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10609

March 25, 1999

CALIFORNIA ENERGY COMMISSION
Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 98-AFC-1

Dear Sir/Madame:

Attached herewith for filing with the California Energy Commission are an original and 12 (twelve) copies of the attached Pittsburg District Energy Facility documents relating to the above-captioned project:

1. Prehearing Conference Statement
2. Witness and Exhibit List
3. Comments Upon Staff Assessment

Sincerely,

Allan J. Thompson
Representing
Pittsburg District Energy Facility, LLC

AJT:dmg
Attachments
Cc: Service List

STATE OF CALIFORNIA

Energy Resources Conservation
And Development Commission

In the Mater of:	)	
	)	
Application for Certification	)	Docket No. 98-AFC-1
For the Pittsburg District	)	
Energy Facility (PDEF)	)	
	)	

PITTSBURG DISTRICT ENERGY FACILITY
PREHEARING CONFERENCE STATEMENT

March 25, 1999

Allan J. Thompson
21 C Orinda Way #314
Orinda, CA 94563

Representing
Pittsburg District Energy Facility

STATE OF CALIFORNIA

Energy Resources Conservation
And Development Commission

In the Matter of:	)	
Application for Certification	)	
For the Pittsburg District	)	Docket No. 98-AFC-1
Energy Facility (PDEF)	)	
	)	

PITTSBURG DISTRICT ENERGY FACILITY
PREHEARING CONFERENCE STATEMENT

Pittsburg District Energy Facility (PDEF) herein files its Prehearing Conference Statement. Attached hereto is a copy of the PDEF comments upon the Staff Assessment, issued March 11, 1999. Applicant has discussed draft comments, which were offered in numerous areas, with Staff at the workshops (March 23 and 24) and believes that most issues have been resolved. Possible remaining issues are in the air quality area. Applicant requests that the Committee retain the schedule adopted in the Second Revised Schedule Order, with the exception of air quality which we request that the Committee hear last. We make this request to give Applicant and Staff additional time to consider the Bay Area Air Quality Management District Preliminary Determination of Compliance and to try to come to a mutually agreeable accommodation on the remaining issues, which are in the area of air quality.

1. Topics Ready for Hearings. Applicant believes that all issues are ready for hearing, with the exception of air quality. Attached hereto is an exhibit and witness list that shows the witnesses that Applicant will offer in all areas, again with the exception of additional air quality witnesses (discussed below). The following areas are ready for hearing along with Applicant's estimate of time required for hearing:

Topic Area	Time
Need Conformance	10 min
Air Quality	30 min
Public Health	10 min

Worker Safety and Fire Protection	10 min
Transmission Line Safety and Nuisance	10 min
Hazardous Material Management	10 min
Waste Management	10 min
Land Use	10 min
Traffic and Transportation	10 min
Noise	10 min
Visual Resources	30 min
Cultural Resources	10 min
Socioeconomic Resources	10 min
Biological Resources	10 min
Soil & Water Resources	10 min
Paleontologic Resources	10 min
Facility Design	10 min
Power Plant Reliability	10 min
Power Plant Efficiency	10 min
Transmission System Engineering	10 min
Alternatives	10 min
General Conditions Including Compliance Monitoring And Closure Plan	10 min

Air Quality. The Bay Area Air Quality Management District has issued the Preliminary Determination of Compliance. Applicant's cursory review indicates that the PDOC is acceptable. Applicant disagrees with three proposed conditions that the Staff wishes to impose on the project, but wishes additional time to attempt to resolve these issues.

If the air quality issues cannot be resolved, Applicant wishes to file air quality testimony on Staff's suggested Conditions of Certification prepared by the following:

David Parquet	ENRON
Sam Wehn	ENRON
Joan Heredia	URS Griener Woodward/Clyde
Undetermined	General Electric Co.
Undetermined	Donald, Lufkin, Jenrette

These witnesses will discuss Applicant's air quality assumptions, Enron management positions on the issues, the air quality impacts of agreeing to the conditions, the difficulty in obtaining vendor guarantees under the conditions and the difficulty in obtaining project financing under the conditions.

2. Disputes Requiring Adjudication. PDEF has major issues in the Air Quality area that it hopes to resolve. Applicant believes that all other issues have been resolved.

3. Exhibits, Witnesses and Topic Areas. See attached for list in addition to Section 1 above. Additionally, the PDEF would like to offer the testimony of Jeffrey Kolin, the Pittsburg City Manager, on community acceptance and support for the project.

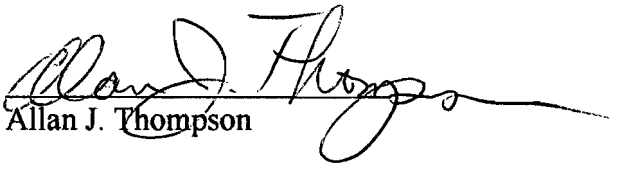
4. Project Schedule. We urge that all parties continue on the schedule of theCommittee's Second Revised Schedule, with the following exception:

Air Quality Testimony filed	April 19
Air Quality Rebuttal Testimony filed	April 23
Air Quality Hearings	May 4 & 5

This schedule allows the parties almost one month to review the BAAQMD PDOC and to attempt to settle the remaining issues.

Respectfully Submitted:

March 25, 1999



Allan J. Thompson

Representing
Pittsburg District Energy Facility

PITTSBURG DISTRICT ENERGY FACILITY
COMMENTS UPON STAFF ASSESSMENT

Applicant has reviewed the Staff Assessment for the Pittsburg District Energy Facility and submitted draft comments to the Assessment for review at the workshops held in Pittsburg on March 23 and 24. Staff evidenced a desire to reach closure on all issues with the exception of air quality, where no progress was made. Applicant herein reiterates its comments on air quality in the hopes that Staff will reconsider its position.

Major Issues of Concern. The discussion that starts with Commissioning and Operation on page 38 and extends to page 43 represents an attempt by Staff to replace Applicant's best knowledge of emissions and emission vendor guarantees with their own limits. These Staff limits do not result in any air quality benefit and will result in severely restricting or defeating attempts to finance the project. These limits are not likely to be recognized by the Bay Area Air Quality Management District and will threaten project financing and viability.

(1) P. 39 "Reduction of the maximum daily emission limits". Staff makes the argument that proposed BAAQMD permit limits are too high. The BAAQMD has primary responsibility for the administration of both federal and state air quality protection laws for stationary sources. Staff bases their arguments upon start-up and shut-down assumptions and a review of one and one-half years of data from a smaller plants, which are likely to have lower **lb/hr emission** than larger plants. Applicant is comfortable with its start-up and shut-down assumptions as it desires maximum operating flexibility for today's deregulated environment. Further, project financing will be dependent upon vendor guarantees. Emission limits lower than those contained in vendor guarantees will defeat financing on reasonable terms. Applicant hopes to operate the PDEF in a way that will produce emissions below the permitted limits, but cannot accept limits without guarantees or a mechanism that could impose limits without guarantees.

(2) P.42 "Reduction of the maximum annual Sox emission limits and establishment of reasonable quarterly emission limits." This is a similar issue in that Applicant estimated its SOx emissions based upon a fuel sulfur content provided by PG&E, the natural gas supplier for the project. This is the level that the utility provides as representing "pipeline quality gas". It may well be that gas provided to the PDEF will have a sulfur content below the 1 grain/100dscf PG&E estimate, but Applicant would be foolish to base its assumptions on anything other than the fuel specifications given by the fuel supplier. The Applicant may be able to accept this limit if Staff and the Commission can exercise its override authority over the BAAQMD and insulate PDEF from any emission violations that occur when PG&E delivers fuel with a sulfur content above the level assumed by Staff. If this assurance is not forthcoming, PDEF will resist Staff's attempt to set emission limits below those found reasonable by the BAAQMD under its

authority given by the US Clean Air Act. Applicant has no choice but to take the gas delivered by PG&E, at or below the sulfur level specified.

(3) P. 42 "Revision of maximum start-up and shutdown emissions based on source test results and actual 1-year operational data." Staff acknowledges that there will be no violations of ambient air quality standards, but wants a mechanism that would establish lower emission limits after one year of operations. This proposal is unacceptable as Applicant, and its sources of capital, believe that operations during years 2, 3, 4, 5 etc. may differ from operations in the first year. These differences could be caused by unit degradation, different operating scenarios, different fuel composition, catalyst efficiency and many other factors. Applicant cannot accept Staff's attempt to restrict its operations in this manner.

Comments to the SA.

(a) Page 19, First paragraph, last sentence. To our knowledge, there is no federal or state standard for PM2.5.

(b) Page 23, Last sentence on page. We believe there is insufficient data to support the statement that the Bay Area will be in non-compliance with the new ozone standard.

(c) Page 29, Table 1. To be consistent with air dispersion modeling and performed regulatory analysis, change CO emissions to 6800 lbs, the NOx emissions to 1360 lbs and delete the heading words "per gas turbine".

(d) Page 30, First sentence. Applicant used the Industrial Source complex Short Term 3 (ISCST3) model to perform the "screening analysis".

(e) Page 31, Table 3. Annual fuel consumption for GT1 and GT2 should be 32,800,000 MMBtu/yr. Annual fuel consumption for the boiler should be 399,000 MMBtu/yr. Total fuel consumption for the facility should be 32,900,000.

(f) Page 33, Table 4. Please provide detailed calculations on the derivation of the 1-hour NO2 . These values are different from what was assumed in the AFC and Applicant cannot replicate these numbers.

(g) Page 33, Project Commissioning Impacts, first sentence. Commissioning operations should take approximately five months, not two months.

(g) Page 35, Air Quality Table 6. The annual PM10 concentrations should be 0.35 ug/m3 and the annual SO2 concentration should be 0.01 ug/m3. In footnote *, please add that the boiler is also in operation. The maximum 8-hour CO impact is 4,214 ug/m3.

(h) Page 37, First full paragraph. This discussion should be amended to recognize that the EPA has given the BAAQMD authority to determine LAER. Without vendor guarantees, Staff's opinion is interesting , but should not be controlling.

(i) Page 37, Last paragraph. Please add language to reflect that the BAAQMD will require a 4 to 1 ratio for SOx to PM10.

