

September 21, 1998

Mr. Bruce Kaneshiro, Project Manager
c/o Environmental Science Associates
225 Bush St., Suite 1700
San Francisco, CA 94104

Re: Draft Environmental Impact Report comments, CPUC Application #98-01-008
Geysers Geothermal Power Plant & Other Divestitures

Dear Mr. Kaneshiro:

District staff has reviewed the referenced document sections related to the air quality issues involved in the pending sale of the PG&E Geysers Power Plants. The District asks that major concerns identified below and the specific comments provided in Attachment #1 be addressed in the final EIR. The background information provided regarding the pending sale and the potential new owners is informative, as are the discussions regarding the various projections for continued operations under the various scenarios, but we do consider them incomplete. We are concerned about conceptual errors and the avoidance of identifying any suggestion of mitigation for the scenarios chosen in the DEIR.

Major Concerns

[Begin H1]

Our major concern continues to be the possibility of plant management under a new owner incompatible with maintaining the integrity of the steamfields. The document should emphasize repeatedly that adverse air quality impacts in Lake County are largely a result of the operations of the applicant's power plants, and when the plants are not operating, the associated steamfields located in Sonoma and Lake counties. [End H1]

[Begin H2] There are a number of reasons for our concerns in this regard for the Sonoma County units including less advanced technical designs, aged equipment, differing operating conditions and poorer steam quality among others. [End H2]

[Begin H3]

The issue of avoiding steam stacking is extensively noted, however we need to emphasize any condition which results in the atmospheric release of untreated steam is at issue and the cumulative impact of well field bleed flows at well pad locations is of equal or greater concern due to the closer proximity to residents, because of poor plume rise and reduced pollutant dispersion. Additionally, when steamfields are extensively curtailed, well

maintenance including the need for deep drilling rig utilization and increased numbers of well blow downs to remove water or rock bridges all contribute to increased emissions.
[End H3]

[Begin H4]

The “must run” contracts have been offered as a reason that hydro or other curtailments should not be a significant concern. Yet, must run class “B” may be needed only a few hours per year (Pg. C-ii). This needs to be clarified as to how effective it is and what to expect in the future as regards to the minimum power generation available to the steamfield owners. Apparently, except for Units 5-8, it is just a peak temperature requirement and is unlikely to be relevant to hydro curtailment. Please clarify and explain.

[End H4]

[Begin H5]

The situation as presented in the DEIR included a reference to a less than 2.2¢/KW power cost and periods of zero price during the present year. Please explain how this will similarly affect the Geysers’ need for a minimum production to avoid steam venting. If that can not be ensured in the future, consider the below scenario and suggested mitigation for inclusion in the EIR.

[End H5]

[Begin H6]

Were AB 1890 funds used to stabilize the price, and if so at what level? Was the price driven down because of abnormally high availability of hydro power? What is considered an economic price? If you conclude as indicated at the 9/15/98 meeting that this is unlikely because of the price of power and the production cost, state and support your assumptions clearly in the EIR. AB1890 apparently provides limited funding to stabilize pricing during the transition years. Will this funding be available to the new owners, or once they are sold will they be considered merchant plants? How significant is the loss of resources of PG&E whom still has a virtual monopoly on customers and extensive hydro power?

[End H6]

Given the above discussion, please consider the following scenario and suggested mitigation for comment.

Scenario #1

[Begin H7]

Identified Potential Impact: The market economy is such that generation units are prevented from selling the power to the PX and no direct customer delivery is possible. The plant owners shut down all the plants to zero production. The units then must stack, by-pass and/or close in the steamfield with resulting water logging of wells, thermal stress and production well failure. The impact on air quality, water quality and the land is

significant from the vented steam and emissions associated with repair (none of the emissions are necessarily stacking). The steamfields become less profitable and threaten the overall viability of electrical power generation and a loss of this green power resource.

Suggested Mitigation: Ensure that a minimum production is allowed and deliverable from each of the two facilities (Lake & Sonoma). Methods to accomplish this could include: 1) a reserve of approximately 50 and 110 Megawatts at the ISO being set aside specifically for the Lake and Sonoma Geysers plants respectively that would be under a must run continuous agreement; 2) requiring the purchaser (and future purchasers) to operate the facility using a continuous direct purchase customer for at least the sustaining portion of the production; 3) committing the smaller negotiated quantity of generation as a RMRA "A" to include hydro-curtailments; or 4) utilize a distribution benefit charge through the PX/ISO that will support and make viable this minimum production capacity for this specific existing (stranded) green power and ensure that it is bid into the PX (with a general benefit subsidy, if necessary, much like the AB 1890 is now providing).

[End H7]

[Begin H8]

We are in agreement that Alternative 3 (sale to steam suppliers) is likely the environmentally best alternative, provided they have the financial strength to maintain the facilities and this green power remains cost competitive. The District is not in agreement with the conclusions in Table S.2 regarding the air impacts being less than significant, as that assumes an approximate 10% change on an annual basis. This does not consider the significant impact of a single or several individual events. There is no mitigation to assure that the plants will be operated at a level at all times sensitive to preserving air quality.

[End H8]

[Begin H9]

The modeling analysis for the geothermal units predicts emissions variability of between -13% and + 39%, depending on the analysis scenario, with the Sonoma County units accounting for the majority of the increase. Many of these units are approaching their design life span and have higher air emissions potentials due to their date of construction, less advanced technical design, increased maintenance requirements and poorer steam quality. As the emissions from these units predominantly impact the Lake County public, and have been the source of significant air quality complaints and AAQS exceeds in the past, a 40% increase in emissions is considered by the District as significant and thus we would require mitigation. In reality such is not likely to happen unless a choice to change the abatement systems operational techniques is implemented by a new owner, as the abatement systems (especially of newer plants) perform superior to present permit emission limitations. (See Exhibit A attached that lists the permitted and actual emissions as tested recently for units being divested.) Again, this is a case of performance superior to what is required under regulations, especially for the newer units.

Similarly the use of mercury scrubbers (while under permit) are not regulatorily required, since cooperation was high and a variety of incentives existed.

[End H9]

[Begin H10]

The Geysers Air Monitoring Program (GAMP) represents a consortium, and while the regulatory alternative exists, participation is voluntarily renewed by MOU. Present PG&E staff displays a sensitivity and concern for safety, the public and the environment and their programs have clear corporate support. The potential of changing from a monopoly, or to a company without PG&E resources, is of concern.

[End H10]

Given the above discussion please consider the following scenario and suggested mitigation for comment.

Scenario #2

[Begin H11]

Identified Potential Impact: The new owner takes only the steps that are specifically required by permit as an economy measure and decides not to participate in efforts jointly or separately. These efforts include seismic monitoring, air monitoring, the use of an iron chelate catalyst in secondary abatement and the use of mercury scrubbers on the Stretford equipped units. This results in less information on which to document environmental management success, less public trust, greater emission releases and less efficient management approaches to the overall resource area.

[End H11]

[Begin H12]

Suggested Mitigation: Ensure that the new owner participates in GAMP, the seismic monitoring program continues, they continue to use Hg scrubbers and use innovative H2S technologies presently installed.

[End H12]

[Begin H13]

The DEIR is long on discussion but slightly off target as to the interaction of the power plant and steamfield operations. The policy implications of green power also need to be further enlarged upon as part of this first significant green power divestiture decision by the CPUC. The document provides little in finding significance in the divestiture of the subject plant and thus avoids having to recommend mitigation measures. The major issue for the AQMD is not just steam stacking but managing (production assurances) in a manner that ensures the physical integrity of the steamfields without stacking, field wide emission or threatening the long term integrity of field operations and production. We do not believe that we are being overly cautious in attempting to be protective of our air resources and requesting assurances that the Geysers steam resource is adequately protected from misuse and abuse, be it intentional, market driven or unwitting. The

remarks regarding the economic incentive to defer maintenance and utilize plant malfunctions to increase the rate basis is disturbing, and is counterproductive to both resource management and air quality. The knowledge regarding the wise management of the Geysers resources and compatibility with good environmental management has been an acquired learning experience gained over a period of more than 30 years. It is imperative that this knowledge and understanding be retained and that we wisely proceed and assure that this goal is nurtured to the extent possible.

[End H13]

[Begin H14]

We are concerned that this first sale of green power by a monopoly utility is occurring without an assessment of policy or the implications of a lack of policy and we ask that such be incorporated into the EIR as a relevant and necessary part of the scope required. We will not repeat past comments of the uniqueness and environmental advantages of the Geysers and green power in general, as we have all been educated by the past events and prior or existing state policies.

[End H14]

[Begin H15]

In discussions before the Lake County Board and elsewhere, two responses have always come forward from CPUC/ESA staff: 1) that there is a willingness for consumers to pay more for green power, and 2) that the federal legislation gives the Geysers a 1.5-cent/KW advantage. While we hope this is correct, we want such to be clearly and correctly evaluated as part of the EIR.

[End H15]

[Begin H16]

Renewables (green power) are apparently 11% of the present PG&E profile and geothermal is approximately 7% of the total. Is the present niche market for green power that large? Is it likely, given that the label "green power" need only to include 50% green power, that this niche market can adsorb 10-22% of the existing total market? Will the niche market be sustainable in times of a depressed economy? What specifically are the state policies that are in place which recognize the advantages of indigenous green power to our state and country? Please summarize the hidden environmental, national defense, green house gas, economic, and other costs of nuclear and fossil fuel and the advantages to society of nurturing and promoting "green power"? Please at least summarize a response in the final EIR.

[End H16]

[Begin H17]

Please consider in your discussion the timing and status of the CPUC green power certifying/ labeling and emissions disclosure on customer billing; the possibility of an ISO distribution benefit charge to enhance green power sustainability; reduced charges on the PX exchange; preferential financing; lessening the PX buy in cost; and other suggestions as are contained in the National Association of State Energy Officials

“Energy Efficiency and Renewable Energy Sources: A Primer” dated July 1998. These issues in are relevant to our society and should be relevant to the CPUC decision to approve the sale with or without mitigation.

[End H17]

Sincerely,

Robert L. Reynolds, APCO

Attachments: Specific Comments
Exhibit A

CC: Board of Directors
Interested Parties

RLK/RLR

Attachment #1 Specific Items of Comment

[Begin H18]

In Tables S.1, S.3, S.5 (and elsewhere) and Table 2.1 (Description of Facilities) there appears to be a significant difference between the projected scenario annual capacity factors for the Lake County units shown which should be elaborated upon. The DEIR states that the Analytical Maximum Scenario is the “conservative” approach and in the case of the Geysers represents a minimum operating level (worst case). While we understand what this is attempting to convey, it is somewhat confusing and represents approximately a 10% reduction in capacity over the no project alternative. The DEIR is vague on the factors which result in this being the “worst case” and does not recommend if this is the minimum level of operation necessary to preserve the existing air quality (Section 3.6.2 end of paragraph 2) or that this will be a regulatory limit imposed on the buyer. This is where the “must run” contract requirements need to be specific enough to ensure that adverse air quality impacts are minimized, or it acknowledged that they are of little relevance.

[End H18]

[Begin H19]

Page 2-26 Geysers Power Plant. Mining was an important historical previous use but has been very limited in the past 40 years to limited aggregate associated with geothermal development and otherwise to recreational prospects. Timber harvests have occurred within the area and the most significant adjacent land uses are recreational, residential and bottled drinking water production.

[End H19]

[Begin H20]

Page 2-35 Geysers Geothermal Field. The Geysers field is more roughly 10 miles long by 4 miles wide although the Known Geothermal Resource Area (KGRA) is more extensive. Surface manifestations of thermal activity occur throughout the area, however it is acknowledged that major early development centered on the Geyser Creek/Geyser Canyon area.

[End H20]

[Begin H22]

Page 2-38 Geyser Power Plant Units (paragraph 3). More correctly, the steam contains hydrogen sulfide and other reduced sulfur compounds which exist in both a dissolved and gas phase. A portion of the hydrogen sulfide remains dissolved in the liquid condensate and is subsequently chemically treated to maintain solubility and prevent “air stripping” in the cooling tower. The non-condensable gas is treated to convert the H₂S to elemental sulfur or SO₂ using a Stretford or Incinerator system respectively. The elemental sulfur is more commonly produced as a “sulfur cake or slurry” product more so than a molten material (both are elemental sulfur); the SO₂ is removed using a scrubber system and the resulting solution re-injected. The description in Table 2.2 contains a better description

of the process. Flow diagrams Figures 2.18 and 2.19 lack the abatement chemical inputs. Abatement system failures on single units in Sonoma County can cause ambient air quality exceeds in Lake County under various conditions.

