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November 10, 2008

Siskiyou County Board of Supervisors
Siskiyou County Court House
311 Fourth Street
P. O. Box 750
Yreka, CA 96097

Re: Appeal of Planning Commission's Certification of Environmental Impact Report and Approval of a Conditional Use Permit (#UP-06-20) for the Roseburg Forest Products Biomass Cogeneration Plant in Weed, CA

Honorable Supervisors,

Per request by Dale LaForest of Mt. Shasta Tomorrow, I have reviewed documents related to the certification of the Final Environmental Impact Report ("EIR") under the California Environmental Quality Act ("CEQA") and approval of a Conditional Use Permit for the proposed 15-Megawatt Roseburg Biomass Cogeneration Plant ("Project") in Weed, CA. My comments below discuss the inadequacy of the EIR and identify significant unmitigated impacts on air quality and public health that would result from the Project's operation if it were permitted and operated as proposed.

Qualifications as an Environmental Consultant

My qualifications to perform this review include a Doctorate in Environmental Science and Engineering from the University of California Los Angeles and over 10 years of consulting practice in the environmental field. I have extensive experience in reviewing air quality and public health components of CEQA documents and air permits on behalf of public agencies and private entities and have reviewed numerous cogeneration plants, including biomass-fired facilities. My resume is attached.

I. The EIR Fails to Identify and Adequately Mitigate Significant Adverse Impacts on Air Quality Resulting from Project Operational Emissions

The EIR assesses the impacts on air quality that would result from operation of the cogeneration plant and its associated activities due to emission increases of toxic air contaminants ("TACs"), hazardous air pollutants ("HAPs") and criteria air pollutants including particulate matter equal to or smaller than 10 micrometers ("PM10") and equal to or smaller than 2.5 micrometers ("PM2.5" or "fine particulate matter"), sulfur dioxide ("SO_2"), carbon monoxide ("CO"), and the ozone precursors nitrogen oxides

("NOx") and reactive organic gases ("ROG"). As discussed below, the EIR's assessment of the Project's future impacts on air quality is technically flawed and relies on an improper environmental baseline and erroneous assumptions. As a result, the EIR fails to identify and adequately mitigate the significant adverse impacts on air quality that would result from operation of the cogeneration facility.

I.A The EIR Relies on an Improper Baseline for Determining Net Daily Emission Increases from Project Operations

The EIR assesses the Project's operational impacts on air quality due to the net emission increases from stationary sources (including the boiler, the cooling tower, and fugitive dust emissions from storage piles, truck drop, and paved and unpaved roads) and mobile sources. The EIR calculates net emission increases from these sources as the difference between the post-modification potential to emit ("PTE"), *i.e.* the hypothetical maximum future emissions from the modified facility, and a baseline assuming the pre-modification PTE for the facility:[1]

$$\text{Project net emission increases}_{\text{DEIR}} = (\text{PTE}_{\text{post-modification}}) - (\text{PTE}_{\text{pre-modification}})$$

However, the PTE baseline used by the EIR to determine net emission increases, *i.e.* the hypothetical maximum emissions previously permitted by the Siskiyou County Air Pollution Control District ("SCAPCD" or "District"), is improper for purposes of CEQA review. The correct and commonly used baseline for environmental review under CEQA is represented by the actual pre-modification emissions from the facility. The net increase of emissions from the Project then is the difference between the post-modification PTE and the actual emissions from the pre-modification facility:

$$\text{Project net emission increases}_{\text{Actual}} = (\text{PTE}_{\text{post-modification}}) - (\text{Actual Emissions}_{\text{pre-modification}})$$

The use of actual emissions from a facility rather than its previously permitted PTE as the correct baseline for CEQA review was affirmed by a recent court decision, which was published on January 16, 2008, more than three months before the Draft EIR for the Project was released. In this case, the California Second District Court of Appeal rejected the environmental review of an oil refinery project because the lead agency used an improper baseline for evaluating impacts on air quality. The court ruled that instead of relying on the refinery's permitted level of nitrogen oxides emissions for the baseline, the air district should have used the actual level of emissions, which was less than half the permitted amount. In reaching this conclusion, the Court attempted to reconcile two lines of reported CEQA decisions concerning the baseline issue and adopted the following standard: "*…a project[']s baseline is normally comprised of the existing environmental setting[,] not what is hypothetically allowed pursuant to existing zoning*

[1] *See* Draft EIR, Appendix C "Air Quality Technical Report", Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-14: Emissions Summary, Footnote (1).

or permitted plans. Where prior environmental review has occurred, though, the existing environmental setting may include what has been approved following CEQA review."[2] There has been no prior CEQA review for the currently permitted PTE for either the boiler or the facility in general. Thus, the EIR should have used the actual pre-modification emissions from the rather than the hypothetical pre-modification PTE to determine net Project emissions increases.

The Mount Shasta Bioregional Ecology Center commented on the Draft EIR's improper use of the PTE as the baseline stating that calculations of the boiler's net emissions increase "should be based on existing *actual* emissions as a starting point, not the *potential* to emit of the boiler because the existing boiler operations are not operating at its full capacity."[3] The Final EIR entirely ignored this comment and its implications for the significance of the Project's impacts on air quality under CEQA.[4]

It could be argued that the Applicant had unlawfully piecemealed CEQA review in the past when it installed a boiler that had excess capacity.

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[2] *See Communities for a Better Environment v. South Coast Air Quality Management District;* http://www.courtinfo.ca.gov/opinions/revpub/B193500.PDF, accessed November 10, 2008.