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Witness and Exhibit List

Topic Area	Exhibit No.	Sec. No.	Document	Witness
Air Quality	1		Dispersion Modeling Protocol – 12/97	Heredia
Management	2		AFC – 6/98	
Management		1.0	Executive Summary	Wehn
		1.2	Project Need	Wehn
Engineering		1.3	Facility Location and Description	Wehn
Management		1.4	Project Schedule	Patch
Management		1.5	Project Ownership	Wehn
Env. Management		1.6	Summary of Environmental Impacts	Ray
Management		2.0	Project Objectives	Wehn
Engineering		3.0	Facility Description and Location	Patch
Management		3.1	Introduction	Patch
Engineering		3.2	Facility Location	Patch
Engineering		3.3	Project Site	Patch
Engineering		3.4	Power Plant Facility	Patch
Transmission		3.5	Transmission Lines	Patch
Engineering		3.6	Pipelines	Patch
Engineering		3.7	Project Construction	Patch
Operations		3.8	Plant Operations	Patch
Reliability		3.9	Reliability	Patch
Management		3.10	Facility Closure	Patch
Transmission		4.0	Proposed Facility Design	Patch
Transmission		4.1	Transmission and Interconnection Design Criteria	Patch
Safety		4.2	Safety Design Standards	Patch
Safety		4.2.1	Power Plant Site	Patch
Geology		4.2.1.1	Natural Hazards	Fenton
Geology		4.2.1.1.1.	Seismic Hazards	Fenton
			Liquefaction Potential	Fenton
Water		4.2.1.1.2	Flooding	Martin
Safety		4.2.1.2	Aviation Safety	Patch
Safety		4.2.1.2.1	Power Plant Stacks	Patch
Transmission		4.2.2	Transmission Line Health, Safety and Nuisance	Patch
Transmission		4.2.2.1	Transmission Line Characteristics	Patch
Transmission		4.2.2.2	Applicable Laws, Ordinances, Regulations and Standards (LORS)	Patch
Safety		4.2.2.3	Aviation Safety	Patch
Noise		4.2.2.4	Audible Noise and Radio/TV Interference	Patch

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
		5.7	Cultural Resources	Hatoff
		5.8	Paleontological Resources	Hatoff/Lawler
		5.9	Land Use	Barati
		5.10	Socioeconomics	Barati
		5.11	Traffic & Transportation	Reid
		5.12	Noise	Greene
		5.13	Visual Resources	Headley
		5.14	Waste Management	Morgan
		5.15	Hazardous Materials Handling	Morgan
		5.16	Public Health	Koehler
		5.17	Worker Safety	Clendening
		5.18	Cumulative Impacts	Barati
Water	30		PDEF Incoming Reclaimed Water & Estimated Discharge Quality Analysis (revised) –12/10/98	Patch
Air Quality	31		Air Quality Technical Appendix (revisions); BAAQMD Permit Application (revisions) —12/10/98	Heredia
Cultural Resources	32		Cultural Resources Technical Report (Confidential) – 12/11/98	Hatoff
Paleontological	33		Paleontological Resources Technical Report (Confidential) – 12/11/98	Hatoff/Lawler
	34		**Response to CEC Data Requests Dated 11/16/98, Docketed 12/14/98**	
Soils & Water	34.1		Response 4	Ray/Martin
Socioeconomics	34.2		Response 2	Barati
Socioeconomics	35		Property Owner Information – 12/15/98	Wehn
Transmission	36		115 kV Transition Configuration; 115 kV Duct Bank Cross Section – 2 Circuit – 12/29/98	Patch
	37		**Response to CEC Data Requests Dated August 24, 1998, Docketed 1/5/99**	
Transmission Line Safety & Nuisance	37.1		Response	Patch
Noise	37.2		Response	Greene
Engineering	37.3		Response	Patch
Air Quality	38		AFC Errata – 1/5/99	Heredia
Air Quality	39		Ltr. To CEC re: Air Quality Issues	Heredia

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
Soil	27.2		12.b, 12.c, 13.a, 13.b, 14, 15, 16, 17, 18.a, 18.b, 18.c, 19.a, 19.b, 20.a, 20.b, 20.c, 20.d, 21, 22.a, 22.b, 22.c, 22.d, 22.e, 23.a, 23.b, 23.c, 23.d, 23.e, 23.f, 24.a, 24.b, 24.c, 24.d, 24.e, 25, 26, 27.a, 27.b, 27.c, Responses 28, 29, 30, 31, 32, 33.a, 33.b, 34, 35.a, 35.b, 36, 37.a, 37.b, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47.a, 47.b, 48.a, 48.b, 48.c, 48.d, 49.a, 49.b, 49.c, 49.d, 50, 51.a, 51.b, 51.c, 52.a, 52.b, 52.c, 53,	Ray
Air Quality	27.3		Responses 47.a, 47.b, 48.a, 48.b, 48.c, 48.d, 49.a, 49.b, 49.c, 49.d, 50, 51.a, 51.b, 51.c, 52.a, 52.b, 52.c, 53, 54,a-c, 54.d, 54.e, 55.a, 55.b, 55.c, 56, 57.a, 57.b, 58.a, 58.b, 58.c, 58.d, 58.e, 59, 60,	Heredia
Transmission	27.4		Responses 61, 62, 62.a, 62.b, 63, 64.a, 64.b, 64.c, 64.d, 64.e, 64.f, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75	Patch
Transmission	28		Preliminary Facilities Study – 12/4/98, Docketed 12/7/98	Patch
Supplement to AFC for PDEF	29		Supplement to AFC – 12/7/98	
		1.0	EXECUTIVE SUMMARY	Wehn
		1.1	Introduction	Wehn
		1.2	Facility Location and Description	Patch
		1.3	Summary of Environmental Impacts	Ray
		2.0	PROJECT OBJECTIVES	Wehn
		3.0	FACILITY DESCRIPTION & LOCATION	Patch
		4.0	PROPOSED FACILITY DESIGN	Patch
		4.2	Safety Design Standards	Patch
		4.2.1	Power Plant Site	Patch
		5.0	ENVIRONMENTAL INFORMATION	
		5.2	Air Quality	Heredia
		5.3	Geologic Hazards and Resources	Fenton
		5.4	Agriculture and Soils	Ray
		5.5	Water Resources	Martin
		5.6	Biological Resources	Kellogg

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
Protection				
Land Use	19.4		Response 1	Barati
Noise	19.5		Responses 1-2	Greene
Soil & Water Resources	19.6		Response 1	Ray
Transmission Line Safety & Nuisance	19.7		Responses 1-2	Patch
Visual Resources	19.8		Responses 1-10	Headley
Waste Management	19.9		Responses 1-3	Morgan
Engineering	20		Proposed Utility Easement Corridor; License Area & Road Access Easement Identification Map – 9/30/98	Patch
Transportation	21		Letter to CEC re: Response to 10/1/98 Question Regarding Rail Deliveries – 10/5/98	Reid
Transmission	22		Proposed Utility Easement Corridor – 10/6/98	Patch
Noise	23		Revised Response "Noise-2" Related to August 24, 1998 Data Requests – 10/7/98	Greene
Soils	24		Preliminary Erosion Control/Stormwater Management Plan – 10/15/98	Martin/Ray
Engineering	25		PDEF AFC Document including Tables; "F" Class Configuration; Conceptual Plant Layout "F" Class Configuration – 10/21/98	Patch
Air Quality	26		Response to BAAQMD Application Incompleteness letter Dated August 27, 1998, Docketed 10/26/98	Heredia
	27		**Response to CURE Data Requests Dated November 2, 1998, Docketed 12/2/98**	
Water	27.1		Responses 1.a, 1.b.i, 1.b.ii, 1.c.ii, 1.b.iii, 1.c.iv, 1.c.v, 1.d, 2.a, 2.b, 2.b.i, 2.b.ii, 2.c.i.(1), 2.c.i.(2), 2.c.i.(3), 2.c.i.(4), 2.c.i.(5), 2.c.ii, 2.c.iii, 2.c.iv, 2.c.v, 2.c.vi, 2.d, 3, 4, 4.a, 4.b, 4.c, 4.d, 5, 6, 7, 7.a, 7.b, 8.a.f, 9.a, 9.b, 9.c, 9.d, 10, 11.a, 11.b, 11.c, 11.d, 11.e, 11.f, 12.a,	Martin

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
			Comments Dated 7/14/98, Docketed 7/20/98	
Reliability	17.5		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Patch
Air Quality	17.6		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Heredia
Water Resources	17.7		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Martin
Biological Resources	17.8		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Kellogg
Land Use	17.9		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Barati
Socioeconomics	17.10		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Barati
Traffic & Transportation	17.11		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Reid
Visual Resources	17.12		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Headley
Air Quality	18		Ltr. To E. Allen from J. Heredia re:PM10 Monitoring Data –9/10/98	Koehler
	19		**Response to CEC Data Requests dated 8/24/98, Docketed-9/24/98**	
Air Quality	19.1		Responses 1-10	Heredia
Biology	19.2		Response 1	Kellogg
Industrial Worker Safety & Fire	19.3		Response 1	Clendening

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
			Proposed Development Fee – 5/13/98	
Management	6		Presentation to CEC by PDEF – 5/19/98	Wehn
Biology	7		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Kellogg
Efficiency	8		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Patch
Land Use	9		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Barati
Overview	10		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Patch
Reliability	11		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Patch
Socioeconomics	12		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Barati
Traffic and Transportation	13		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Reid
Water Resources	14		Responses to CEC's Prelim. Data Adequacy Review – 7/10/98	Martin
Engineering	15		Significant Structures & Equipment	Patch
Biological Resources	16		Response to CEC Data Adequacy Review Comments Dated 7/6/98, Docketed 7/13/98	Kellogg
	17		**AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98**	
Visual	17.1		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Headley
Efficiency	17.2		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Patch
Project Overview	17.3		AFC Revisions in Response to CEC's Data Adequacy Review Comments Dated 7/14/98, Docketed 7/20/98	Patch
Transmission System	17.4		AFC Revisions in Response to CEC's Data Adequacy Review	Patch

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
Standards				
APPENDICES				
Engineering		App. A	Heat and Mass Balance	Patch
Water Quality		App. B	Water Balance and Water Quality Analyses	Patch
Engineering		App. C	Civil Engineering Design Criteria and Civil Design Criteria	Patch
Engineering		App. D	Structural Engineering Design Criteria	Patch
Engineering		App. E	Mechanical Engineering Design Criteria	Patch
Engineering		App. F	Electrical Engineering Design Criteria	Patch
Engineering		App. G	Control Systems Engineering Design Criteria	Patch
Engineering		App. H	Chemical Engineering Design Criteria	Patch
Air Quality		App. I	Air Quality Technical Appendix	Heredia
Air Quality		App. J	Bay Area Air Quality Management District Permit Application	Heredia
Cultural		App. K	Cultural Resources Technical Report for the Pittsburg District Energy Facility Project	Hatoff
Paleo		App. L	Paleontological Resources Technical Report for the Pittsburg District Energy Facility Project	Hatoff/Lawler
Management		App. M	Qualifying Facility (QF) Calculations	Patch
Transmission Line Engineering		App. N	Estimated Capital Cost for Electric Transmission Line and Substation Equipment	Patch
Engineering		App. O	Preliminary Load Flow Information	
Management		App. P	Property Owner Information	Wehn
Documents				
Management	3		Alliance & Development Agrmt. – 6/27/97	Wehn
Management	4		Designation of Specified Projects – 7/2/97	Wehn
Management	5		Proposed changes to the Implementation Proposal and	Wehn

