

**Mono County
Community Development Department
Planning Division**

PO Box 347
Mammoth Lakes, CA 93546
760-924-1800, fax 924-1801
comndev@mono.ca.gov

PO Box 8
Bridgeport, CA 93517
760-932-5420, fax 932-5431
www.monocounty.ca.gov

**APPEAL
APPLICATION**

In order to be valid,
appeal must be filed within
10 days of action date.

RECEIVED		
APPLICATION	OCT 19 2012	FEE \$ <u>495.00</u>
DATE RECEIVED		RECEIVED BY
RECEIPT	MONO COUNTY Community Development CHECK	(NO CASH)

APPELLANT California Unions for Reliable Energy s

ADDRESS 601 Gateway Blvd., Suite 1000 CITY/ STATE/ ZIP South San Francisco, CA 94080

TELEPHONE (650)589-1660 E-MAIL eklebaner@adamsbroadwell.com

APPLICATION # BEING APPEALED CUP 12-004

DATE OF ACTION 10/11/2012 DATE OF APPEAL 10/19/12

NATURE OF APPEAL: Describe what is being appealed. If it is a condition of approval, attach a copy of the project conditions and indicate which conditions are being appealed.

Planning Division 10/11 actions on CUP 12-004 and FEIR adoption.

REASON FOR APPEAL: Describe why the decision is being appealed

See Attached.

APPLICATION SHALL INCLUDE:

- A. Completed application form.
- B. Deposit for project processing: See Development Fee Schedule.

I CERTIFY UNDER PENALTY OF PERJURY THAT I am: I legal owner(s) of the subject property,
 corporate officer(s) empowered to sign for the corporation or authorized legal agent, or
other interested party.

Signature _____

Elizabeth Klebaner
Signature _____

10/18/12
Date _____

ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062

eklebaner@adamsbroadwell.com

SACRAMENTO OFFICE

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
PAMELA N. EPSTEIN
TANYA A. GULESSERIAN
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
JAMIE L. MAULDIN
ROBYN C. PURCHIA
ELLEN L. TRESKOTT

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL

October 18, 2012

BY: Overnight Mail

Mono County Board of Supervisors
C/O: Scott Burns, Director
Mono County
Community Development
437 Old Mammoth Road, Suite P
Mammoth Lakes, CA 93546

RE: Appeal of Planning Commission Approval of Conditional Use Permit No. 12-004 and Final Environmental Impact Report for the Mammoth Pacific I Replacement Project; and Clarifying General Plan Amendment 12-003(b)

Dear Board:

We write on behalf of California Unions for Reliable Energy ("CURE") to appeal the Mono County Planning Commission's decision to approve Conditional Use Permit No. 12-004 and Final Environmental Impact Report for the Mammoth Pacific I Replacement Project and clarify General Plan Amendment 12-003(b) (collectively, "Project"). This appeal is made pursuant to Mono County General Plan Land Development Regulations sections 47.010 and 47.020 and all applicable local and state laws and regulations.

Ormat Nevada, Inc., ("Applicant" or "Ormat") seeks a conditional use permit authorizing: the construction of: the Mammoth Pacific I Replacement ("M-1") unit, a geothermal power plant facility with a net generating capacity of approximately 18.8 megawatts ("MW"); the routing and rerouting of geothermal pipelines; the construction of a substation and transmission line; the simultaneous operation of the proposed M-1 unit and the existing Mammoth Pacific Unit I ("MP-I") plant¹ for

¹ The existing MP-I facility includes a binary geothermal power plant with a design capacity of 14 MW, associated well field, production and injection fluid pipelines, and ancillary facilities. MP-I is one of three existing geothermal plants within the Casa Diablo Geothermal Complex.

2620-023cv

October 18, 2012

Page 2

a period of two years; the decommissioning of MP-I; and a 30-year operational life and the eventual decommissioning of the M-1 unit. The County prepared an Environmental Impact Report (“EIR”), under the California Environmental Quality Act (“CEQA”),² to allegedly evaluate the above activities. The EIR, and these comments, refer to the proposed M-1 unit, substation, transmission line, and ancillary pipeline facilities together with the eventual decommissioning of the MP-I unit as the “Project” for the purpose of CEQA. It is unclear from the Planning Division Staff and County Counsel’s testimony at the October 11, 2012 Planning Commission Hearing whether the Plan Amendment is part of the Project. However, an amendment to a General Plan is a discretionary action subject to CEQA and the County is required to undertake environmental review of Plan Amendment 12-003(b) prior to approving the action.

The Project is located on private land owned by the Applicant within the Casa Diablo geothermal development complex, northeast of the intersection of Highway 395 and Route 203 and approximately two miles east of Mammoth Lakes in Mono County, California. The Project requires a conditional use permit from Mono County; variances from County land use regulations authorizing construction of a transmission line and construction within 100 feet of the exterior property line; and an Authority to Construct and Permit to Operate from the Great Basin Unified Air Pollution Control District. The Project also requires the County to amend the Mono County General Plan to authorize the Applicant to develop geothermal facilities within 500 feet of a watercourse within the Hot Creek Buffer Area.

Based upon our review of the EIR and the County’s responses to comments on the Revised Draft EIR (“RDEIR”) and the Second Revised Draft EIR (“RDEIR2”), we conclude that the County failed to comply with CEQA. We incorporate by reference our earlier comments on the Draft EIR,³ the RDEIR,⁴ the RDEIR2,⁵ and the Final EIR.⁶ Our comments⁷ and this letter constitute our reasons for this Appeal.

² Pub. Resources Code, §§ 21000 et seq.

³ Comments of California Unions for Reliable Energy on the Draft Environmental Impact Report for the Mammoth Pacific I Replacement Project, August 26, 2011.

⁴ Comments of California Unions for Reliable Energy on the Revised Draft Environmental Impact Report for the Mammoth Pacific I Replacement Project, March 26, 2012.

⁵ Comments of California Unions for Reliable Energy on the Second Revised Draft Environmental Impact Report for the Mammoth Pacific I Replacement Project, August 6, 2012.

⁶ Comments of California Unions for Reliable Energy on the Final Environmental Impact Report for the Mammoth Pacific I Replacement Project, October 10, 2012.

I. STATEMENT OF INTEREST

CURE has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for industry to expand in Mono County, and by making it less desirable for businesses to locate and people to live in the County, including the Project vicinity. Continued degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduces future employment opportunities. CURE's members live, work, recreate and raise their families in Mono County, including in and around Mammoth Lakes. Accordingly, CURE's members would be directly affected by the Project's adverse environmental impacts. CURE's members may also work on the Project itself. They will, therefore, be first in line to be exposed to any hazardous materials, air contaminants, and other health and safety hazards that exist onsite.

II. THE EIR FAILS TO INCLUDE AN ADEQUATE PROJECT DESCRIPTION

The EIR is inadequate because it fails to include a stable Project description. The courts have repeatedly held that "an accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient [CEQA document]." ⁸ Only through an accurate view of the project may affected outsiders and public decisionmakers balance the proposal's benefit against its environmental costs. ⁹ In particular, the EIR fails to consistently describe the proposed Plan Amendment, conclude whether the Plan Amendment is part of the Project, and analyze alternatives to the Plan Amendment in accordance with CEQA. ¹⁰ In July 2012, the County recirculated the Draft EIR for the second time to allow the public to comment on clarifying Plan Amendments proposed in the RDEIR2. ¹¹ The EIR now states that Plan Amendment is no longer required and that all references to the proposed Plan Amendment have been deleted from the EIR. ¹² The County's failure

⁷ As our earlier comments were previously submitted to the County and are part of the record that was before the Planning Commissions we do not resubmit them with this appeal.

⁸ *County of Inyo v. County of Los Angeles* (1977) 71 Cal.App.3d 185, 193.

⁹ *Id.* at 192-193.

¹⁰ See CURE's Comments on RDEIR2, August 6, 2012.

¹¹ See RDEIR2, at p. 29.

¹² FEIR, Response to Comment 12-03.

to consistently describe the Project throughout the environmental review process inhibits public participation and informed decisionmaking and violates CEQA.

III. THE EIR VIOLATES CEQA'S PROHIBITION ON PIECEMEALED REVIEW

CEQA mandates "that environmental considerations do not become submerged by chopping a large project into many little ones – each with a minimal potential impact on the environment – which cumulatively may have disastrous consequences."¹³ CEQA prohibits such a "piecemeal" approach and requires review of a Project's impacts as a whole.¹⁴ Accordingly, a public agency may not segment a large project into two or more smaller projects in order to mask serious environmental consequences. Here, the EIR fails to consider the entire Project by failing to analyze the Applicant's separately proposed Casa Diablo IV unit together with this Project in one EIR. This approach violates CEQA.

The *Arviv Enterprises v. South Valley Area Planning Commission* ("Arviv") case is directly on point here.¹⁵ In *Arviv*, the Court found that a housing developer's plan to divide a 21-home development into several smaller pieces – first 5 homes, then 2 homes, then 14 homes, each with successive mitigated negative declarations – violated CEQA. Concluding that the applicant had improperly described the project, the Court held that a single EIR was required to analyze and mitigate the effects of the entire 21-home development. The court explained that:

the significance of an accurate project description is manifest, where, as here, cumulative environmental impacts may be disguised or minimized by filing numerous, serial applications.¹⁶

Similarly here, the County's environmental document fails to consider the Applicant's entire plan of development and expansion for the Casa Diablo geothermal complex.

The instant Project and the concurrently proposed, but separately evaluated, Casa Diablo IV project are just another component of the ongoing, iterative

¹³ *Bozung v. Local Agency Formation Commission* (1975) 13 Cal.3d 263, 283-84; *City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1452.

¹⁴ CEQA Guidelines, § 15378, subd. (a); *Burbank-Glendale-Pasadena Airport Authority v. Hensler* (1991) 233 Cal.App.3d 577, 592.

¹⁵ *Arviv Enterprises v. South Valley Area Planning Commission* (2002) 101 Cal.App.4th 1333, 1346.

¹⁶ *Id.*

expansion of the Casa Diablo geothermal complex. In 1986, just one year after the MP-I facility commenced operation, Mammoth Pacific L.P. (“MPLP”)¹⁷ sought to develop three additional generating facilities – the 15 MW MP-II unit, the 15 MW MP-III unit, and the 15 MW PLES-I unit – totaling 45 MW in gross generating capacity adjacent to the MP-I unit. MPLP sought County authorization to develop the MP-II and MP-III units, and separately filed an application to develop the PLES-I project with the U.S. Bureau of Land Management (“BLM”). The MP-III facility was not developed as initially proposed; however, the MP-II and PLES-I facilities both commenced operation in 1990. Notably, the PLES-I unit was approved in the midst of significant controversy regarding the unit’s potential impacts to surface hydrothermal features in the Casa Diablo area and its vicinity and the unit’s potential impacts to the Hot Creek Hatchery and the Hot Creek Gorge.¹⁸

In 2005, MPLP sought and received local and federal approval to construct the 3-mile Basalt Canyon Pipeline to carry hot geothermal fluid from a new geothermal field in the Inyo National Forest to the MP-I and MP-II units. The Basalt Canyon Pipeline Project was undertaken by MPLP because the temperature of the geothermal resource at the MP-I and MP-II well field dropped so significantly that the well field could not sustain power generation needs.¹⁹ The Applicant and current owner of MPLP, Ormat, presently holds authorizations for additional exploratory drilling activities in the vicinity of the Casa Diablo geothermal complex.²⁰

Continuing with this trend of creeping development, the Applicant now seeks to double the generating capacity of the existing complex through the instant approval and the separate federal approval of the proposed 33 MW Casa Diablo IV

¹⁷ MPLP was acquired by Ormat in 2010.

¹⁸ The Sierra Club and the California Department of Fish and Game appealed BLM’s decision to conduct limited environmental review of the project, causing BLM to prepare an Environmental Impact Statement pursuant to NEPA and to establish a detailed monitoring system to limit and avoid impacts to geothermal resources and related impacts to critical habitat for the federally-endangered Owens tui chub. PLES-I EIS/SEIR, pp. 1-2-1-3; *see also* Resolution 86-16, A Resolution of the Planning Commission of the County of Mono Urging the Bureau of Land Management to Prepare an Environmental Impact Statement for the Proposed Geothermal Expansion at Casa Diablo.

¹⁹ Basalt Canyon Pipeline Project DEIR, p. 1-2 (“Pipeline DEIR”).

²⁰ In 2002 and 2005, the Applicant received approvals for additional geothermal exploration projects in the vicinity of the Casa Diablo geothermal complex. Pipeline DEIR, p. 1-5.

facility.²¹ The Project and the Casa Diablo IV project are clearly related to each other and, therefore, should have been analyzed as one project in a single EIR.²² As acknowledged in the RDEIR and the EIR, the Project and the Casa Diablo IV project are owned and will be operated by the same entity, share a common geothermal well field and will be operated out of a common control room located on the existing MP-I project.²³ The County's failure to analyze the Casa Diablo IV project together with the Project violates CEQA's prohibition on piecemealed review. The contentions in the EIR that the Project and the Casa Diablo IV are separate and independent projects – as demonstrated, for example, by the Applicant's intent to enter into separate power purchase agreements for the capacity generated by these facilities – is flawed and simply not credible.

The impacts of a larger project “may be disguised or minimized by filing numerous, serial applications;” what is relevant is the developer's actual intent.²⁴ In *Tuolumne County Citizens for Responsible Growth, Inc. v. City of Sonora*,²⁵ the court articulated “general principles” for determining whether two actions are one CEQA project, including “how closely related the acts are to the overall objective of the project,” and how closely related they are in time, physical location, and the entity undertaking the action.²⁶ The court rejected arguments that a shopping center and nearby road alignment were “separate and independent” projects, and held that (1) separate approvals do not sever the connections between two activities; (2) the broad definition of a CEQA “project” extends beyond situations where a future activity is “necessitated by” an earlier one (noting that when actions “actually will be taken,” the appropriate inquiry is whether they are related to one another, i.e. they comprise the “whole of an action” or “coordinated endeavor”); and (3) the applicable standard is not always whether two actions “could be implemented independently of each other.”²⁷

Here, the Casa Diablo IV project and the instant Project are concurrently evaluated by local permitting authorities,²⁸ would be located 0.25 miles from the

²¹ See Ormat Technologies, Inc., Form 10-k, December 31, 2011, item 1 Business, available at http://www.sec.gov/Archives/edgar/data/1296445/000119312512089532/d261816d10k.htm#tx261816_1.

²² *Plan for Arcadia v. City Council of Arcadia* (1974) 42 Cal.App.3d 712, 723, 726.