In this case, the court clarified the appropriate baseline for environmental review, finding that the appropriate baseline for a refinery modification project was actual, not permitted, emissions. Communities for a Better Environment ("CBE") challenged the SCAQMD's approval of modifications to an oil refinery. The refinery's permit allowed it to emit a certain level of NOx; however, as of 2003 actual NOx emissions from the plant had declined such that the plant was emitting less than 50 percent of its initial permitted limit. SCAQMD acknowledged that the project could generate an increase in emissions that exceeded the CEQA threshold; however, using the permitted level of emissions as the baseline, SCAQMD reasoned that the increased emissions that could be generated by the project would still be less than the baseline level and, thus would not result in a significant impact to the environment.

In addressing CBE's claims of an improper baseline, the Court evaluated two lines of cases: *San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, where the court found that the proper baseline was actual operations, as opposed to permitted operations, and *Fairview Neighbors v. County of Ventura* (1999) 70 Cal.App.4th 238, where the court found the proper baseline to be the projected activity when the project operates at full capacity. The court in *CBE v. SCAQMD* reconciled the decisions by noting that the *Fairview Neighbors* cases had all involved prior environmental review, unlike the *San Joaquin Raptor Rescue* cases. In applying this standard to the refinery project, the court held that SCAQMD should have used existing emissions as a baseline for evaluation, rather than permitted emissions. Since there was no evidence of prior environmental review, the court analogized the circumstances to those of *San Joaquin Raptor Rescue* rather than the *Fairview Neighbors* line of cases.

[3] Michelle Berditschevsky, Mount Shasta Bioregional Ecology Center, Letter to Terry Barber, Siskiyou County Department of Public Health & Community Development, Planning Division, Re: Public Comment on Draft Environmental Impact Report for Roseburg Biomass Cogeneration Plant in Weed, CA, Project # UP-07-05, July 18, 2008, Comment OG1-9; *emphasis* retained.

[4] Final EIR, Response to Comment OG1-9, p. 2-27.

I.B Actual Pre-modification Emissions Are Considerably Lower than Previously Permitted PTE

The EIR's calculation of pre-modification emissions from the boiler were based on a maximum potential steaming rate of 120 thousand pounds of steam per hour ("Mlbs steam/hour") corresponding to a maximum heat input of 169.74 million British thermal units per hour ("MMBtu/hr").[5] However, review of available information indicates that for the past few years the boiler has operated considerably below capacity. At full capacity, *i.e.* a steaming rate of 120 Mlbs steam/hr, the boiler is capable of a maximum annual steam production of 1,051,200 thousand pounds of steam per year ("Mlbs steam/year"). The reported steam production in the past three years was 573,443 Mlbs steam/year in 2004,[6] 570,584 Mlbs steam/year in 2005,[7] and 531,751 Mlbs steam/year in 2006,[8] for a three-year average of 558,593 Mlbs steam/year, or 53 percent of the maximum potential steam production.[9] Emissions from the boiler are directly proportional to the steam production; thus, actual three-year average emissions from the pre-modification boiler are only 53 percent of the maximum PTE used by the EIR as the baseline. Pre-modification emissions from other sources (fugitive dust) are analogously overestimated. Therefore, the net emissions increases due to Project operations are about twice as high as estimated by the EIR.

I.C Project Net Daily Emission Increases Exceed SCAPCD Significance Thresholds for New and Modified Stationary Sources

The EIR compares the Project's net daily emission increases (calculated based on the pre-modification PTE) to the significance thresholds for criteria pollutant emissions from new or modified stationary sources established by District Rule 6.1. Based on this improper emissions baseline, the EIR finds that Project net daily emission increases would not exceed the District's significance thresholds and would therefore not be significant. This conclusion is incorrect as demonstrated in Tables 1A through 1C below.

Table 1A summarizes average actual (pre-modification) boiler emissions for the years 2004 and 2005 as reported in the application for the authority to construct ("ATC"), submitted to the District in 2006, and the fugitive dust emissions as presented

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[5] *See* Draft EIR, Appendix C "Air Quality Technical Report", Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-8: Boiler Pre-Modification PTE, Notes (a) and (b) and Reference (3).

[6] SECOR International Incorporated, Final Authority to Construct Application for Boiler Turbine Project, Roseburg Forest Products, Weed Veneer Facility, August 16, 2006, Appendix A, Table 3.

[7] *Ibid*, Appendix A, Table 4.

[8] Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-10: Material Handling Truck Drop Point Pre-Modification PTE.

[9] (558,593 Mlbs steam/year) / (1,051,200 Mlbs steam/year) = **0.53**.

in the EIR without changes. Table 1B summarizes the potential future (post-modification) emissions from the boiler, cooling tower, and fugitive dust sources as presented in the EIR without any changes. Table 1C compares the net increase of criteria pollutant emissions, *i.e.* the difference between the post-modification and pre-modification emissions, to the SCAPCD's thresholds.