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Topic Area	Exhibit No.	Sec. No.	Document	Witness
Transmission Line Engineering		4.2.2.6	Description of Proposed Project-Utility Line	Patch
Transmission Line Engineering		4.2.7	Design Guidelines for New Transmission Facilities	Patch
Fire Safety		4.2.2.8	Fire Hazards	Patch
Environmental		5.0	Environmental Information	Ray
Environmental		5.1	Introduction	Ray
Air Quality		5.2	Air Quality	Heredia
Geology		5.3	Geologic Hazards and Resources	Fenton
AG and Soils		5.4	Agriculture and Soils	Ray
Water		5.5	Water Resources	Martin
Biology		5.6	Biological Resources	Kellogg
Cultural		5.7	Cultural Resources	Hatoff
Paleo		5.8	Paleontological Resources	Hatoff/Lawler
Land		5.9	Land Use	Barati
Socio		5.10	Socioeconomics	Barati
Traffic/Trans		5.11	Traffic and Transportation	Reid
Noise		5.12	Noise	Greene
Visual		5.13	Visual Resources	Headley
Waste		5.14	Waste Management	Morgan
Haz Mat		5.15	Hazardous Materials Handling	Morgan
Public Health		5.16	Public Health	Koehler
Worker Safety		5.17	Worker Safety	Clendening
Cumulative Impacts		5.18	Cumulative Impacts	Barati
Alternatives		6.0	Alternatives to the Proposed Project	Wehn/Patch/Heredia
Alternatives		6.1	No Project Alternative	Wehn/Patch/Heredia
Alternatives		6.2	Alternative Generation Technologies	Wehn/Patch/Heredia
Alternatives		6.2.1	Alternate Turbine or Project Size	Wehn/Patch
Alternatives		6.2.2	Alternate Methods of Generation	Patch
Alternatives		6.3	Alternate Site Locations	Patch
Alternatives		6.3.	Site Evaluation Criteria	Patch
Alternatives		6.3.2	Sites Evaluated	Patch
Alternatives		6.4	Alternative Transmission Routes	Patch
Alternatives		6.5	Alternative Pipeline Routes	Patch
Alternatives		6.6	Turbine Emission Control Alternatives	Heredia
Alternatives		6.6.1	SCONOx	Heredia
Alternatives		6.6.2	XONON	Heredia
Alternatives		6.6.3	Summary	Wehn/Patch/Heredia
Laws, Ordinances, Regulations &		7.0	LORS	Not Applicable

C. J. PATCH III, P.E.

PRESIDENT/ PRINCIPLE ENGINEER

EDUCATION

Worcester Polytechnic Institute - BSCE
California State College at Long Beach – MSCE
Drexel University - MBA - Finance

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer - Texas
Registered Professional Engineer - California
Registered Professional Engineer - Massachusetts
Registered Professional Engineer - Arizona
Registered Professional Engineer - New York
Registered Professional Engineer - Georgia
Registered Professional Engineer - Alabama
Registered Professional Engineer - Louisiana
Registered Professional Engineer - Florida
Registered Professional Engineer - Tennessee

PROFESSIONAL AFFILIATIONS

National Society of Professional Engineers (NSPE),
Texas Society of Professional Engineers (TSPE)
Project Management Institute (PMI)

PROFESSIONAL EXPERIENCE

With a background as both engineer and constructor, Mr. Patch has over 30 years of experience with electrical power generation, industrial and marine projects. Responsibilities have included engineering design, construction and construction management over a broad range of projects. Recently, as the President of Patch Incorporated, Mr. Patch has been accountable for corporate performance and profitability, in addition to the management of several major projects.

Resume of C. J. Patch III, P.E. (continued)

REPRESENTATIVE WORK EXPERIENCE

President and Principle Engineer of Patch Incorporated. Major project assignments include:

- Engineering and construction of large fossil fired utility electric generating plants.
- Engineering and construction of nuclear powered generating facilities.
- Cryogenic Air Separation Plant (770 metric tons per day) in the Middle East designed to produce nitrogen and oxygen, liquids and gasses.
- Designed and procured equipment for a 30 MW power generating station in South America.
- Bulk Terminal Facility for up to 1.5mm BPD of product storage which contains the largest transfer manifold on the Houston Ship Channel. Managed all work for design, procurement, and construction management.
- Viscous Petroleum Product Handling Facility. Fully automated, the facility captures high operating economies, handling products ranging in viscosity from 500 to 1,500 centistokes.
- Petroleum Terminal Expansion at an existing terminal which provides the capability to handle and store an additional 770,000 barrels of refined product.
- Gas Pipeline Compressor Station addition.
- Processing and Remediation of a 26 acre Surge Pond located in an operating refinery. In a three and one half month period, this multi-million dollar project was taken from preliminary P&ID's and layouts to start-up and full operation.
- Designed, procured and constructed a vapory recovery system including a Thermal Oxidizer and Waste Heat Recovery Boiler.
- Prior to employment with Patch Incorporated, Mr. Patch held a number of Corporate and Project assignments with a major Engineering and Construction Company. Projects included major power generating facilities (hydro, fossil, and nuclear), oil refining facilities, chemical production plants, a mine development project and corporate management.

AREAS OF EXPERTISE

- Water Quality Monitoring
- Marine and Aquatic Biology
- Estuarine Ecology

EDUCATION

Humboldt State University, Arcata, California: B.S., Oceanography, 1983

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Assistant Project Scientist, 1984-date

Scripps Institution of Oceanography, Research Diver, 1982

AFFILIATIONS

American Geophysical Union

American Society of Limnology and Oceanography

Society of Environmental Toxicology and Chemistry

REPRESENTATIVE EXPERIENCE

Mr. Martin has participated in a wide variety of projects, including biological impact assessment, bioaccumulation monitoring, sediment and water quality monitoring, oil spill impact assessment and NEPA/CEQA compliance. He has developed and managed several large environmental impact studies related to NPDES permits and NEPA/CEQA compliance. He has had extensive experience in the design and implementation of field studies in both marine and terrestrial environments. He is also a certified research diver. Representative project experience includes:

- Project Manager for a special NPDES sediment, bioaccumulation, and water quality study for the City of Palo Alto. This program, begun in 1989, consists of an assessment of the effects of discharge on South San Francisco Bay and examination of processes influencing the fate of ultra-trace metals from Palo Alto's sewage treatment facility. Designed and implemented field program. Coordinated with Regional Water Quality Control Board and South Bay dischargers. Supervised sediment toxicity program, QA/QC program, and data analysis.
- Managed a 3-year mercury bioaccumulation monitoring study for the Clorox Company. Assessed the impact of the discharge of treated groundwater to the Alameda/Oakland estuary, as part of NPDES permit compliance requirements. Tasks included quarterly sampling of receiving water and transplanted shellfish, data analysis, and report preparation.
- Task Manager in an assessment of impacts to the San Joaquin Delta near Pittsburg, California, resulting from chemical constituents detected in shallow groundwater wells near the estuary. Conducted an evaluation of heavy metals and organic compounds in aquatic vascular plants and benthic organisms and concentrations in water and sediment. Designed and implemented an assessment of the abundance and distribution of the benthic organisms in the vicinity.
- Prepared EIR for the Marin Municipal Water Districts proposed desalination plant on San Rafael Bay. Assessed of potential biological impacts to the bay from the construction and operation of the desalination plant.

Designed and managed a year-long field survey of fishery resources near the proposed desalination plant outfall.

Other project experience includes:

- Conducted marine and aquatic biological impact assessment on a large site selection and NEPA/CEQA-compliance environmental study for a San Diego Gas and Electric Company proposed 460 MW power plant. Compiled a report on the effects of thermal effluent on the South San Diego Bay benthic community.
- Biological assessment for the U.S. Navy at its Alameda Naval Air Station. Conducted physical oceanographic, and biological studies to assess the effect of proposed breakwater modifications on California least tern foraging. In addition, studies were conducted at the U.S. Army Corps of Engineers San Francisco Bay Model. The biological assessment included an evaluation of alternative breakwater modifications, impact assessment of these alternatives, as well as an extensive literature review of least tern foraging ecology.
- Assessed the effects of heavy metals, PAHs, and pesticides in aquatic biota in a former effluent treatment pond near Pittsburg, California.
- Designed and conducted studies to assess the impacts of a large industrial discharge to the lower San Joaquin Delta. Tasks included an evaluation of heavy metals and organics in native plant and bivalve (*Corbicula*) tissue, sediments, and water quality. A year-long monitoring program, designed to measure bioaccumulation of heavy metals in transplanted bivalves, was also developed and implemented at 12 stations.
- Exxon Valdez oil spill, Valdez, Alaska. As a member of SCAT (Shoreline Cleanup Advisory Team), Mr. Martin documented impacts to the intertidal environment and identified ecological constraints associated with the oil spill cleanup operations. The information was used in real time to determine appropriate cleanup techniques and to prioritize beach cleanup.
- Assessed impacts of an oil spill (tanker *Puerto Rican*) to the marine food chain near the Farallon Islands.

AREAS OF EXPERTISE

- Air Quality Permitting
- Air Toxics/Risk Assessment
- Emissions Inventories
- Control Technology Evaluations
- Project Management

EDUCATION

Harvard University, School of Public Health: Sc.D., Environmental Science, 1986

Harvard University, School of Public Health: M.S., Environmental Science, 1982

University of California, Los Angeles: B.S., Chemical Engineering, 1978

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Senior Project Scientist, 1987-date

Instructor, University of California, Berkeley, 1990-date

Private Consultant, Boston, Massachusetts, 1984-1986

Harvard University, Research Assistant and Teaching Fellow, 1982-1986

REPRESENTATIVE EXPERIENCE

Dr. Koehler has a broad background in air quality, noise, and hazardous materials derived from over 15 years of experience in the private, academic, and public sectors. His expertise includes air pollution control technology, estimation of air emissions (criteria pollutants and air toxics), air sampling methods, and air quality regulatory compliance. Dr. Koehler is also experienced in health risk assessment, air quality modeling, and industrial hygiene practices, and has a strong working knowledge of federal, state, and local air quality regulations. He has developed effective working relationships with the U.S. Environmental Protection Agency (EPA), the California Air Resources Board, and several other state and local agencies.