[End H22]

[Begin H23]

Page 3-12, 3.6.2 1999 Analytical Maximum Scenario (last four sentences of the first paragraph). The 230KV line outage results in simultaneous multiple plant outages and is of concern during coincident periods of poor air dispersion. The District's concern regarding hydro curtailment is acknowledged, however paragraph (3) is a disclaimer that any particular plant may not operate within range of capacity factors cited. The District is also concerned that the plants receive ongoing preventative maintenance and upgrades where feasible to reduce unexpected maintenance, related temporary shutdowns and resultant emissions. Again, analysis on an annual basis misses short term, event driven, emissions impacts.

[End H23]

[Begin H24]

Chapter 4, 4.1.1 Sonoma and Lake Counties - The reference to a "series of geysers" is likely a reference to a "series of geothermal power plants". Retirement residential and related services are also a major factor in the economy of Lake County. This is an important distinction considering the expanded government service requirements and the sensitivity to air pollutants of the receptor population.

[End H24]

[Begin H25]

Page 4.1-4 Geysers Power Plant - While the Sonoma county portion of the Geysers is sparsely inhabited, the Lake County portion is within or adjacent to community residential, recreational (camps, retreats) and rural residential development. We are not aware of any active mining activity other than geothermal resource exploitation.

[End H25]

[Begin H26]

Page 4.2-10 Geysers Power Plant - The comparison of the number of jobs relative to Sonoma County is not representative of the impact on Lake County (where a large proportion of the workers reside).

[End H26]

[Begin H27]

Page 4.3-6 Geysers Power Plant - Geologic description should include serpentine as a significant rock type present in the Geysers. Serpentine is of concern due to its asbestos content and potential for airborne release.

[End H27]

[Begin H28]

Page 4.5-4 (top of page) Discussion of pollutant transport should emphasize that the regional northwest winds transport pollutants from the Sonoma County power plants into inhabited communities within the Lake County Air Basin (Glenbrook, Pine Summit, Cobb, Anderson Springs, Middletown).

[End H28]

[Begin H29]

Page 4.5-8 Hydrogen Sulfide - Is highly toxic and lethal at concentrations of 1,000 ppm. H₂S concentrations in the geothermal steam varies by location, usually in the range of 50 -1,200 ppm. H₂S concentrations in the non-condensable gas is within the range of 10,000 - 50,000 ppm.

[End H29]

[Begin H30]

Page 4.5-9 Table 4.5-2 Lake County Air Basin, Particulate Matter (PM-10)^d. The footnote refers to the new federal PM 2.5 standard. In addition to the PM 2.5 standard, a modified federal PM-10 standard was also retained.

[End H30]

[Begin H31]

Page 4.5-20 Lake County AQMD Regulations, Plans and Policies (first paragraph); The 40 lb/hr particulate emission limit is from the District Rule 411. The source of the cited 15 lb/hr H₂S limit is not known and oversimplified. The District has general regulations limiting sulfur emissions from various sources, set at various concentration and mass emission limits. Power plants are subject to New Source Review and Best Available Control Technology (BACT). BACT is project specific and for the existing Lake County units has been defined as emissions of not more than 5 lb/hr H₂S per million pounds of steam used. The District's authority to construct and permits to operate further refine and restrict project emissions based on the New Source Review assessment of project emission impacts on the closest receptor.

[End H31]

[Begin H32]

Page 4.5-45 Paragraph (2); The PM-10 monitoring data includes analysis by XRF for the elements cited. Ambient radon concentrations are also measured at the Glenbrook and Anderson Springs sites.

[End H32]

[Begin H33]

Page 4.5-46, Table 4.5-19 "Particulate Matter (PM-10)". Data is available for Glenbrook and Anderson Springs (both located adjacent to and downwind of the Geysers). This GAMP data should be utilized in this table as representative of geothermal impacts.

[End H33]

[Begin H34]

Page 4.5-46 Existing Emissions (first sentence). Include benzene and radon in the category of "other gasses". Geothermal air pollutants are not generally emitted from steam wells, steam transmission lines and steam stacking facilities under normal operations. Steam is emitted during well construction, testing and maintenance operations. Most of the geothermal emissions are from the cooling towers and gas treatment facilities. While well bleeds and well maintenance is currently the largest "steam field" emission source, steam field emissions are relatively insignificant when the power plant is operating.

[End H34]

[Begin H35]

Page 4.5-47, top of page; Most of the air pollutant emissions during normal operations are from the evaporation of the circulating water and "air stripping" which occurs in the cooling towers (provided the gas treatment systems are properly functioning).

[End H35]

[Begin H36]

Paragraph (2): Steam Stacking is more properly a result of the power plant's inability to utilize the available steam rather than a slowdown in use of the steam wells. The "slowdown" is typically an immediate 100% rejection of steam flowing to the plant. While stacking is an immediate and usually short term occurrence, such was not always the case previously.

[End H36]

[Begin H37]

Paragraph (3): Of greater concern now is a condition where a power plant is not operated (for mechanical or perhaps economic considerations) and the steam wells have to be shut-in to a sustaining steam bleed rate consistent with maintaining well integrity for extended periods of time. The cumulative impact of such action has a greater impact potential due to the large number of wells involved, their location closer to residents and the lower air dispersion characteristics of the bleed flows as compared to the massive stacking flow rates.

[End H37]

[Begin H38]

Paragraph (4): Ambient radon measurements continue to be part of the Geysers Air Monitoring Program. The measurements show ambient radon concentrations of 0.3 - 0.5 pico-curies per liter (not 3 -5 pico-curies) and these values are considered background and are within the range of reported background concentrations for many areas in the United States.

[End H38]

[Begin H39]

Page 4.5-49 Tables 4.5-21 and 4.5-22; Since the Geysers Power Plant emissions primarily impact Lake County residents, the Tables would be more descriptive if the emissions were all compared as a percentage to the Lake County emissions inventory.

[End H39]

[Begin H40]

Page 4.5-50 (top of page) ; The reference exposure levels used in calculating risk are currently under review by OEHHA and it is expected that the revised values may result in a significantly higher calculated risk.

[End H40]

[Begin H41]

Page 4.5-60 (Tables 4.5-27 and 4.5-28). Are the Baseline and Analytical Maximum emissions estimates in these tables different than those presented in the Executive Summary and Section 3 where analytical maximum was a minimum capacity factor? Are the emissions factors utilized based on test data or permit limits? If permit limits are the basis, emissions would not be expected to change, if operating data is utilized, do the estimates consider that the new owner will continue to control emissions to less than (at times considerably below) the permit limits? The difference between actual and permitted emissions can be significant. For Lake County Unit #16, actual emissions are approximately 3.5 times lower than allowed by the permit for H₂S and 16.5 times lower for particulate matter. The EIR should address whether or not the new owner will operate the plants similarly. If realized, the projected 40% increase in emissions from the Sonoma County units would appear to be capable of a significant impact. Of greater concern to the LCAQMD is an increase in “uncontrolled” emissions due to economics, reliability or maintenance factors.

[End H41]

[Begin H42]

Page 4.5-75 Geysers Power Plant; Although steam stacking has been shown as a cause of AAQS exceeds the same can be demonstrated for emissions from untreated well bleeds, normal and abnormal power plant operations as separate and cumulative sources. Cumulative steady state “controlled” emissions are capable of, and have been the source of both nuisance complaint generation and AAQS exceeds. These events are typically associated with episodes of regional air stagnation and a “flushing” of built up pollutant concentrations from West Geysers area into Lake County during the early afternoon wind flow reversal from a westerly direction. The approach here in the DEIR is too simplistic and ignores the various complexities discussed above.

[End H42]

[Begin H43]

Page 4.5-76 Geysers Power Plant; The reference to the absence of combustion sources and acidic particulate does not consider the operation of the “incinerator” abatement systems and SO₂ emissions from both the abatement systems and the atmospheric

oxidation of H₂S to H₂SO₄. A less than significant impact from FTP would be expected due to the proximity and elevation distances between the source(s) and receptors rather than the absence of combustion sources.

[End H43]

[Begin H44]

Page 4.8-2 (Paragraph 1) Economic curtailment is a significant concern if it results in untreated steam releases such as would occur if the production wells were required to be placed on bleed flows or the wells were damaged due to excessive thermal stress (thus requiring extensive maintenance and maintenance related emissions). This is an important point and should be in body of the text and not a footnote.

[End H44]

[Begin H45]

(Paragraph 2) Many of the Geysers Power Plant units have reached or are approaching their 25 year design lifetime. It is expected that the inefficient older units will be abandoned and the remaining marginally efficient units reconstructed to make efficient use of the lower pressure steam resource. We believe it is important to efficiently utilize this valuable, renewable and more environmentally sound resource through careful management and in so doing preserve the air quality. This should be accomplished by efficiency improvements and operating the plants at flow rates that are sustainable and protective of the steam production facilities (some form of sustainable base loading).

[End H45]

[Begin H46]

Page 4.8-1 Impacts and Mitigation Measures; No mitigation measures are proposed and the DEIR represents that none are required despite obvious adverse and significant impacts should the power plants be operated inefficiently or without regard to protecting the steam supplies. This section needs additional review and mitigation to assure that power plant operations remain consistent with good management practices which are protective of this valuable resource. We suggest appropriate “must run” agreements and regulatory support to assure that this power resource is preserved.

[End H46]

[Begin H47]

Page 4.9-12 Hazardous Materials and Waste (Paragraph 2) Mercury and arsenic are two important additional hazardous constituents of the geothermal steam which are concentrated in the power generation cycle at various locations. PG&E constructed and operates “hygiene facilities” at each of the Geysers power plants primarily in response to concerns regarding exposures to these two materials.

[End H47]

[Begin H48]

Page 4.9-19 - 4.9-20 Hazardous Materials; Add hydrogen sulfide, arsenic, mercury and possibly radon as hazardous components of geothermal steam which are found in

significant concentrations at the Geysers power plants. It should be noted that concentrations of asbestos >1% is associated with serpentine rock and soils which are common to the Geysers area and possibly on properties considered for divestiture. The District believes that Unit #16 is located on or adjacent to property extensively mined for mercury.

[End H48]

[Begin H49]

Page 4.12-11 North Geysers Unit Loading Instructions; Current and planned future modifications to system loading requirements and transmission line improvements should consider promoting the optimal use of the steam resource and electrical generation from the Geysers, especially as it relates to a sustainable base loading of units and transmission line reliability.

[End H49]

[Begin H50]

Page 4.12-14 Sanitary /Storm Sewers; Although this may or may not be the location in the DEIR to discuss this issue, it should be emphasized that the operations of Regional Wastewater Plants in Lake County are tied to the operations of the Geysers via the Geysers Wastewater Pipeline Project. Operational changes at the power plants should consider not only impacts to the steam suppliers but also the Lake County Sanitation District and the general economy of the county relative to the economic continuance of these essential services.

[End H50]

[Begin H51]

Page 4.12-15 Solid Waste; The Clearlake Landfill is a public County of Lake Solid Waste facility located in the City of Clearlake. Geothermal wastes were previously transported to the IT Benson Ridge site (a now closed facility) and also to GII site located on Butts Canyon Rd., Middletown. The GII site received PG&E wastes and is in the process of sorting out the responsibilities for remediation costs. The Geysers continue to produce both solid and liquid industrial wastes (both hazardous and non-hazardous). Those materials, amounts and locations should be identified either in this section or in Section 4.9.

[End H51]

[Begin H52]

Page 4.12-17 Electricity (Paragraph 1) The ISO coordination and dispatch to maintain reliability of the transmission system presumably will minimize line outages which have recently occurred. It should be noted that the PG&E Geysers plants do not generally have the ability to produce "in house load" power for critical component operation during line outages, but must rely on external line power for pumps, fans and controls necessary to rapidly return to production after a line fault is cleared. Air emissions during extended start up conditions have been/can be significant.

[End H52]

[Begin H53]

Section 5.3.2 Cumulative Effects by Environmental Topic.

See comments above in reference to Section 4.5, Air Quality.