²³ See, e.g., RDEIR, p. 5-7.

²⁴ *Arviv*, supra, 101 Cal.App.4th 1333 at 1336-1337, 1343, 1344, 1346.

²⁵ (2007) 155 Cal.App.4th 1214.

²⁶ *Id.* at 1226-1227.

²⁷ *Id.* at 1228-1230 (citing CEQA Guidelines § 15378(c) and analyzing *Sierra Club v. W. Side Irr. Dist.* (2005) 128 Cal.App.4th 690, 698-700).

²⁸ In the case of Casa Diablo IV, the Great Basin Unified Air District is the CEQA lead agency. 2620-023ev

existing MP-I plant site,²⁹ and are proposed by one entity: Ormat. Ormat's plans for selling the capacity have no bearing on the County's requirement to analyze the whole of the project under CEQA. What is relevant, is that Ormat intends to exploit the geothermal resource at Casa Diablo to the full possible extent. The County must prepare a revised EIR that evaluates the Project's impacts together with those of the Casa Diablo IV project.

IV. THE EIR FAILS TO DISCLOSE THE ENVIRONMENTAL SETTING

The EIR employs an inaccurate and incomplete baseline, thereby skewing the impact analysis. An accurate description of the environmental setting is important because it establishes the baseline physical conditions against which a lead agency can determine whether an impact is significant. The failure to adequately describe the existing setting contravenes the fundamental purpose of the environmental review process, which is to determine whether there is a potentially substantial, adverse change, compared to the existing setting. CEQA requires the lead agency to include a description of the physical environmental conditions in the vicinity of a project as they exist at the time environmental review commences. The EIR must also describe the existing environmental setting in sufficient detail to enable a proper analysis of project impacts. The RDEIR fails on both accounts. CEQA requires the County to gather and disclose the relevant data in a revised DEIR.

A. The EIR Fails to Include Baseline Data on the Federally Endangered Owens Tui Chub

On August 5, 1985, the U.S. Fish and Wildlife Service ("FWS") listed the Owens tui chub as an endangered species under the Federal Endangered Species Act.³⁰ The Owens tui chub historically inhabited streams, rivers, springs and irrigation ditches in the Owens Basin, in Mono and Inyo Counties.³¹ Finding that the Owens tui chub had been extirpated from much of its range – viable populations are known only in two locations in Mono County –, the FWS designated a portion of

²⁹ FEIR, at p. 5-4.

³⁰ U.S. Fish and Wildlife Service, Department of the Interior, *Endangered and Threatened Wildlife and Plants; Endangered Status and Critical Habitat Designated for the Owens Tui Chub* Final Rule, 50 Fed. Reg., 31,592, August 5, 1985.

³¹ *Ibid.*

October 18, 2012

Page 8

Hot Creek as critical habitat for the Owens tui chub.³² Hot Creek is located approximately 0.6 miles from the Project site.³³

A prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process.³⁴ An EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project.³⁵ The EIR is inadequate because it fails to disclose information necessary to evaluate the significance of the Project's impacts on the Owens tui chub and its habitat. The EIR does not reflect any efforts on the part of the County to interpret recent biological monitoring data and disclose that information to the public and decisionmakers.

Substantial evidence shows that ongoing geothermal extraction resulted in thermal spring discharge decreases.³⁶ A study conducted in 2000 concludes that at the Hot Creek Hatchery, the thermal water component in the springs declined by 30-40% since 1990.³⁷ Because a hydrological connection exists between the Casa Diablo geothermal complex and Owens tui chub critical habitat and because the Applicant proposes to extend power production activities by replacing the aging MP-I unit, the EIR should have included baseline data regarding the Owens tui chub. The EIR omits this information.

As described in the comments of biology expert Scott Cashen, M.S., studies conducted by the USGS indicate the decline in the thermal water component and other surficial changes in the vicinity of Casa Diablo are due to geothermal development.³⁸ Further, the area of impact from geothermal development includes the known habitat of the Owens tui chub.³⁹ The EIR fails to identify these critical facts. Although the County provided hydrologic monitoring data approximately one year after the County first released the EIR for public review, the data provided is not interpreted in the EIR and does not assist the public or decisionmakers because

³² *Id.* at 31,594.

³³ RDEIR, p. 4-123.

³⁴ *Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners* (1993) 18 Cal.App.4th 729, 748.

³⁵ *Association of Irrigated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1390.

³⁶ CURE Comments, August 26, 2011, Exhibit B, p.6.

³⁷ *Ibid.*

³⁸ Scott Cashen Comments on the Environmental Impact Report for the Mammoth Pacific I Replacement Project, October 18, 2012, at pp. 1-2 (**Attachment 1**).

³⁹ *See id.* at p. 2.

it is inconclusive with respect to impacts on the chub. As described by Scott Cashen, the data provide limited value in disclosing existing conditions because the data lack statistical analysis or interpretation of the monitoring results.⁴⁰ The County must include baseline data on both the endangered Owens tui chub and its habitat in a revised DEIR. Absent this information, the public and decisionmakers cannot consider the Project in its full environmental context.

Finally, the EIR's constant refrain that the Project "would not result in any changes to the geothermal wellfield" is irrelevant for the purpose of establishing the existing environmental setting.⁴¹ The County is required to disclose the physical environmental conditions in the vicinity of the Project, as they exist at the time of the notice of preparation is published at the time environmental analysis is commenced.⁴² It is well established that the baseline environmental setting for CEQA review is the existing environment; not the environmental setting that could exist under existing entitlements and not a hypothetical environmental setting that might possibly exist in the future.⁴³ The EIR fails to identify the existing rate of geothermal extraction, precluding the County and the public from evaluating the Project's impacts on the Owens tui chub and its habitat.⁴⁴

While the maximum physical pumping capacity of the existing Casa Diablo complex may be approximately 6,900,000 pounds per hour, the EIR fails to establish that MP-I is actually operating at its maximum physical pumping capacity.⁴⁵ The record points to the opposite conclusion. Power production at MP-I averaged less than 50% of capacity between 2007 and 2010.⁴⁶ According to the EIR, absent the Project, the Applicant would not be able to ensure continuous power generation from MP-I⁴⁷ and the principle reason for the Project is to replace the aging, leak-prone MP-I unit, whose condensing capacity has been severely restricted due to

⁴⁰ *Id.* at p. 3.

⁴¹ *See e. g.*, FEIR Response to Comment 9-10.

⁴² *See* CEQA Guidelines, § 15125 subd. (a).

⁴³ *CBE v. SCAQMD* (2010) 48 Cal.4th 310, 321-322, 322, n. 6-7.

⁴⁴ *See* CEQA Guidelines § 15125 subd. (a) ("[the existing physical environmental conditions] will normally constitute the baseline a physical conditions by which a lead agency determines whether an impact is significant").

⁴⁵ Cashen Comments, October 18, 2012, at p. 3; *see also* CURE Comments on RDEIR, March 26, 2012, Exhibit B.

⁴⁶ *Id.* at p. 3.

⁴⁷ FEIR, at p. 2-34.

the need to plug damaged condenser tubes, with the new, modern and more efficient M-1 unit.⁴⁸

The above information strongly suggests that the Project will increase power production activities and the rate of extraction as compared to existing conditions. As described by Scott Cashen, any incremental increase in pumping over the existing setting due to the Project has the potential to exacerbate changes to Owens tui chub by causing further declines in the thermal water component and, thus, significantly impact the Owens tui chub and its habitat.⁴⁹ The County failed to identify the existing conditions and to evaluate the significance of increased power production activities on the Owens tui chub in the EIR. These omissions are fatal. The County is required to provide baseline data on the Owens tui chub, and analyze the Project's impacts, as compared to existing conditions, in a revised DEIR.

B. The EIR Fails to Identify the Environmental Setting and Baseline for Air Quality Resources

The baseline environmental setting for CEQA review is the existing environment; not the environmental setting that could exist under existing entitlements and not a hypothetical environmental setting that might possibly exist in the future.⁵⁰ The EIR fails to identify the existing emissions from the MP-I Unit and erroneously concludes that the Project would reduce operational emissions of volatile organic compounds ("VOCs"), an on ozone precursor and a regulated air contaminant, as compared to existing conditions.

In particular, the FEIR states:

The operating rate of the respective plants [MP-I and M-1] during the transition period is limited by the geothermal fluid provided to each plant, and the maximum geothermal fluid available to Casa Diablo is fixed to the existing maximum geothermal fluid pumping capacity of the wellfield (6,900,000 pounds per hour). This physical pumping limit would not change with the MP-I Replacement Project (RDEIR page 2-17), and the geothermal fluid flow rates to the respective facilities would be inversely proportional. As such when geothermal fluid flow to the M-1 plant increases the geothermal fluid flow to MP-I plant

⁴⁸ *Id.* at p. 4-132.

⁴⁹ Cashen Comments, October 18, 2012 at p. 3.

⁵⁰ *CBE v. SCAQMD* (2010) 48 Cal.4th 310, 321-322, 322, n. 6-7.
2620-023cv

must decrease proportionally. Similarly, the combined emission of isobutane and n-pentane occurring while both plants are operating at reduced capacities would be proportional to the respective fraction that each plant is operating. Motive fluid emissions would range from about 500 pounds per day (when only the MP-I plant is operating) to zero emissions of isobutane and about 205 pounds per day of n-pentane (when only the M-1 plant is operating). In general, when the MP-I plant is operating at a higher capacity than the M-1 plant must be operating at a proportionally lower capacity and vice versa. Thus, at any time the M-1 plant is operating during the transition period there would be a reduction in the total emissions of motive fluid from the MP-I plant.⁵¹

The analysis in the EIR is in error. First, as reviewed above, the County is required to determine baseline emissions with reference to existing conditions. The EIR fails to include the required analysis. As described by technical expert Dr. Petra Pless, the condensing capacity of the aging leak-prone MP-I plant has been severely restricted due to the need to plug damaged condenser tubes, such that MP-I is operating at far less than its design capacity.⁵² Accordingly, the operational VOC emissions from the existing MP-I plant – estimated in the EIR to be emitted at a rate of 500 pounds per day (“lbs/day”) – mostly likely reflect these low capacity factors and the corresponding reduced pumping of geothermal fluid from the wellfield.⁵³ As further described by Dr. Pless, and contrary to the EIR, the proposed M-1 unit can be operated without reducing existing operations and the associated rate of VOC emissions, from the MP-I facility.⁵⁴

Second, the County is required to assess the significance of Project’s impacts with reference to existing conditions.⁵⁵ In particular, and because the addition of the M-1 unit could increase power production to the maximum capacity at the Casa Diablo complex, the County was required to add the estimated daily VOC emissions from the proposed M-1 (i.e. 205 lbs/day) unit to the estimated daily VOC operational emissions from the MP-I unit (i.e. 500 lbs/day) in order to evaluate Project impacts. Again, the EIR fails to include the required analysis. Contrary to the EIR, the Project would increase, not reduce, daily emissions of VOCs. As described by Dr.

⁵¹ FEIR, Response to Comment 9D-06, p. 40.

⁵² Comments of Petra Pless, October 17, 2012, p. 10 (Attachment 2).

⁵³ *Id.* at p. 11.

⁵⁴ *Ibid.*

⁵⁵ See CEQA Guidelines § 15125 subd. (a).

Pless, the contemporaneous operation of the existing MP-I plant and the Project would result in increased emissions of VOCs, which as ozone precursors would contribute to the region's non-attainment status of this pollutant.⁵⁶ The County is required to provide a corrected analysis in a revised DEIR.

V. THE EIR FAILS TO IDENTIFY AND ADDRESS THE PROJECT'S POTENTIALLY SIGNIFICANT IMPACTS

CEQA has two basic purposes, neither of which the EIR satisfies. First, CEQA is designed to inform decision-makers and the public about the potential, significant environmental effects of a project.⁵⁷ CEQA requires that an agency analyze potentially significant environmental impacts in an EIR.⁵⁸ The EIR should not rely on scientifically outdated information to assess the significance of impacts. The EIR's evaluation of impacts should be based on "extensive research and information gathering," including consultation with state and federal agencies, local officials, and the interested public.⁵⁹ To be adequate, the EIR should demonstrate the lead agency's good faith effort at full disclosure.⁶⁰ Its purpose is to inform the public and responsible officials of the environmental consequences of their decisions *before* they are made. For this reason, the EIR has been described as "an environmental 'alarm bell' whose purpose is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."⁶¹ Thus, the EIR protects not only the environment but also informed self-government."⁶²

Second, CEQA directs public agencies to avoid or reduce environmental damage when possible by requiring alternatives or mitigation measures.⁶³ The EIR serves to provide public agencies, and the public in general, with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly

⁵⁶ Pless Comments, October 17, 2012, at p. 11.

⁵⁷ Cal. Code Regs., tit. 14, § 15002, subd. (a)(1) (hereafter "CEQA Guidelines").

⁵⁸ See Pub. Resources Code, § 21000; CEQA Guidelines, § 15002.

⁵⁹ *Berkeley Keep Jets Over the Bay Comm. v. Board of Port Comm.* (2001) 91 Cal. App.4th 1344, 1367 and *Schaeffer Land Trust v. San Jose City Council* (1989) 215 Cal.App.3d 612, 620.

⁶⁰ CEQA Guidelines, § 15151; see also *Laurel Heights I* (1998) 47 Cal.3d 376, 406.

⁶¹ *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.

⁶² *Citizens of Goleta Valley v. Bd. of Supervisors* (1990) 52 Cal.3d 553, 564 (citations omitted).

⁶³ CEQA Guidelines, § 15002(a)(2)-(3); *Berkeley Keep Jets Over the Bay Comm.*, 91 Cal.App.4th at 1354.

reduced.”⁶⁴ If a project has a significant effect on the environment, the agency may approve the project only upon a finding that it has “eliminated or substantially lessened all significant effects on the environment where feasible,” and that any unavoidable significant effects on the environment are “acceptable due to overriding concerns” specified in CEQA section 21081.⁶⁵

The EIR fails to satisfy these basic purposes of CEQA. Although the record is replete with evidence regarding the Project’s unaddressed potentially significant impacts on air quality and biological resources, the EIR fails to identify and address these impacts. In particular, the Project will result in significant, unmitigated emissions of regulated pollutants, and potentially significant impacts on the endangered Owens tui chub, and biological resources and wildlife within the Project vicinity. We address several of these issues below, and incorporate by reference our prior comments.