Permit Applications

- Project manager for Title V permit applications for three municipal wastewater treatment plants (WWTPs) operated by the City and County of Honolulu. Work included emission inventory development (criteria and toxic pollutants), dispersion modeling for compliance with air quality standards (required by the State of Hawaii regulations), identification of applicable requirements, and development of a compliance plan. Two of the WWTPs operate sewage sludge incinerators. In addition, Dr. Koehler provided technical review for another Hawaii Title V permit application for Chevron's Barbers Point refinery on Oahu.
- Project manager for the air quality permitting of a hazardous waste treatment, storage, and disposal facility in the San Francisco Bay Area. Responsibilities included developing the permitting strategy, estimating air toxics and criteria pollutant emissions for stack and fugitive sources, and preparing authority to construct and emissions banking applications.
- Project manager for the air quality permitting of a proposed Chemical Waste Management hazardous waste incinerator in Kettleman Hills, California. Responsibilities included estimating air toxics emissions from stack and fugitive emission sources, performing an emissions offset survey, coordinating production of an air quality permit application, and providing testimony at regulatory public hearings.

Environmental Protection Agency Region IX, Environmental Engineer, 1978-1981

AFFILIATIONS

Air and Waste Management Association

American Institute of Chemical Engineers

Engineer-in-Training Certificate, State of California

- Project and task manager for the air quality permitting of various fossil-fuel-fired facilities, such as gas pipeline compressor stations and cogeneration plants, as well as several manufacturing facilities, including semiconductors, musical instruments, and wood products. Some assignments included assessment of criteria and air toxics emissions.

Environmental Impact Analyses

- Task manager for numerous air quality and public health impact analyses for environmental impact reports and statements. Facilities have included municipal waste landfills, oil refineries, transportation projects, waste management facilities, power plants, and universities.
- Task manager for odor analyses for environmental impact report and statements. Facilities have included municipal waste landfills, oil refineries, and waste management facilities.

Health Risk Assessments

- Project manager for approximately 15 multi-environmental and inhalation pathway health risk assessments for the California Air Toxics "Hot Spots" Law (AB 2588), most of which included the assessment of air toxics emissions. Sources included a municipal wastewater treatment plant (with sewage sludge incineration), a municipal waste landfill, an electronics manufacturing facility, a gasoline bulk loading terminal, a chrome plating facility, a wood products facility, and several cogeneration plants. Also, project manager for several other air toxics emission inventories pursuant to AB 2588.
- Task manager for a multi-pathway environmental health risk assessment for a proposed combined-cycle cogeneration plant. Analysis included assessment of potential air toxic emissions from two natural-gas-fired turbines as well as from cooling towers with processed wastewater proposed as part of the make-up water flow. The health risk assessment was incorporated into an Application for Certification submitted to the California Energy Commission.
- Task manager for an air toxics health risk assessment for a proposed industrial waste water reclamation facility. The health risk assessment is being prepared for incorporation

into an Environmental Impact Report (EIR), an air quality permit application, and a RCRA Part B permit application.

Emission Inventories

- Project manager for air toxics emission inventories at two pharmaceutical manufacturing facilities in California. Approximately 30 air toxic compounds were inventoried from sources that included storage tanks, manufacturing operations, laboratory fume hoods, combustion sources, and fugitive emissions.
- Project manager for an air toxics emissions inventory for a large food processing plant. Effort involved specifying several different emissions source tests as part of an overall program to assess emissions from over 80 different emission points. The program was designed to develop facility-specific emission factors for the cost-effective assessment of overall facility emissions.
- Task manager for a literature search on actual emissions and emission standards for U.S.-based hazardous waste incinerators for input into an Australia and New Zealand waste management plan prepared by ICI Australia.

Compliance Assessment

- Task manager for an air quality compliance audit and updating of air quality permits for a large food processing plant. Responsibilities included addressing California Energy Commission conditions on a Determination of Compliance issued for an associated cogeneration facility.
- Task manager for an air quality compliance audit for a natural-gas-fired cogeneration power plant at a major university. The effort was part of an overall facility environmental compliance audit.

Regulatory Analyses

- Project manager for an emissions offset search for a major California public utility. Search included review of the air pollution control district's emissions bank as well as a telephone survey of facilities in the regional emissions inventory. For NO_x and VOCs, BARCT/RACT adjustments were estimated to assess potential offset credits. Project included interface with the California Energy Commission and the local air district.

- Task manager for a reasonably available control technology (RACT) analysis for volatile organic compound (VOC) emissions from a fiberboard manufacturing plant. Developed an alternative VOC control rule for consideration by the EPA and the local air pollution control district, in response to a VOC control rule proposed by the EPA in a Notice of Proposed Rulemaking concerning a proposed Federal Implementation Plan (FIP) for California. Analysis included a technical assessment of potential emission reductions associated with the facility's planned control systems, and a cost-effectiveness analysis of these systems against the control systems proposed by EPA in terms of annualized capital and operating costs per ton of emissions controlled. The alternative VOC control rule was accepted and adopted by the local air district.
- Task manager for a regulatory analysis of a contemplated cogeneration plant in the Los Angeles area. Analysis included compliance with South Coast Air Quality Management District (SCAQMD) regulations, potential 1990 Clean Air Act constraints on securing necessary ERCs, and potential impacts of the proposed SCAQMD RECLAIM rules.
- Performed several tasks involving the development of an emissions offset search strategy for the Sacramento Municipal Utility District (SMUD), including the assessment of potential emission reduction credits (ERCs) from several candidate emission sources. The analyses considered regulatory constraints posed by Title I and Title III of the 1990 Clean Air Act, as well as constraints posed by California air pollution control regulations.

Ambient Air/Emissions Monitoring

- Task manager for the development of a source testing protocol for gaseous and particulate-bound formaldehyde emissions from a hardboard manufacturing plant, and lead emissions from a musical instruments manufacturer.
- Task manager for baseline air quality monitoring and air quality permitting for a proposed hazardous waste incinerator in the State of Washington.
- Task manager for the development of an air quality monitoring plan at a hazardous waste landfill.

- Peer reviewer for several ambient air monitoring plans and programs, including two municipal waste landfills, the U.S. Army Rocky Mountain Arsenal (Superfund site), and several meteorological and ambient air monitoring stations for proposed PSD sources.

Control Equipment Evaluations

- Evaluated the performance of a multiclone on a wood-fired boiler at a wood products facility. Analysis included the evaluation of emissions source test results, particulate size distribution, and contact with the boiler manufacturer. This effort was part of an overall baseline emissions assessment for the facility.
- Evaluated the performance of a proposed thermal oxidizer system to treat VOC emissions from a Formica plant. The thermal oxidizer was being installed to create ERCs at this facility for use by SMUD in its power plant expansion plans. The control effectiveness analysis was part of an overall review of the proposed modifications at the Formica plant to help assure the quantity of ERCs being purchased by SMUD.
- Task manager for "top-down" best available control technology (BACT) demonstrations for several Prevention of Significant Deterioration (PSD) air pollution permit applications, including a proposed 2000-MW coal-fired power plant, two natural gas-fired power plants, and several large natural gas pipeline compressor stations.

Harvard University Experience

- At Harvard University, Dr. Koehler wrote his thesis on modeling liquid behavior in a venturi scrubber (an air pollution control device) and the effects of incorporating this liquid behavior model into a model for venturi scrubber performance. Based on data collected from a pilot-scale scrubber, Dr. Koehler found that his new model predicted venturi scrubber performance better than previous theoretical models. Dr. Koehler also participated in research projects on fabric filtration, high temperature/high pressure gas cleanup, environmental risk analysis, and indoor radon exposure.

U.S. Environmental Protection Agency Experience

- With the EPA, Dr. Koehler evaluated Prevention of Significant Deterioration (PSD) and New Source Review (NSR) permit rules for state and local regulatory agencies. He also reviewed other state and local air quality regulations for their incorporation into federally enforceable state implementation plans (SIPs).Type Bullet Points Here.

OTHER PROFESSIONAL EXPERIENCE

- Author or co-author of over 20 papers published in professional journals or conference proceedings; presenter of 8 of these papers.
- Instructor on the faculty of the University of California at Berkeley. Course instructor for two courses through UC Berkeley Extension, a two-day course on emission estimation methods and a one-semester evening course of air pollution control technology.
- Member of the statewide advisory committee for the Air Quality Management curriculum for all University of California Extension campuses.

PUBLICATIONS

Evans, J.S., Kinney, P.L., Koehler, J.L., and Cooper, D.W., "Relationship Between Cross-Sectional and Time Series Analysis," J. Air Pollution Control Association, Vol. 34, 551-553, 1984.

Koehler, J.L., "Effects of Elevated Temperature and Pressure on Particle Dynamics," Appendix II in First, M.W., "Final Report on High Temperature Gas Filtration Research Needs," DOE Contract No. DE-AC01-83FE60365, 1984.

Koehler, J.L.M., "Effects of Liquid Utilization on Venturi Scrubber Performance," Sc.D. Thesis, Harvard University, 1986.

Koehler, J.L. and Leith, D., "Model Calibration for Pressure Drop in a Pulse-Jet Cleaned Fabric Filter," Atmospheric Environment, Vol. 17, 1909-1913, 1983.

Koehler, J.L.M., Leith, D., and Feldman, H.A., "Gas-Borne Liquid Flow Rate in a Venturi Scrubber with Two Different Liquid Injection Arrangements," Aerosol Sci. and Technol., Vol. 7, 15-29, 1987.

Rudnick, S.N., Koehler, J.L.M., Martin, K.P., Leith, D., and Cooper, D.W., "Particle Collection Efficiency in a Venturi Scrubber: Comparison of Experiments with Theory," Environ. Sci. Technol., Vol. 20, 237-242, 1986.

Steiner, W.E., Koehler, J.L.M., and Popenuck, W.W., "Guadalupe Corridor Transportation Project Asbestos Health Risk Assessment, San Jose, California," The Science of the Total Environment, Vol. 93, 115-124, 1990.

PRESENTATIONS

Guido, D.R, and Koehler, J., "Alternative VOC RACT for a Wood Products Plant in Response to Title I of the Clean Air Act and the California FIP," Paper 95-FA154.06, presented at the 88th Annual Meeting of the Air and Waste Management Association, San Antonio, Texas, June 1995.

Guido, D.R, and Koehler, J.L.M., "Characterizing Source Strength, Dimensions and Associated Dispersion Modeling for a Hypothetical Catastrophic Release of Anhydrous Ammonia," Paper 92-155.05, presented at the 85th Annual Meeting of the Air and Waste Management Association, Kansas City, Missouri, June 1992.

Koehler, J.L., "Controlled Trading: A Region IX Perspective," presented at the conference "Regulatory Reform at the EPA:

Cost Saving Approaches to Controlling Air Pollution," Seattle, Washington, April 1981.

Koehler, J.L., Leith, D., and Feldman, H.A., "Gas-Borne Liquid Flow Rate in a Venturi Scrubber with Radially Inward Liquid Injection," presented at the Student Award Paper Competition, 77th Annual Meeting of the Air Pollution Control Association, San Francisco, California, June 1984.

Koehler, J.L.M., and Feldman, H.A., "Computer Model for Venturi Scrubber Performance That Accounts for the Role of Non-Ideal Liquid Behavior," Paper 87-49.4, presented at the 80th Annual Meeting of the Air Pollution Control Association, New York, New York, June 1987.