[End H53]

[Begin H54]

Page 5-33 Noise - Geysers Power Plant; Steam Stacking occurs through the “stacking mufflers” located at each power plant. This operation is not normally a significant noise source. Power plant operations which result in unmuffled steam releases, produce harmonic or tonal sound because of improperly sized valves, loudspeaker annunciator use at inappropriate hours, or off-hours maintenance operations (bearing failures, construction/repair operations and truck traffic) have all been sources of noise complaints. These may be considered less than significant with new owners complying with the Lake County Planning Department Use Permit conditions for noise mitigation and adherence to the noise mitigation plans

[End H54]

[Begin H55]

Page 6-23, Section 6.4.3 Alternative Three, (paragraph 2, sentence 3) “namely steam stacking” add: well bleeds and steam field maintenance problems. References to “stacking” should be expanded to include all atmospheric releases of untreated steam. Steam stacking presently is a relatively rare event which occurs as result of sudden steam flow rejection and has been of limited occurrence due to lower pipeline pressures and the ability to intertie multiple power plants together. Stacking now is largely avoided by using the interties, the ability of the pipelines to reduce the rate of pressure increase through well steam flow reductions using automated controls.

[End H55]

[Begin H56]

Paragraph 4: While the steam field operators have a contract to accept effluent for 25-30 years, the steam supply contracts are likely not of similar duration. The remaining useful life span of many of the power plants will expire prior to this time frame unless there are provisions for maintenance, re-construction or replacement.

[End H56]

[Begin H57]

Paragraph 6 (RE: CPUC authority to force sale to particular buyers): While the DEIR explores the potential impacts of a sale to the steam suppliers, it does not explore CPUC or other agency alternatives to assure that the geothermal resource and power production is beneficially operated. The DEIR should explore the impact of classifying the Geysers Power Plant as a “stranded asset” as well as additional details regarding the viability of promoting or subsidizing “green power”.

[End H57]

[Begin H58]

Attachment C, Page C-1, 1.1 Level of Operation. While the price of steam is a factor in the higher availability of the Lake County power plants, it should also be noted that these Units are of a more advanced design than most of the other PG&E Geysers plants, the steam has significantly lower H₂S and corrosive content and the steam supplier has expended considerable capital to maintain production capabilities and improve steam production and electrical generation efficiencies.

[End H58]

[Begin H59]

Page C-7 (Paragraph 1); Steam is supplied by the geothermal wells utilizing the underground reservoir pressure and is not “pumped”. “Transport” would be a more appropriate term.

[End H59]

[Begin H60]

Page C-8 Remedial Actions to Maintain Steam Supplies; Load cycling increases maintenance costs and necessity to re-drill or perform additional well construction. These activities all have increased emissions or increase the potential for emissions and should be minimized to the extent practical and feasible. This should be addressed and mitigation proposed.

[End H60]

[Begin H61]

Page C-10 Historic and Forecasted Generation, Table C-1. Insight as to why PG&E’s actual generation is significantly lower than available generation since 1995 may be helpful in determining how fuel pricing and contracts affect power plant operations.

[End H61]

[Begin H62]

Page C-11, Section 1.4.1, Must Run Designations. Should be modified for the Geysers power plant to favor the efficient use of the resource and to minimize air quality impacts. This unique resource should be removed from the “competitive market” if necessary for preservation.

[End H62]

[Begin H63]

Page C-24, Choices Facing Single Power Plant Operator. Page 25 describes the probable certainty of a single plant operator shutting down operations during periods of abundant hydro power, low energy demands and low pricing. This discussion appears to address combustion units and not geothermal, however a complete shut down of the geothermal plant may have unacceptable consequences to the steam field and air quality. A alternate scenario of hydro curtailment is a low load cycling operation which increases stress on components and has higher associated maintenance costs and potential air quality impacts due to breakdown emissions. Power plant cycling from a shut down situation is a less

efficient use of the resource and has a much higher excess emissions potential due to equipment failures (unit trips) during plant start up operations. This type of operation should be discouraged and regulated to the extent feasible. This should be discussed and mitigation proposed.

[End H63]

[Begin H64]

Page C-29, Spares and Maintenance Policies. This discussion outlines the negative impact on maintenance and spares availability due to price structuring of deregulation. Deferred maintenance and equipment failure is represented as having an increased profit incentive to the portfolio holder of a number of various types of power plant facilities. Equipment failures, start ups and shut downs all typically have associated excess air emissions. For geothermal plants, the emissions can be significant and unscheduled outages also can have severe consequences on the steam suppliers equipment and the geothermal reservoir. These should be discussed with mitigation recommendations.

[End H64]

[Begin H65]

Page C-33, Section 3.2.4 Geothermal Steam Supply Contracts. The steam supply contracts have historically impacted air emissions due to a variety of reasons. Where contracts were tied to electrical production there was little incentive for the efficient utilization of steam resources, often to the detriment of air quality where there is no other purchaser available for the steam and the steam flow cannot be fully curtailed because of the potential for well damage. It would appear to be in the best public interest to manage the steam resource for the most efficient utilization of this unique, environmentally superior commodity.

[End H65]

[Begin H66]

Page C-34, Section 3.3 The Influence of Must-Run Status on Operations. In order to minimize air emissions associated with cycling, excessive startups or shutdowns and consequent impacts on the steam fields causing well bleeds and/or maintenance related breakdowns, the Geysers Power Plants should be required to maintain a minimum sustaining level of availability and operation. This may be accomplished under a specific must run agreement or other similar regulatory requirement crafted to address these issues. We believe that this type of agreement or approach should be included in the mitigation required for this project. The issue would not be startup costs as much as the cost to the steam supplier and environment of having to shut down. This is missed and needs to be assessed.

[End H66]

[Begin H67]

Page 36, (Paragraph 1, footnote 71). Under CPUC D.97-04-042 would the new owner of the older Geysers units have the ability to retire the units, recover associated stranded assets and re-power or construct new replacement units?

[End H67]

[Begin H68]

Page D-5, NOP, Environmental Effects. (Bottom of page, paraphrased) The sale of the Geysers Plant could have an effect on the environment, which might be significant, if the sale causes changes such as: the amount or pattern of generation; maintenance practices; etc. (among others). The DEIR concludes that the pattern of generation and maintenance practices may change. The analysis included scenarios which considered a operating capacity range of -9% to +16% from the a 1999 baseline. The air emissions evaluation described more variation with up to a 40% increase, however the analysis did not include emissions from the steam wells or steam field maintenance associated with changes in plant operations. The cumulative impact is believed significant, given that a malfunction at a single plant is capable of causing an exceed of the AAQS and although none is offered, mitigation should be required.

[End H68]

[Begin H69]

Page G-5, Footnote 10. The model heat rate utilized 10,000 Btu/kWh instead of the more technically correct 22,000 Btu/kWh. The footnote stated that this did not affect the total potential generation nor economic dispatch position of individual plants. The reference is in the context of emissions and we fail to understand how a factor of 2.2 is essentially the same value unless the notations in the footnote are incorrect.

[End H69]

[Begin H70]

Page G-7, 2.3 Analytical Maximum Generation, 2.3.1 Procedures, (last paragraph).
Typo: Geysers geothermal plants (nos. 13 and 16) supplied by Calpine wells; not Calpine wells (Nos. 13 and 16).

[End H70]

[Begin H71]

Tables G-1 through G-17; Apparent program or program input error for geothermal units. Power plants #13 and #16 are shown with identical capacities, similar generation and capacity factors and share a similar steam resource yet the H₂S emissions of Unit #13 is approximately a factor of (6) higher. The H₂S values reported in Table G-1 are 28 tons per year and 5 tons per year for Units #13 and #16 respectively. H₂S emissions are limited by permit at Unit #13 to 9.47 lb/hr and at Unit #16 to 5 lb/hr. Actual emissions as tested at either unit are similar and typically less than 2 lb/hr (approx. 1.5 - 4 tons per year for each unit), see Exhibit A. The Title V applications (referenced as the source of input data) cite annual emissions at Unit #13 as 14.4 tpy and Unit #16 at 6.2 tpy (total 20.6 tpy). Table 4.5-27 lists 38 tpy for existing and 33 tpy as the 1999 baseline (Table G-1 total for both units is listed as 31 tpy). We also note that the ROG emissions factor (0.01#/Mwh) is the same for all units, however the NC gas concentration (source of ROG) is highly variable on a unit by unit basis. The Appendix G Tables are unclear as to the basis for the underlying emission factors and should be clearly identified.

[End H71]

Note: Included with this comment was one page of Exhibit A. Since these cannot be reasonably duplicated here on this web page they are not available electronically. Should the viewer require a copy of these, please contact Webmaster for a printed copy.

H. LAKE COUNTY AIR QUALITY MANAGEMENT DISTRICT

H1 Section 4.5 of the DEIR addresses air quality impacts of the Geysers Power Plant. The DEIR indicates on page 4.5-19 that Lake County is the only county in the state designated “attainment” for all state and federal air quality standards and state visibility standards. In response to the comment, the following sentence is added to the DEIR as the last sentence of the second paragraph on page 4.5-45:

Adverse air quality impacts in Lake County are recognized to be largely a result of the operations of the Geysers plant, and when the plants are not operating, the associated steam fields in Sonoma and Lake County.

H2 The CPUC is aware of the differences in age and technology among the Geysers units, and that the Sonoma County units are generally older and less technologically advanced than the Lake County units, though a few Sonoma County units are as advanced as the Lake County units. Those differences were fully accounted for in the DEIR analysis.

H3 It is true that air pollutant emissions at the Geysers come from a variety of sources, not just the controlled releases of unabated steam during steam stacking events. All possible emissions sources were considered in the DEIR analysis. Some of the data and conclusions of the DEIR were drawn from the results of the Geysers Air Monitoring Program (GAMP), which detects and measures actual emissions, regardless of the source or the factors that cause increases in emissions. The GAMP was in operation during the types of events the commenter refers to, so emissions from all sources during those events were detected and measured. It is this data that was used to reach the conclusions noted in the Impacts sections of Section 4.5 of the DEIR. Regardless, as detailed in the response to Comment H15, generation at the Geysers is likely to increase rather than decrease in the future, and any potential impact caused by generation curtailment at the Geysers will be the result of restructuring, and not divestiture.

H4 While the “must-run” contracts (Reliability Must Run Agreements, or RMRAs) will require that certain Geysers units will run during certain times, these do not provide a guarantee against curtailments because of low market prices caused by hydropower spill conditions or other economic factors. In fact, under the current contracts between PG&E and its steam suppliers, such economic curtailment is allowed.

In 1997, PG&E curtailed 19.8 percent of available steam deliveries from U-N-T, and 2.8 percent from Calpine, largely because of economic considerations. That the Geysers units run at relatively high availability factors (usually in excess of 60 percent since 1994, when such curtailment was first allowed) is a testament to the low costs for producing such power. The Calpine contract is particularly advantageous to PG&E, and this is reflected in the higher economic output levels from Units 13 and 16.

The new owners would likely have the same or similar contracts that place the Geysers units at an economic advantage compared to natural gas-fired units, which typically

establish the market-clearing price in 70 percent to 90 percent of the hours. Also, as detailed in the response to Comment H15, the new owner will apparently have access to programs that offer financial incentives or give some preference for generation from renewable resources, and be eligible for tax incentives that PG&E is not eligible for, which should act to increase generation at the Geysers. In any event, potential impacts caused by economic curtailments are the result of restructuring, and would occur even if PG&E would continue to own the Geysers generating units.

- H5 Please see response to Comment H4. The steam prices at the Geysers under both the U-N-T and Calpine steam supply contracts typically translate to bulk power prices that are below the market-clearing prices during most hours of the year. In other words, economic incentives already exist to encourage continued substantial generation at the Geysers. Under the restructured market, Geysers generation is rejected only when its bid price is above the market-clearing price. While this price likely will fall during hydro spill conditions, perhaps even to zero, there is no direct link between hydro conditions and Geysers generation.

PG&E is now in a dispute with U-N-T as to what is the minimum generation requirement for those units (see page C-8). If the Geysers units were not divested, this dispute would continue. Thus, the controversy over sustaining a minimum generation level to avoid significant steam venting at the Geysers is a result of restructuring and a contract dispute among the existing stakeholders, and not a result of divestiture. However, because the new owner is expected to maintain substantial operations at the Geysers generating units, as noted in the response to Comments H13 and H14 below, no increase in steam venting is expected at the Geysers after the sale to a new owner.

- H6 Please see response to Comment H15 for a discussion of the incentives and programs available to new owners of the Geysers units and of the use of AB 1890 funds to stabilize the price of renewable energy.