Table 1A:
Actual (Pre-modification) Stationary Source Emissions*

Source	Criteria Pollutants (lbs/day)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Boiler (2004/2005 average)	25.1	23.2	54.8	358.9	835.3	37.3
Storage Piles	2.3	0.48				
Truck Drop	9.2E-03	1.4E-03				
Paved Road Dust	9.6	1.43				
Unpaved Road Dust	9.3	0.93				
Total	**46**	**26**	**55**	**359**	**835**	**37**

* 2004/2005 Average boiler emissions from SECOR, Final Authority to Construct Application for Boiler Turbine Project, Roseburg Forest Products, Weed Veneer Facility, Weed, CA, August 16, 2006, Table 5: Daily Net Emissions Increase, Roseburg Forest Products, Weed, California Veneer Facility (PM2.5 calculated as 92.7% of PM); all other emissions from Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-14: Emissions Summary

Table 1B:
Proposed Future (Post-modification) Stationary Source Potential to Emit*

Source	Criteria Pollutants (lbs/day)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Boiler	61	57	136	846	2,044	92
Cooling Tower	3.8	2.3				
Storage Piles	3.1	0.64				
Truck Drop	1.2E-02	1.8E-03				
Paved Road Dust	80	12				
Unpaved Road Dust	83	8.3				
Total	**231**	**80**	**136**	**846**	**2,044**	**92**

* All emissions from Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-14: Emissions Summary

Table 1C:
Net Increase Stationary Source Emissions -
SCAPCD New Source Siting Thresholds for New or Modified Stationary Sources

	Criteria Pollutants (lbs/day)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Daily Net Emissions Increase*	185	54	81	487	1,209	55
New Source Siting Threshold	250	250	250	250	2,500	250
Exceeds Threshold?	**no**	**no**	**no**	**YES**	**no**	**no**

* Daily Net Emissions Increase = (Proposed Future (Post-modification) Stationary Source Potential to Emit) – (Actual (Pre-modification) Stationary Source Potential to Emit)

Table 1C demonstrates that net emission increases from the Project's stationary sources based on actual annual (pre-modification) emissions as the baseline would exceed the District's significance threshold for NOx. This is a significant impact on air quality that was not identified in the EIR and that was not properly mitigated.

Emissions of ozone precursors such as NOx and ROG from the Project's stationary and mobile sources will further aggravate the existing ozone problems in the region and impede the region's progress towards compliance with the state 8-hour ambient air quality standard for ozone for which the Northeast Plateau air basin is currently in non-attainment.[10]

I.D The Facility Is A Major Source and Project Emissions Exceed the PSD Significant Increment Thresholds Requiring PSD Review

The facility is located in a federal attainment area for all criteria pollutants, thus potentially requiring review under the federal Clean Air Act's Prevention of Significant Deterioration ("PSD") provisions. The EIR contends that the Project, i.e. the modifications to the existing facility, is not subject to PSD review because criteria pollutant emissions from the proposed modifications would not exceed the 250 tons per year threshold.[11] This assessment is flawed and its conclusion is erroneous. A modification is subject to PSD review if a) the existing facility that is modified is a major stationary source exceeding the major source threshold (in this case 250 tons/year) or the modification by itself exceeds the major source threshold *and* b) the net emissions increase due to the modification is significant, *i.e.* exceeds the PSD significant emission rates set forth in 40 CFR 52.21(b)(23) (25 tons/year for PM, 15 tons/year for PM10, 10 tons/year for PM2.5, 40 tons/year for SO_2, 40 tons per year for NOx, 100 tons/year for CO and 40 tons/year for ROG).

The EIR failed to determine whether the existing facility is a major stationary source for purposes of PSD review. The EIR contains no information regarding emissions from all sources at the existing facility including the veneer dryers. However, the existing boiler, pre-modification, is by itself a major source because its PTE exceeds the 250 tons per year ("ton/year") threshold under 40 CFR 21.21(b)(1)(i) for emissions of criteria pollutants in attainment areas.[12] This is confirmed by a comment letter submitted by the U.S. Environmental Protection Agency which stated that the existing facility is an existing major stationary source subject to PSD review due to CO emissions from the existing pre-modification boiler.[13]

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[10] *See* Draft EIR, Table 3.2-1, p. 3.2-9.

[11] Draft EIR, p. 3.2-3.

[12] Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-8: Boiler Pre-Modification PTE:
(CO PTE from existing facility: 1,535 lb/day) × (365 days/year) / (2,000 lbs/day) = **280.14 ton/year**.

[13] Gerardo Rios, U.S. Environmental Protection Agency, Letter to Eldon Beck, Siskiyou County Air Pollution Control District, Re: Draft Authority to Construct Permit for Roseburg Forest Products, September 11, 2008.

As a result, the net increase in emissions from the Project, calculated as the difference between the baseline actual pre-modification emissions and the future post-modification PTE, must be compared to the above discussed PSD significant emission rates. Based on the daily emission rates presented in Tables 1A through 1C, the annual net increase of emissions from the Project can be calculated as follows:

Table 2A:
Current (Pre-Modification) Stationary Source Potential to Emit*

Source	Criteria Pollutants (tons/year)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Boiler	8	8	19	120	280	13
Cooling Tower						
Storage Piles	0.4	0.09				
Truck Drop	1.7E-03	2.6E-04				
Unpaved Road Dust	1.7	0.17				
Total	**11**	**8**	**19**	**120**	**280**	**13**
PSD Major Stationary Source Threshold	250	250	250	250	250	250
Exceeds Threshold?	**no**	**no**	**no**	**no**	**YES**	**no**

* 2004/2005 Average boiler emissions from SECOR, Final Authority to Construct Application for Boiler Turbine Project, Roseburg Forest Products, Weed Veneer Facility, Weed, CA, August 16, 2006, Table 5: Daily Net Emissions Increase, Roseburg Forest Products, Weed, California Veneer Facility (PM2.5 calculated as 92.7% of PM); all other emissions from Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-14: Emissions Summary, Project Related Criteria Pollutant Emissions, Roseburg Forest Products, Weed, California; multiplied by 365 days/year and divided by 2,000 lbs/ton