A. The EIR Fails to Identify and Address the Project’s Significant Impacts on Air Quality

We previously commented that the Project would result in potentially significant impacts because the Project’s rate of operational emissions of VOCs, an ozone precursor, exceeds CEQA significance thresholds.⁶⁶ Further, we commented that the Project’s emissions would be significant during all operational phases of the Project – i.e. the two years of simultaneous operation of the MP-I and M-1 facilities, as well as the expected remaining 30-year lifespan of the new M-1 facility after the MP-I facility is decommissioned.⁶⁷ In response to comments, the County maintains that Project emissions are insignificant because the cited CEQA threshold of 55 lbs per day does not apply to this Project. The County’s reasoning is unsound. Because the County is in nonattainment of state ambient air quality standards for ozone, any increase in emissions can be deemed significant. However, as demonstrated by Dr. Pless, the Project’s emissions also exceed the more lenient significant threshold of 250 lbs/day relied on by the County in the EIR.

In comments to the Planning Commission during the October 11th hearing, we explained that the EIR underestimates Project operational emissions of ozone precursors. In particular, the estimates provided in the EIR fail to include

⁶⁴ CEQA Guidelines, § 15002 subd. (a)(2).

⁶⁵ CEQA Guidelines, § 15092, subd. (b)(2)(A)-(B).

⁶⁶ *See, e.g.*, FEIR, Comment 9-14, 9D-09, 9-23, 9-24.

⁶⁷ *Ibid.*

emissions from the M-1 plant's pressure relief valves, and are otherwise unreliable.⁶⁸ When accounting for fugitive emissions of ozone precursors from all Project components, Dr. Pless estimates that the Project operational VOC emissions could range from 256 lbs/day to 291.6 lbs/day, considerably in excess of the significant threshold relied upon by the County.⁶⁹ Dr. Pless concludes, in reliance on the County's preferred significance threshold of 250 lbs/day, that Project emissions are potentially significant.⁷⁰ The EIR fails to identify this significant impact or to propose mitigation to reduce Project emissions to a less than significant level. The County is required to address the Project's air quality impacts in a revised DEIR.

B. The EIR's Conclusions Regarding Projects Impacts on the Owens Tui Chub Are Unsupported

The RDEIR states that "there have been historic concerns that cumulative geothermal development in Long Valley may directly affect the subsurface hydrology associated with these springs." The RDEIR acknowledges that continued geothermal fluid production may result in potentially significant impacts to the federally endangered Owens tui chub:

the Owens tui chub and the designated critical aquatic habitat supported by these springs has the potential to be affected by changes in spring flow rate, temperature, or chemistry that could potentially result from changes to groundwater production, long-term geothermal fluid production or other factors

The EIR then dismisses the potential for a significant impact, relying on the assumption the Project would not change the existing rate of geothermal production or injection at the Casa Diablo complex and that the Project impacts would be mitigated pursuant to the County's biological and hydrological monitoring programs. The County's conclusions are invalid because they are unsupported.

First, as described above and contrary to the County, the Project would increase the rate of geothermal production and injection because the existing MP-I plant is operating significantly below maximum capacity and the proposed M-1 unit would increase production above existing conditions at the Casa Diablo complex.

⁶⁸ See Pless Comments, October 17, 2012, at pp. 5-7.

⁶⁹ *Id.* at p. 6-9.

⁷⁰ *Ibid.*

Second, the County lacks substantial evidence to support the conclusion that the monitoring program has prevented changes to the thermal component in Hot Creek and the Hot Creek Fish Hatchery and, consequently, modifications to Owens tui chub habitat. To the contrary, substantial evidence shows that changes have occurred to the resource even after the monitoring program was adopted by the County. As described by Scott Cashen there has been a significant decline in Owens tui chub populations in the Hot Creek Headsprings since 1988, the thermal water component in the springs has declined by 30-40% since 1990, and water level declines have been associated with increased power production activities.⁷¹

Substantial evidence shows that the Project may result in potentially significant, unmitigated impacts to the Owens tui chub.⁷² The Project will increase the existing rate of power production and will extend power production activities by extending the operational life of the MP-I unit through the construction of the M-1 plant. As shown by Scott Cashen, extending the duration of resource extraction could also lead to a further reduction in the thermal water component within Owen tui chub habitat.⁷³ The County is required to address the Project's potentially significant impacts to the Owens tui chub in a revised DEIR.

C. The EIR Fails to Address the Project's Potentially Significant Impacts on Biological Resources

An EIR must identify and focus on the possible significant environmental impacts of a proposed project.⁷⁴ In 2006, the USGS began collecting data on tree kills. As demonstrated by Scott Cashen in his comments on the RDEIR, there is little doubt that tree kills and vegetation depletion are linked to geothermal power production activities and this effect is documented at the Casa Diablo geothermal complex.⁷⁵ The EIR fails to consider the Project's potentially significant impacts on vegetation depletion. In particular, the EIR fails to consider the impacts on vegetation depletion, and species that depend on the habitat in the Project vicinity, due to continuing power production activities once the MP-I unit is decommissioned. Substantial evidence shows that extending the duration of resource extraction is potentially significant because it could perpetuate tree-kills and have an impact on

⁷¹ Cashen Comments, October 18, 2012, pp. 1-4; *see also* CURE Comments on DEIR, August 26, 2011, Exhibit B.

⁷² Cashen Comments, October 18, 2012, pp. 1-4; *see also* CURE Comments on DEIR, August 26, 2011, Exhibit B; *see also* Cashen Comments, October 18, 2012, pp. 4-5.

⁷³ Cashen Comments, October 18, 2012, at p. 5.

species that depend on trees for habitat.⁷⁶ The County is required to address this Project impact in a revised DEIR.

D. The EIR's Conclusions Regarding Projects Impacts on Hydrological Resources Are Unsupported

We previously commented that the conclusion in the EIR that Project impacts to hydrological resources are insignificant lacks basis and is invalid under CEQA. In particular, the EIR assumes that because the M-1 project consists of a closed loop geothermal system, the cold geothermal fluid would be returned to the geothermal reservoir via the geothermal injection wells, essentially replacing the produced hot geothermal fluid circulated through the binary power plant facilities. Substantial evidence in the record contradicts this assumption. In particular, record evidence shows that less than 10% of the fluid injected at Casa Diablo moves into the production zone and that most flows away from the wellfield within the injection reservoir.⁷⁷ The County fails to address the impacts associated with increasing power production activities with the construction of the M-1 replacement plant.⁷⁸ Finally, the conclusion in the EIR that the County's hydrologic monitoring program will prevent potentially significant impacts to hydrological resources from power production activities is contradicted by the record. As demonstrated by technical expert Matthew Hagemann P.G. C. Hg, the monitoring program is insufficient as a preventative measure because it fails to include quantitative significance thresholds and is, therefore, unenforceable.⁷⁹

Contrary to the County, evidence submitted by CURE demonstrates that changes have occurred in the hydrological system at Casa Diablo, and that the Project may further exacerbate the degradation of geothermal resource through

⁷⁴ Pub. Resources Code, § 21100 subd. (b)(1); CEQA Guidelines, § 15126, subd. (a).

⁷⁵ CURE Comments on RDEIR, March 26, 2012, Exhibit A; *see also* CURE's Comments on RDEIR, March 26, 2012, pp. 17-18.

⁷⁶ Scott Cashen Comments, October 18, 2012, p. 5.

⁷⁷ CURE DEIR Comments, August 26, 2011, Exhibit C, at p. 4.

⁷⁸ *See* FEIR, Response to Comments 9-17, 9A-17, 9-19.

⁷⁹ Matthew Hagemann Comments, October 18, 2012 (**Attachment C**); *see also* discussion of monitoring program and how it is invalid as a matter of law in CURE's comments on the FEIR. *See* CURE Comments on the FEIR, October 10, 2012, pp. 6-7.

increased and extended power production activities.⁸⁰ The County is required to address these potentially significant impacts in a revised DEIR.

VI. THE COUNTY FAILED TO RESPOND TO COMMENTS ON THE EIR

“The evaluation and response to public comments is an essential part of the CEQA process.”⁸¹ CEQA requires the lead agency to evaluate and respond to all environmental comments it receives on draft EIRs within the public review period.⁸² The lead agency’s written responses must specifically explain its reasons for rejecting suggestions received in comments. “There must be a good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice.”⁸³

The EIR fails to respond to several environmental comments, including but not limited to the following:

1. The existing environmental baseline for geothermal resource extraction and reinjection and the Project’s incremental impact on that regime due to the replacement of the aging MP-I facility;⁸⁴
2. The potentially significant impact to biological resources and special status species resulting from extending the operational life of the aging MP-I project by 30 years through the construction of the replacement M-1 facility;⁸⁵
3. The County’s failure to disclose a potentially significant impact to biological resources resulting from the Project’s conflict with the Mono County General Plan;⁸⁶
4. The potentially significant impact to biological resources through vegetation depletion and “tree kills” due to the Project’s

⁸⁰ See CURE Comments on the DEIR, August 26, 2011; CURE Comments on the RDEIR, March 26, 2012.

⁸¹ CEQA Guidelines § 15088.

⁸² See Pub. Resources Code § 21091 subd. (d)(2)(A).

⁸³ CEQA Guidelines § 15088 subd. (c).

⁸⁴ See FEIR, Comment and Response 9-12; see also *id.* at Comments and Responses 9B-01, 9-16.

⁸⁵ See FEIR, Comment and Response 9-10.

⁸⁶ See FEIR, Comment and Response 9-13.

extending the operational life of the aging MP-I project by 30 years with the construction of the replacement M-1 facility;⁸⁷

5. The County's failure to disclose the goals of applicable deer management plans to enable the public to evaluate potential conflicts with Mono County General Plan;⁸⁸ and
6. Comments regarding the potentially significant impacts to geothermal resources, including continual depletion of the resource, through prospective power production activities.⁸⁹

The County violated CEQA by failing to respond to these comments.

VII. CEQA REQUIRES THE COUNTY TO RECIRCULATE THE EIR

A lead agency is required to recirculate an EIR when "significant new information" is added to the EIR after public notice is given of the availability of the DEIR, but before certification.⁹⁰ The CEQA Guidelines define "significant new information" as changes in the project or environmental settings, as well as additional data or other information that deprives the public of a meaningful opportunity to comment on significant impacts or feasible mitigation measures.⁹¹ Specifically, "significant new information" includes: a new significant environmental impact resulting from the project or from a new mitigation measure proposed to be implemented; a substantial increase in the severity of an environmental impact unless mitigation measures are adopted that reduce the impact to a level of insignificance; and a feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.⁹² Recirculation is also appropriate if the draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment was precluded.⁹³

⁸⁷ See FEIR, Comments and Responses 9-17, 9A-17.

⁸⁸ See FEIR, Comment and Response, 9A-11.

⁸⁹ See FEIR, Comment and Response 9-19.

⁹⁰ Pub. Resources Code, § 21092.1; Cal. Code Regs. tit. 14, § 15088.5 ("CEQA Guidelines").

⁹¹ CEQA Guidelines, § 15088.5, subd. (a).

⁹² CEQA Guidelines, § 15088.5, subd. (a); see also *Laurel Heights Improvement Assn. v. Regents of Univ. of Cal.* (1993) 6 Cal.4th 1112, 1129.

⁹³ *Ibid.*

The failure to recirculate an EIR after significant new information has been added turns the process of environmental evaluation into a “useless ritual” which could jeopardize “responsible decision-making.”⁹⁴ One of the purposes of CEQA is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR protects not only the environment but also informed self-government.”⁹⁵ Both, the opportunity to comment and the preparation of written responses to those comments are crucial parts of the EIR process. In this case, recirculation is required because the FEIR, for the first time, expressly identifies a potentially significant impact to mule deer.⁹⁶ This admission was made more than one year after the County first released the EIR for public review. The identification of a new potentially significant impact on mule deer is “significant new information” requiring recirculation of the EIR. Now that the County concedes that impacts to mule deer are potentially significant, further analysis is required to ensure that the mitigation measures proposed in the FEIR will reduce impacts to a less than significant level.

VIII. ACTIONS REQUESTED

We request that the Board uphold the appeal, vacate the Planning Commission’s October 11th approvals and stay a decision on the Conditional Use Permit Application No. 12-004 until the County complies with CEQA. We further request that the Board direct the Planning Division to revise and re-circulate the EIR, consistent with this appeal letter, prior to any action approving the Project. In this way, the County can ensure that it is acting in accordance with state law and that the Project’s adverse impacts are disclosed and mitigated to the fullest extent feasible as required by CEQA.

Thank you for your consideration of this appeal.

Sincerely,



Elizabeth Klebaner

⁹⁴ *Sutter Sensible Planning v. Sutter County Bd.* (1981) 122 Cal.App.3d 813, 822.

⁹⁵ *Citizens of Goleta Valley v. Bd. of Supervisors* (1990) 52 Cal.3d 553, 564 (citations omitted).

⁹⁶ See FEIR, Response 9-25 *cf.* RDEIR pp. 4-65-67.

October 18, 2012
Page 20

EK:clv
Attach.

Cc: Linda Roberts, Clerk of the Board of Supervisors, 74 School Street, Annex 1,
Bridgeport, CA 93517 (via overnight mail)

Attachment 1

Scott Cashen, M.S.—Independent Biological Resources and Forestry Consultant

October 18, 2012

Ms. Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Subject: Comments on the Environmental Impact Report for the Mammoth Pacific I Replacement Project

Dear Ms. Klebaner:

This letter contains my comments on the Final Environmental Impact Report (“FEIR”) prepared for Mammoth Pacific Limited Partnership’s (“Applicant”) proposed Mammoth Pacific I Replacement Project (“Project”). I submitted comment letters in response to the Draft Environmental Impact Report and the Revised Draft Environmental Impact Report (“RDEIR”) prepared by Mono County (“County”). These comment letters established my professional qualifications and described the actions I took to evaluate the DEIR, RDEIR, and the underlying analyses, and are incorporated by reference here.

Impacts to Critical Habitat for the Owens Tui Chub

The Owens tui chub (*Gila bicolor snyderi*) is a subspecies of fish that is listed as endangered under the state and federal Endangered Species Acts. It is known to occur at only six sites, one of which is the headwaters of Hot Creek above the Hot Creek Fish Hatchery. The Hot Creek Headsprings (or Headwaters) site consists of two springs, “AB Spring” and “CD Spring,” and it is one of two sites that have been designated as critical habitat for the subspecies. In designating critical habitat for the subspecies, the U.S. Fish and Wildlife (“USFWS”) identified activities that may adversely affect critical habitat for the Owens tui chub. These include “activities that decrease available water or cause a significant change in the physical or chemical properties (e.g., temperature, pH, or dissolved gases) of the water.”¹ Hydrologic monitoring data indicate the thermal water component in the Hot Creek Headsprings has declined by 30% to 40% since 1990.² The data also indicate there has been a decline in the volume of thermal water entering the Hot Creek Headsprings since the early 1990s.³

Studies conducted by the USGS indicate the decline in the thermal water component and other surficial changes in the vicinity of Casa Diablo are due to geothermal

¹ Department of the Interior, US Fish and Wildlife Service. 1985. Endangered and Threatened Wildlife and Plants; Endangered Status and Critical Habitat Designation for the Owens Tui Chub. Final rule. Federal Register 50(150): 31592-31597.