Koehler, J.L.M., "Stationary Source Air Pollution Control Technology," presented at the conference "The Application of U.S. Water and Air Pollution Control Technology in Korea," Seoul, South Korea, March 1989.

Koehler, J.L.M., "Inhalation Health Risk Assessment for a Hazardous Waste Treatment, Storage, and Disposal Facility: A Case History," Paper 91-84.2, presented at the 84th Annual Meeting of the Air and Waste Management Association, Vancouver, British Columbia, Canada, June 1991.

Koehler, J.L.M., Guido, D.R., and Lewandowski, T.A., "Estimation of Emission Rates and

Indoor Air Concentrations Associated with a Hypothetical Indoor Chemical Spill," Paper 94-RA108.01, presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 1994.

Koehler, J.L.M., Sylte, W.W., Steiner, W.E., and Beckham, B.J., "Impact of 1990 Clean Air Act Amendments on California's Clean Air Programs," Paper 92-97.03, presented at the 85th Annual Meeting of the Air and Waste Management Association, Kansas City, Missouri, June 1992.

Popenuck, W.W. and Koehler, J.L.M., "Current Practices in Air Pollution Dispersion Modeling in the United States," presented at the conference "The Application of U.S. Water and Air Pollution Control Technology in Korea," Seoul, South Korea, March 1989.

Reyff, J.A., Houps, L.R., Koehler, J.L.M., Ritts, D., and Cook, B., "Soil to Air Vapor Flux and Air Sampling Program to Evaluate Onsite Air Pathway Exposures for Input into a Health Risk Assessment," Paper 91-80.14, presented at the

84th Annual Meeting of the Air and Waste Management Association, Vancouver, British Columbia, Canada, June 1991.

Steiner, W.E. and Koehler, J.L.M., "NOx BACT for Gas Turbines in California," Paper 89-75.3, presented at the 82nd Annual Meeting of the Air and Waste Management Association, Anaheim, California, June 1989.

Steiner, W.E., Koehler, J.L.M., and Popenuck, W.W., "Guadalupe Corridor Transportation Project Asbestos Health Risk Assessment," presented at the Third International Symposium on Highway Pollution, Commission of the European Community, Munich, West Germany, September 1989.

Tuchfeld, H.A., Koehler, J.L.M., and Reyff, J.A., "Evaluation of Potential Health Risks from Hypothetical Indoor Toxic Gas Releases at a Research Laboratory Facility", Paper 24E, presented at the 1991 Summer National Meeting of the American Institute of Chemical Engineers, Pittsburgh, Pennsylvania, August 1991.

AREAS OF EXPERTISE

- Project Management
- RCRA/Environmental Audits
- Site Investigations
- Environmental Engineering
- Process Engineering
- Waste Minimization
- Wastewater Engineering

EDUCATION

Georgia Institute of Technology: B.S., Chemistry, 1973

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Senior Project Scientist, 1991-date

J.H. Baxter & Co., San Mateo, California, Technical Director, Vice President, Technical Services, 1981-1991

Southern Wood Piedmont, Spartanburg, South Carolina, Environmental Technician, Environmental Manager, 1973-1981

AFFILIATIONS

REPRESENTATIVE EXPERIENCE

Mr. Morgan has extensive environmental project management experience with environmental compliance audits, site assessments, and site remediation under both federal and state Superfund regulations in California, Oregon, and Washington. His work has covered negotiations with agencies, insurance companies, and other potentially responsible parties (PRPs). He has served as project manager on two property developments: one, a former wood-preserving site; another, a former coal tar distillation plant. He has directed multi-plant efforts on waste minimization, process water treatment and reuse, and shortened production cycles. He has written and updated SPCC and contingency plans for 15 sites, including an Army chemical munitions depot, and he has also conducted numerous RCRA/environmental audits and site investigations.

Specific Environmental Experience

- Program manager for a major military installation with a variety of project tasks, including site assessment, multi-media environmental compliance audits, Health & Safety SOP development, noise survey and abatement plans, asbestos abatement, stormwater sampling and plan updates, earthwork sampling, and Hazardous Materials Business Plan development.
- Project manager for two food processing facilities. One with TPH and lead impacted gravel and the other with USTs and lead impacted railroad ballast. Both sites required investigations, remediation design, agency coordination, and remediation oversight. Not further action letters were obtained from responsible agencies for both sites.
- Project manager for approximately 10 Phase I site assessments/year for a variety of clients.
- Program manager for a major textile firm client, coordinating international regulatory reviews, site investigation/risk assessment for chlorinated solvent spill area, diesel fuel spill investigation.
- Project manager for demolition, on-site treatment, and delisting of a wood preserving plant drip pad contaminated with list wood preserving residuals
- Project manager for the design and installation of a groundwater treatment system for a site with chlorinated

American Wood Preservers Association

- Currently serving on the Executive Committee of the AWPA
- Chairman of Committee P-5, Waterborne Preservation Systems for six years
- Member of five other AWPA committees

Western Wood Preservers Institute

- Chairman - California Environmental Committee for six years
- Member of the Technical Committee

American Wood Preservers Institute

- Chairman of the Subcommittee on Treated Wood Disposal for five years
- Member of Regulatory Affairs Committee
- Participant in Congressional Lobbying efforts
- American Chemical Society

solvents contamination

- Project manager for a multi-disciplinary team of scientists and engineers for a comprehensive environmental compliance audit for a major Nevada utility company. The audit covered an operating large coal-fired power plant, two standby gas/oil fired power plants and a large utility service yard including PCB transformer handling and storage facilities.
- Project manager for a confidential client in the conceptual design/cost estimate for a commercial aqueous hazardous waste treatment facility to receive up to 1 million gallons/day of wastes and to produce up of 800,000 gallons/day of drinking quality water as the main product. This plant was designed to comply with Federal and California environmental laws and regulations.
- Task manager for an in-depth compliance audit/Phase I investigation on a large closed sawmill/wood preserving complex in the Pacific Northwest
- Project Manager for a large forest products company for multi-media compliance audits at two large sawmill and plywood complexes, logging facilities, and a closed large sawmill facility.
- Temporary resident environmental engineer for United States Chemical Activity Pacific on Johnston Island working with a multi-disciplinary team on environmental compliance at the chemical weapons depot and reconfiguration plant. Follow-up project work to develop comprehensive overall environmental for USACAP.
- Project manager for a multi-disciplinary team for a large steel finishing mill with NPDES permit discharge limit exceedances.
- Project manager for one federal and four state Superfund cleanups with extensive soil and groundwater contamination. Projected ultimate costs exceeded $40 million.
- Project manager responsible for cleanup of two contaminated property developments adjacent to a large body of fresh water and valued over $40 million. Estimated cleanup costs were $25 million.
- Responsible for writing and managing of permits for air, water, and hazardous materials/wastes for nine plants and

two property developments.

- Project manager responsible for rainwater runoff and air pollution control, design, and implementation for multiple plants.
- Wrote ten SPCC plans and supervised five SPCC/contingency plan updates.
- Project manager responsible for bringing four wood preserving plants into compliance with new RCRA waste listing rule. Projected costs were over $2 million.
- Served as in-house consultant for pesticide registration. Holder of Certified Applicator Certificates for the States of Oregon and Washington, and a Restricted Use Pesticide Dealers License for the State of California. Organized central seminars for statewide certification training programs.
- Managed Potentially Responsible Party negotiations on multi-party sites, the largest for a $15 million cleanup.
- Negotiated insurance payments of past and ongoing remedial costs in excess of $20 million.
- Worked extensively with legal counsel on environmental issues and negotiations with regulatory agencies.
- Conducted semiannual multi-media compliance audits for two wood preserving companies, one with 9 plants on the east coast and the other with 6 plants on the west coast over an 8 and 10 year period respectively.

Technical Services Experience

- Directed process improvements for water conservation, wastewater treatment, wood preservative utilization, and waste reduction.
- Formerly a certified wastewater treatment plant operator. (South Carolina)
- Initiated process variable studies that resulted in 25-35 percent time reductions in plant processes.
- Supervised quality control efforts for six plants; supervised quality control laboratory.
- Provided contact for sales and customers for technical questions.

- Served as in-house consultant for preservative sales and advertising/marketing group.

Purchasing Experience

- Supervised purchase of approximately $3 million of preservatives yearly.

PUBLICATIONS

Longevity of Treated Wood Utility Poles in the Pacific Northwest, American Wood Preservers Association Annual Proceedings, 1992.

Advantages of Closed Pre-steaming with ACZA Preservative Treatment, American Wood Preservers Association Annual Proceedings, 1990.

Chemonite Pole Treatments, Northwest Pole Conference Proceedings, 1990.

Evaluation and Commercialization of a New Wood Preservative, American Wood Preservers Association Annual Proceedings, 1989.

Safe Handling and Disposal of Arsenically Preserved Wood Poles, Northwest Wood Pole Conference Proceedings, 1988.

Impact of EPA Ruling on Utility Pole Treatment, Handling, and Disposal, Northwest Wood Pole Conference Proceedings, 1986.

Zero Discharge of Wood Treating Plant Effluent and Specified Rainwater Runoff, American Wood Preservers Association Annual Proceedings, 1978.