Table 2B:
Proposed Future (Post-Modification) Stationary Source Potential to Emit*

Source	Criteria Pollutants (tons/year)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Boiler	12	11	25	238	404	17
Cooling Tower	0.7	0.4				
Storage Piles	0.6	0.12				
Truck Drop	2.2E-03	3.3E-04				
Unpaved Road Dust	15	1.5				
Total	**29**	**13**	**25**	**238**	**404**	**17**

* Emissions from Draft EIR, Appendix C "Air Quality Technical Report", Appendix C "Project Criteria Pollutant Emission Increase Calculations", Table C-14: Emissions Summary, Project Related Criteria Pollutant Emissions, Roseburg Forest Products, Weed, California; multiplied by 365 days/year and divided by 2,000 lbs/ton; NOx emissions divided by (1-SNCR control efficiency/100) to exclude control efficiency of SNCR

Table 2C:
Potential to Emit Net Increase -
PSD Significant Emission Rates

	Criteria Pollutants (tons/year)					
	PM10	PM2.5	SO_2	NOx	CO	ROG
Increase	18	5	6	117	124	4
PSD Significant Emission Rate	15	10	40	40	100	40
Exceeds Threshold?	**YES**	**no**	**no**	**YES**	**YES**	**no**

Table 2C demonstrates that Project modifications would exceed the PSD significant emission rates for PM10, NOx and CO and would therefore constitute a major modification under the PSD provisions. The EIR fails to identify the applicability of PSD. Sources subject to PSD must apply best available control technology ("BACT") to all emissions sources at the facility. As discussed in Comment II, the control technology for NOx emissions proposed for the Project boiler does not constitute BACT and no additional controls are proposed for PM10 and CO emissions from the boiler. It is unlikely that the existing PM10 and CO controls constitute BACT. As discussed in Comment II.C, the cooling tower drift eliminators also do not constitute BACT.

I.E The EIR Fails to Demonstrate that the Project Would Not Result in Exceedances of Ambient Air Quality Standards

Based on the criteria set forth in Appendix G of the CEQA Guidelines[14] the Project would have a significant effect on air quality if it would a) violate any air quality standard or contribute substantially to an existing or projected air quality violation and b) expose sensitive receptors to substantial pollutant concentrations. The EIR does not provide ambient air quality modeling to demonstrate that ambient air quality standards for criteria pollutants would not be exceeded but rather determines significance of net emissions increases due to the Project based on two thresholds: a) comparison of stationary source emissions to the SCAPCD stationary source siting or modification thresholds of 250 lb/day net increase of criteria pollutants or their precursors (with the exception of CO: 2,500 lb/day) set forth in SCAPCD Rule 6.1; and b) comparison of mobile source emissions to the federal *de minimis* emission thresholds for conformity determinations related to transportation plans, programs, or projects, etc. of 548 lb/day (calculated from 100 tons/year) for criteria pollutant emissions in maintenance areas. Not triggering these thresholds is not a guarantee that ambient air quality standards would not be exceeded.

The Project site is located approximately 250 feet north of residences[15], which is unusually close for this type of project. In such cases, EIR's typically determine significance by modeling the concentrations of criteria pollutants ambient air quality resulting from project emissions to determine whether the project would expose sensitive receptors to substantial pollutant concentrations. Considering the proximity of residences to the Project site, the lack of such modeling is inexcusable and suspicious.

[14] 14 CCR 15000 *et seq*.

[15] Draft EIR, Appendix B, Initial Study Checklist, p. 17.

I.F The EIR Underestimates Post-Modification Emissions of PM10, PM2.5 and CO from the Boiler

Once the new superheat is installed, the boiler is capable of generating a peak steaming rate of 130 Mlbs steam/hr.[16] Yet the EIR's emission estimates from the post-modification boiler for PM10, PM2.5 and CO rely on a steaming rate of 120 Mlbs steam/hr.[17] Emissions calculations for the Project must be based on the maximum potential to emit. Using a peak steaming rate of 130 Mlbs steam/hr, PM1 emissions increase by 5.1 pounds per day ("lbs/day"), PM2.5 emissions increase by 4.7 lbs/day, and CO emissions increase by 170.3 lbs/day.

I.G The EIR Fails to Identify the Reducing Agent for the SNCR and Fails to Quantify and Evaluate Ammonia Slip

The Project would use SNCR to control NOx emissions from the boiler. There are two types of SNCR processes. The first technique is known as ammonia-based SNCR since it utilizes either anhydrous or aqueous ammonia which is injected into the flue gas; the second technique is known as urea-based SNCR since it utilizes urea as the reducing agent injected into the flue gas. The EIR contains no indication whatsoever whether ammonia or urea would be used as reducing agent. The SCAPCD's Draft ATC also does not contain any information about the type of reducing agent that would be used for the Project's SNCR system. This type of information must be provided in the project description; its absence renders the EIR legally deficient.

Anhydrous ammonia is classified as hazardous, toxic, and dangerous for the environment. It requires a hazardous safety permit when transported in quantities greater than 3,500 gallons. If anhydrous ammonia is to be used as reducing agent for the SNCR, a risk management plan must be developed for its transport, storage, and use unless the County explicitly requires the company to use either aqueous ammonia or urea.