² Sorey ML. 2000. Geothermal Development and Changes in Surficial Features: Examples from the Western United States. Proceedings of the World Geothermal Congress 2000; Kyushu - Tohoku, Japan, May 28 - June 10, 2000. pp. 705-711. See also Second Revised DEIR, Appendix M.

³ Second Revised DEIR, Appendix M.

development.⁴ For example, those studies have reported the following:

1. “[t]he hydrologic monitoring program has detected changes in the hydrologic system caused by geothermal development and variations in precipitation and recharge (Howle and Farrar, 1997). For example, we have delineated decreases in thermal-spring discharge at sites within about 5 km to the east of Casa Diablo that are caused by subsurface pressure declines at the geothermal well field. No changes have as yet been detected in the springs in Hot Creek gorge. There has also been an increase in steam discharge at Casa Diablo and sites farther west due to increased boiling in the geothermal reservoir caused by geothermal production;”⁵
2. “[w]ater levels in geothermal well CW-3 (5 km east of Casa Diablo) show the effects of pressure reductions caused by the withdrawal of geothermal fluid at Casa Diablo; water levels declined significantly in 1991 when the production rate was increased to supply two new power plants. A similar water level decline has not yet occurred in geothermal observation well CH-10B, located 9 km east of Casa Diablo;”⁶
3. “[a]t the Hot Creek Fish Hatchery, chemical-flux measurements show that the thermal-water component in the springs has declined by some 30-40% since 1990;”⁷
4. “[t]he best-documented cases [of changes in surficial thermal features] are for the Casa Diablo area in Long Valley caldera, California and for Steamboat Springs, Nevada where hydrologic monitoring programs have delineated some combination of declines in thermal-water discharge, increases in fumarolic steam discharge, and subsidence.”⁸

The Hot Creek Headsprings are located less than four kilometers east of Casa Diablo (i.e., within the area that has exhibited surficial changes due to geothermal development). However, the EIR states “no substantive impacts on the Hot Creek headsprings supporting the Owens tui chub critical habitat could be attributed to the existing geothermal development.”⁹ The EIR does not define “substantive impact.” The County also has not provided hydrologic and biologic resource monitoring analyses that would enable me to assess whether the impacts attributable to geothermal development would

⁴ Sorey ML. 2000. Geothermal Development and Changes in Surficial Features: Examples from the Western United States. Proceedings of the World Geothermal Congress 2000; Kyushu - Tohoku, Japan, May 28 - June 10, 2000. pp. 705-711. *See also* US Geological Service. n.d. Long Valley Caldera Hydrologic Studies [internet]. Available at:

<http://pubs.usgs.gov/dds/dds-81/Intro/MonitoringData/Hydrologic/Hydro.html>.

⁵ USGS. N.d. Long Valley Caldera Hydrologic Studies [internet]. Available at: <http://pubs.usgs.gov/dds/dds-81/Intro/MonitoringData/Hydrologic/Hydro.html>.

⁶ *Ibid.*

⁷ Sorey ML. 2000. Geothermal Development and Changes in Surficial Features: Examples from the Western United States. Proceedings of the World Geothermal Congress 2000; Kyushu - Tohoku, Japan, May 28 - June 10, 2000. pp. 705-711.

⁸ *Ibid.*

⁹ RDEIR, p. 4-71.

be potentially significant to biological resources such as the Owens tui chub. For example, although the Second RDEIR included hydrologic monitoring data, these data were limited to graphs depicting the relationship between a dependent variable (e.g., water temperature) and independent variable (e.g., year). The graphs provide limited value in assessing potential impacts to biological resources without: (a) statistical analysis, and (b) analytical interpretation of the results.

For example, the graphs depict what appears to be a *statistically significant* drop in the thermal water component in the AB Spring and CD Spring beginning in 1993. In 1988, prior to the decrease in thermal water to the springs, the population estimate for Owens tui chub in the AB Spring was 334 ± 105 , and it was 523 ± 146 in the CD Spring.¹⁰ In 1999, after the decrease in thermal water, the population estimate for the AB Spring was 180 to 245, and no tui chub were detected in the CD Spring.¹¹ The EIR fails to analyze whether the apparent decline in the tui chub populations was related to (a) the corresponding drop in the thermal water component; or (b) other factors (e.g., predation). Thermal water entering the Hot Creek Headsprings has a different chemical composition than non-thermal water, and information provided by the USFWS suggests the chemicals present in the thermal water benefit the Owens tui chub.¹² Consequently, one can infer that the apparent decline in the Owens tui chub populations *could* be due to the decline in the thermal water component.

According to the EIR, the maximum physical pumping capacity for the Casa Diablo complex is approximately 6,900,000 pounds per hour.¹³ However, the EIR fails to establish whether the Casa Diablo complex is now operating at full capacity. Comments submitted in response to the RDEIR indicate power production at the existing MP-I facility averaged less than 50 percent of its capacity between 2007 and 2010.¹⁴ This suggests that: (a) pumping from the production wells has also been below capacity; and/or (b) pumping has been at capacity, but the existing MP-I facility has been incapable of producing power at its original capacity due to operational inefficiencies (e.g., degraded equipment). Any incremental increase in pumping due to the Project, as compared to existing conditions, has the potential to exacerbate changes to critical habitat for the Owens tui chub by causing further declines in the thermal water component.

Biologic and Hydrologic Monitoring

The County has indicated that the Project will be subject to the same hydrologic and biologic monitoring and remedial action program requirements as those that are required for MP-II and PLES-I. According to the RDEIR, “[t]he adoption of the prescribed hydrologic and biologic monitoring and mitigation measure program by the MP-I Project would reduce the potential adverse effects of the Project on the Owens tui chub critical

¹⁰ US Fish and Wildlife Service. 2009. Owens Tui Chub: 5-Year Review and Evaluation, Table 1.

¹¹ *Ibid.*

¹² U.S. Fish and Wildlife Service. 1998. Owens Basin Wetland and Aquatic Species Recovery Plan, Inyo and Mono Counties, California. Portland, Oregon, p. 92.

¹³ FEIR, Response to Comment 9-12.

¹⁴ RDEIR Comment 9-12 and 9B-1.

habitat [and Hot Creek Fish Hatchery] to below the level of significance.”¹⁵ This statement cannot be verified because the FEIR does not describe the current rate of power production, and the impacts that increasing production above current conditions would have on the Owens tui chub. In addition, the conclusion in the FEIR that impacts would be reduced to below the level of significance is contradicted by the fact that (a) the monitoring and mitigation referenced in the RDEIR was ineffective in reversing the decline of thermal water to the Hot Creek Headsprings that began in 1993; and (b) there appears to have been a significant decline in Owens tui chub populations in the Hot Creek Headsprings that may be due to the decline of thermal water.

Furthermore, the hydrologic and biologic monitoring and mitigation program required for MP-II and PLES-I may be inconsistent with USFWS Recovery Plan for the Owen tui chub. In particular, Recovery Task 2.4.2 is:

Protect spring discharge. Geothermal development and groundwater pumping in Long Valley may alter aquifer dynamics. **Springs supporting Hot Creek should be protected from adverse impacts of decreased discharge, and changes in the thermal and chemical characteristics of water.** Monitoring programs should be [designed to] determine characteristics (temporal, chemical, physical) of natural spring discharge, if spring discharge is being affected, and the location of activities causing adverse effects. Actions should be taken to protect discharge at 1998 levels.¹⁶

Based on my review, the hydrological and biological monitoring program has not ensured consistency with the Recovery Task (i.e., it has not prevented potential adverse impacts associated with changes in the thermal and chemical characteristics of water in AB Spring and CD Spring), or that actions are, have been or, or will be taken to protect discharge at 1998 levels.

Impacts Due to Increased Pumping and Project Lifespan

The principal reason for the M-1 Replacement Project is to replace the aging, leak-prone MP-I unit, whose condensing capacity has been severely restricted due to the need to plug damaged condenser tubes.¹⁷ According to the RDEIR, “[t]he aging MP-I power plant would be expected to continue to operate as long as repair and restoration of the facility remains economically practical, but the long-term continuing utilization of the MP-I project geothermal resources could be shortened due to eventual equipment failure.”¹⁸ The aforementioned information contradicts the statement in the FEIR that the existing MP-I Project would continue to operate *indefinitely* if the MP-I Replacement Project is not approved.¹⁹ It is reasonable to assume that the Project will extend the duration of geothermal resource extraction from the existing wellfield long after the MP-I unit’s operational life.

¹⁵ RDEIR, p. 12.

¹⁶ U.S. Fish and Wildlife Service. 1998. Owens Basin Wetland and Aquatic Species Recovery Plan, Inyo and Mono Counties, California. Portland, Oregon, p. 92. [emphasis added].

¹⁷ RDEIR, p. 4-131.

¹⁸ RDEIR, p. 2-32.

¹⁹ FEIR, p. 33.

Extending the duration of resource extraction could perpetuate tree-kills, as discussed in my earlier comments, and have an impact on sensitive species that depend on live trees for habitat. Extending the duration of resource extraction could also lead to a further reduction in the thermal water component within critical habitat for the Owens tui chub. Indeed, the RDEIR indicates *extended geothermal resource production and injection activities from the MP-I Project* could result in changes in the temperature, flow rate or quality of the Hot Creek headsprings, and that these changes could be a potentially significant impact under CEQA.²⁰ The EIR fails to address these potentially significant impacts.

The FEIR does not provide a mitigation and monitoring program for tree-kills that may be influenced by the Project. In addition, it is my professional opinion that the hydrologic and biologic monitoring and remedial action program imposed by the County currently lacks the ability to ensure that the Project would not have a significant impact to critical habitat for the Owens tui chub in the Hot Creek Headsprings.

Sincerely,



Scott Cashen, M.S.
Senior Biologist

²⁰ RDEIR, p. 4-135.

Scott Cashen, M.S.

Senior Biologist / Forest Ecologist

3264 Hudson Avenue, Walnut Creek, CA 94597. (925) 256-9185. scottcashen@gmail.com

Scott Cashen has 20 years of professional experience in natural resources management. During that time he has worked as a field biologist, forester, environmental consultant, and instructor of Wildlife Management. Mr. Cashen currently operates an independent consulting business that focuses on CEQA/NEPA compliance issues, endangered species, scientific field studies, and other topics that require a high level of scientific expertise.

Mr. Cashen has knowledge and experience with many taxa, biological resource issues, and environmental regulations. This knowledge and experience has made him a highly sought after biological resources expert. To date, he has been retained as a biological resources expert for over 40 projects. Mr. Cashen's role in this capacity has encompassed all stages of the environmental review process, from initial document review through litigation support and expert witness testimony.

Mr. Cashen is a recognized expert on the environmental impacts of renewable energy development. He has been involved in the environmental review process for 28 renewable energy projects, and he has been a biological resources expert for more of California's solar energy projects than any other private consultant. In 2010, Mr. Cashen testified on 5 of the Department of the Interior's "Top 6 Fast-tracked Solar Projects" and his testimony influenced the outcome of each of these projects.

Mr. Cashen is a versatile scientist capable of addressing numerous aspects of natural resource management simultaneously. Because of Mr. Cashen's expertise in both forestry and biology, Calfire had him prepare the biological resource assessments for all of its fuels treatment projects in Riverside and San Diego Counties following the 2003 Cedar Fire. Mr. Cashen has led field studies on several special-status species, including plants, fish, reptiles, amphibians, birds, and mammals. Mr. Cashen has been the technical editor of several resource management documents, and his strong scientific writing skills have enabled him to secure grant funding for several clients.

AREAS OF EXPERTISE

- CEQA, NEPA, and Endangered Species Act compliance issues
- Comprehensive biological resource assessments
- Endangered species management
- Renewable energy
- Forest fuels reduction and timber harvesting
- Scientific field studies, grant writing and technical editing

EDUCATION

M.S. Wildlife and Fisheries Science - The Pennsylvania State University (1998)

B.S. Resource Management - The University of California, Berkeley (1992)

PROFESSIONAL EXPERIENCE

Litigation Support / Expert Witness

As a biological resources expert, Mr. Cashen reviews CEQA/NEPA documents and provides his client(s) with an assessment of biological resource issues. He then prepares written comments on the scientific and legal adequacy of the project's environmental documents (e.g., EIR). For projects requiring California Energy Commission (CEC) approval, Mr. Cashen has submitted written testimony (opening and rebuttal) in conjunction with oral testimony before the CEC.

Mr. Cashen can lead field studies to generate evidence for legal testimony, and he can incorporate testimony from his deep network of species-specific experts. Mr. Cashen's clients have included law firms, non-profit organizations, and citizen groups.

REPRESENTATIVE EXPERIENCE

Solar Energy Facilities

- Abengoa Mojave Solar Project
- Avenal Energy Power Plant
- Beacon Solar Energy Project
- Blythe Solar Power Project
- Calico Solar Project
- Calipatria Solar Farm II
- Carrizo Energy Solar Farm
- Catalina Renewable Energy Project
- Fink Road Solar Farm
- Genesis Solar Energy Project
- Heber Solar Energy Facility
- Imperial Valley Solar Project
- Ivanpah Solar Electric Generating
- Maricopa Sun Solar Complex
- Mt. Signal and Calexico Solar
- San Joaquin Solar I & II
- Solar Gen II Projects
- SR Solis Oro Loma
- Vestal Solar Facilities
- Victorville 2 Power Project

Geothermal Energy Facilities

- East Brawley Geothermal
- Mammoth Pacific 1 Replacement
- Western GeoPower Plant and

Wind Energy Facilities

- Catalina Renewable Energy Project
- Ocotillo Express Wind Energy
- San Diego County Wind Ordinance
- Tres Vaqueros Repowering Project
- Vasco Winds Relicensing Project

Biomass Facilities

- Tracy Green Energy Project

Development Projects

- Alves Ranch
- Aviano
- Chula Vista Bayfront Master Plan
- Columbus Salame
- Concord Naval Weapons Station
- Faria Annexation
- Live Oak Master Plan
- Napa Pipe
- Roddy Ranch
- Rollingwood
- Sprint-Nextel Tower

Project Management

Mr. Cashen has managed several large-scale wildlife, forestry, and natural resource management projects. Many of these projects have required hiring and training field crews, coordinating with other professionals, and communicating with project stakeholders. Mr. Cashen's experience in study design, data collection, and scientific writing make him an effective project manager, and his background in several different natural resource disciplines enable him to address the many facets of contemporary land management in a cost-effective manner.