AREAS OF EXPERTISE

- Seismic Hazards
- Paleoseismology
- Seismotectonics
- Geologic Hazards

EDUCATION

University of Glasgow, Glasgow, Scotland: Ph.D., Neotectonics and Paleoseismicity, 1991

University of Strathclyde, Glasgow, Scotland: Doctoral research in neotectonics, 1987-1989

University of Glasgow, Glasgow, Scotland: B.Sc. (Honors), Geology, 1987

PROFESSIONAL HISTORY

Woodward-Clyde Federal Services, Seismic Geologist, 1993-date

Geological Survey of Canada, Postdoctoral Research Fellow, 1992-1993

UK Seismic Hazard Working Party, Paleoseismology Consultant, 1992

Soil Mechanics Ltd., Paleoseismology Consultant, 1992

Sir William Halcrow & Partners, Neotectonics Consultant, 1991-1992

SKB AB, Sweden,

REPRESENTATIVE EXPERIENCE

Dr. Fenton has six years of experience in seismic geology and geologic hazards. He obtained his Ph.D. from the University of Glasgow for research on the seismotectonics and paleoseismicity of the United Kingdom. Prior to joining Woodward-Clyde, Dr. Fenton was a Visiting Postdocatoral Fellow at the Geological Survey of Canada where he carried out research into postglacial faulting and seismic hazards in intraplate environments. He has participated in both geological and seismological investigations for seismic hazard evaluations for a number of critical facilities including dams, pipelines, bridges, hospitals, nuclear power plants and hazardous waste repository sites. Dr. Fenton has carried out detailed fault investigations under the National Earthquake Hazard Reduction Program (NEHRP). He has also carried out investigations for landslide hazards, liquefaction potential, radon emissions, groundwater contamination, and foundation engineering conditions. Dr. Fenton's has worked on projects in the western United States, the United Kingdom, southeast Asia, Scandinavia, northeast Africa, Canada and South America. Dr. Fenton has a strong background in paleoseismology, structural geology, Quaternary geology, photogeology and remote sensing, geomorphology, geochronology, and engineering geology. In addition, Dr. Fenton has broad experience in interpretation of both seismic reflection and refraction data, and is conversant with the use of Schlumberger GeoData seismic data analysis software. Dr. Fenton's experience includes:

- Site-specific paleoseismic trenching investigations for damsites, schools, hospitals, and nuclear power facilities in the western United States, Peru, Thailand, Canada, Scandinavia, and the United Kingdom. These studies included detailed field mapping, fault scarp profiling, trench logging, pedologic studies, and application of geochronological techniques, including radiocarbon and electron spin resonance. Other paleoseismic investigations have also included the mapping of seismically-induced liquefaction features and earthquake-triggered landslides.
- Seismic source characterization studies for active faults and seismic source zones in the western United States, Canada, Peru, Thailand, Indonesia, Eritrea, and the United Kingdom. Synthesis of these data to provide the input for

Consultant, Member of Expert Panel on Postglacial Faulting, 1991

AFFILIATIONS

American Geophysical Union

Geological Society of America

Geological Society of Glasgow

Geological Society of London (Fellow)

Northern California Geological Society

Quaternary Research Association

Seismological Society of America

seismic source characterization models for probabilistic seismic hazard evaluations.

- Fault rupture hazard studies for dams, bridges, hospitals, schools, nuclear power facilities, pipelines, and other lifelines. Includes analysis of rupture type, maximum offset, slip distribution, rupture zone width, and complexity.
- Regional seismotectonic evaluations for seismic hazards evaluations for numerous sites and engineered facilities in the western US, South America, northeastern Africa, and southeast Asia. Includes the compilation and synthesis of geologic. seismologic, geodetic, and paleoseismic data.
- Rock and soil slope stability analysis under both static and dynamic conditions. Evaluations for quarry excavations, dam abutments, roadcuts, pipeline alignments, and offshore installations. Includes trenching investigations (of rock block failures and 'sackung' slope creep), detailed mapping, and topographic profiling. Large-scale submarine slope failures were mapped and characterized using seismic reflection data. Areas of investigation include California, Peru, Scotland, Thailand, and Indonesia.
- Research into the occurrence of pop-ups and other shallow stress-relief features in regions of high horizontal stress, particularly in eastern Ontario, Canada and the northeastern United States. Development of criteria to distinguish between such shallow stress-release features and tectonic fault rupture.
- Research on recurrence rates and seismic risk assessment for areas of low to moderate seismic activity, particularly continental shield regions and passive margin environments including the causes of postglacial surface rupturing faulting in formerly glaciated regions and surface faulting in "stable" continental interior regions.
- Engineering geological studies, including investigations of foundation conditions, liquefaction potential, landslide susceptibility, and other geologic hazards (groundwater contamination and radon emissions).
- Analysis of subsurface geologic data, including seismic reflection and seismic refraction profiles, ground probing radar (GPR) data, drill hole correlation, and cone

penetrometer (CPT) profiles.

- Detailed field mapping of bedrock, Quaternary geology, and geomorphology. Areas include high grade, polyphase-deformed terrain in Scotland, Ireland, and eastern Canada; extensional basin and range terrains in the western United States, Thailand, and southern Peru.

Dr. Fenton is also actively involved in the activities of a number of professional organizations. He has organized and led a field workshop on postglacial faulting and paleoseismicity for the International Quaternary Association Neotectonics Commission. Dr. Fenton has also been an invited speaker at professional meetings and at a U.S. Geological Survey paleoseismology workshop. He also regularly gives presentations on seismic geology and paleoseismology at professional meetings and symposia.

HONORS AND AWARDS

Natural Sciences and Engineering Research Council of Canada Visiting Postdoctoral Fellowship, 1992-1993

Natural Environment Research Council (UK) Studentship, 1987-1990

Shields Award for Geology, University of Glasgow, 1987

Joseph Black Medal for Geology, University of Glasgow, 1983

PUBLICATIONS

Davenport, C.A., Ringrose, P.S., Becker, A., Hancock, P., & Fenton, C. 1989. Geological investigations of late and postglacial earthquake activity in Scotland, in Gregerson, S. & Basham, P. (eds.), Earthquakes at North Atlantic Passive Margins: Neotectonics and Postglacial Rebound, Kluwer Academic Press, Dordrecht, 175-194.

Grün, R. & Fenton, C. 1990. Internal dose rates in quartz grains separated from fault gouge. Ancient TL, v. 8, 26-28.

Fenton, C.H. (1991). Postglacial faulting and paleoseismic activity in North West Scotland (abs.), Abstracts with Programs, Geological Society of America, v. 23, p. A90-A91.

Grün, R. & Fenton, C. 1991. An ESR study of fault gouge from Holocene fault systems in Scotland (abs.), Proceedings of International Conference on Thermoluminescence & ESR age-dating, Clermond Ferrand, 1990, Quaternary Science Reviews Special Publication, Abstract 129.

Ringrose, P.S., P. Hancock, C. Fenton, and C.A. Davenport (1991). Quaternary tectonic activity in Scotland, in Quaternary Engineering Geology, A. Foster, M.G. Culshaw, J.C. Cripps, J.A. Little, and C.F. Moon, Geological Society Special Publication No. 7, p. 679-696.

Fenton, C. (1992). The effects of ice-cap loading on crustal stress patterns and the consequences for seismotectonic activity in the postglacial environment (abs.), Annales Geophysicae, v. 10, p. 113.

Fenton, C. (1992). U.K. seismic activity during the Holocene: A comparison of instrumental, historical and paleoseismic data from North West Scotland (abs.), in Neotectonics - Recent Advances: Abstract Volume, N.A. Mörner, L.A. Owen, I. Stewart, and C. Vita-Finzi (eds.), Quaternary Research Association, Cambridge, p. 21.

Fenton, C. (1992). Late Quaternary fault activity in North West Scotland (abs.), in Neotectonics - Recent Advances: Abstract Volume, N.A. Mörner, L.A. Owen, I. Stewart, and C. Vita-Finzi (eds.), Quaternary Research Association, Cambridge, p. 21.

Fenton, C.H. (1992). Neotectonics in Scotland: A field Guide, Department of Geology & Applied Geology, University of Glasgow, Glasgow, 81 p.

Fenton, C. (1992). Holocene seismic activity in the UK: A comparison of instrumental, historical and paleoseismic data

from North - West Scotland (abs.), EOS Transactions, American Geophysical Union, v. 73, p. 399.
Fenton, C., J. Adams, A. Brown, S. Halchuck, and M. Cajka (1993). How often have earthquakes broken the surface of the Canadian Shield? (abs.), Abstracts with Programs, Geological Survey of Canada Current Activities Forum '93, Ottawa, January 1993, p. 29.

Fenton, C. 1993. An annotated bibliography of postglacial faulting in eastern North America: the first 150 years (abs), MAGNEC Annual Meeting, Ottawa, October 1993.

Adams, J. & Fenton, C. 1993. Surface faulting in the Canadian Shield: assessing the risk (abs), MAGNEC Annual Meeting, Ottawa, October 1993.

Fenton, C. 1993. Postglacial faulting in eastern Canada: recently discovered examples from Northern Ontario and Southern Labrador (abs.), MAGNEC Annual Meeting, Ottawa, October 1993.

Adams, J., L. Dredge, C. Fenton, D.R. Grant, and W.W. Shilts (1993). Late Quaternary faulting in the Rouge River Valley, southern Ontario: Seismogenic or glaciotectonic? Geological Survey of Canada Open-File Report 2653, 60 p.

Adams, J., L. Dredge, C. Fenton, D.R. Grant, and W.W. Shilts (1993). Comment on Neotectonic faulting in metropolitan Toronto: Implications for earthquake hazard assessment in the Lake Ontario region, Geology, v. 21, p. 863.

Fenton, C., J. Adams, A. Brown, M. Cajka, and S. Halchuck (1993). Surface rupture in eastern Canada: Searching for evidence and assessing the risk (abs.), EOS Transactions, American Geophysical Union, v. 74, p. 438.

Fenton, C.H. (1994). Postglacial faulting in Eastern Canada, Geological Survey of Canada Open-File Report 2774, 94 p.

Fenton, C.., 1994, An annotated bibliography of postglacial faulting in eastern North America: the first 150 years, Bulletin of the INQUA Neotectonics Commission, v. 17, p. 61-62.

Adams, J., Fenton, C., & Muise, J. 1994. High horizontal stresses in the Ottawa area. Geological Association of Canada Program with Abstracts, v. 19.

Adams, J. and C. Fenton (1994). Stress relief and incidental geological observations in and around Ottawa, Ontario, Current Research, Geological Survey of Canada Paper 1994-ID, p. 155-

160.

Fenton, C.H. and S.S. Olig (1994). Length-displacement profiles and rates of displacement decay on surface rupturing Basin and Range normal faults: Evidence for characteristic earthquakes? (abs.), U.S. Geological Survey Open-File Report 94-568, p. 62.

Fenton, C.H. (1994). Paleoseismology in northwestern Europe: Investigations of postglacial intraplate faulting (abs.), U.S. Geological Survey Open-File Report 94-568, p. 63-65.

Fenton, C.H. (1994). Length-displacement profiles and rates of displacement decay on surface-rupturing Basin and Range normal faults, Abstracts with Programs, Geological Society of America, v. 26, p. A-268.

Fenton, C.H., J.E. Sawyer, I.G. Wong, T.L. Sawyer, and D.T. Simpson (1994). The Evergreen fault: An example of Late Quaternary oblique-thrust faulting in the southeastern San Francisco Bay area, California (abs.), EOS, Transactions of the American Geophysical Union, v. 75, p. 683.

Fenton, C.H., I.G. Wong, and J.E. Sawyer (1995). Geological and seismological investigations of the Evergreen fault, southeastern San Francisco Bay area, California (abs.). American Association of Petroleum Geologists Bulletin, v.79, p 584.

Fenton, C.H., I.G. Wong, and D.M. Baures (1995). An evaluation of earthquake potential in southern most Peru: Part I - Characterization of crustal faults (abs.), Abstracts with Programs, Geological Society of America, v. 27, p. A-193 - A-194.

Wong, I.G., C.H. Fenton and J.D. Bott (1995) An evaluation of earthquake potential in southernmost Peru: Part II - Subduction zone and implications to seismic hazards (abs.), Abstracts with Programs, Geological Society of America, v. 27, p. A-194.