The low market prices during off-peak hours in April through May of 1998 most likely reflected unusually abundant hydropower caused by the El Niño weather conditions of 1997-98. During that time, the abundance of hydropower, coupled with the low demand during the mild spring weather, resulted in a very low market clearing price at the Power Exchange (PX) compared to the rest of the year. This is a result of simple “supply and demand” economics. However, 1997-98 was a particularly wet season in California, and such an abundance of hydropower is not likely to occur often. Therefore, because of the transmission constraints and the economic incentives detailed in the response to Comment H15, the price of power from the Geysers units is likely to be at or under the market clearing price at the PX during the vast majority of the hours of the year, thus ensuring the Geysers will continue to generate substantial amounts of energy.

The commenter’s final question in this comment reads: “How significant is the loss of resources of PG&E whom still has a virtual monopoly on customers and extensive hydropower?” Under restructuring, either PG&E or a new owner of the Geysers

generating units must recover their investment solely through revenues from direct sales from the units, whether to the PX or through the Direct Access market. PG&E can no longer cross-subsidize operations at the Geysers with revenues from hydropower generation or transmission and distribution operations. Therefore, either PG&E or a new owner of the units would face the same challenge of managing the units such that their operations remain economically viable on a stand-alone basis.

H7 Please see response to Comment H5. The scenario described by the commenter could occur whether or not PG&E continues to own the Geysers generating units, so the project examined in this EIR – the sale of four PG&E power plants – would have no effect on the likelihood of such a scenario occurring. The potential for all scenarios that would result in steam stacking already exists today under restructuring and would not be affected or exacerbated by divestiture. The environmentally superior alternative set forth in the DEIR (page 6-28) to sell the plants to the respective steam suppliers directly addresses this issue. The following numerical responses correspond to the commenter’s suggested mitigation measures and is provided for informational purposes only since none of these proposed measures relate to environmental impacts associated with the project analyzed in this EIR.

- 1) The reservation of 50 to 110 MW of must-run requirements for the Geysers is beyond the authority of the CPUC, and would be a matter for consideration by the Independent System Operator (ISO).
- 2) Requiring that the new owners sell a prescribed amount of power into the direct access market in order to satisfy a need for minimum generation at all times would be extremely difficult in a practical sense because of the nature of energy use by most customers (which varies widely during the week) and because of the transmission constraints in the region. However, whoever owns the Geysers units will be required to take a certain amount of steam each month from the steam suppliers. This requirement effectively ensures a certain amount of generation will occur during much of the month, though not for every hour of the month; and it would effectively accomplish the same objective as requiring the new owner to find one or more direct access customers to take energy at all times.
- 3) As mentioned in response to H6, hydro curtailment no longer exists as a defined condition pertaining to the performance of power sales contracts. All hydro conditions are now reflected in the market-clearing prices set by the PX. In other words, during hydro spill conditions, hydroelectric plant owners will bid into the Power Exchange at very low prices, since the power produced is essentially free. That would force the PX to essentially take all the hydropower available. Curtailment at the Geysers during hydro spill conditions would only occur when owners of the Geysers units do not meet or beat the market clearing price.
- 4) As mentioned in the response to H15, the California Energy Commission (CEC) administers funds to subsidize eligible renewable power operations. In addition, numerous power marketers are already selling “green power” to consumers at rates 1 to 2 cents per kWh above standard market prices, following the tenet that many

California consumers are willing to pay a premium for non-polluting, renewable energy.

- H8 The commenter is referring to Impact 4.5-1 on page S-30 of the DEIR. Impact 4.5-1 is further discussed on pages 4.5-51 to 4.5-61. As described in the “Conclusions” paragraph on page 4.5-61 of the DEIR, the emissions increases are from “direct” sources which are covered by air permits. Since the emissions increases that are discussed by the commenter would occur under air permits and would be consistent with all emissions limitations and standards, they are not considered to be significant. These emissions would only be significant if they were expected to result in any significant increase in local concentrations of criteria air pollutants (see Impact 4.5-2), a significant increase in health risks in the vicinities of the plants (see Impact 4.5-3), or significant increases relative to emissions projections used in regional air quality plants (see Impact 4.5-5). None of these other impacts were found to be significant at the Geysers plant.

The reference to single or several individual events is referring to steam venting episodes that could release large quantities of unabated steam. As indicated in response to Comment H5, divestiture is not expected to increase steam venting at the Geysers plant.

With the transfer of existing permits to a new owner, plants would continue to operate under reissued air permits that would be consistent with all emissions limitations and standards. These emissions limitations and standards are assumed to be sensitive to the preservation of air quality.

- H9 Regarding increased emissions, please see response to Comment H8. As the commenter notes, a 40 percent increase in emissions is not likely unless the abatement systems were changed. The analysis presented in the DEIR (page 4.5-75) indicates that the project would not have a significant impact on either local health risks or nuisance odors, and therefore mitigation is not needed. A change of abatement systems is not part of the proposed project, and is not anticipated. With respect to mercury scrubbers, please see response to Comment H11.
- H10 Regarding the resources of the new owner(s), PG&E requires that successful bidder(s) for the Geysers units have sufficient financial resources and technical expertise to properly operate and maintain the plant, and the CPUC is also responsible for ensuring that the new owners are financially responsible and viable entities to operate the plant.

The commenter is correct that participation specifically in the GAMP program is voluntary. However, as the DEIR states (page 4.5-45), air permits from both the Lake County Air Quality Management District and the Northern Sonoma County Air Pollution Control District require participation in an air monitoring program comparable to GAMP. According to the Northern Sonoma County Air Pollution Control Officer (Erdman, 1998, as cited in DEIR page 4.5-83), the mechanics of assigning PG&E’s participation in GAMP to a new owner, or owners in the event different units are sold to different parties, have been worked out. PG&E recently contractually committed itself to participating in GAMP

for at least the next 4 years. Even though any new owner would have to participate in an air monitoring program and the DEIR indicates that emissions from the Geysers units would not result in significant environmental impacts, in light of the commenter's preference, the DEIR on page 4.5-61 is amended to add the following mitigation measure:

Mitigation Measure Identified in this Report

~~None required.~~

Mitigation Measure 4.5-1: The new owner of any generating unit at PG&E's Geysers Power Plant shall participate in the existing Geysers Air Monitoring Program through at least June 30, 2002.

Monitoring Action: The purchaser(s) of the Lake County units and the Sonoma County units shall submit documentation to the CPUC that the new owner has made a binding commitment to participate in the existing Geysers Air Monitoring Program through at least June 30, 2002, and has given notice of such participation to the Air Pollution Control Officer of the Lake County Air Quality Management District and/or the Northern Sonoma County Air Pollution Control District as applicable.

Responsibility:

CPUC

Timing:

At least 10 days prior to the transfer of title of the Geysers Power Plant.

- H11 Regarding air quality monitoring, please see the response to Comment H10. With respect to seismic monitoring, PG&E does not do any seismic monitoring, nor does it participate in the seismic monitoring done by others. As described on page 4.3-13 of the DEIR, the Southeast Geysers Monitoring Advisory Committee was created by the Lake County Board of Supervisors. The continued existence of the committee would not be affected by the project, and neither the new owner nor the CPUC has authority over the composition of the committee.

With respect to the use of the chelate catalyst, it is noted that the economic costs of using the chelate would be similar for both PG&E and the new owner(s). Although a small portion of the chelate PG&E has used comes from boiler cleaning solution at its fossil plants, most of the chelate is purchased from non-PG&E power plants. Catalysts are used to make the processes in which they are used more efficient. Because the use of the chelate improves the efficiency of the abatement systems at the Geysers and the new owner's economic constraints and incentives to use it would be similar to PG&E's, it is assumed that the new owner(s) would continue to use it, unless a better system is developed.

Regarding the use of mercury scrubbers, as noted on page 4.9-13 of the DEIR, PG&E recently installed activated-carbon scrubbers to remove and collect the trace amounts of mercury. The scrubbing system minimizes mercury contamination in the sulfur waste,

lowering overall operational costs by reducing the overall amount of hazardous waste generated. Since the mercury scrubbers are in place, and reduce overall operational costs, it is assumed, as stated in the DEIR, that the new operators would continue to use the equipment.

- H12 Regarding continued participation in GAMP, please see response to Comment H10. With respect to the suggested mitigation measure that the seismic monitoring program continue, as noted in response to Comment H11, PG&E does not participate in a seismic monitoring program and does not have authority over the composition of Lake County's Southeast Geysers Monitoring Advisory Committee.
- H13 The CPUC strongly supports the continued viability of the Geysers as a geothermal generating resource, which includes continued coordination of operations between the steam field owners and the generating unit owners. The CPUC will not approve any transfer of a Geysers generating unit to an entity that is not qualified to operate those units in a responsible manner. The response to Comment H14 below addresses the issue of "green power" policy.

With regards to maintenance policies, the commenter may have misread Attachment C to the DEIR. The new owners would have a greater incentive to maintain the Geysers plants than would PG&E (see page C-29 of the DEIR). The new owners will have the benefit of PG&E labor and insight for at least two years after divestiture, and they are free to continue to employ valuable PG&E employees.

Also, it appears that the market will provide a very strong incentive to the new owners of the generating units to ensure the long-term viability of the units and the steam fields that supply them. One cannot sell power, or recover investment, from a plant that does not generate.

- H14 The purpose of an EIR is to provide decision-makers and the public with information concerning the environmental impacts of a proposed governmental action. The project will not alter any policies concerning green power. Thus, this EIR is not the appropriate avenue for examining policy concerning green power production in the state. Please see the response to Comment H15 for further discussion of policy issues.
- H15 The discussion of market forces and available subsidies and other incentives for the Geysers plant is largely mooted by the fact that the electric transmission system in Northern California is significantly constrained during much of the year, meaning that bringing in power from outside the region to serve local loads is often difficult, if not impossible. Because of this fact, the ISO has designated the Geysers plant as a "must-run" facility, meaning that PG&E (and any future owner) receives payments from the ISO over and above any revenues received from selling the power from the facility, merely for remaining available to serve local loads. (This contractual arrangement assures that an owner of a must-run facility would not charge exorbitant prices during times when that facility is the only resource available to serve certain loads.) Barring construction of a new

major power plant near the Geysers, or a significant upgrade of the transmission system (which would most likely include obtaining new rights-of-way because existing rights-of-way are already at maximum capacity), this situation is likely to continue indefinitely. And because of the lead time needed to construct a new power plant or to upgrade the transmission system, the situation will likely continue for several years. Therefore, an evaluation of subsidies, tax benefits and other incentives for renewable power in this EIR is not needed and would not enhance the analysis. However, for discussion purposes, a brief examination of market and policy issues related to renewable energy resources is provided below.

The California Legislature and the CPUC have enacted the restructuring of the electric utility industry in the state following the tenet that consumer choice is a very powerful tool in guiding the electric power market in the years to come. By expressing their desire to use renewable energy to power their homes and businesses, even if they must pay a premium above the cost of power from conventional resources, California consumers can in effect make decisions on the makeup of the future generating portfolio available in the state. This process is apparently already occurring, as some consumers have switched to service providers who guarantee that all or a significant portion of the power they market comes from renewable sources. Since restructuring was initiated in March 1998, at least 69,000 residential customers in the state have switched their service provider from their local utility to independent suppliers. According to the Center for Energy Efficiency and Renewables Technology, the majority of those customers switched to green power providers. Several businesses have also publicized their switch to renewable energy service providers as a means of attracting customers (article, "Green power luring consumers," by Associated Press reporter Martha Bellisle, in the September 28, 1998 issue of the *San Francisco Examiner*).

While only time will tell if a large, robust market for renewable energy resources will develop in California, early indications show that the market is promising, and could become much larger than it was before restructuring, largely because of the innovation and creativity in marketing brought about by restructuring. For example, Green Mountain Energy Resources, LLC, an energy service provider registered with the CPUC, has promised to construct a new wind turbine for every 4,000 new customers that sign up under one of its Green Power programs. The company to date has committed to installing two new turbines in the Palm Springs area because of the marketing commitment. It recently stated the two turbines represent "the first new renewable generation ever built in the U.S. because of electric deregulation" ("Green energy' sales build new turbines," by George Raine, *San Francisco Examiner*, October 15, 1998). Use of this type of marketing technique is a direct result of the CPUC's restructuring effort, and shows that by bringing market forces to bear in the electric generation marketplace, companies will craft innovative and creative marketing techniques to become long-term players in the market. This is exactly what is envisioned in the sale of the Geysers geothermal plant. The CPUC believes that market forces will pressure the new owner(s) of the Geysers generating units

to become similarly creative and innovative in marketing their non-polluting power to California consumers.