With SNCR technology, the reagent is generally injected within the boiler superheater and reheater radiant and convective regions where the combustion gas temperature is at the required temperature range. When the reagent (ammonia or urea) is injected into the hot flue gas, it reacts with the NOx converting it to nitrogen gas and water vapor. A side effect of SNCR technology is that, in practice, a small amount of ammonia passes through the SNCR system, commonly called "ammonia slip." Ammonia slip from SNCR systems occurs either from injection at temperatures too low for effective reaction with NOx or from over-injection of reagent leading to uneven

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[16] Foster Wheeler Canada Limited, Letter to G. Roberts, Re: NOx Emissions from the FWCL SF Type, Wood-fired boiler, Weed, CA, FWCL Order No. 6457-4693; Original C/2-78-3288, December 6, 2006.

[17] Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-1: Boiler Post-Modification PTE, Note (b).

distribution. Controlling ammonia slip in SNCR systems is difficult since there is no opportunity for effective feedback to control reagent injection. Accurate and inexpensive in-situ ammonia monitors are available and should be required for the Project to avoid excessive emissions. An initial source test, as proposed in the SCAPCD's Draft ATC is insufficient to verify ammonia slip emissions and detect deterioration of the system.[18] Further, the SDAPCD's Draft ATC limits ammonia to 25 ppm on an uncorrected basis[19], considerably higher than the typically observed 10 ppm.[20] This excessively high ammonia slip would unnecessarily expose residents to this toxic air contaminant ("TAC") and increase the particulate matter concentrations in the ambient air due to formation of secondary particulates.

Ammonia absorption into the fly ash may also affect the disposal or reuse of the ash. The EIR currently proposes to sell the fly ash as certified organic to organic farmers for soil enhancement.[21] The EIR fails to address the potential ammonia content of the fly ash or other disposal options in case the fly ash may no longer be feasible as an organic soil amendment.

Finally, the EIR failed to quantify ammonia slip from the SNCR system. Ammonia is a TAC that must be included in the evaluation of acute and chronic non-cancer risks. Further, ammonia slip downstream of the SNCR can react with SO_3, NO_2, and water vapor present in the stack gases and downwind in the atmosphere to form secondary particulate matter including ammonium sulfate, ammonium bisulfate, and ammonium nitrate. This additional secondary particulate matter has not been included in the EIR's emissions estimates.

I.H The EIR's Health Risk Assessment Is Based on Industry-Generated Emission Factors that Are Not Conservative

The Draft EIR based the calculation of TAC emissions on emission factors generated by the National Council for Air and Stream Improvement ("NCASI"), a research organization supported by the forest products industry[22] rather than using factors published by the U.S. EPA in its *Compilation of Air Pollutant Emission Factors* ("AP-42"). In general, the U.S. EPA's AP-42 factors tend to be higher than NCASI

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[18] County of Siskiyou, Air Pollution Control District, Authority to Construct, Roseburg Forest Products, ATC-040208-B, Condition 26.

[19] *Ibid*, Condition 25.

[20] David Wojichowski, SNCR System – Design, Installation, and Operating Experience; http://www.netl.doe.gov/publications/proceedings/02/scr-sncr/wojichowskisystemsummary.pdf, accessed November 10, 2008.

[21] Draft EIR, p. 3.4-9.

[22] Draft EIR, Appendix C "Air Quality Technical Report," Appendix D "Project Toxic Air Contaminant Emission Increase Calculations," Table D-1: Boiler Post-Modification PTE, Emissions.

factors for most pollutants. The industry-generated standards are frequently rejected by permitting agencies in the interest of providing a conservative analysis.[23]

The EIR calculated a total of 10.0 tons per year ("tons/year") of toxic air contaminant emissions, of which 5.6 tons/year are listed by the U.S. EPA as hazardous air pollutants ("HAP"). Based on the AP-42 emission factors, emissions of toxic air contaminants would be considerably higher. For example, the emissions of hydrogen chloride, reported by the EIR as 0.66 tons/year based on the NCASI emission factor, would increase to 18.81 tons/year based on the AP-42 emission factor.[24] Thus, emissions of hydrogen chloride from the boiler would exceed the 10 tons/year National Emissions Standards for Hazardous Air Pollutants ("NESHAP") established under the Clean Air Act's Title III, requiring maximum achievable control technology ("MACT") for the boiler. Total HAPs would exceed the 25 ton/year NESHAP. Exceedance of these thresholds indicates that the Project would result in significant health impacts. Therefore, the EIR's health risk assessment should be revised based on the more conservative AP-42 emission factors.

I.I The EIR's Health Risk Assessment Fails to Include a Number of Toxic Air Contaminants

The EIR failed to quantify several toxic air contaminant emissions contained in the boiler exhaust gases and consequently, failed to include these TACs in its health risk assessment. These TACs include ammonia slip from the SNCR system, chlorine, and polychlorinated dibenzo-p-dioxins ("PCDD").[25] PCDDs are potent carcinogens, which are formed by incomplete combustion. While dioxin emissions from boilers firing clean wood are considerably lower compared to boilers burning treated, plywood, hardboard, or construction and demolition wood,[26] they must nonetheless be included in the health

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[23] *See, for example*, Hawaii Department of Health, Permit Application Review, Covered Source Permit (CSP) No. 0625-01-N, Application No. 0625-01, Applicant: Tradewinds Forest Products, LLC, Facility Name: O'okala Veneer Mill, p. 9; http://www.tradewindsforestproducts.com/documents/Tradewindspermitdraftpdf_000.pdf, accessed November 12, 2008.