Fenton, C.H. (1995). Extensional collapse of the Andean Orogen: Normal reactivation of strike-slip faults in southernmost Peru (abs.), EOS, Transactions of the American Geophysical Union, v. 76 (Supplement), p. 376

Olig, S.S., Fenton, C.H., McCleary, J., and Wong, I.G., 1996, The earthquake potential of the Moab fault and its relation to salt tectonics in the Paradox basin, Utah, *in* A.C. Huffman, Jr., W.R. Lund, and L.H. Godwin (eds.), Geology and Resources of the Paradox Basin, Utah Geological Association and Four

Corners Geological Society Guidebook 25, p. 251-264.

Fenton, C.H., Bott, J.D.J., Gorton, A.E., Olig, S.S., Sawyer, J.E., Wong, I.G., Hinthong, C., and Lumjuan, A., 1996, Earthquake potential of Cenozoic basin-bounding faults in northern Thailand, Abstracts with Programs, Geological Survey of America, v. 28, p. A-371.

Adams, J., and Fenton, C., 1996, Contemporary seismic hazard from reactivation of faults of the Canadian shield - Which faults will rupture, and does it matter?, Abstracts with Programs, v. 28, p. A-414.

Wong, I.G., Fenton, C.H., Bott, J.D.J., Becker, A.M., and Green, R.K., 1997, Seismic hazards in northern Thailand, Seismological Research Letters, v. 68, 316.

Fenton, C.H., Charusiri, P., Hinthong, C., Lumjuan, A., and Mangkonkarn, B., 1997, Late Quaternary faulting in northern Thailand, Proceedings of the International Conference on Stratigraphy and Tectonic Evaluation of SE Asia and the South Pacific, GEOTHAI '97 (*in press*).

Fenton, C.H. and Adams, J., 1997, Seismic hazard assessment for radioactive waste disposal sites in regions of low and moderate seismic activity, Quarterly Journal of Engineering Geology (*in press*).

AREAS OF EXPERTISE

- Noise Control Engineering
- Project Management
- Environmental Studies

EDUCATION

Pacific Western University, Los Angeles: B.S., Environmental Science, 1990

REGISTRATION

Institute of Noise Control Engineering, No. 84004

Certified Acoustical Consultant, No. 10104: County of Orange, California

PROFESSIONAL HISTORY

Woodward-Clyde, Senior Project Scientist, 1993-Present

Nolte and Associates, Inc., Senior Environmental Engineer, 1990-1993

Bruel & Kjaer Instruments, Inc., Senior Engineer/Acoustics Specialist, 1982-1990

County of Orange, Environmental Management Agency, Acoustical Engineer, 1978-1982

REPRESENTATIVE EXPERIENCE

Mr. Greene is a Senior Project Scientist in Woodward-Clyde's Environmental Sciences Practice. Mr. Greene has over 18 years background in environmental impact analysis, several specialty branches of acoustics, systems engineering, and project management. His technical qualifications include Board Certification by the Institute of Noise Control Engineering which requires the Professional Examination in Vibration and Acoustics plus at least 8 years responsible charge of work. Mr. Greene provides additional expertise in project permitting, and CEQA/NEPA compliance.

Formerly the Acoustical Engineer for the County of Orange and Chief of the Acoustics/Noise Control Section of the County's Environmental Management Agency (EMA), Mr. Greene was responsible for establishing policies that integrated environmental noise issues with land-use planning, and had key roles in two major General Plan amendments. Mr. Greene served as EMA representative to the County's Airport Commission and Airport Land Use Commission. Mr. Greene holds a certificate in Traffic Noise Analysis issued by Caltrans' Transportation Laboratory.

- Managed an environmental study of drilling noise associated with construction of caissons for the El Paseo access bridge to a large commercial site.
- Noise Analysis Task Manager for the Adelanto Lugo Transmission Project which proposes to provide approximately 17 miles of 500 kilovolt transmission lines plus substation facilities.
- As Senior Noise Analyst, directed, reviewed and provided supplemental acoustical engineering and environmental impact analysis during preparation of project EIR's for the Reformulated Fuels Projects at the Chevron Refinery, El Segundo.
- Project Engineer/Task Manager for all professional services required to prepare the noise analysis for the Master EIR for the Metropolitan Water District's Central Pool Augmentation and Water Quality Project.
- Project Manager/Project Engineer on ARCO/Four Corners Pipe Line Company Project. Provided noise measurements, analysis, retrofit noise control engineering, PS&E, government agency consultation, and regulatory

AFFILIATIONS

Institute of Noise Control Engineering

Institute of Environmental Science

Audio Engineering Society

Acoustical Society of America, Orange County Chapter

compliance testing for the Morongo Pump Station to reduce excessive noise levels

AREAS OF EXPERTISE

- Terrestrial Ecology
- Project Management

EDUCATION

San Diego State University:

M.S. Ecology, 1975

University of California, Davis:

B.S. Biology, 1970

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Senior Project Scientist, 1971 - Date

REPRESENTATIVE EXPERIENCE

Mr. Kellogg has been task leader for ecology and project manager for a variety of interdisciplinary environmental programs in the western United States. His experience includes siting and licensing/permit studies for: fossil-fuel, hydroelectric, nuclear, and solar power plants; cogeneration projects; synthetic fuels projects; EHV transmission systems; pipeline systems; coal and uranium mining projects; and telecommunication and fiber optic cable projects.

- Mr. Kellogg is a resource specialist in assessments for terrestrial ecology. He has experience in analyzing a variety of ecosystems, including hot and cold deserts, chaparral, coniferous forests, and grasslands throughout the western United States. He is experienced in a wide variety of standard techniques for estimating and quantifying wildlife populations and vegetation types. Mr. Kellogg is thoroughly familiar with the requirements of the Endangered Species Act and has directed or performed numerous biological assessments for threatened or endangered species and habitat. Additionally, Mr. Kellogg has undergone certification training for the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures.
- Recently, Mr. Kellogg was project manager for a proposed hydroelectric facility located on the Kern River in Kern County. As project manager, Mr. Kellogg was responsible for directing all environmental studies and mitigation planning, coordination of agency scoping and public presentations. Key issues in this project were recreational use, fisheries, and water releases elated to downstream users. To resolve key issues, Mr. Kellogg was the prime contact with key personnel from the Division of Water Rights (State Water Resources Control Board), California Department of Fish and Game, U.S. Fish and Wildlife Service, United States Forest Service, and Kern County Planning Department.
- Mr. Kellogg was also WCC project manager for recreation and wildlife mitigation studies pertaining to the application for amendment for new license of the PG&E Haas-Kings River Project (located in the Central Sierra) and for environmental studies required for the SCE Balsam Meadow Project (also located in the Central Sierra) FERC Exhibit E. As manager of these studies, Mr. Kellogg was responsible for agency coordination,

direction of environmental and mitigation studies, public participation, and report production. Both projects involved a complicated network of tunnels, aqueducts, penstock and other water conveyance facilities to support the overall power project. Assesment of potential environmental impacts related to the construction of these facilities has provided Mr. Kellogg with an in-depth understanding of water supply and water conveyance systems in this geographic area.

- As a project manager, Mr. Kellogg has been responsible for development of work plans; client and agency coordination; development and application of methodologies for data collection; budgetary and schedule control; interpretation and decision making; and day-to-day direction of interdisciplinary teams of environmental specialists.
- Mr. Kellogg is well-versed in federal and state environmental laws, regulations, and guidelines and has prepared numerous environmental reports for submittal to lead federal and state regulatory agencies. Mr. Kellogg has completed studies to determine environmental permitting feasibility; determine federal, state, and local permitting requirements and constraints; develop permitting programs and schedules; and conduct regulatory agency negotiations for a number of major projects.

AWARDS

President's Scholar, 1965-1967, University of California, Davis

PUBLICATIONS

A list of Mr. Kellogg's publications will be provided upon request.

AREAS OF EXPERTISE

- Risk Assessment
- Fate and Transport
- Oil Spill Response
- Soil Science

EDUCATION

University of California, Riverside: Ph.D., Soil Physics, 1988

University of California, Riverside: M.S. Soil Science, 1985

University of California, Riverside: B.S. Geology, 1983

PROFESSIONAL HISTORY

Woodward-Clyde, Senior Project Scientist, 1993-date

Chevron Oil Field Research Company, Research Physicist, 1990-1993

McLaren Environmental Engineering, Senior Soil Scientist, 1988-1990

University of California, Research/Teaching Assistant, 1983-1988

REPRESENTATIVE EXPERIENCE

Dr. Clendening provides technical oversight and performs human health risk assessments of chemical waste at RCRA, Superfund, and other sites. She uses the Data Quality Objective (DQO) process to focus investigations so that they provide the information needed to make decisions. She applies alternative methods, when possible, to identify soil, water, and air cleanup levels that are economical yet protective of human health and the environment. Her work has involved pesticides, heavy metals, solvents, and petroleum contaminated soils. She applies her expertise in transport and fate of chemicals in soil and groundwater to conducting more realistic site-specific risk assessments and calculating target soil and groundwater cleanup levels based on site-specific exposure scenarios. She has managed large power plant divestiture environmental due diligence projects.

She has been involved in the development and testing of risk assessment software for the American Petroleum Institute. She has taught training courses in risk assessment including the use of different risk assessment software programs. She has extensive experience advocating for her clients with the Departments of Toxic Substance Control (DTSC), Environmental Protection Agency (EPA), and Regional Water Quality Control Boards (RWQCB).

Dr. Clendening is the Southwest Practice Leader for Human Health Risk Assessment and also for Chemical and Oil Spills. Dr. Clendening's representative project experience includes:

- Eaton Corporation: Wrote the RCRA risk assessment workplan and conducted agency negotiations for a site contaminated with chlorinated solvents in soil and groundwater. Conducted a Preliminary Endangerment Assessment (PEA) for the site.
- City of Redlands: Conducted a human health risk assessment for a site contaminated with sludge, organics, and metals. The risk assessment involved the use of ASTM RBCA and additional fate and transport models for soil and groundwater. Project manager for a feasibility study and closure plan for the site.
- Sacramento City College School District: Conducted a PEA for a site that is being used for student parking.

