
<td>At least 30 days prior to the start of construction of the diesel engine and wet-down pump and the pump house, the project owner shall submit a plan and photographs showing the language and location of the signage to the CPM for review and approval.</td>
<td>30 days prior to construction of diesel engine and wet-down pump</td>
<td>Complete</td>
<td>Condition is complete and will no longer be provided to the CEC in the ACR.</td>
<td></td>
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</tbody>
</table>
CONDITION OF CERTIFICATION
PUBLIC HEALTH 2-1

Geysers Grant Plant (Unit 20) 82-AFC-01
2020 Annual Compliance Report to the California Energy Commission
January 2020-December 2020
<table>
<thead>
<tr>
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<tr>
<td>Date</td>
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<td>06/30/20</td>
<td>07/28/20</td>
<td>12/2/20</td>
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<td>Unit</td>
<td>20</td>
<td>20</td>
<td>20</td>
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<tr>
<td>[Rn-222] Main Steam Sample (pCi/Kg)</td>
<td>18988</td>
<td>19426</td>
<td>18248</td>
<td>19026</td>
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<td>Unit gross load (MW)</td>
<td>40.8</td>
<td>38</td>
<td>39.3</td>
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<tr>
<td>Supply steam flow rate (klb/hr)</td>
<td>605</td>
<td>590</td>
<td>621</td>
<td>630</td>
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<td>Supply Steam Flow Rate (Mg/hr)</td>
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<td>268</td>
<td>282</td>
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<td>Steam Rate (lb/kwhr)</td>
<td>15.55</td>
<td>15.21</td>
<td>15.58</td>
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<td>Steam Rate Derived Supply Steam Flow Rate (Mg/hr)</td>
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<td>100% Service Cool. Tower Air flow Rate, S.T.P. (GL/hr)</td>
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<td>23.60</td>
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<tr>
<td>Number of Fans in Service</td>
<td>11</td>
<td>9</td>
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<td>Number of Fans</td>
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<td>11</td>
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<td>Cool. Tower fract. (cells oper. /cells design)</td>
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<td>0.82</td>
<td>1.00</td>
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<td>Cooling Tower air flow rate, S.T.P. (GL/hr)</td>
<td>23.60</td>
<td>19.31</td>
<td>23.60</td>
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<td>Unit daily Cooling Tower air flow (L/day)</td>
<td>5.664E+11</td>
<td>4.63418E+11</td>
<td>5.664E+11</td>
<td>5.664E+11</td>
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<tr>
<td>Unit Rn222 Release Rate (Ci/day)</td>
<td>0.13</td>
<td>0.12</td>
<td>0.12</td>
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<td>Unit Rn222, Emission Concentration (pCi/L)</td>
<td>0.22</td>
<td>0.27</td>
<td>0.22</td>
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Notes on Color Codes:
- Data from Sample Collection Sheet
- Data from Analytical Laboratory Results
- Data From Annual Criteria Pollutant Inventory (see updated Generation Summary tab)

**Data Result**
- Data Entry Or Import From Other Source Required
- Maximum Value Substituted in lieu of corrupt data
- Anomolous Source Data Corrupt And Not Used
- Data is Constant or Calculated

Conversion Const. Mg/klb = 0.4535924