[24] (AP-42 emission factor for hydrogen chloride: 1.9E-02 lb/MMBtu) × (226 MMBtu/hr) × (8,760 hours/year) / (2,000 lb/ton) = **18.81 ton/year**.

[25] Draft EIR, Appendix C "Air Quality Technical Report," Appendix D "Project Toxic Air Contaminant Emission Increase Calculations," Table D-1: Boiler Post-Modification PTE, Emissions.

[26] Vic Uloth, Tim Whitford, and Ron van Heek, Dioxin and Furan Emission Factors for Wood Waste Incinerators, December 23, 2002; http://www.ec.gc.ca/pdb/npri/2002guidance/Emission_Factor_Report_for_Wood_Waste_Incinerators.pdf, accessed November 10, 2008.

risk assessment. The U.S. EPA's AP-42 for wood-fired boilers contains emission factors for these pollutants.[27]

I.J The EIR Fails to Evaluate Acute Non-Cancer Risks

The health risk assessment provided in the EIR evaluates excess cancer risk and chronic cancer risk. The evaluation of acute non-cancer risks is suspiciously absent from the EIR's health risk assessment. This lack of an assessment of acute non-cancer risks is particularly worrisome considering the proximity of the Project site to sensitive receptors.

I.K The EIR Fails to Identify Exceedances of State 24-hour PM10 Ambient Air Quality Standard

The Draft EIR presents ambient air quality monitoring data for 2004 through 2006 for the Northeast Plateau air basin. The Final EIR failed to update these data to include monitoring data for the most recent year, 2007, which was available at the time of the publication of the Final EIR. As a result, the Final EIR fails to identify the substantial exceedances of the national and California ambient air quality standards for PM10 that occurred in 2007. The federal 24-hour standard is set at 150 $\mu g/m^3$ and the California 24-hour standard is 50 $\mu g/m^3$. The highest measured concentration for the federal standard was 205 $\mu g/m^3$ on July 17, 2007.[28] The SCAPCD did not report any exceptional events such as wildfires for the year 2007.

II. Additional Mitigation for Project NOx Emissions Is Available

The EIR states that "SCAPCD Rule 6.1 requires that best available control technology for NOx be applied as part of the project. This will include selective non-catalytic reduction equipment to control emissions of NOx from the boiler. In addition, the project applicant has committed to installing filtration to control diesel particulate matter emissions from the fuel handling equipment (*i.e.*, Bobcat and front-end loader)."[29] As demonstrated in Comment I.C above, the proposed control technologies are not sufficient to reduce emissions to below the thresholds of significance requiring additional mitigation. Further, as discussed in the following comments, the proposed control technologies, the selective non-catalytic reduction ("SNCR") and diesel particulate filters ("DPF") do not constitute BACT.

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[27] U.S. Environmental Protection Agency, AP-42, Wood Residue Combustion in Boilers, September 2003, Table 1.6-3; http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s06.pdf, accessed November 10, 2008.

[28] California Air Resources Board, Air Quality Data Statistics, Highest Daily PM10 Measurements, Northeast Plateau Air Basin; http://arb.ca.gov/adam or http://snipurl.com/5d4uh, accessed November 10, 2008.

[29] Draft EIR, p. 3.2-27.

II.A Higher SNCR Control Efficiency for Boiler Exhaust Gas NOx Emissions Is Feasible

The EIR states that SNCR system would control NOx emissions from the boiler by a minimum of 35 percent.[30,31] This is not BACT and, as demonstrated in Comment I.C, fails to reduce emissions to below the SCAPCD's threshold of significance. Several agencies have recommended considerably higher control efficiencies for SNCR systems on wood-fired boilers. For example, the U.S. EPA indicates that selective catalytic reduction on wood-fired boilers can achieve NOx reductions of 50 to 70 percent.[32] The Massachusetts Department of Environmental Protection has published BACT guidance for biomass projects. The starting point for NOx BACT determinations for biomass combustion facilities with a capacity of 10 to 25 Megawatt ("MW") is suggested at 0.015 pounds per Million British thermal units ("lbs/MMBtu").[33] The proposed emissions rate from the 15-MW Project including the 35 percent SNCR control efficiency is 0.156 lbs/MMBtu[34], more than an order of magnitude higher. The Bay Area Air Quality Management District BACT Guideline dated August 5th, 1991, more than 15 years ago, determines NOx BACT achieved in practice for wood-fired boilers of all sizes with SNCR at 0.08 lb/MMBtu, about half of the proposed NOx emissions from the Project. Clearly, considerably higher control efficiencies can be achieved with SNCR systems on the Project's wood-fired boiler.

II.B Use of Regenerative Selective Catalytic Reduction System as Boiler Exhaust Gas NOx Control Is Feasible

The Final EIR states that a selective catalytic reduction system ("SCR"), reported to achieve NOx reductions as high as 95 percent, would not be effective for the Project because the boiler's exhaust gases would be too cool to utilize an SCR, which requires exhaust gas temperatures that exceed 400°F.[35] The SCAPCD stated that SCR was

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[30] Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-1: Boiler Post-Modification PTE.

[31] Final EIR, Response to Comment GP11-2, p. 2-22, and Response to Comment GP11-29, p. 2-24.

[32] U.S. Environmental Protection Agency, Emission Inventory Improvement Program, Technical Report Series, Volume 2, Point Sources, Chapter 2, Preferred and Alternative Methods for Estimating Air Emissions from Boilers. January 2001, Table 2.2-2, p. 2.2-17; http://www.epa.gov/ttn/chief/eiip/techreport/volume02/ii02.pdf, accessed November 10, 2008.