REPRESENTATIVE EXPERIENCE

Wildlife Studies

- Peninsular Bighorn Sheep Resource Use and Behavior Study: (CA State Parks)
- "KV" Spotted Owl and Northern Goshawk Inventory: (USFS, Plumas NF)
- Amphibian Inventory Project: (USFS, Plumas NF)
- San Mateo Creek Steelhead Restoration Project: (Trout Unlimited and CA Coastal Conservancy, Orange County)
- Delta Meadows State Park Special-status Species Inventory: (CA State Parks, Locke)

Natural Resources Management

- Mather Lake Resource Management Study and Plan – (Sacramento County)
- Placer County Vernal Pool Study – (Placer County)
- Weidemann Ranch Mitigation Project – (Toll Brothers, Inc., San Ramon)
- Ion Communities Biological Resource Assessments – (Ion Communities, Riverside and San Bernardino Counties)
- Del Rio Hills Biological Resource Assessment – (The Wyro Company, Rio Vista)

Forestry

- Forest Health Improvement Projects – (CalFire, SD and Riverside Counties)
- San Diego Bark Beetle Tree Removal Project – (SDG&E, San Diego Co.)
- San Diego Bark Beetle Tree Removal Project – (San Diego County/NRCS)
- Hillslope Monitoring Project – (CalFire, throughout California)

Biological Resources

Mr. Cashen has a diverse background with biological resources. He has conducted comprehensive biological resource assessments, habitat evaluations, species inventories, and scientific peer review. Mr. Cashen has led investigations on several special-status species, including ones focusing on the foothill yellow-legged frog, mountain yellow-legged frog, desert tortoise, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, Peninsular bighorn sheep, red panda, and forest carnivores.

REPRESENTATIVE EXPERIENCE

Avian

- Study design and Lead Investigator - Delta Meadows State Park Special-Status Species Inventory (*CA State Parks: Locke*)
- Study design and lead bird surveyor - Placer County Vernal Pool Study (*Placer County: throughout Placer County*)
- Surveyor - Willow flycatcher habitat mapping (*USFS: Plumas NF*)
- Independent surveyor - Tolay Creek, Cullinan Ranch, and Guadacanal Village restoration projects (*Ducks Unlimited/USGS: San Pablo Bay*)
- Study design and Lead Investigator - Bird use of restored wetlands research (*Pennsylvania Game Commission: throughout Pennsylvania*)
- Study design and surveyor - Baseline inventory of bird species at a 400-acre site in Napa County (*HCV Associates: Napa*)
- Surveyor - Baseline inventory of bird abundance following diesel spill (*LFR Levine-Fricke: Suisun Bay*)
- Study design and lead bird surveyor - Green Valley Creek Riparian Restoration Site (*City of Fairfield: Fairfield, CA*)
- Surveyor - Burrowing owl relocation and monitoring (*US Navy: Dixon, CA*)
- Surveyor - Pre-construction raptor and burrowing owl surveys (*various clients and locations*)
- Surveyor - Backcountry bird inventory (*National Park Service: Eagle, Alaska*)
- Lead surveyor - Tidal salt marsh bird surveys (*Point Reyes Bird Observatory: throughout Bay Area*)
- Surveyor - Pre-construction surveys for nesting birds (*various clients and locations*)

Amphibian

- Crew Leader - Red-legged frog, foothill yellow-legged frog, and mountain yellow-legged frog surveys (*USFS: Plumas NF*)

- Surveyor - Foothill yellow-legged frog surveys (*PG&E: North Fork Feather River*)
- Surveyor - Mountain yellow-legged frog surveys (*El Dorado Irrigation District: Desolation Wilderness*)
- Crew Leader - Bullfrog eradication (*Trout Unlimited: Cleveland NF*)

Fish and Aquatic Resources

- Surveyor - Hardhead minnow and other fish surveys (*USFS: Plumas NF*)
- Surveyor - Weber Creek aquatic habitat mapping (*El Dorado Irrigation District: Placerville, CA*)
- Surveyor - Green Valley Creek aquatic habitat mapping (*City of Fairfield: Fairfield, CA*)
- GPS Specialist - Salmonid spawning habitat mapping (*CDFG: Sacramento River*)
- Surveyor - Fish composition and abundance study (*PG&E: Upper North Fork Feather River and Lake Almanor*)
- Crew Leader - Surveys of steelhead abundance and habitat use (*CA Coastal Conservancy: Gualala River estuary*)
- Crew Leader - Exotic species identification and eradication (*Trout Unlimited: Cleveland NF*)

Mammals

- Principal Investigator – Peninsular bighorn sheep resource use and behavior study (*California State Parks: Freeman Properties*)
- Scientific Advisor – Study on red panda occupancy and abundance in eastern Nepal (*The Red Panda Network: CA and Nepal*)
- Surveyor - Forest carnivore surveys (*University of CA: Tahoe NF*)
- Surveyor - Relocation and monitoring of salt marsh harvest mice and other small mammals (*US Navy: Skagg's Island, CA*)
- Surveyor – Surveys for Monterey dusky-footed woodrat. Relocation of woodrat houses (*Touré Associates: Prunedale*)

Natural Resource Investigations / Multiple Species Studies

- Scientific Review Team Member – Member of the science review team assessing the effectiveness of the US Forest Service's implementation of the Herger-Feinstein Quincy Library Group Act.
- Lead Consultant - Baseline biological resource assessments and habitat mapping for CDF management units (*CDF: San Diego, San Bernardino, and Riverside Counties*)

- Biological Resources Expert – Peer review of CEQA/NEPA documents (*Adams Broadwell Joseph & Cardoza: California*)
- Lead Consultant - Pre- and post-harvest biological resource assessments of tree removal sites (*SDG&E: San Diego County*)
- Crew Leader - T&E species habitat evaluations for Biological Assessment in support of a steelhead restoration plan (*Trout Unlimited: Cleveland NF*)
- Lead Investigator - Resource Management Study and Plan for Mather Lake Regional Park (*County of Sacramento: Sacramento, CA*)
- Lead Investigator - Biological Resources Assessment for 1,070-acre Alfaro Ranch property (*Yuba County, CA*)
- Lead Investigator - Wildlife Strike Hazard Management Plan (*HCV Associates: Napa*)
- Lead Investigator - Del Rio Hills Biological Resource Assessment (*The Wyro Company: Rio Vista, CA*)
- Lead Investigator – Ion Communities project sites (*Ion Communities: Riverside and San Bernardino Counties*)
- Surveyor – Tahoe Pilot Project: Validation of California’s Wildlife Habitat Relationships (CWHR) Model (*University of California: Tahoe NF*)

Forestry

Mr. Cashen has five years of experience working as a consulting forester on projects throughout California. Mr. Cashen has consulted with landowners and timber operators on forest management practices; and he has worked on a variety of forestry tasks including selective tree marking, forest inventory, harvest layout, erosion control, and supervision of logging operations. Mr. Cashen’s experience with many different natural resources enable him to provide a holistic approach to forest management, rather than just management of timber resources.

REPRESENTATIVE EXPERIENCE

- Lead Consultant - CalFire fuels treatment projects (*SD and Riverside Counties*)
- Lead Consultant and supervisor of harvest activities – San Diego Gas and Electric Bark Beetle Tree Removal Project (*San Diego*)
- Crew Leader - Hillslope Monitoring Program (*CalFire: throughout California*)
- Consulting Forester – Forest inventories and timber harvest projects (*various clients throughout California*)

Grant Writing and Technical Editing

Mr. Cashen has prepared and submitted over 50 proposals and grant applications. Many of the projects listed herein were acquired through proposals he wrote. Mr. Cashen's clients and colleagues have recognized his strong scientific writing skills and ability to generate technically superior proposal packages. Consequently, he routinely prepares funding applications and conducts technical editing for various clients.

PERMITS

U.S. Fish and Wildlife Service Section 10(a)(1)(A) Recovery Permit for the Peninsular bighorn sheep

CA Department of Fish and Game Scientific Collecting Permit

PROFESSIONAL ORGANIZATIONS / ASSOCIATIONS

The Wildlife Society (Conservation Affairs Committee member)

Cal Alumni Foresters

Mt. Diablo Audubon Society

OTHER AFFILIATIONS

Scientific Advisor and Grant Writer – *The Red Panda Network*

Scientific Advisor – *Mt. Diablo Audubon Society*

Grant Writer – *American Conservation Experience*

Scientific Advisor and Land Committee Member – *Save Mt. Diablo*

TEACHING EXPERIENCE

Instructor: Wildlife Management - The Pennsylvania State University, 1998

Teaching Assistant: Ornithology - The Pennsylvania State University, 1996-1997

Attachment 2

Pless Environmental, Inc.

440 Nova Albion Way, Suite 2
San Rafael, CA 94903
(415) 492-2131 voice
(815) 572-8600 fax

BY EMAIL

October 17, 2012

Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Re: Comments on Final Environmental Impact Report for Mammoth Pacific I Replacement Project

Dear Ms. Klebaner,

Per your request, I have reviewed the Final Environmental Impact Report ("FEIR") for the Mammoth Pacific I Replacement Project ("Project") published by the County of Mono ("County") as the lead agency under the California Environmental Quality Act ("CEQA")¹ and related documents.^{2,3,4} My review focuses on the Project's impacts related to air quality and hazardous materials.

I. Background

Mammoth Pacific L.P. ("MPLP" or "Applicant"), a subsidiary of Ormat Nevada, Inc. ("Ormat"), proposes to replace its aging Mammoth Pacific Unit I ("MP-I") geothermal power plant located near Casa Diablo Hot Springs in Mono County, CA,

¹ County of Mono, Mammoth Pacific I Replacement Project, Final Environmental Impact Report, California Clearinghouse Number 2011022020, September 2012.

² County of Mono, Mammoth Pacific I Replacement Project, Second Revised Draft Environmental Impact Report, California Clearinghouse Number 2011022020, July 2012.

³ County of Mono, Mammoth Pacific I Replacement Project, Revised Draft Environmental Impact Report, California Clearinghouse Number 2011022020, February 2012; hereinafter "RDEIR."

⁴ County of Mono, Mammoth Pacific I Replacement Project Draft Environmental Impact Report, California Clearinghouse Number 2011022020, July 2011; hereinafter "DEIR."

with a new, more modern and efficient power plant while maintaining the existing geothermal wellfield, pipeline system and ancillary facilities.⁵

The existing MP-I plant, which is located approximately 1,200 feet northeast of the intersection of U.S. Highway 395 and California State Route 203 on 90 acres of private land owned by Ormat, has a design capacity of approximately 14 megawatts ("MW")⁶ and consists of a binary power plant⁷, a geothermal wellfield, production and injection fluid pipelines, and ancillary facilities.⁸ The existing MP-I plant, permitted by the County in 1982 and in operation since 1984, is one of three existing geothermal power plants (MP-I, MP-II, and PLES-I) located in the Casa Diablo geothermal development complex. The three existing plants are operated out of a single control room located adjacent to the existing MP-I generation facilities⁹ and share a common geothermal wellfield.¹⁰ The principal reason for the Project is to replace the aging, leak prone MP-I generation unit, whose condensing capacity has been severely restricted due to the need to plug damaged condenser tubes.¹¹

The M-1 replacement plant, proposed to be located on private land about 500 feet northeast of the existing MP-I generation facilities and immediately adjacent to the existing MP-II generation facilities¹², would have a generating capacity of approximately 18.8 MW (net).¹³ The Project includes: the construction of the new M-1 plant generation facilities; the demolition and decommissioning of the existing MP-I generation facilities; the construction of new paved access roads; the installation of a fire

⁵ FEIR, at p. 1.

⁶ The California Energy Commission's

⁷ A binary cycle power plant is a type of geothermal power plant that allows cooler geothermal reservoirs to be used than with dry steam and flash steam plants. With binary cycle geothermal power plants, pumps are used to pump hot water from a geothermal well, through a heat exchanger, and the cooled water is returned to the underground reservoir. A second "working" or "binary" fluid with a low boiling point, typically a butane or pentane hydrocarbon, is pumped at fairly high pressure through a heat exchanger, where it is vaporized and then directed through a turbine. The vapor exiting the turbine is then condensed by cold air radiators or cold water and cycled back through the heat exchanger. (Description excerpted from Wikipedia.)

⁸ FEIR, at p. 1.

⁹ DEIR, at p. 5-2.

¹⁰ *Id.*, at p. 5-7.

¹¹ *Id.* at p. 4-131.

¹² FEIR, at p. 1.

¹³ FEIR, at p. 4.

water storage tank and motive fluid storage tanks; the construction of an electrical shelter, a machinery room a main electrical room, an electrical substation, interconnection transmission to connect the M-1 plant to the existing Southern California Edison Casa Diablo substation, and two aboveground interconnection pipelines to interconnect the existing geothermal production and injection pipelines to the M-1 plant site.¹⁴ According to the EIR, the Project would not include changes to the existing wellfield or wellfield operations.¹⁵

Geothermal fluids from the existing production wells would be transported to the proposed M-1 geothermal plant through existing production pipelines. The M-1 plant would utilize Ormat Energy Converter (“OEC”) technology, a proprietary modular binary geothermal power generation equipment that uses an organic “working” or “motive” fluid for non-contact heat transfer from the geothermal fluid. Specifically, the Project would use an Integrated Two Level Unit (“ITLU”), which provides two levels of heat extraction from the geothermal fluid in a series with a higher temperature and pressure unit, Level 1, and a lower temperature and pressure unit, Level 2. The geothermal heat vaporizes the motive fluid which then turns a binary turbine, which together would turn a common generator producing electricity that would be delivered to the substation and transferred to the interconnection transmission line. The vaporized motive fluid exits the turbine and is condensed in an air-cooled condenser system that uses large fans to pull a cooling air stream over the tubes carrying the motive fluid. The condensed motive fluid is then pumped back to the heat exchangers for re-heating and vaporization, completing the closed cycle. The cooled geothermal fluid from the heat exchangers is pumped under pressure to the geothermal injection wells.¹⁶

The existing MP-I plant uses isobutane as the motive fluid in its binary power generation equipment. The new M-1 plant would use normal pentane (n-pentane) as the binary motive fluid.¹⁷ Both working fluids, isobutane and n-pentane, are volatile organic compounds, which are precursors for the formation of ozone, a regulated air

¹⁴ DEIR, at pp. 2-4-2-17.