In addition to market forces, efforts by various agencies and non-profits are also acting to promote use of renewable resources in the state. For example, to help consumers in deciding whether and who to choose as a renewable energy service provider, AB 1890 (the California Legislature bill mandating restructuring) requires the CEC to implement a process for certifying renewable energy providers. In response, the CEC has established a program for certifying the renewable energy products offered by registered energy service providers in the state. The electric service industry, through the efforts of various associations and individuals, has also established a program, called the "Green-e Renewable Branding Program," for certifying renewable energy service products. Green-e certification is administered by the Center for Resources Solutions, a non-governmental non-profit organization. To receive the Green-e certificate or to qualify as a renewable energy service provider with the CEC, at least 50 percent of the energy offered through the product must come from qualifying renewable energy resources. Those include solar, wind, biomass, waste tire, municipal solid waste, small hydroelectric, digester and landfill gas, and all geothermal sources. As well, Senate Bill 1305 requires all energy suppliers to periodically disclose the sources of the energy resources they market, using a standard label created by the CEC. The CEC believes these labeling programs will become a powerful marketing tool for energy service providers.

The CEC itself is strongly promoting renewable energy to the state's consumers. In its educational material available on the Internet, the CEC points out that although consumers may have to pay a premium for renewable energy, that premium is just a small portion of the consumer's overall bill. The material also points out that the price of power from conventional sources does not include the cost to repair the environmental damage caused by the generation of that power, nor is the environmental benefit of renewable energy resources included in the pricing of the power they generate.

In relation to the various incentives available to renewable energy generators, many sections of the Energy Policy Act of 1992 (EPAct) address subsidies and tax incentives provided to renewable power producers. Section 1212 (e) specifies that qualified renewable energy facilities are eligible for a direct 1.5 cent/kWh energy production subsidy from the federal government for a period of 10 years. This credit will rise over time to account for inflation. However, the Geysers project does not appear to qualify for this direct subsidy under the EPAct. The subsidy applies only to projects owned by government and non-profit corporations or to private wind and closed-loop biomass projects, and any representation by a CPUC representative to the contrary was incorrect. If the Geysers plant was purchased by a government agency or government-owned corporation or non-profit organization, however, energy sales from the facility would apparently be eligible for the 1.5 cent/kWh subsidy under the Act.

The Geysers plant, like all renewable energy projects except hydroelectric facilities, is eligible for tax and other benefits under the EPAct and state law. The benefits vary depending on the nature of the new owner of the facilities. The EPAct (Public Law 102-486-Oct. 24, 1992) contains several provisions that encourage investment in renewable energy technologies by private and public entities. Under the act businesses can take a 10 percent business investment tax credit for purchases of solar and geothermal energy property under Sec. 1916, Permanent Extension of Energy Investment Credit for Solar and Geothermal Property.

Other applicable EPAct provisions include: Section 2111, Renewable Energy, and Section 1202, Demonstration and Commercial Application Projects for Renewable Energy and Energy Efficiency Technologies, which both offer funds, financial assistance and cost-sharing benefits to renewable energy generators for a variety of research and demonstration projects, including the demonstration of reliable generation from existing resources; Section 29, which grants a tax credit for producing fuel, including electricity, from a non-conventional source; Section 3001, Research, Development, Demonstration, and Commercial Application Activities; and Section 3002, Cost Sharing, which obliges the federal government to pay up to 50 percent of certain renewable energy research or demonstration projects.

In addition to the provisions of the EPAct, Section 168 of the Internal Revenue Code contains a Modified Accelerated Cost Recovery System (MACRS) by which businesses can recover investments in solar, wind, and geothermal property through depreciation deductions. The MACRS establishes a set of class lives for most property, ranging from 3 to 31.5 years, over which the property may be depreciated. The types of property covered by MACRS include equipment used to produce, distribute or use energy derived from a geothermal deposit, up to the electrical transmission stage.

Other potentially applicable federal laws giving preference, tax or other benefits to renewable energy generators include the Public Utilities Regulatory Policy Act (PURPA) of 1978, the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989, the Energy Policy and Conservation Act, the Powerplant and Industrial Fuel Use Act of 1978, and the Stevenson-Wydler Technology Innovation Act of 1980.

At the state level, renewable energy policy has somewhat shifted away from using set-asides and other government mandates to ensure renewable resources were developed to help meet California's electricity needs. Instead, in the new competitive electricity market, consumers will decide whether further development of renewable resources will continue. However, many state programs offering incentives for renewable energy generators still exist. Primary among those is a program run by the CEC under which consumers of renewable energy can receive a credit of up to 1.5 cents/kWh. Some electric service providers may reflect the value of this credit in their pricing scheme, while others may use the credit to give customers a monthly bonus.

To qualify for the program, the electric service provider must: register with the CEC as a renewable electricity product provider (having a Green-e certificate does not necessarily make a provider eligible for the credit because that program has slightly different criteria for determining eligibility); serve customers previously served by either PG&E, Southern California Edison or San Diego Gas & Electric; and, obtain the renewable energy from non-utility generators within the state. Power sold by the new owner of the Geysers to customers of PG&E, Edison and SDG&E would qualify for this credit. The credit is funded through a \$0.0002/kWh surcharge on all electricity sold in the state (typically, about \$8 million per year), which can and will be used for other programs that promote development of renewable resources.

Conversely, if PG&E would continue to own the Geysers, purchasers of power from the Geysers would not be eligible for this credit. Thus, through the divestiture project, the Geysers should become more competitive under a new owner. And if the Geysers plant was purchased by a government-owned entity, it apparently would be eligible for a total of at least 3 cents/kWh in generation subsidies or credits.

Other California incentives programs potentially available to a new owner of the Geysers include: the Geothermal Resources Development Account (GRDA); the Energy Technologies Advancement Program; the Geothermal Grant & Loan Program; Opportunity Technology Commercialization Program; and the Energy Technology Export Program. Most of those programs offer grant and/or loans for geothermal research, resource development, commercialization, planning and impact mitigation. The GRDA, however, is specifically aimed at finding ways to make existing geothermal generators, including the Geysers, more competitive in the restructured electric industry.

By mandating these programs in state law, including the 1.5 cent/kWh credit and the certification process, the California Legislature made clear it wants the renewable energy industry in the state to continue to flourish. Some municipal utilities, especially the Sacramento Municipal Utilities District, are also offering their customers the choice of having all or a portion of their power come from renewable sources, and are crafting ways to provide incentives to make that choice.

In any event, however, PG&E has successfully generated very large amounts of electrical energy from the Geysers plant over the years without the benefit of many of the subsidies and tax benefits available to other renewable project owners. The new owner(s) of the Geysers units will likely receive the same or better subsidies or tax benefits as PG&E has had. Therefore, given the constraint of the transmission system, and PG&E's successful track record to date, any analysis of how market forces or government-mandated incentives for renewable power production will affect the viability of the Geysers would not change the conclusions of this EIR.

H16 Please see responses to Comments H14 and H15 above.

H17 Please see responses to Comments H14, H15, and J8.

H18 The term “Analytical Maximum scenario” used on the pages cited by the commenter is more relevant to the potential change in operations at the fossil-fueled plants proposed for divestiture than to future Geysers operations. Because of the potential adverse air quality impacts and damage to the steam fields, the theoretical “worst case” for the Geysers units is reduced generation. The capacity factors for Geysers units listed in the tables cited by the commenter represent the minimum expected output level under new ownership with no mitigation measures or minimum generation requirements beyond those already in place. (Please see response to Comment H7 on the appropriateness of mitigation measures.) The Analytical Maximum scenarios are not meant to capture realistic operations, but rather are artificial constructs used to analyze the maximum potential environmental impacts associated with the change of ownership for all the divested plants. The reduced capacity factors listed for the Geysers generating units in fact do not reflect any changes in behavior by the new owners of the Geysers units compared to PG&E; rather it reflects how increased generation at the other divested fossil-fueled plants depresses generation at the Geysers. In other words, under the Analytical Maximum scenario, generation from the Geysers units would fall even if they were still owned by PG&E. Thus, the change in capacity factors for the Geysers units is not a result of analyzing the effects of the divestiture of the Geysers units, but rather is an effect related to the predicted change in operations of the fossil-fueled plants at Pittsburg, Contra Costa, and Potrero after divestiture. As the DEIR states on page 4.5-55, the Analytical Maximum scenario is “extremely unlikely” to reflect a true operating scenario. The Analytical Maximum scenarios were used to provide a “conservative” analysis, as noted in the comment.

H19 To reflect the commenter’s clarification, the last sentence of fourth paragraph on page 2-26 of the DEIR is revised as follows:

Mining is for aggregate and gold and used to include mercury mining. Mining was an important historical use, but in the past 40 years has been confined to limited aggregate mining associated with geothermal development and otherwise to recreational prospects.

H20 To reflect the commenter’s clarification, the second sentence of the fourth paragraph on page 2-35 of the DEIR is revised as follows:

“The area is roughly ~~5-5~~ 10 miles long and ~~4~~ 4 miles wide and is drained by Big Sulphur Creek.”

H21 This comment number was not used.

H22 This topic is addressed in “Existing Emissions,” which begins on page 4.5-46, and Impact 4.5-3, which begins on page 4.5-71 of the DEIR.

Page 2-38 of the DEIR (third full paragraph) is hereby amended as follows:

Geothermal steam contains reduced sulfur compounds that exist in both a liquid and gas phase. More specifically, the geothermal steam contains small amounts of “non-condensable gases,” including hydrogen sulfide gas (H₂S). After passing through the steam turbine and the condenser, a portion of the hydrogen sulfide remains dissolved in the liquid condensate and is subsequently chemically treated to maintain solubility and prevent “air stripping” in the cooling tower. Air stripping in this case refers to the process in which hydrogen sulfide is converted from its liquid phase to a gas phase. These non-condensable gases are removed from the condenser and transferred to an H₂S abatement system, where they are treated to convert the hydrogen sulfide component of the gas into elemental sulfur or sulfur dioxide (SO₂) using a Stretford or Incinerator Abatement System, respectively. The chemical solution in a Stretford Abatement System oxidizes the hydrogen sulfide into elemental sulfur by producing a “sulfur cake or slurry” product that remains suspended in the cooling water and can easily be removed. Sulfur dioxide, a byproduct of hydrogen sulfide combustion in an Incinerator Abatement System, is removed using a scrubber system in which the remaining scrubber solution is re-injected into the cooling tower. After converting the H₂S component of the gas into other sulfur by-products (e.g., elemental or molten sulfur), the remaining non-condensable gases are routed into the cooling tower and exit to the atmosphere. Table 2.2 describes the four types of abatement systems used at the Geysers Power Plant and identifies the units to which these systems apply. As shown in Table 2.2, each of the units at the power plant has more than one H₂S abatement system available for use. Figures 2.18 and 2.19 show a schematic flow diagram of the power generating process for a typical geothermal unit equipped with a Stretford Abatement System and an Incinerator System, respectively.

Figures 2.18 and 2.19 are intended to show only the general processes involved in power generation in a steam turbine generating unit. Specific details relating to any one of the processes were not included. However, to clarify where chemicals are put into the system, Figure 2.18 on page 2-40 is hereby amended to show that chemicals (i.e., Stretford Solution) are added to the process block labeled “Hydrogen Sulfide (H₂S) Abatement System.” No chemicals are added during the incinerator process of an Incinerator Abatement System and, therefore, no changes have been made to Figure 2.19.

- H23 Please see response to Comments H5, H7, and H18. Not all future events can be anticipated in any modeling exercise, and for this reason capacity factors for individual generating units will periodically fall outside the ranges shown in this analysis.

As to the commenter’s concerns regarding maintenance done on the Geysers units, the new owners will have a greater incentive than PG&E to maintain the generating units because they must remain operational in order to recover their investments in the units. For this reason, short-term, event-driven outages and resultant emission impacts are no more likely

to occur with a new owner than when PG&E owned the units. Please also see response to Comment H13.

H24 Page 4.1-1 of the DEIR (last paragraph, first sentence) is hereby amended as follows:

The Geysers Power Plant includes a series of ~~geysers~~ generating units dispersed throughout the northeastern portion of Sonoma County...