[33] James C. Colman, Assistant Commissioner, Bureau of Waste Prevention Memorandum, Massachusetts Department of Environmental Protection, to Biomass Energy Stakeholders, Re: BACT guidance for Biomass April 18, 2007; http://www.mass.gov/dep/air/laws/biombact.doc, last accessed November 10, 2008.

[34] Controlled boiler NOx emission factor = (uncontrolled boiler emission factor: 0.24 lbs/MMBtu) × (SNCR control efficiency: 1 – 35/100) = **0.156 lbs/MMBtu**.

[35] Final EIR, Response to Comment GP11-29, p. 2-24.

eliminated as a potential BACT option due to the high amounts of particulate matter contained in the exhaust stream which can foul the catalyst in an SCR unit.[36]

Commenting on the SCAPCD's Draft ATC for the Project, the California Air Resources Board ("CARB") and the U.S. EPA recommended evaluation of a new, patented NOx emission control technology, known as RSCR for the Project. RSCR designed for NOx reduction on tail-end, low-temperature applications and is a combination of a regenerative thermal oxidizer ("RTO") and a selective catalytic reduction system. This technology is applied downstream of the particulate control device. It uses large ceramic bed heat exchangers to bring the flue gas back up to 600 to 800°F for catalytic reduction in the RSCR system. The technology claims to have the potential to reduce NOx emissions by as much as 70 percent. RSCR technology has been installed on three existing biomass boilers in the U.S.:

- 15-MW Whitefield Power & Light, New Hampshire: Boiler uses whole tree chips as fuel and has operated since October 2004.
- 16-MW Bridgewater Power, New Hampshire: Boiler uses whole tree chips as fuel and has operated since October 2007.
- 50-MW Boralex Stratton, Maine: Boiler uses whole tree chips, waste wood, and construction and demolition fuel as fuel and has operated since December 2004.

These boilers have permitted pre-control NOx emission factors ranging from 0.25 lb/MMBtu to 0.28 lb/MMBtu. RSCR technology was installed on these boilers to qualify for the Connecticut Renewable Energy Credits, which require a NOx emission factor of 0.075 lb/MMBtu or less. This corresponds to a NOx reduction of about 70 percent.[37] Another application is scheduled to start up in October 2008 at the 54-MW Burlington Electric plant in Vermont. The unit in Vermont is targeting a NOx emission factor of 0.075 lb/MMBtu or less for the Massachusetts Renewable Energy Credit program.[38] In comparison, the proposed Project post-modification boiler NOx emission factor applying the 35 percent SNCR control efficiency is 0.156 lbs/MMBtu.

II.C Cooling Tower PM10 BACT

In cooling towers, some water is lost by droplets being carried out with the exhaust air, the so-called drift. To minimize this drift, cooling towers are typically

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[36] Siskiyou County Air Pollution Control District, Technical Review and Evaluation Report, Roseburg Forest Products Co., May 6, 2008, p. 3.

[37] (1-0.075/0.28) = **0.70**; (0.075/0.25) = **0.73**

[38] Michael Tollstrup, California Air Resources Board, Letter to Eldon Beck, Siskiyou County Air Pollution Control District, August 13, 2008.

equipped with baffle-like devices, so-called drift eliminators, to collect the droplets, thereby reducing particulate matter emissions. The Project proposes to use a cooling tower with a drift loss of 0.005 percent.[39] This is not BACT, which is required for the Project because of its significant PM10 emissions. (*See* Comment I.D) Considerably lower drift loss rates are routinely achieved at similar facilities and must be required for this Project. For example, the 16-MW Hemphill Power and Light facility in Springfield, New Hampshire, operates a cooling tower with a drift loss of 0.00088 percent.[40] The 20.6-MW Darrington Energy wood-fired cogeneration plant in Darrington, Washington, operates a cooling tower with a 0.001 percent drift loss.[41] The 25-MW wood-fired cogeneration Pinetree Power facility located in Tamworth, New Hampshire, operates a cooling tower with a 0.002 percent drift loss.[42]

II.D Control Technologies for Mobile Source NOx Emissions

There are a number of options available to cost-effectively reduce emissions from diesel-powered off-road equipment and trucks that could substantially reduce exhaust emissions from the Project's diesel-powered mobile sources. Both the CARB and the U.S. EPA maintain lists of recommended diesel retrofit alternatives and alternative fuels. Alternative fuels in combination with retrofit technologies or in new or rebuilt equipment can achieve emission reductions of up to 89% PM10, 90% CO, 93% ROG, and 40% NOx depending on the engine type of on-road or off-road equipment.[43,44] Refueling options include emulsified diesel, fuel-borne catalysts, compressed and liquefied natural gas, propane. Retrofit options include diesel oxidation catalysts, selective catalytic reduction, lean NOx catalysts, and exhaust gas recirculation.

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[39] Draft EIR, Appendix C "Air Quality Technical Report," Appendix C "Project Criteria Pollutant Emission Increase Calculations," Table C-2: Cooling Tower Post-Modification PTE.

[40] New Hampshire Department of Environmental Services, Engineering Calculation Sheet, Air Resources Division, Project Name: Hemphill Power and Light, Engineering Calculation Sheet-NHDES/ARD, Application Number: FY04-0171, August 30, 2005; http://www2.des.state.nh.us/OneStopPub/Air/3301900031FY04-0171TypeSummary.pdf, accessed November 10, 2008.