¹⁵ *Id.* at p. 1-1.

¹⁶ DEIR, pp. 2-1-2-2.

¹⁷ DEIR, p. 2-2.

pollutant¹⁸ for which short- and long-term state and national ambient air quality standards have been established.¹⁹

The OEC unit contains approximately 250,000 pounds of motive fluid (in the vaporizers, preheaters, condensers and piping) in a closed-loop system, with no significant, routine release or discharge of motive fluid.²⁰ Bulk quantities of n-pentane would be stored in pressure vessels and bulk storage containers on the M-1 power plant site.²¹ During operations, vaporized n-pentane would be condensed in an air-cooled tube condenser and returned to the preheaters and vaporizers to repeat the cycle. Any non-condensable gases which may leak into the motive fluid system would collect in the OEC condenser and removed through a vapor recovery unit ("VRU"). During purging, the majority of the n-pentane vapors would be condensed into liquid n-pentane and returned to the OEC unit. The noncondensable gases and the remaining, uncontrolled n-pentane vapors would be discharged into the atmosphere.²² Like the existing MP-I facility, the M-1 plant would release fugitive emissions into the atmosphere. These emissions would be released from leaks of n-pentane through leaking valves, flanges, seals, and other connections.

According to the EIR, the M-1 plant would emit fugitive emissions of n-pentane at a rate of 205 pounds per day ("lbs/day") or 37.4 tons per year ("tons/year").²³ Fugitive emissions of isobutene from the existing MP-I facility are estimated by Ormat to occur at a rate of 500 lbs/day or 91.3 tons/year.²⁴

During M-1 plant startup operations, the existing MP-I plant would continue to operate until the new M-1 replacement plant becomes commercial.²⁵ The period of simultaneous operation authorized in the FEIR is two years. Once the M-1 plant becomes commercial, the MP-I plant will be dismantled and the plant facilities would be removed from the site, the site would be regraded, covered with gravel and

¹⁸ DEIR, pp. 2-19 and 4-36.

¹⁹ California Air Resources Board, Ambient Air Quality Standards, June 7, 2012; <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>.

²⁰ DEIR, pp. 2-15-2-16.

²¹ *Id.*, at p. 2-2.

²² *Id.*, at p. 2-18.

²³ *Id.* at p. 4-38.

²⁴ *Ibid.*

²⁵ *Id.* at p. 1-1.

converted to a fenced equipment storage yard that would be used periodically for overflow parking.²⁶

II. Emission Estimates of Volatile Organic Compounds from Project Operation Are Not Adequately Documented

In response to a comment by James Clark, PhD, on the RDEIR's lack of documentation validating the VOC emission estimates²⁷ due to fugitive losses of motive fluid from the existing MP-I and the proposed M-1 facilities, the FEIR explains that: a) the inventory loss of 500 lb/day isobutane from MP-I was based on historical plant inventory losses based on proprietary isobutane purchase records; and b) the inventory loss of 205 lb/day n-pentane from M-1 was based on emission estimate methods for VOC leaks from equipment leaks and proprietary engineering estimates developed by the U.S. Environmental Protection Agency ("USEPA") using operational information on Ormat-manufactured equipment in operation at other locations.²⁸ The FEIR's explanation how the respective emission estimates for fugitive losses of motive fluids from the existing and proposed facilities were derived is unsatisfactory and fails to constitute adequate documentation and, further, is suspect, as detailed below.

Existing MP-I Facility

For the existing MP-I facility, the FEIR fails to document whether the estimated 500 lb/day of VOC emissions were derived as the maximum or average daily inventory losses based on historical plant purchase records. If average daily inventory losses were used as the basis, then the FEIR must indicate the timeframe over which the purchase records were averaged. When relying on purchase records to derive emissions, the Applicant should, at a minimum, provide a table listing either the gallons per purchase record or annualized inventory losses based on the facility's purchase records and demonstrate how the estimate of 500 lb/day of VOC emissions were derived. CEQA

²⁶ *Ibid.*

²⁷ In his letter, Dr. Clark refers to photochemically reactive compounds as "reactive organic gases" or "ROG," rather than "VOCs." The term ROG is used by the California Air Resources Board ("CARB") for chemical compounds with photochemical reactivity and is, for example, used for purposes of the agency's emission inventory for the state. The term "VOCs" is used by the U.S. Environmental Protection Agency ("USEPA") for photochemically reactive chemical compounds. The CARB's and USEPA's definitions of VOCs and ROGs differ somewhat with respect to in/excluded compounds but both agencies include isobutane and n-pentane as photochemically reactive compounds. Therefore, the terms ROG and VOCs are used interchangeably for purposes of this comment letter.

²⁸ FEIR, Response to Comment 9D-04, at p. 39.

requires that an environmental review document be adequately supported and that persons not involved in preparing the EIR understand the conclusion reached in the EIR. Here, the information provided requires the reviewer to accept this estimate in blind faith.

Project M-1 Facility

The FEIR's approach deriving a total of 205 lb/day of VOC (n-pentane) emissions for the new Project M-1 facility is problematic for a number of reasons:

First, the FEIR's estimates of fugitive emissions of n-pentane from Project equipment including valves, pump seals, turbine seals, flanges, connectors, and the purge system were allegedly based on emission factors reported in USEPA's 1995 *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017). Review of this document shows that the FEIR relied on average emission factors (leak rates) for refinery equipment for estimating emissions from the Project's six valves in gas service, five valves in liquid service, five pump seals, two turbine seals, and 220 flanges and connectors. The FEIR fails to discuss the applicability of the *average emission factors for refineries* from the USEPA's document to the Project's equipment. Further, for the eight components of the purge system (normal operations), the FEIR relies on a VOC emission factor of 0.005 kilograms per hour per source ("kg/hr/source") which is nowhere to be found in the USEPA's document. The FEIR fails to explain how it derived this emission factor, leaving the reviewer once again with no other option than to accept this estimate in blind faith. In addition, the FEIR's equipment list fails to include the facility's pressure relief valves, which the DEIR indicates would be used at the facility.²⁹ Emissions from these pressure relief valves must be included in the emission estimates. (See Comment III below.)

Second, the FEIR's estimates of operational losses of n-pentane from fill, drain, and lube leaks of 92 lb/day³⁰ were based on "Ormat operating experience."³¹ The FEIR provides no documentation whatsoever for this operating experience or information on what basis this estimate was derived, e.g., the number of facilities inventoried; their respective MW-output and number and type of OEC(s) (e.g., single-level or integrated

²⁹ DEIR, at p. 2-18: "Safeguards inherent to the design of the power plant would include *relief valves*, manual and automatic shutoffs, interlocks, vents, and check valves." (*Emphasis added.*)

³⁰ FEIR, table "Fugitive n-Pentane Emission Calculations – Typical 16 MW Air-Cooled OEC (Reference Methodology EPA453/R-95-017 Protocol for Equipment Leak Emissions)", at p. 39.

³¹ FEIR, footnote * to table "Fugitive n-Pentane Emission Calculations – Typical 16 MW Air-Cooled OEC (Reference Methodology EPA453/R-95-017 Protocol for Equipment Leak Emissions)", at p. 39.

two-level unit); the type and quantity of motive fluid (isobutane, n-pentane, or other) in the facilities' systems; the number of years the information was collected; etc. Finally, it begs the question, why the FEIR estimates emissions from the existing MP-I plant and losses of n-pentane from "fill drain, and lube leaks" from the new M-1 plant based on "operating experience" and "purchase records" at other Ormat facilities but estimates fugitive equipment leaks from the Project's valves, pump seals, turbine seals, flanges, connectors, and the purge system based on the USEPA methodology. At the very least, the EIR should be revised to a) include a discussion why it considered the approaches it chose to estimate emissions applicable the respective emission sources and b) validate the use of USEPA's emission factors for refineries for estimating fugitive equipment leaks from M-1 with information based on experience and purchase records gathered at other geothermal facilities, preferably ones that also use integrated two-level binary OEC technology.

Third, the VOC (n-pentane) emission calculations presented by the FEIR in Response to Comment 9D-04 were based on a "Typical 16 MW Air-Cooled OEC;" the Project's OEC would generate 18.8 MW. The FEIR fails to specify whether the number of equipment components (valves, pump seals, turbine seals, flanges, connectors, and purge system) used to calculate fugitive equipment leak emissions were based on this "typical" 16-MW OEC or rather based on site-specific information for the Project. Further, the FEIR failed to appropriately scale the "OEC operational losses" from the "typical" 16 MW equipment to the 18.8-MW Project equipment. To address these deficiencies, the EIR should be revised, if necessary, to provide emission estimates specific to the components of the 18.8 MW Project rather than for a generic 16-MW plant.

III. Emissions of Volatile Organic Compounds from Project Operation Are Likely Underestimated, Potentially Significant and Unmitigated

As discussed in the following, information available for similar plants indicates that the FEIR underestimates emissions of VOCs from Project operations.

Emission Estimates for Fugitive Losses of Volatile Organic Compounds from Pressure Relief Valves

As discussed above, the FEIR did not estimate VOC emissions from pressure relief valves and the record does not contain information on how many pressure relief valves would be in service at the facility. However, information available for another geothermal plant that uses OEC technology for one of its four units, the Brady Geothermal Plant in Fallon, NV, indicates that relief valves are located on the n-pentane storage tank and on the OEC vaporizers and condensers. Each pressure relief valve relieves directly to atmosphere. The OEC at the Brady Geothermal Plant is a 5-MW

unit.³² Here, the 18.8 MW M-1 Project would require three n-pentane storage tanks³³, two vaporizers (one each for level 1 and level 2 of the OEC unit)³⁴, and air-cooled tube condenser system. Thus, it can be conservatively assumed that the Project would have at least six pressure relief valves, one for each of the above-listed plant components.

Based on a leak rate of 0.16 kg/hr/source for VOC emissions from pressure relief valves from USEPA's 1995 *Protocol for Equipment Leak Emission Estimates*, fugitive losses of n-pentane from six pressure relief valves can be estimated at 50.8 lb/day.³⁵ Adding this estimate for emissions from six pressure relief valves to the FEIR's estimate of total VOC emissions (205 lb/day) results in a revised total of 256 lb/day. This estimate exceeds the 250 lb/day threshold for VOC emissions from stationary sources established by the Great Basin Unified Air Pollution Control District ("GBUAPCD") for requiring best available control technology ("BACT").

Emission Estimates for Fugitive Losses of Volatile Organic Compounds from Proposed CD-4 Geothermal Project

Comparison with the VOC emission estimate provided by the Applicant for the proposed CD-4 geothermal project further supports the supposition that emissions from the M-1 Project are underestimated: Based on the FEIR's emissions estimate of 512 lb/day VOC emissions for the 33-MW CD-4 project, it can be calculated that the facility generates more than 15 pounds per MW and day ("lb/MW-day") of VOC emissions³⁶; in comparison, based on the FEIR's estimate of 205 lb/day of VOC emissions, the 18.8-MW Project would generate less than 11 lb/MW-day of VOC emissions.³⁷ Based on these calculated pro-rated (MW-based) daily VOC emission factor for the proposed CD-4 project of 15.5 lb/MW-day and the Project's design capacity of 18 MW, VOC emissions from the Project can be estimated at 291.7 lb/day³⁸, more than

³² The Right-to-Know Network, Risk Management Plan (RMP) Database, Brady Geothermal Plant; http://data.rtknet.org/rmp/rmp.php?database=rmp&detail=3&datatype=T&facility_id=100000183428.

³³ See FEIR, Figures 5, 6, 9, 13, and 26.

³⁴ See FEIR, Figure 4.

³⁵ $(0.16 \text{ kg/hr/pressure relief valve}) \times (6 \text{ pressure relief valves}) \times (24 \text{ hours/day}) \times (2.20462 \text{ lb/kg}) = 50.79 \text{ lb/day}$.

³⁶ CD-4 plant pro-rated emissions: $(512 \text{ lb/day}) / (33 \text{ MW}) = 15.5 \text{ lb/MW-day}$.

³⁷ Project M-1 plant pro-rated emissions: $(205 \text{ lb/day}) / (18.8 \text{ MW}) = 10.9 \text{ lb/MW-day}$.

³⁸ Revised Project M-1 plant emissions based on CD-4 pro-rated emission factor and design capacity: $(15.5 \text{ lb/MW-day}) \times (18.8 \text{ MW}) = 291.7 \text{ lb/day}$.

40 percent higher than the FEIR's estimate of 205 lb/day.³⁹ This emission estimate considerably exceeds the GBUAPCD's BACT threshold of 250 lbs/day for VOC emissions from stationary sources.

Recommendation for Revision of FEIR to Address Potentially Significant Operational VOC Emission Estimates

I recommend that the County revise the EIR to include emission estimates based on an accurate Project-specific component count, validated by experience at other Ormat facilities using the proposed technology. If revised Project VOC emissions should exceed the GBUAPCD's BACT significance threshold of 250 lbs/day of VOC emissions from stationary sources, a BACT analysis should be prepared for the Project's equipment to minimize fugitive losses from equipment leaks. Technologies that should be evaluated in such a BACT analysis include, *e.g.*, leakless components.

IV. The FEIR Fails to Identify and Mitigate Significant Impacts on Air Quality due to VOC Emissions from Project Operations

The Project would replace the existing MP-I plant which has been operating for 28 years (since 1984) and is nearing the end of its useful life. During the startup of the Project there would be an up to two-year transition period during which both the MP-I and M-1 plant operations would overlap. In comment letters on the RDEIR, your office and James Clark, PhD, discussed the document's failure to disclose the potential increase in VOC emissions during this transition period.⁴⁰ In response, the FEIR claims that emissions from contemporaneous operation of the two plants would not increase fugitive (VOC) motive fluid emissions:

The operating rate of the respective plants during the transition period is limited by the geothermal fluid provided to each plant, and the maximum geothermal fluid available to Casa Diablo is fixed to the existing maximum geothermal fluid pumping capacity of the wellfield (6,900,000 pounds per hour). This physical pumping limit would not change with the MP-I Replacement Project (RDEIR page 2-17), and the geothermal fluid flow rates to the respective facilities would be inversely proportional. As such when geothermal fluid flow to the M-1 plant increases the geothermal fluid flow to MP-I plant must decrease proportionally. Similarly, the combined emissions of isobutane and n-pentane occurring while both plants are operating at reduced capacities would be proportional to the

³⁹ $(291.7 \text{ lb/day}) / (205 \text{ lb/day}) = 1.43$.