The last sentence of the first paragraph on page 4.1-2 is amended as follows:

Lake County's economy is primarily based on tourism; resource extraction; retirement, residential and related services; and agriculture.

H25 To reflect the commenter's clarification (here and in Comment H19), the third paragraph on page 4.1-4 of the DEIR is hereby amended as follows:

Other uses include recreational (~~primarily~~ hunting clubs, camps, and retreats) and ~~mining (e.g., gold, mercury)~~ limited aggregate mining associated with geothermal development. The small towns of Anderson Springs, Cobb Mountain, and Whispering Pines are located adjacent to the Geysers area to the east.

H26 Page 4.2-10 of the DEIR, the second paragraph under Geysers Power Plant subheading is hereby amended as follows:

The Geysers, which employs ~~204~~ 208 workers, are located in rural portions of Sonoma and Lake Counties. Twelve of the 14 units are located in Sonoma County; ~~so the number of workers at the Geysers is compared to Sonoma County jobs. and~~ two are located in Lake County. Of the 208 employees of the Geysers, 105 live in Lake County, 87 live in Sonoma County, and the remaining 16 workers live in other nearby counties.

In 2000, Sonoma County is projected to have 184,810 jobs. Employment in Sonoma County is projected to increase by 14 percent between 2000 and 2005, representing nearly 26,000 jobs. ~~The 204 jobs~~ The 87 workers living in Sonoma County and working at The Geysers constitute less than 0.1 percent of Sonoma County's jobs. Due to data limitations for Lake County, the number of employed residents of the County is used as an indicator for the number of jobs in the County. The 105 Geysers workers who live in Lake County represent less than 0.5 percent of the 21,100 employed residents (1996 employment inventory from California Department of Finance).

Although it is unknown if the future owners of the Geysers units would increase or decrease the number of employees at the plant, a doubling of the existing jobs at the Geysers would represent 0.1 percent of Sonoma County jobs and about 1.0 percent of Lake County jobs. A change of this nature would not substantially affect Sonoma

County's current jobs/housing ratio of 1.26 employed resident per job. Because data on the number of jobs located in Lake County is not available, the jobs/housing ratio cannot be determined. However, because Lake County is primarily a rural county, many employed residents likely travel outside of the county for jobs, and the county probably has a jobs/housing ratio greater than 1.00. A change in the number of jobs in Lake County of 1.0 percent would not substantially affect Lake County's jobs/housing ratio. Therefore, there would be no substantial growth or large concentration of population in Sonoma or Lake Counties, and the divestiture project would have a less-than-significant impact on population growth.

H27 Page 4.3-6, paragraph 2 is hereby amended as follows:

The bedrock within the Geysers area consists of two basic groups: the Quaternary and Tertiary age volcanic rocks of the Clear Lake Volcanic Series and the Franciscan Formation of Jurassic-Cretaceous geologic age. The Clear Lake Volcanic Series rocks are of basaltic to rhyolite composition and overlie the Franciscan rocks in the Clear Lake area north of the plant. The closest outcrop of these volcanic rocks to the Plant is on Cobb Mountain. The Franciscan Formation is the predominant rock type within the area and consists of an assemblage of volcanic and sedimentary rocks which were deposited in a subsiding marine trough. Major rock types of the Franciscan Formation include graywacke, shale, ~~and~~ volcanic of basaltic composition, and masses of serpentine. These deeply imbedded rocks were subjected to regional metamorphism and intrusion by ultramafic rocks. A thin veneer of valley alluvium sediments can be found in the local drainage channels with thicker sequences found in the valleys to the east and west of the Geysers area.

Impact 4.9-3, second bulleted item on Page 4.9-20 (Asbestos), is hereby amended to add the following:

The bedrock in the Geysers area is formed of, among other rock types, serpentine, which contains asbestos. In order for asbestos particles that are contained in the serpentine rock to become a hazard, it would have to be entrained into the air and transported by the wind to off-site receptors. For this to occur the exposed rock would have to be crushed through construction activities and clearing and grading operations. The project will not require construction operations at the Geysers plant; therefore, there would be no exposure to asbestos particles as a result of divestiture.

H28 The text referred to by the commenter is concerned with the broad overview of the regional climate and meteorological setting of the project. The commenter requests that specific text be added to point out that various communities are downwind of the Sonoma County Geyser units and thus are potentially impacted by these units. The DEIR addresses this issue in Section 4.5.3 and, thus, no modification of the DEIR text is necessary.

H29 Although concentrations of hydrogen sulfide in the gas stream may reach unsafe levels, similar to those identified in the comment, these levels have not been observed in the

ambient air at offsite receptors, mainly because the pollutants are diluted in the atmosphere while being transported to downwind receptors. In order to ensure that releases of hydrogen sulfide do not occur when the levels are high in the gas stream, workers routinely measure the hydrogen sulfide concentrations in the gas stream, and when the levels are higher than normal, extra checks are performed on the hydrogen sulfide control systems, such as the Stretford units, to make sure that they are properly operating. Also, the concentrations of the analytes in the sulfur removal solutions are checked to optimize the H₂S control system.

H30 The commenter is correct that footnote “d” refers to the new federal PM-2.5 standard. As presented, the table conveys that the modified federal PM-10 standard was also retained, and the table lists the current attainment status for PM-10 (i.e., for Lake County it is “unclassified”). Footnote “d” simply reminds the reader that the attainment status for the new PM-2.5 standard has yet to be developed. The federal PM-10 standard is presented (with the new PM-2.5 standard) in Table 4.5-1.

H31 Page 4.5-20 of the DEIR (first full paragraph) is hereby revised as follows:

LCAQMD regulates emissions from geothermal power plants through its permitting authority over stationary sources. LCAQMD Rule 411 Local regulations limits emissions of particulate matter for each operating unit to 40 pounds per hour, and hydrogen sulfide emissions are limited to 15 pounds per hour. LCAQMD has general regulations limiting sulfur emissions from various sources, set at various concentration and mass emission limits. New power plants are subject to New Source Review and Best Available Control Technology (BACT). BACT is project-specific and, for the existing Lake County units, has been defined as emissions of not more than 5 pounds per hour of hydrogen sulfide per million pounds of steam used. LCAQMD’s ability to issue Authorities To Construct and Permits To Operate further refines and restricts project emissions based on the New Source Review assessment of project emission impacts on the closest receptor.

H32 Page 4.5-45 of the DEIR (second paragraph, second sentence) is hereby amended to read:

The PM-10 monitoring stations provide data that can be analyzed by X-ray Florescence (XRF) for various compounds, including arsenic, mercury, sulfur, vanadium, and others. Ambient radon concentrations are also measured at the Glenbrook and Anderson Springs sites.

H33 GAMP PM-10 data for the Anderson Springs station and for the Glenbrook station were obtained from PG&E and are added to the revised Table 4.5-19 given below. The text in the second paragraph, fourth sentence on page 4.5-45 is amended as follows:

Table 4.5-19 also presents ozone data from Lakeport and PM-10 data from Lakeport, Anderson Springs, and Glenbrook.

TABLE 4.5-19
LAKE COUNTY AIR BASIN CRITERIA AIR POLLUTANT CONCENTRATIONS,
1992-1996

Pollutant	State Standard ^c	Monitoring Data by Year ^a				
		1992	1993	1994	1995	1996
<u>Ozone:</u>						
Highest 1-hr. average, ppm ^b	0.09	0.08	0.08	0.09	0.07	0.09
Number of exceedances		0	0	0	0	0
<u>Particulate Matter (PM-10):</u>						
Highest 24-hr. avg., $\mu\text{g}/\text{m}^3$ ^b <u>Lakeport</u>	50	22	30	21	30	26
Exceedances/Samples ^d		0/58	0/61	0/61	0/61	0/61
Annual Geometric Mean, $\mu\text{g}/\text{m}^3$	30	11.1	9.9	10.1	9.6	9.1
Highest 24-hr. avg., $\mu\text{g}/\text{m}^3$ ^b <u>And. Spr.^e</u>	50	<u>29</u>	<u>29</u>	<u>26</u>	<u>45</u>	<u>36</u>
Exceedances/Samples ^d		<u>0/61</u>	<u>0/61</u>	<u>0/45</u>	<u>0/60</u>	<u>0/59</u>
Annual Geometric Mean, $\mu\text{g}/\text{m}^3$	30	<u>10.7</u>	<u>9.5</u>	<u>11.9</u>	<u>12.5</u>	<u>10.8</u>
Highest 24-hr. avg., $\mu\text{g}/\text{m}^3$ ^b <u>Glenbrook^e</u>	50	<u>18</u>	<u>18</u>	<u>14</u>	<u>24</u>	<u>26</u>
Exceedances/Samples ^d		<u>0/61</u>	<u>0/61</u>	<u>0/45</u>	<u>0/60</u>	<u>0/59</u>
Annual Geometric Mean, $\mu\text{g}/\text{m}^3$	30	<u>5.6</u>	<u>95.4</u>	<u>6.6</u>	<u>5.8</u>	<u>5.8</u>
<u>Hydrogen Sulfide (H₂S):</u>						
Highest 1-hr. average, ppm						
(Anderson Springs station)	0.03	0.01	0.01	0.01	0.01	0.01
(Glenbrook - High Valley Road station)	0.03	0.01	0.02	0.01	0.03	0.01
(Hobergs - Pine Summit station)	0.03	0.01	0.01	0.01	0.05	0.01

^a Data for ozone and PM-10 are from the air quality monitoring station in Lakeport. The hydrogen sulfide data are listed with the applicable monitoring station.

^b ppm = parts per million; $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

^c State standards for ozone and PM-10 are not to be exceeded; the state standard for hydrogen sulfide is not to be equaled or exceeded.

^d PM-10 is usually measured every sixth day (rather than continuously like the other pollutants). For PM-10, "exceedances/samples" indicates the number of exceedances of the state standard that occurred in a given year and the total number of samples that were taken that year.

^e Data from LCAQMD.

SOURCE: California Air Resources Board, *California Air Quality Data*, 1992, 1993, 1994, 1995, and 1996.

H34 Page 4.5-46 of the DEIR (last paragraph and then continuing onto the next page) is hereby revised as follows:

Geothermal steam contains small amounts of naturally occurring non-condensable gases, including carbon dioxide, H₂S, ammonia, methane, hydrogen, nitrogen, and trace amounts of other gases, including reactive organic gases, benzene, and radon.

Geothermal air pollutants are not generally emitted from steam wells, steam transmission lines and steam stacking facilities under normal operations. Steam is emitted during well construction, testing and maintenance operations, ~~and non-condensable~~ Most of the geothermal emissions are from the cooling towers and gas treatment facilities at power plants. ~~While~~ Well bleeds and well maintenance steam releases are currently the largest “steam field” emission sources, steam field emissions are relatively insignificant when the power generating units are operating. Most of the air pollutant emissions from the Geysers plant are due to naturally occurring constituents of the geothermal steam released to the air from the evaporation of the circulating water and “air stripping,” which occurs in the cooling towers (provided the gas treatment systems are functioning properly). ~~during condensation of the steam after it passes through the turbine.~~ One significant constituent is H₂S, and all the units are equipped with H₂S abatement systems.

H35 Please see response to Comment H34.

H36 Though stacking can occur with a mere slowdown in the rate of steam use at a generating unit, the commenter is correct that stacking events are more likely to occur after an immediate 100 percent rejection of steam flowing to a Geysers generating units, such as when a generating unit is tripped off-line. For further clarification, the second sentence of the first full paragraph of page 4.5-47 is hereby revised as follows:

H₂S emissions can occur as a result of steam stacking, which is the term used to describe the controlled release of unabated steam in order to relieve a buildup of steam pressure in a geothermal field due to a temporary slowdown or cessation in use of the steam wells.

H37 As detailed in the response to Comment H18, the analytical maximum scenarios examined in the DEIR conclude that generation at the Geysers may decrease somewhat in the future, but such a scenario is an artificial construct designed to capture the maximum potential environmental from divestiture of the Geysers units. Because of the factors discussed in the response to Comment H15, incidences of shutting in the steam wells are not expected to increase under divestiture because the new owner(s) of the Geysers generating units will have significant incentives to operate the Geysers units at relatively high capacity factors. Thus, there would be no impacts expected from divestiture, even if generation decreased as described in the analytical maximum scenario. Also, the magnitude of a H₂S gas release during such an operation would be considerably lower than releases that may occur from a stacking event and would result in lower concentrations at off-site receptors, even though such a release may create less turbulence than a stacking event.