[41] Washington State Department of Ecology, Darrington Energy, LLC, Cogeneration Power Project, PSD-03-04; http://www.ecy.wa.gov/programs/air/psd/PSD_PDFS/PSD0304_final.pdf, accessed November 10, 2008.

[42] New Hampshire, Engineering Calculation Sheet, Air Resources Division, Project Name: Pinetree Power - Tamworth, Tamworth, NH, Title V Operating Permit (Renewal), June 20, 2005; http://www2.des.state.nh.us/OneStopPub/Air/3300300019FY04-0428TypeSummary.pdf, accessed November 10, 2008.

[43] U.S. Environmental Protection Agency, Voluntary Diesel Retrofit Program, Verified Products; http://www.epa.gov/otaq/retrofit/verif-list.htm, accessed November 10, 2008.

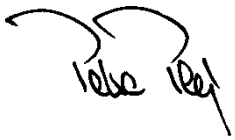
[44] California Air Resources Board, Currently Verified Technologies, http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm; accessed November 10, 2008.

III. Conclusion

As discussed in the Comments above, the EIR for the Roseburg Cogeneration Project is severely flawed and fails to identify and mitigate the significant impact on air quality resulting from the Project's emissions. There are numerous other flaws in the EIR which I was unable to address due to time constraints. To protect the air quality in Weed and the Northeast Plateau air basin, I recommend that the Board of Supervisors reverse the Planning Commission's September 30th, 2008 decision and request that deficiencies in the EIR be addressed and a revised EIR be recirculated for public review. As discussed, several options exist to substantially reduce emissions of criteria pollutants and toxic air contaminants from the Project which would reduce its impacts on the local and regional air quality and the health of Weed's residents and the residents of Siskiyou County.

Please do not hesitate to contact me with questions.

Sincerely,



Petra Pless, D.Env.

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Dr. Pless has over 10 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. This broad-based experience includes air quality and air pollution control; water quality, water supply, and water pollution control; biology; public health and safety; and noise studies. National Environmental Policy Act ("NEPA"), California Environmental Quality Act ("CEQA"), and Clean Air Act ("CAA") 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 in Biology, Technical University of Munich, Germany, 1991

PROFESSIONAL HISTORY

Pless Environmental Consulting, 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; attainment and non-attainment new source review ("NSR"), prevention of significant deterioration ("PSD") and Title V permitting; control technology analyses (BACT, LAER, RACT, BARCT, MACT); technology evaluations and cost-effectiveness analyses; criteria and toxic pollutant 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, hospitals, refineries, slaughterhouses, food processing facilities, printing facilities, quarries, and mines).
- 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.
- 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 NOx 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 NOx, 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 NOx 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 NOx 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, 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, 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 NOx 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 rule and in the Texas SIP.
- In support of several federal lawsuits filed under the Clean Air Act, prepared cost-effectiveness analyses for SCR and oxidation catalysts for simple cycle gas turbines and evaluated opacity data.
- 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 ("GIS").

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:

- 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 measured organochlorine pesticide concentrations at a U.S. naval air station are residuals from past applications of these pesticides consistent with manufacturers' recommendations. Retained as expert witness in legal proceedings.
- 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 studies to license new 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 licensing

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 European pesticide manufacturer.
- Designed and managed toxicological study on potential interference of delta-9-tetrahydro-cannabinol 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; developed sampling methodologies, coordinated field sampling, determined species abundance and distribution in intertidal zone, and analyzed data.
- 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.
- 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 plant fibers and conducted comparative life cycle assessments.
- Conducted and organized underwater surveying and mapping of plant species in several lakes and rivers in Sweden and Germany as ecological indicators for the health of limnological ecosystems.

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.)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals

SELECTED PUBLICATIONS

Leson G. and Pless P., Hemp seeds and hemp oil, in: Grotenhermen F. and Russo E. (Eds.), Cannabis und Cannabinoids, Pharmacology, Toxicology, and Therapeutic Potential, The Haworth Integrative Healing Press, New York, 2002.

Leson G., Pless P., Grotenhermen F., Kalant H., and ElSohly M., Evaluating the impact of hemp food consumption on workplace drug tests, Journal of Analytical Toxicology, Vol. 25, No. 11/12, pp. 1-8, 2001.

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Pless P., Technical and environmental assessment of thermal insulation materials from fiber crops, doctoral dissertation in Environmental Science and Engineering, University of California, Los Angeles, 2001.

Center for Waste Reduction Technologies in the American Institute of Chemical Engineers, Collaborative Biofilter Project, Technical Report, co-author with Leson G. of sections 'Compound Database,' 'Design Manual,' and 'Literature Database,' 1998.

Hantke B., Domany I., Fleischer P., Koch M., Pless P., Wiendl M., and Melzer M., Depth profiles of the kinetics of phosphatase activity in hardwater lakes of different trophic level, Archives Hydrobiologia, vol. 135, pp. 451–471, 1996.

Hantke B., Fleischer P., Domany I., Koch M., Pless P., Wiendl M., and Melzer M., P-release from DOP by phosphatase activity in comparison to P-excretion by zooplankton: studies in hardwater lakes of different trophic level, Hydrobiologia, vol. 317, pp. 151–162, 1996.

Pless P., Untersuchungen zur Phytoplanktonentwicklung im Herrensee (investigations on phytoplankton succession in an oligotrophic hardwater lake), Master of Science thesis in biology with focus on botany/ecology/limnology, Technical University of Munich, Germany, 1991; graduated with first class honors.