⁴⁰ See FEIR, Comment 9-14 and Comment 9D-06.

respective fraction that each plant is operating. Motive fluid emissions would range from about 500 pounds per day (when only the MP-I plant is operating) to zero emissions of isobutane and about 205 pounds per day of n-pentane (when only the M-1 plant is operating). In general, when the MP-I plant is operating at a higher capacity than the M-1 plant must be operating at a proportionally lower capacity and vice versa. Thus, at any time the M-1 plant is operating during the transition period there would be a reduction in the total emissions of motive fluid from the MP-I plant.⁴¹

This explanation fails to acknowledge that the existing MP-I plant has been operating at far less than its design capacity over the past decade and therefore is likely not drawing geothermal fluid at the maximum design capacity rate, but instead only a fraction thereof. As discussed in the DEIR, the condensing capacity of the aging, leak prone MP-I generation unit has been severely restricted due to the need to plug damaged condenser tubes.⁴² As a result, both of the 5-MW generation units (U100 and U200) have been operating at substantially reduced capacity, as previously discussed in the March 15, 2012 comment letter on the RDEIR by David Marcus.⁴³ In the past decade, the annual capacity factor⁴⁴ for Unit 1 (U100) ranged from 61% to 21%; the annual capacity factor for Unit 2 (U200) ranged from 60% to 37%. The combined capacity factor for the MP-I plant ranged from 56% to 37%, as shown in the inset figure below.

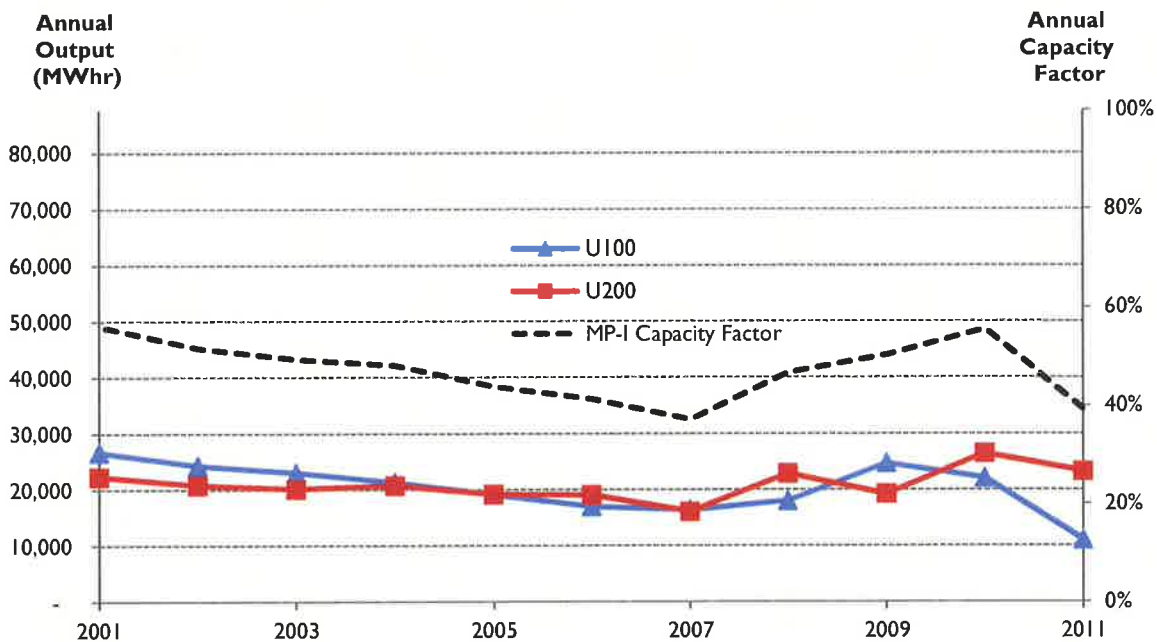
⁴¹ FEIR, Response to Comment 9D-06, p. 40.

⁴² *Id.* at p. 4-131.

⁴³ See FEIR, Comment Letter 9B.

⁴⁴ The capacity factor is the ratio of actual output to potential output if operated continuously at 100 percent of rated capacity.

**Annual output (MWhr) for units U100 and U200
 and MP-I annual capacity factor (%)**



Annual output for MP-I generation units U100 (5 MW) and U200 (5 MW) from: California Energy Commission, Energy Almanac at http://energyalmanac.ca.gov/electricity/web_qfer/plant_stats_2.php.

Annual capacity factor for MP-I (10 MW) calculated as: (annual output U100 + annual output U200) / (10 MW × 8,760 hours)

Because VOC emissions from the existing MP-I plant of 500 lbs/day were calculated as inventory losses based on historical plant purchase records (*see* Comment I), these emission estimates most likely reflect these low capacity factors and corresponding reduced pumping of geothermal fluid from the wellfield. Conservatively assuming that the geothermal wellfield and associated piping were sized to supply 100% of the existing MP-I plant's design capacity (to ensure operating reliability, the wellfield capacity was likely sized considerably larger), means that there is unused pumping capacity available for the new M-1 plant without reducing current operations of the existing MP-I plant. Thus, VOC emissions from the new plant must be added to the 500 lbs/day of VOC emissions from the existing plant (or the revised emissions based on Comments II and III).

Consequently, the contemporaneous operation of the existing MP-I plant and the Project would result in increased emissions of VOCs, which as ozone precursors would contribute to the region's non-attainment status of this pollutant. This is a significant impact on air quality (*i.e.*, additional VOC emissions up to the full pumping capacity of the wellfield has been reached) that the FEIR fails to identify and mitigate. I recommend that the County prepare a revised EIR that addresses this issue.

V. The EIR Fails to Provide an Off-Site Consequence Analysis for the Flammable Motive Fluid n-Pentane

As discussed previously, the existing MP-I plant uses isobutane as the motive fluid, whereas the Project M-1 plant would use n-pentane. As the FEIR readily acknowledges, these chemicals have considerably different chemical and physical properties: *e.g.*, isobutane is a flammable gas at standard temperature and pressure; in contrast, n-pentane is a flammable liquid at standard temperature and pressure.⁴⁵ Due to their different chemical and physical properties, these chemicals require different handling and equipment during transportation, transfer, and storage.

The record for the FEIR does not include an off-site consequence analysis for the Project's highly flammable motive fluid, n-pentane, as required by the Chemical Accident Prevention Provisions under USEPA's Risk Management Plan ("RMP") rule (Section 112(r) of the federal Clean Air Act).⁴⁶ The DEIR acknowledges that the chemical is flammable and recognizes that the Project is subject to the USEPA's RMP rule. Yet, rather than providing an off-site consequence analysis for n-pentane, the DEIR states that MPLP would revise and update its "integrated program" for the existing three plants (which is intended to meet the requirements of the California Accidental Release Prevention program, the USEPA's RMP, and the federal Occupational Safety and Health Administration's Process Safety Management Program) "[p]rior to delivery of n-pentane, to reflect the new M-1 plant"⁴⁷ This approach improperly defers an analysis that should be part of the CEQA review process for the Project into the future.

I recommend that the County revise the EIR to provide an off-site consequence analysis for the flammable motive fluid n-pentane using USEPA's RMP*Comp model as required by the USEPA's RMP to satisfy the requirements of CEQA and disclose all potential impacts to the public.

⁴⁵ FEIR, Response to Comment 9D-02, at pp. 38-39.

⁴⁶ U.S. Environmental Protection Agency, Risk Management Plan (RMP) Rule; <http://epa.gov/emergencies/content/rmp/index.htm>.

⁴⁷ DEIR, at p. 2-17.

VI. Recommendation

I recommend that the County prepare a revised EIR for review and comment by the public that addresses the above issues.

Please feel free to call me at (415) 492-2131 or e-mail at petra.pless@gmail.com if you have any questions.

With best regards,

A handwritten signature in black ink, appearing to read 'Petra Pless', with a stylized flourish above the name.

Petra Pless, D.Env.

Petra Pless, D.Env.

440 Nova Albion Way, #2
San Rafael, CA 94903
(415) 492-2131 phone
(815) 572-8600 fax
petra.pless@gmail.com

Dr. Pless is a court-recognized expert with over 20 years of experience in environmental consulting conducting and managing interdisciplinary environmental research projects and preparing and reviewing environmental permits and other documents for U.S. and European stakeholder groups. Her broad-based experience includes air quality and air pollution control; water quality, water supply, and water pollution control; biological resources; public health and safety; noise studies; California Environmental Quality Act ("CEQA"), Clean Air Act ("CAA"), and National Environmental Policy Act ("NEPA") review; industrial ecology and risk assessment; and use of a wide range of environmental software.

EDUCATION

Doctorate in Environmental Science and Engineering (D.Env.), University of California
Los Angeles, 2001

Master of Science (equivalent) in Biology, Technical University of Munich, Germany, 1991

PROFESSIONAL HISTORY

Pless Environmental, Inc., Principal, 2008–present

Environmental Consultant, Sole Proprietor, 2006–2008

Leson & Associates (previously Leson Environmental Consulting), Kensington, CA,
Environmental Scientist/Project Manager, 1997–2005

University of California Los Angeles, Graduate Research Assistant/Teaching Assistant, 1994–1996

ECON Research and Development, Environmental Scientist, Ingelheim, Germany, 1992–1993

Biocontrol, Environmental Projects Manager, Ingelheim, Germany, 1991–1992

REPRESENTATIVE EXPERIENCE

Air Quality and Pollution Control

Projects include CEQA/NEPA review; CAA attainment and non-attainment new source review; prevention of significant deterioration ("PSD") and Title V permitting; control technology analyses (BACT, LAER, RACT, BARCT, BART, MACT); technology evaluations and cost-effectiveness analyses; criteria and toxic pollutant and greenhouse gas emission inventories; emission offsets; ambient and source monitoring; analysis of emissions estimates and ambient air pollutant concentration modeling. Some typical projects include:

- Critically reviewed and prepared technical comments on the air quality, biology, noise, water quality, and public health and safety sections of CEQA/NEPA documents for numerous

commercial, residential, and industrial projects (e.g., power plants, airports, residential developments, retail developments, university expansions, hospitals, refineries, slaughterhouses, asphalt plants, food processing facilities, printing facilities, mines, quarries, and recycling facilities) and provided litigation support in a number of cases filed under CEQA.

- Critically reviewed and prepared technical comments on the air quality and public health sections of the Los Angeles Airport Master Plan (Draft, Supplement, and Final Environmental Impact Statement/Environmental Impact Report) for the City of El Segundo. Provided technical comments on the Draft and Final General Conformity Determination for the preferred alternative submitted to the Federal Aviation Administration.
- Prepared comments on proposed PSD and Title V permit best available control technology (“BACT”) analysis for greenhouse gas emissions from a proposed direct reduced iron facility in Louisiana.
- Prepared technical comments on the potential air quality impacts of the California Air Resources Board’s *Proposed Actions to Further Reduce Particulate Matter at High Priority California Railyards*.
- For several California refineries, evaluated compliance of fired sources with Bay Area Air Quality Management District Rule 9-10. This required evaluation and review of hundreds of source tests to determine if refinery-wide emission caps and compliance monitoring provisions were being met.
- Critically reviewed and prepared technical comments on draft Title V permits for several refineries and other industrial facilities in California.
- Evaluated the public health impacts of locating big-box retail developments in densely populated areas in California and Hawaii. Monitored and evaluated impacts of diesel exhaust emissions and noise on surrounding residential communities.
- In conjunction with the permitting of several residential and commercial developments, conducted studies to determine baseline concentrations of diesel exhaust particulate matter using an aethalometer.
- For an Indiana steel mill, evaluated technology to control NO_x and CO emissions from fired sources, including electric arc furnaces and reheat furnaces, to establish BACT. This required a comprehensive review of U.S. and European operating experience. The lowest emission levels were being achieved by steel mills using selective catalytic reduction (“SCR”) and selective non-catalytic reduction (“SNCR”) in Sweden and The Netherlands.
- For a California petroleum coke calciner, evaluated technology to control NO_x, CO, VOCs, and PM₁₀ emissions from the kiln and pyroscrubbers to establish BACT and LAER. This required a review of state and federal clearinghouses, working with regulatory agencies and pollution control vendors, and obtaining and reviewing permits and emissions data from other similar facilities. The best-controlled facilities were located in the South Coast Air Quality Management District.
- For a Kentucky coal-fired power plant, identified the lowest NO_x levels that had been permitted and demonstrated in practice to establish BACT. Reviewed operating experience of European, Japanese, and U.S. facilities and evaluated continuous emission monitoring data. The lowest NO_x levels had been permitted and achieved in Denmark and in the U.S. in Texas and New York.

- In support of efforts to lower the CO BACT level for power plant emissions, evaluated the contribution of CO emissions to tropospheric ozone formation and co-authored report on same.
- Critically reviewed and prepared technical comments on applications for certification (“AFCs”) for numerous natural-gas fired, solar, biomass, and geothermal power plants in California permitted by the California Energy Commission. The comments addressed construction and operational emissions inventories and dispersion modeling, BACT determinations for combustion turbine generators, fluidized bed combustors, diesel emergency generators, etc.
- Critically reviewed and prepared technical comments on draft PSD permits for several natural gas-fired power plants in California, Indiana, and Oregon. The comments addressed emission inventories, greenhouse gas emissions, BACT, case-by-case MACT, compliance monitoring, cost-effectiveness analyses, and enforceability of permit limits.
- For a California refinery, evaluated technology to control NO_x and CO emissions from CO Boilers to establish RACT/BARCT to comply with BAAQMD Rule 9-10. This required a review of BACT/RACT/LAER clearinghouses, working with regulatory agencies across the U.S., and reviewing federal and state regulations and State Implementation Plans (“SIPs”). The lowest levels were required in a South Coast Air Quality Management District rule and in the Texas SIP.
- In support of several federal lawsuits filed under the federal Clean Air Act, prepared cost-effectiveness analyses for SCR and oxidation catalysts for simple cycle gas turbines and evaluated opacity data.
- Provided litigation support for a CEQA lawsuit addressing the adequacy of pollution control equipment at a biomass cogeneration plant.
- Prepared comments and provided litigation support on several proposed regulations including the Mojave Desert Air Quality Management District Rule 1406 (fugitive dust emission reduction credits for road paving); South Coast Air Quality Management District Rule 1316, San Joaquin Valley Air Pollution Control District Rule 2201, Antelope Valley Air Quality Management District Regulation XIII, and Mojave Desert Air Quality Management District Regulation XIII (implementation of December 2002 amendments to the federal Clean Air Act).
- Critically reviewed draft permits for several ethanol plants in California, Indiana, Ohio, and Illinois and prepared technical comments.
- Reviewed state-wide average emissions, state-of-the-art control devices, and emissions standards for construction equipment and developed recommendations for mitigation measures for numerous large construction projects.
- Researched sustainable building concepts and alternative energy and determined their feasibility for residential and commercial developments, *e.g.*, regional shopping malls and hospitals.
- Provided comprehensive environmental and regulatory services for an industrial laundry chain. Facilitated permit process with the South Coast Air Quality Management District. Developed test protocol for VOC emissions, conducted field tests, and used mass balance methods to estimate emissions. Reduced disposal costs for solvent-containing waste streams by identifying alternative disposal options. Performed health risk screening for air toxics

- emissions. Provided permitting support. Renegotiated sewer surcharges with wastewater treatment plant. Identified new customers for shop-towel recycling services.
- Designed computer model to predict performance of biological air pollution control (biofilters) as part of a collaborative technology assessment project, co-funded by several major chemical manufacturers.
 - Experience using a wide range of environmental software, including air dispersion models, air emission modeling software, database programs, and geographic information systems.