H38 Please see response to Comment T7.

H39 The DEIR’s air quality analysis concerning emissions from the Geysers Power Plant fully accounts for the fact that wind patterns in the Geysers area generally result in all emissions from both the Sonoma County and Lake County Geysers generating units flowing into the

Lake County air basin. As detailed in the response to Comment H3, the Geysers air quality analysis relies mainly on the results of the Geysers Air Monitoring Program (GAMP), which detects existing emissions, regardless of their origin or destination. However, for further clarification, Page 4.5-47 of the DEIR (last paragraph and then continuing onto the next page) is hereby revised as follows:

Table 4.5-21 shows criteria air pollutant emissions from the plant units located in Lake County for 1995, 1996, and 1997 and compares the 1997 estimates with county-wide emissions for Lake County in that year. Table 4.5-22 shows the 1995, 1996, and 1997 criteria pollutant emissions from the Sonoma County units and compares 1997 emissions the values with county-wide and basin-wide emissions for Sonoma County. As indicated in Table 4.5-22, the Geysers Power Plant accounted for relatively large portions of Sonoma County's 1997 inventory of PM-10. Given that prevailing winds tend to transport emissions from the Sonoma County units to the Lake County Air Basin, a comparison of the aggregate emissions from all of the Geysers Power Plant units with Lake County emissions is also appropriate. Table 4.5-22a provides such a comparison and shows that Geysers Power Plant emissions constitute a substantial fraction of total Lake County emissions of total organic gases and PM-10.

TABLE 4.5-22a
EMISSIONS FROM GEYSERS POWER PLANT UNITS, 1995, 1996, 1997

Pollutant	Emissions (tons per year)^a			1997 Emissions As Percent of Lake County
	1995	1996	1997	
Total Organic Gases	2,463	2,839	2,755	46
Reactive Organic Gases	29	33	32	0.8
Particulate Matter (PM-10)	552	651	734	16

^a Emissions estimates represent the sum of emissions estimates shown in Tables 4.5-21 (Lake County units) and 4.5-22 (Sonoma County units).

H40 The risk assessments that are in the DEIR reflect the latest reference dose information officially released by the Office of Environmental Health and Hazards Assessment (OEHHA). These reference doses are revised when new data are reported by the scientific community. For plants that emit pollutants with revised reference doses, the risks must be recalculated. Under AB 2588, the Air Toxics "Hot Spots" Information Act, all industrial facilities in the state must report any changes in emissions and/or any changes in risks from their plants on a biennial basis. Thus, if reference doses are revised, the owner(s) of

the Geysers units would be required to update their risk assessments in accordance with AB 2588.

- H41 The emission estimates reported in the air quality section (as well as the baseline and analytical maximum capacity factors used to derive them) are consistent with those reported in other parts of the EIR. With regard to the comment on emissions factors, the emissions reported in Tables 4.5-27 and 28 are based on factors that were derived from measurements for these systems and are not based on permitted levels. Actual production rates were used in combination with the emission factors to estimate the emissions reported in the tables. Please see the responses to Comments H8 and H9 for further discussion of the analytical maximum scenarios and air quality impacts.
- H42 The DEIR refers to steam stacking as an example of a condition that can result in unabated releases. In order to include other factors besides steam stacking that can result in these releases, the text on page 4.5-75 (under "Geysers Power Plant") is hereby amended to read as follows:

The principal health risk that could be experienced from plant operations under the 1999 A-Max scenario would be the potential for increased acute exposure to toxic hydrogen sulfide emissions. For the Lake County units, emissions of hydrogen sulfide are estimated to remain the same (see Table 4.5-27) under the 1999 A-Max scenario as compared with the 1999 Baseline, while the corresponding emissions at the Sonoma County units under this scenario are estimated to increase by approximately 40 percent (see Table 4.5-28). The scenario analyzed in Tables 4.5-27 and 4.5-28 is the one that maximizes "controlled emissions" and not the scenario that depicts the minimum level of operations that has generally been used for the A-Max for the Geysers (see Table 3.1). Although steam stacking has been shown to cause exceedances of ambient air quality standards (AAQS), the same can be demonstrated for emissions from untreated well bleeds, normal and abnormal power plant operations. Steady state "controlled" emissions are capable of, and have been the source of both nuisance complaint generation (odors) and AAQS exceedances. These events are typically associated with episodes of regional air stagnation and a "flushing" of built up pollutant concentrations from the West Geysers area into Lake County during the early afternoon wind flow reversal from a westerly direction. However, this increase in hydrogen sulfide emissions would not be expected to result in a significant increase in health risk or nuisance odor complaints since the two phenomena are essentially independent of one another. This is because the peaks in hydrogen sulfide concentrations (and ensuing complaints) that have occurred in the past have been the result of uncontrolled releases of steam due to events like steam stacking rather than from the steady-state, "controlled" emissions released at the power plants. As discussed in the setting section, in addition to H₂S abatement systems to reduce controlled operations, an automated pipe manifold system has been installed, and this system has significantly reduced the incidents of steam stacking. Because the project would not affect operation of the H₂S

abatement systems, or the manifold systems, steam wells and wellheads, or change the applicability of any air district rules or regulations, or affect the frequency of regional air stagnation, the project would not have a significant effect on the local health risks or the potential for nuisance odor complaints that are associated with controlled releases, or steam stacking and related uncontrolled releases of steam.

- H43 The commenter is correct in that some of the Geysers units (5, 6, 7, 8, 11, and 12) utilize an incinerator system (a form of combustion) as an emission control system. It is also true (and is so stated on Table 2.2 of the DEIR) that emissions from this system contain SO₂. However, this abatement system is by no means comparable to the large boilers found in the Bay Area fossil-fueled plants, which release their emissions through a tall chimney via a generally hot, dry process, versus the Geysers incinerator abatement systems emissions being released through cooling towers (essentially a wet, cool process). Furthermore, one of the key features of fallout-type particulate (FTP) from the fossil-fueled plants (as described on pages 4.5-13-14 of the DEIR) is the formation of FeSO₄, which is a result of the interaction between the boiler exhaust gas and the boiler tube steel walls. While there are apparently similar chemical processes between the Geysers incinerator abatement systems and the fossil-fueled power plants, no data is available to suggest that FTP (as discussed beginning on page 4.5-13 of the DEIR) is emitted from the Geysers Power Plant. There are also great process differences between the two systems. Regardless, the commenter is correct that because the Geysers Power Plant location is far from any potentially impacted sources, the DEIR is correct in stating that, for the Geysers, this would be a less-than-significant impact. Thus, in response to this comment, the first sentence of the third paragraph of page 4.5-76 of the DEIR is hereby amended to read:

Unlike the three Bay Area fossil-fueled power plants, ~~Because~~ there are no combustion sources used in the process that can generate acidic particles at the Geysers; therefore, no measurable impact from FTP is expected at the Geysers. Geysers units 5, 6, 7, 8, 11, and 12 do utilize an incinerator based emission control system that emits exhaust gasses with similar chemistry to that causing FTP from the fossil-fueled power plants. However, the distance of these Geysers units from potential receptors that could experience any FTP-like nuisance effects from these units is far greater than that of the Bay Area fossil-fueled power plants and thus, further ensure that no FTP-like nuisance effects would be experienced.

- H44 The issue of economic curtailment is mentioned in a footnote on page 4.8-2 of the DEIR instead of in the body of the text because it is an economic issue that is not directly related to plant ownership and therefore is not affected by divestiture. Economic curtailment has occurred at least in the U-N-T fields since 1994, and would likely continue under PG&E ownership. Divestiture would have little or no detrimental effect on economic curtailment, and in fact would be more likely to reduce curtailment as shown in the response to Comments H5, H7, and H13 through H17.

H45 The number of units that could be closed to better utilize the steam resource is quite limited by the fact that geothermal steam can only be transferred to another site less than a mile away. Both PG&E and the new owners would face the same decisions on plant closures and reconstructions, so that divestiture would not change this situation. The new owners will have a strong incentive to maintain the resource in a manner that is most economically efficient and beneficial. The alternative of selling the plants to the steam suppliers only reinforces this incentive.

While the commenter believes that operating the units at a sustainable, baseload flow rate would efficiently utilize the steam resource, the Legislature and the CPUC have decided to rely on the marketplace to the extent feasible as the best means of efficiently managing these resources. The CEC is charged with assessing the societal benefits and costs of pursuing different resource options. Nevertheless, restructuring is intended to decentralize resource planning so as to avoid the compounding of mistakes that can occur with one decision-maker overseeing all.

H46 There is no basis for concluding that Geysers units would be operated inefficiently after divestiture. Please see responses to Comments H7 and H45, where related issues of energy efficiency are addressed.

H47 A new paragraph on page 4.9-12 of the DEIR (following the fourth paragraph) is hereby added as follows:

PG&E maintains hygiene facilities (buildings with lockers, showers, and coverall storage areas) at each unit site. These facilities minimize worker exposure to the trace contaminants that are found in the steam, primarily arsenic.

The activated-carbon scrubbers that remove mercury from the geothermal steam are described in the DEIR on page 4.9-13 (second paragraph).

H48 The comment refers to the project setting, which is discussed starting on page 4.9-12 of the DEIR, and not to a project impact. Page 4.9-12 of the DEIR (fourth paragraph, second sentence) is hereby revised as follows:

Other constituents include ammonia, hydrogen, methane, nitrogen, carbon dioxide, and trace amounts of other gases, including radon, as well as trace amounts of various metals, including arsenic and mercury. Asbestos is present in serpentine rock and soils, which are common throughout the Geysers area.

The presence of trace metals arsenic and mercury in geothermal steam was also described in the DEIR on page 4.9-13 (second paragraph). Please see the response to Comment T18 for a discussion of mercury mining in the Geysers area, as well as further details on potential asbestos contamination.

H49 The North Geysers Unit Loading Instructions are instructions written by PG&E staff to ensure that system operators preserve system reliability. They are in a state of flux because another unit, Geysers Unit 11, is being “wired” into the north Geysers system to provide greater and more reliable voltage support in the Mendocino area. These instructions and the responsibility for observing them have now been transferred to the ISO and it is assumed in the DEIR that the ISO will continue to observe them as they are modified to reflect the completion of the Unit 11 interconnection.

These instructions do not consider economic or energy policy issues and would not be an appropriate document into which to insert such considerations. Such considerations are currently in the hands of PG&E and will in the future be in the hands of the new owner of the Geysers plant. The economics of the steam supplies will certainly affect how these units are operated. It may be possible that in the context of providing green power, the Geysers could be employed in a more baseloaded mode in order to firm up other sources of green power such as wind generation or hydro. That issue is appropriately left to the discretion of the new owner.

H50 Page 2-39 of the DEIR notes that the Lake County Sanitation District (LACOSAN) has a long-term contract to supply wastewater to the Geysers Power Plant where it is injected into the steam fields. A pipeline from the Southeast Regional Wastewater Treatment Plant (SERWTP) delivers up to 8 million gallons a day of treated wastewater or lake water to the Southeast Geysers geothermal field. This mutually beneficial arrangement provides LACOSAN with a means to dispose of SERWTP wastewater effluent and allows the steam field operators to increase recoverable steam pressure and improve the reliability of steam delivery. This information was not presented in the discussion on sanitary and storm sewers because that section of the DEIR examines potential impacts of the proposed project on sanitary and storm sewer systems and, in the case of the Geysers, there would be no such impacts, nor would there be any impacts on LACOSAN. CEQA does not require consideration or discussion of economic effects, except insofar as they may result in secondary environmental effects. Given that the proposed project would not affect LACOSAN, there is no reason to assume that there would be project-generated economic effects related to the continued provision of wastewater management services in Lake County.

H51 The source points, waste composition, quantity, and ultimate disposal method of each hazardous waste stream generated at the Geysers Power Plant are summarized in the DEIR on page E-5 of Attachment E.

PG&E has provided the following information on waste generation at the Geysers Power Plant for 1998 through September:

Unit	Hazardous Waste (Tons)	Nonhazardous Waste (Tons)
7&8	39	0
9&10	41	0
13	136	135
14	141	72
16	33	145
17	442	436
18	0	171
20	28	241
Various	146	23
Common	27	0
Total (1998 through September)	1,035	1,225

Note also that the amounts of hazardous and non-hazardous wastes generated each year can vary significantly, depending on whether special equipment or site upgrades or repairs are performed.