Water Quality and Pollution Control

Experience in water quality and pollution control, including surface water and ground water quality and supply studies, evaluating water and wastewater treatment technologies, and identifying, evaluating and implementing pollution controls. Some typical projects include:

- Evaluated impacts of on-shore oil drilling activities on large-scale coastal erosion in Nigeria.
- For a 500-MW combined-cycle power plant, prepared a study to evaluate the impact of proposed groundwater pumping on local water quality and supply, including a nearby stream, springs, and a spring-fed waterfall. The study was docketed with the California Energy Commission.
- For a 500-MW combined-cycle power plant, identified and evaluated methods to reduce water use and water quality impacts. These included the use of zero-liquid-discharge systems and alternative cooling technologies, including dry and parallel wet-dry cooling. Prepared cost analyses and evaluated impact of options on water resources. This work led to a settlement in which parallel wet dry cooling and a crystallizer were selected, replacing 100 percent groundwater pumping and wastewater disposal to evaporation ponds.
- For a homeowner's association, reviewed a California Coastal Commission staff report on the replacement of 12,000 linear feet of wooden bulkhead with PVC sheet pile armor. Researched and evaluated impact of proposed project on lagoon water quality, including sediment resuspension, potential leaching of additives and sealants, and long-term stability. Summarized results in technical report.

Applied Ecology, Industrial Ecology and Risk Assessment

Experience in applied ecology, industrial ecology and risk assessment, including human and ecological risk assessments, life cycle assessment, evaluation and licensing of new chemicals, and fate and transport studies of contaminants. Experienced in botanical, phytoplankton, and intertidal species identification and water chemistry analyses. Some typical projects include:

- Conducted technical, ecological, and economic assessments of product lines from agricultural fiber crops for European equipment manufacturer; co-authored proprietary client reports.
- Developed life cycle assessment methodology for industrial products, including agricultural fiber crops and mineral fibers; analyzed technical feasibility and markets for thermal insulation materials from natural plant fibers and conducted comparative life cycle assessments.
- For the California Coastal Conservancy, San Francisco Estuary Institute, Invasive *Spartina* Project, evaluated the potential use of a new aquatic pesticide for eradication of non-native, invasive cordgrass (*Spartina spp.*) species in the San Francisco Estuary with respect to water

- quality, biological resources, and human health and safety. Assisted staff in preparing an amendment to the Final EIR.
- Evaluated likelihood that organochlorine pesticide concentrations detected at a U.S. naval air station are residuals from past applications of these pesticides consistent with manufacturers' recommendations. Retained as expert witness in federal court case.
 - Prepared human health risk assessments of air pollutant emissions from several industrial and commercial establishments, including power plants, refineries, and commercial laundries.
 - Managed and conducted laboratory studies to license pesticides. This work included the evaluation of the adequacy and identification of deficiencies in existing physical/chemical and health effects data sets, initiating and supervising studies to fill data gaps, conducting environmental fate and transport studies, and QA/QC compliance at subcontractor laboratories. Prepared licensing applications and coordinated the registration process with German environmental protection agencies. This work led to regulatory approval of several pesticide applications in less than six months.
 - Designed and implemented database on physical/chemical properties, environmental fate, and health impacts of pesticides for a major multi-national pesticide manufacturer.
 - Designed and managed experimental toxicological study on potential interference of delta-9-tetrahydrocannabinol in food products with U.S. employee drug testing; co-authored peer-reviewed publication.
 - Critically reviewed and prepared technical comments on applications for certification for several natural-gas fired, solar, and geothermal power plants and transmission lines in California permitted by the California Energy Commission. The comments addressed avian collisions and electrocution, construction and operational noise impacts on wildlife, risks from brine ponds, and impacts on endangered species.
 - For a 180-MW geothermal power plant, evaluated the impacts of plant construction and operation on the fragile desert ecosystem in the Salton Sea area. This work included baseline noise monitoring and assessing the impact of noise, brine handling and disposal, and air emissions on local biota, public health, and welfare.
 - Designed research protocols for a coastal ecological inventory in Southern California; developed sampling methodologies, coordinated field sampling, determined species abundance and distribution in intertidal zone, and conducted statistical data analyses.
 - Designed and conducted limnological study on effects of physical/chemical parameters on phytoplankton succession; performed water chemistry analyses and identified phytoplankton species; co-authored two journal articles on results.

PRO BONO ACTIVITIES

Founding member of "SecondAid," a non-profit organization providing tsunami relief for the recovery of small family businesses in Sri Lanka. (www.secondaid.org.)

PUBLICATIONS & RECOMMENDATIONS

Available upon request.

Attachment 3



Technical Consultation, Data Analysis and
Litigation Support for the Environment

2503 Eastbluff Dr., Suite 206
Newport Beach, California 92660
Fax: (949) 717-0069

Matt Hagemann
Tel: (949) 887-9013
Email: mhagemann@swape.com

October 18, 2012

Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080-7037

**Subject: Comments on the Proposed Mammoth Pacific I Replacement Project Final
Environmental Impact Report**

Dear Ms. Klebaner:

I have reviewed the September 2012 Final Environmental Impact Report (FEIR) for the proposed Mammoth Pacific I Replacement Project (Project). The FEIR includes responses to comments (Responses) we made on the February 2012 Revised Draft EIR on the issue of cumulative impacts to geothermal resources from development of the Project along with development of other projects in the area. The FEIR fails to adequately address our comments.

We prepared separate, timely comments, dated August 25, 2011, in response to the July 2011 DEIR. We also prepared comments, dated March 22, 2012 on the February 2012 Revised Draft Environmental Impact Report. Our comments on the DEIR and RDEIR are incorporated by reference.

1. Failure to Disclose Cumulative Impacts to Geothermal Resources

Comments we made on the cumulative impacts to water resources focused on extraction of fluids from 14 production wells that would be utilized over the lifetime of the proposed 33 MW CD-4 facility.¹ Currently, five production wells are utilized in the Casa Diablo area; the addition of 14 production wells may have significant impacts on thermal discharge from the Hot Creek Headsprings and on the geothermal aquifer.

When CD-4 is completed, fluids will be withdrawn from 17 wells, not from five as occurs under current conditions². Withdrawal from all wells needs to be cumulatively considered, especially in light of

¹ February 2012 RDEIR, p. 5-17

² February 2012 RDEIR, Fig. 39

declines in thermal water discharges from 1990 to 2000 of 30-40% at the Fish Hatchery, according to the U.S. Geological Survey.³ Declines in reservoir pressure and temperature have been attributed to geothermal development by the U.S. Geological Survey.⁴

Contrary to the FEIR's conclusions, the County's reliance on Cumulative Hydro Mitigation Measure 1 will not reduce potentially significant impacts to a level of insignificance. Monitoring is a retrospective program and changes that could be detected would occur only after impacts would have occurred to the reservoir. If management response to monitoring data is not swift, impacts to the reservoir may degrade ecological habitat before conditions are restored.

A swift and appropriate management response can be ensured through the establishment of numeric temperature and pressure criteria that would automatically trigger changes in reservoir utilization. For example, if thermal temperature declines exceeded a trigger level, management actions may include a reduction or even a stoppage in pumping until conditions are restored. No such triggers exist in the monitoring plans I reviewed in association with the Project.

I reviewed monitoring provisions in the Conditional Use Permit Conditions for the Existing MP-II Geothermal Project (Appendix K to the February 2012 RDEIR). Condition D9 (Hydrology and Water Quality)⁵ requires the implementation of a Hydrologic Resource Monitoring Plan "to monitor baseline conditions and detect changes in the existing hydrothermal reservoir pressures and shallow aquifer water levels, as well as the discharge and temperatures of selected thermal springs in the Long Valley Caldera." This plan, however, does not include quantitative temperature or pressure thresholds and is therefore unenforceable. Condition 13 only vaguely states that "if scientific evidence demonstrates that project operations are significantly threatening, or causing, pressure or temperature changes to the Hot creek Gorge springs or Hot Creek Hatchery springs, the Permit Holder shall implement such additional mitigation measures as are reasonably required by the MCEMD."

I also reviewed a plan provided by Mono County entitled "Baseline Hydrologic Monitoring Plan" which governs surface water, springflow, and groundwater sampling (attached). This plan also fails to identify any numeric limits for temperature and pressure that would prompt a management response to restore reservoir conditions.

The language in the Conditional Use Permit conditions and the Baseline Hydrologic Monitoring Plan is not protective of geothermal resources because of the failure to include specific temperature and pressure thresholds that would result in management actions such as reduction or cessation of pumping. Additionally, monitoring that is in place for the existing five production wells would be inadequate for an expanded production well field constituted by 17 wells. Reversal of pressure and temperature changes would take time and would have to rely upon such management responses for

³ <http://www.geothermal-energy.org/pdf/IGAstandard/WGC/2000/R0149.PDF>, p. 706.

⁴ Ibid.

⁵ Appendix K references Exhibit B, Hydrologic Monitoring Plan. Although Exhibit B was not included in the RDEIR, or the FEIR, the County provided Exhibit B in response to a Public Records Act request. I have reviewed the document provided by the County, and have attached it for the County's reference.

which there are no triggers. In the interim, prior to recovery of pressure or temperature impacts, degradation to ecological habitat could occur.

A recirculated EIR should include a monitoring plan to identify impacts on geothermal resources from existing and proposed power production activities at the Casa Diablo geothermal complex. The monitoring plan should include numeric thresholds for triggering management response to observed changes in geothermal reservoir pressure and temperature, including reduction or cessation of pumping until reservoir conditions are reestablished. Mitigation measures should be included in the recirculated EIR to compensate for loss of fisheries and for other ecological effects that would result from declines in thermal discharge, for example, until conditions in the reservoir are restored through management actions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Matt Hagemann".

Matt Hagemann, P.G., C.Hg.

U.S. Geological Survey
California Water Science Center
6000 J Street, Placer Hall
California State University
Sacramento, California 95819-6129
Phone: (916) 278-3000 Fax: (916) 278-3070
<http://water.wr.usgs.gov>

Mr. Daniel L. Lyster, Director
Mono County Economic Development Department
Post Office Box 2415
Mammoth Lakes, California 93546

Baseline Hydrologic Monitoring Plan

I. Surface water discharge and water-quality measurements

- A. Discharge measurements will be made and water samples collected quarterly at two sites on Mammoth Creek (stations 10265130 and 10265143). Annual (April) water samples will be analyzed for major ions, nutrients, arsenic, boron, fluoride, and lithium. Field measurements of water temperature, specific conductance, pH, and alkalinity will be made at the time of sampling. Quarterly (January, April, July, and October) water samples will be analyzed for dissolved chloride and boron concentrations; field measurements of water temperature and specific conductance will be made.
- B. Discharge measurements will be made quarterly at Hot Creek above Gorge Geyser near Mammoth Lakes (station 10265147).
- C. Discharge measurements will be made quarterly at the Hot Creek flume near Mammoth Lakes (station 10265150).
- D. Water quality samples will be collected quarterly at stations 10265147 (HCA) and 10265150 (HCF). The samples will be analyzed for dissolved chloride and boron concentrations and the data will be used to estimate thermal spring discharge in Hot Creek Gorge.

II. Spring flow and water-quality measurements

- A. Continuous stage and water temperature measurements will be recorded at the Fish Hatchery Spring groups, AB, CD, and H-2, 3. Stage will be used to compute daily mean flow rates. Discharge ratings will be confirmed by making meter measurements as required. Water samples will be collected annually at spring groups AB, CD, and H-2, 3, these will be analyzed for major ions, nutrients, arsenic, boron, fluoride, and lithium. Field measurements of water temperature, specific conductance, pH, and alkalinity will be made at the time of sampling. Quarterly (January, April, July, and October) water samples will be collected at AB and CD - these samples will be analyzed for dissolved chloride and boron and field measurements of specific conductance and water temperature will be made.
- B. Water samples from a thermal spring in Hot Creek gorge will be collected and analyzed quarterly for dissolved boron, chloride, water temperature, and specific conductance.

III. Ground-water levels

Quarterly ground-water level measurements will be made in wells CH10B and LV-19.

IV. Precipitation data

Daily precipitation records provided by USFS for a site near the Mammoth Ranger Station in Mammoth Lakes will be tabulated.

V. Methods

Field data collection will be carried out following standard USGS methods. All laboratory analyses of water samples will be done at the USGS National Water Quality Laboratory in Denver, Colorado.

VI. Reporting

Preliminary USGS data summaries, compiling the above described data, will be provided to the Long Valley Hydrologic Advisory Committee on a bi-annual basis. All data collected under this monitoring plan will be entered into the USGS National Water Information System (NWIS) database.



2503 Eastbluff Dr., Suite 206
Newport Beach, California 92660
Tel: (949) 887-9013
Fax: (949) 717-0069
Email: mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization
Industrial Stormwater Compliance
CEQA Review
Investigation and Remediation Strategies
Litigation Support and Testifying Expert**

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.

B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certification:

California Professional Geologist

California Certified Hydrogeologist

Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – present;
- Senior Environmental Analyst, Komex H₂O Science, Inc (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Partner, SWAPE:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of numerous environmental impact reports under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions and geologic hazards.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Technical assistance and litigation support for vapor intrusion concerns.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.
- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nationwide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt currently teaches Physical Geology (lecture and lab) to students at Golden West College in Huntington Beach, California.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Colorado.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and Hagemann, M., 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal representatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and Hagemann, M.F. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukunaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.