Page 4.12-15 of the DEIR (fifth paragraph, first sentence) is hereby amended to read:

Solid waste generated in Lake County is disposed of at the ~~privately owned Eastlake Clearlake Highlands~~ Landfill, located off State Route 53 in the City of Clearlake.

H52 The commenter is correct that the Geysers generating units do not have “black start” capability, meaning they must have off-site power available to start up, and that significant emissions occur during unexpected shutdowns and resultant startups. However, divestiture of the units will have no effect on the availability of off-site power, and therefore no impact on the reliability of the electric grid in California. As noted by the commenter, transmission outages are likely to decrease under restructuring due to the operation of the ISO, because its one and only task is to ensure reliability of the grid. In contrast, the previous grid operators (PG&E, Southern California Edison, and San Diego Gas & Electric) each operated only a portion of the state’s transmission grid and had a variety of motivations behind their transmission system operational decisions, such as protecting their generating assets. By having a single entity controlling all of the state’s transmission grid, with continued reliability as its only motivation, outage duration and frequency in the restructured electric utility industry are more likely to decrease rather than increase.

H53 Comment noted.

H54 The DEIR assumes that the Geysers units under new ownership would operate within the parameters of their existing permits, as stated on page 3-8, first paragraph. In its comment, the agency agrees that if this is the case, the noise impact would be less than significant.

H55 In response to comment, the third sentence of the second paragraph under Section 6.4.3 (page 6-23) is hereby amended to read:

This may reduce environmental effects that are of concern, namely steam stacking, well bleeds, and field maintenance problems.

The last sentence of the same paragraph (pages 6-23 – 6-24) is hereby amended to read:

As owners of the generating units, the steam field operators would be uniquely positioned to coordinate the operations of the units to maximize utilization of steam pressure and avoid steam stacking, well bleeds, and other problems associated with field maintenance.

H56 As noted on pages 2-4 to 2-5 of the DEIR, PG&E plans to transfer its rights and obligations under the existing steam supply contracts with U-N-T and Calpine to the new owner(s). Divestiture would not change the future need for maintenance at the units or shorten the useful life span of the units.

H57 Utility plants are not classified as “stranded assets” arbitrarily by the CPUC. Whether a plant is an “economic” or “uneconomic or stranded” asset is derived by comparing the remaining book value to the market value. The important factor is not the determination of whether an asset is economic, but rather the dollar amount representing the difference between the book and market values. That determination cannot be made until the asset is market valued in some fashion, including by an auction. No other special significance is attached to a “stranded asset.” Please see responses to Comments H13, H14, and H15 for discussion of “green power” policies.

H58 The Lake County steam contract provides for prices as much as 50 percent lower than those in Sonoma County, partially because the steam from Calpine’s field is less contaminated than steam from other fields, thus reducing abatement costs. This lower price is sufficient incentive to dramatically reduce economic curtailments. Calpine does drill more intensively to supply its adjacent QF plants, which hold comparatively lucrative Interim Standard Offer 4 (ISO 4) contracts with PG&E, as mentioned on page C-8 of the DEIR. Please see response to Comment H2.

H59 Please see response to Comment N61.

H60 Attachment C of the DEIR concludes that divestiture is more likely to *reduce* cycling at the Geysers, not increase it. In any event, as noted in the responses to Comments H5, H7, H13, and H44, any increase in load cycling at the Geysers, and the resultant increase in emissions, would be a direct result of restructuring, and not of divestiture of the units.

- H61 The first bullet on page C-8 of the DEIR, “Baseload to load-following operation,” explains why Geysers generation has been economically curtailed and discusses how “fuel pricing and contracts affect power plant operations.”
- H62 Please see response to Comment H7.
- H63 Please see responses to Comments H5 and H7. Cycling of the Geysers units already occurs under PG&E ownership, and is likely to decrease, rather than increase, under any new ownership scenario.
- H64 Please see response to Comment H13. The commenter may have misinterpreted the discussion at C-29 to arrive at a completely opposite conclusion from the DEIR. The portfolio holder discussed there is PG&E, not the new owners, who will have a small portfolio of plants, if any. Therefore, assuming the new owners only have one or few generating plants from which to recover their investment, they would be more likely to ensure their units are well maintained.
- H65 The commenter’s statement reflects the rationale behind the designation of the environmentally superior alternative in the DEIR. As well, if the steam field owners do not exercise their right of first refusal, the new owners will assume the existing steam contracts. Therefore, the project will have no effect on any potential impact related to the steam supply contracts.
- H66 Please see responses to Comments H5, H7, H15 and J8.
- H67 CPUC Decision 97-04-042 applies to those electrical utilities regulated by the CPUC. The new owner of the Geysers will presumably be a non-utility company, and therefore will not be regulated by the CPUC. As a result, the policies contained in D.97-04-042 will not apply to the new owner. New owners of the divested power plants will have the freedom to retire, repower, or replace the generation units. The recovery of stranded generation assets, legislated by AB 1890, is restricted only to utility companies regulated by the CPUC.
- H68 The commenter references the Notice of Preparation (NOP), which is the public notice required by CEQA stating the lead agency’s intent to prepare an environmental impact report. The NOP provides a brief discussion of the project and the known potential environmental effects that will be addressed in the EIR. It was prepared before any of the analysis conducted for this EIR was even started, and does not reflect any of the conclusions reached in the DEIR. However, addressing the commenter’s concerns about the cumulative impact of emissions from all parts of the Geysers area, including the steam fields, the analysis conducted for the air quality section (Section 4.5) of the DEIR relied heavily on the data collected by the GAMP, which detects all pollutants coming from the Geysers units, steam fields and related equipment. That data confirmed the effectiveness of the pipe manifold network system installed at the Geysers in the mid-1980s, as noted on page 4.5-47 of the DEIR. Because of this technology, the GAMP has detected only one

incidence of release of significant amounts of H₂S in recent years, as noted on page 4.5-45 of the DEIR. In any event, the DEIR concludes that malfunctions at any of the Geysers units leading to exceedance of ambient air quality standards are no more likely to occur under a new owner than under PG&E's continued ownership. As well, existing air quality permits, with which the new owners of the Geysers units must comply, clearly specify that the new owner must not exceed ambient air quality standards, including H₂S concentration limits, and that they must participate in an air quality monitoring plan similar to the GAMP in order to ensure standards are not violated. Thus, with these permit requirements, the continued use of the manifold piping system and continued coordination between the steam field owners and the generating unit owners (as specified in the steam supply contracts), the DEIR concludes that the potential for the project to result in increased impacts associated with exceeding ambient air quality standards is less than significant.

H69 The footnote is correct. The geothermal purchase contracts governing payments by PG&E for geothermal generation from U-N-T and Calpine base payments on the number of kilowatt-hours produced. Thus, PG&E determines dispatch of Geysers generation based upon the incremental cost of generation, not on the amount of geothermal energy used. In the SERASYM™ modeling, the same behavior needed to be employed to forecast future Geysers operations. Because the incremental cost of generation for most utility generating units is determined by a combination of fuel cost and unit specific energy conversion efficiency, the same approach is followed in the SERASYM™ algorithms, thereby necessitating special procedures to accurately reflect the geothermal contracts. These adjustments involved normalizing the unit heat rates for each geothermal unit to a 10,000 Btu/kWh "pseudo-heat rate" so that the actual cost of geothermal steam was reflected in forecasted operations of the units. Once it was determined how much the units would run (using the above procedures), the actual heat rates were used to calculate the emissions.

H70 Page G-7 (last paragraph, first sentence) is hereby amended to read:

The Geysers geothermal plants (Nos. 13 and 16), supplied by Calpine, ~~wells (Nos. 13 and 16)~~ are already running at their steam-limited maximum levels; the remainder, supplied by UNT, are not.

H71 The source of emission rates in the SERASYM™ program for both units is the CEC Electricity Report 94 (page A-II-A-19, dated 12/8/94), wherein the column for hydrogen sulfide was understood to be 7 pounds per hour and 1.1 pounds per hour for Geysers Units 13 and 16, respectively,⁷ which is within permitted levels. The reason that the emissions do not differ by the full 7 to 1.1 factor of 6.36 is that the decline in capacity caused by steam supply reduction is more severe for Geysers Unit 13 than for Geysers Unit 16.

⁷ The column heading in the report is actually lb/MMBtu which would result in a much higher emission rate, but CEC staff clarified that the column should have been listed as pounds per hour.

It is noted, however, that the emissions estimates for the Geysers units in Chapter 4.5 (Air Quality) of the DEIR relied upon the information contained in Attachment G for electricity generation estimates and for hydrogen sulfide only and that Title V application data was used as the basis for ROG, NO_x, and PM-10 emissions estimates. Based on Title V application data, ROG emissions factors used for the emissions estimates included in Chapter 4.5 of the DEIR were 10.9 pounds per GWh for Unit 13 and 8.0 pounds per GWh for Unit 16, which, incidentally, round to 0.01 pound per MWh. Since the footnotes to Tables 4.5-27 and 4.5-28 are not precise on this point, those two tables are hereby revised as follows:

**TABLE 4.5-27
LAKE COUNTY GEYSERS POWER PLANTS
CRITERIA AIR POLLUTANT EMISSIONS, 1999 AND 2005**

Pollutant	Estimated Emissions in Tons Per Year ^a			
	Existing ^b	1999 Baseline	1999 Analytical Maximum	2005 Cumulative Analytical Maximum
Carbon Monoxide	0	0	0	0
Reactive Organic Gases	7	6	6	5
Nitrogen Oxides	0	0	0	0
Hydrogen Sulfides	38	33	33	31
Particulate Matter (PM-10)	46	39	39	38

^a Baseline and analytical maximum emissions estimates were developed using generation rates developed by Sierra Energy and Risk Assessment, Inc. for this report, and emissions factors for carbon monoxide, ROG, NO_x, and PM-10 derived from the Title V applications (to the Lake County AQMD) for Units 13 and 16, and emissions factors for hydrogen sulfide from the California Energy Commission's Electricity Report 94.

^b Existing emissions reflect an average of emissions over the 1995 to 1997 period. The emissions estimates were made based on electricity generated during the 1995 to 1997 period, and on emissions factors for carbon monoxide, ROG, NO_x, and PM-10 derived from the Title V applications (to the Lake County AQMD) for Units 13 and 16, and emissions factors for hydrogen sulfide from the California Energy Commission's Electricity Report 94.

Finally, it is noted that the hydrogen sulfide emissions data provided by the commenter substantially lowers the emissions estimates of that pollutant. Using the commenter's data, emissions of hydrogen sulfide from the two Lake County units would be 5 tons per year under existing conditions, 1999 baseline, and 1999 Analytical Maximum, and would be 4 tons per year under the 2005 Analytical Maximum. The corresponding DEIR estimates were in the 30 to 40 ton-per-year range. However, since the DEIR concluded

TABLE 4.5-28
NORTHERN SONOMA COUNTY GEYSERS POWER PLANTS
CRITERIA AIR POLLUTANT EMISSIONS, 1999 AND 2005

Pollutant	Estimated Emissions in Tons Per Year ^a			
	Existing ^b	1999 Baseline	1999 Analytical Maximum	2005 Cumulative Analytical Maximum
Carbon Monoxide	1	1	1	1
Reactive Organic Gases	25	24	30	30
Nitrogen Oxides	3	3	4	4
Hydrogen Sulfides	516	488	685	696
Particulate Matter (PM-10)	600	571	778	786

^a Baseline and analytical maximum emissions estimates were developed using generation rates developed by Sierra Energy and Risk Assessment, Inc. for this report, and emissions factors for carbon monoxide, ROG, NOx, and PM-10 derived from the Title V applications (to the Northern Sonoma County APCD) for Units 5, 6, 7, 8, 9, 10, 11, 12, 14, 17, 18, and 20, and emissions factors for hydrogen sulfide from the California Energy Commission's Electricity Report 94.

^b Existing emissions reflect an average of emissions over the 1995 to 1997 period. The emissions estimates were made based on electricity generated during the 1995 to 1997 period, and on emissions factors for carbon monoxide, ROG, NOx, and PM-10 derived from the Title V applications (to the Northern Sonoma County APCD) for Units 5, 6, 7, 8, 9, 10, 11, 12, 14, 17, 18, and 20, and emissions factors for hydrogen sulfide from the California Energy Commission's Electricity Report 94.

that even the higher emissions estimates included therein would not be significant, the conclusion would remain the same with respect to the lower estimates as well.