AFFILIATIONS

Soil Science Society of America

American Geophysical Union

American Chemical Society

Society of Risk Analysis

- Xerox Corporation: Conducted a human health risk assessment and PEA for solvent contaminated soil. Involvement included fate and transport modeling used in risk assessment calculations and calculating health based soil cleanup levels. This site is currently in a no further action record of decision.
- Wrote the human health and worker safety sections for Certificate for Application for permitting for five cogeneration facilities in California.
- Port of Los NRG Energy: Project manager for multiphase environmental due diligence investigations for power plant sites in Southern California. Work included risk based screening.
- AES: Wrote environmental due diligence investigation workplans for three power plant sites in Southern California.
- Confidential client(s): Conducted human health risk assessments and indoor air sampling using ambient and flux chamber data to evaluate indoor air exposure route.
- Evaluate potential impacts to residents from lead based paint contamination in soil for property transactions. Involved negotiations for risk based cleanup levels.
- Commercial property in San Diego: Conducted an ASTM RBCA assessment on a site contaminated with chlorinated organics in groundwater. Directed indoor air sampling that was used in conjunction with the risk assessment.
- Taught risk-based corrective action (RBCA) training classes for industry and agencies.
- Conducted ASTM RBCA assessments for numerous dry cleaning facilities. Assessments included indoor air, soil, and groundwater exposure pathways.
- Confidential Mineral Resources Client: Conducted a human health risk assessment for a Superfund mine tailing site that evaluated multiple exposure routes for heavy metals in soil and groundwater.
- Confidential Client: Wrote a human health risk assessment and groundwater impact analysis for a former trucking facility. The fate and transport analysis used unsaturated and saturated zone models to predict potential

organic chemical concentrations in the onsite well. The site has gone to closure based on the risk assessment results.

- Confidential Mining Client: Evaluated potential air exposure pathways at a copper leaching mine in Nevada.
- Confidential Mining Client: Evaluated potential lead exposure to the community from a former smelter. Report included information on current blood lead issues for children.
- Cannon Air Force Base. Selected the chemicals of concern and risk based concentrations for screening level risk assessment. Analysis of data involved the DQO process.
- Confidential client. Wrote the risk assessment and modeling portion of a Corrective Measure Study for a RCRA woodtreating site. The site is contaminated with inorganics and organics in a complex geologic setting.

  Fort MacArthur: Conducted a human health risk assessment using the Department of Toxic Substance's (DTSC) protocol for using EPA Region IX Preliminary Remediation Goals (PRGs). Peer reviewer for the ecological assessment. Closure has been granted for the site based on the risk assessments.

- Whites Point Nike Missile Site: Conducting a human health risk assessment for areas on the base that are contaminated with metals, polycyclic aromatic hydrocarbons, and PCBs. Working closely with the DTSC and RWQCB on methodology.
- Los Angeles Air Force Base. Conducting a screening level risk assessment using Preliminary Remediation Goals for multiple sites on the base.
- Task manager for the fate and transport modeling section of the Louisiana Army Ammunition Plant risk assessment and Remedial Investigation. Modeling involved VOCs, SVOCs, pesticides, and metals. Assisted with the human health risk assessment and ecological risk assessment.
- Evaluated human health effects from oil spills on inland waters for the American Petroleum Institute (API) for an API report.
- Technical reviewer of human health and ecological risk

assessments on numerous petroleum contaminated sites involving crude oil and refined products in soil and groundwater.

- Participated in landfill risk assessments. Developed transport model for calculating horizontal gas migration from a landfill. Calculated volatilization fluxes and concentrations of chemicals from landfills.
- Involved in numerous risk assessments involving pesticide contaminated soil. The risk assessments included calculating health based soil cleanup levels.
- Coteacher of a 2 day risk assessment workshop for project managers at TRW. The purpose of the workshop was to introduce the defense contractor to risk assessment and how to peer review risk assessments.
- Computer model oil spill trajectory and fate for emergency response team. Technical advisor for worldwide oil model system for contingency planning, permitting and emergency response in the marine environment.
- Project manager on oil spill response contingency plans addressing both federal and state regulations for refineries and marine terminals.

Shabnam Barati
Senior Project Scientist

AREAS OF EXPERTISE

- Socioeconomics Impact Analysis
- Demographic Analysis
- Land Use Impact Analysis

EDUCATION

University of Sheffield, U.K.: Ph.D., Geography, 1986

J. Nehru University, New Delhi, India: M. Phil., Regional Science, 1978

Punjab University, Chandigarh, India: M.A., Geography; 1974

Punjab University, Chandigarh, India: B.A., Geography and Economics, 1972

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Senior Project Scientist, 1989-date

South County Community College District, Hayward, California, Instructor, 1989-date

University of Sheffield, U.K., Teaching Assistant, 1984-1986

Punjabi University, Patiala, India, Assistant Professor, 1978-1983

REPRESENTATIVE EXPERIENCE

Dr. Barati specializes in socioeconomic, demographic, and land use impact analyses and has extensive research experience in data collection, analysis and econometric modeling. She has participated in the preparation of numerous environmental impact assessments (EAs and EIAs) and other environmental compliance documents. Specific prleject experience is as follows:

- Estimation of population change in a rural mining area and its economic consequences from the expansion of a major mine in northern Nevada for Cortez Mine Expansion Project and the Cortez Pipeline Deposit Project. The study was conducted for the U.S. Bureau of Land Management.
- Estimation of population change, economic consequences, and social effects of a proposed coal-based power plant at Thousand Springs, Nevada. The study was conducted for U.S. Bureau of Land Management.
- Assessment of demographic and economic effects of the Mojave Pipeline Northward Expansion project in California, a project that involved a 380-mile long natural gas pipeline.
- Evaluation of demographic and economic effects of the Unocal-Chevron natural gas pipeline project in Northern California.
- Assessment of demographic and economic changes from the construction or modification of numerous large industrial facilities including a cogeneration facility in central California; a large power plant in southern California; and two refineries in northern California.
- Socioeconomic baseline discussion and data base for Adelanto-Lugo Transmission Project in southern California. Attributes studied included demographics, housing, and labor availability.
- Analysis of social and economic impacts of a 105-mile long transmission line in Virginia and West Virginia, and a geothermal power plant in Deschutes County, Oregon.
- Socioeconomic and land use impact report and a relocation study for an interchange project in Alameda County, California.

- Socioeconomic and land use impact analyses for a 1.5 million square foot commercial/residential development in northern California.
- Socioeconomic and land use impact assessment for a roadway project for the Port of Oakland, California.
- Economic impact assessment of naval air operations on the economy of Whidbey Island, Washington State, for an environmental impact assessment prepared for the U.S. Navy.
- Socioeconomic impact and cost-benefit analyses for an environmental impact assessment prepared for a dam restoration and reservoir project in southern California.
- Social, economic, and land use impact evaluations for a landfill expansion project in northern California, and for the construction of a new landfill in Washington.
- Socioeconomic and cumulative impact analyses for an environmental impact assessment on proposed land withdrawals in Churchill County, Nevada, for the U.S. Navy.
- Pro-forma fiscal impact analysis for a fertilizer-handling facility in West Sacramento, California. Cost-benefit analysis for a large commercial development in Redwood City, California.

HONORS

Commonwealth Merit Scholarship for higher education, British Council, 1983-86

University gold medalist in Geography, Punjab University, 1972 and 1974

National Merit Scholarship for higher education, Government of India, 1972-74

AREAS OF EXPERTISE

- Cultural Resource Management
- Section 106, NHPA Compliance
- Prehistoric Archaeology

EDUCATION

University of California, Davis:

M.A., Anthropology, 1974

University of California, Davis:

B.A., Anthropology (High Honors), 1971

CERTIFICATION

Register of Professional Archaeologists

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Project Scientist, 1991-date

U.S. Department of Interior, Bureau of Land Management - District Archaeologist, 1975-1991

REPRESENTATIVE EXPERIENCE

Mr. Hatoff has 25 years of experience in the management of cultural resources with specialized expertise in the prehistoric archaeology and ecology of California and the Great Basin. He has held sole responsibility for the management of cultural resources on 5.5 million acres of public lands in western Nevada and eastern California. In this role, he has handled a wide array of undertakings including preparation of EIS/EA documentation, Section 106 compliance/evaluation/ review, Native American consultations pursuant to provisions of the American Indian Religious Freedom Act, cultural resource permitting, contract development and administration, preparation of cultural resource management plans for cultural and paleontological resources, and technical document preparation.

As a Project Scientist in WCC's cultural resources group Mr. Hatoff has recently managed several major cultural resource studies in support of NEPA and CEQA-driven projects. Most recently he completed preparation of the cultural resources technical report and and cultural reources and paleontology environmental report sections for California Energy Commission Applications for Certification in Pittsburg, CA; Buttonwillow, CA; and Long Beach, CA.

Representative project experience includes the following:

- Pittsburg District Energy Facility Project, Pittsburg, California - Confidential Client: Directed cultural and paleontological resources components of California Energy Commission Application for Certification (AFC). Conducted field surveys and prepared cultural resources technical report and cultural resources and paleontology AFC sections.
- La Paloma Generating Project, Buttonwillow, California - La Paloma Generating Company, LLC: Directed cultural and paleontological resources components of California Energy Commission Application for Certification (AFC). Conducted field surveys and prepared cultural resources technical report and cultural resources and paleontology AFC sections.
- Long Beach District Energy Facility Project, Port of Long Beach, California - Confidential Client: Directed cultural and paleontological resources components of California Energy Commission Application for Certification (AFC).

Conducted field surveys and prepared cultural resources technical report and cultural resources and paleontology AFC sections.

- Lower Guadalupe Flood Control Project, Santa Clara County, California - Santa Clara Valley Water District: Cultural resources program manager for levee enhancement project; directed archaeological survey program and identified testing requirements for project.
- Tasman Light Rail Corridor Project, Santa Clara County, California - Santa Clara Valley Transportation Authority: Directed archaeological excavations at archaeological site SCL-12; wrote 66 page interpretive book on archaeology and ethnohistory in Santa Clara County; direct archaeological monitoring program during Tasman Corridor construction.
- Malin, Oregon to Road Mountain California Transmission line and Access Road Maintenance Program, northeastern California - Western Area Power Administration (Western): Directed cultural resources program for comprehensive Class I overview and Class III survey for over 100 miles of western-maintained facilities to ensure Section 106 compliance.
- Otay Mesa Generating Project, San Diego County, California - U.S. Generating Company: Directed cultural and paleontological resources components of California Energy Commission Application for Certification (AFC). Prepared AFC sections and directed subcontractors on complex, multi-component project.
- Mojave Pipeline Northward Expansion, California - Mojave Pipeline Company; Comprehensive Class I Cultural Resources Overview for proposed 560-mile natural gas pipeline (documents prepared for FERC, BLM, and responsible for preparation and implementation of Class III technical report, California State Lands Commission, and California OHP).
- Topock Interconnect, Arizona - Enron Corporation; Preparation (and successful implementation) of Treatment and Monitoring Program for natural gas pipeline pursuant to FERC, BLM and Arizona SHPO requirements; Native American consultation with Colorado River Indian Tribes and Fort Mohave Indian Tribe.
- Alturas Transmission Line Project - CPUC and BLM;

Cultural resources task leader for Class III surveys of 270 miles of transmission line ROW in northeastern California and western Nevada and preparation of cultural resource sections of CEQA/NEPA documents.

- Presidio of San Francisco - U.S. Army Corps of Engineers and National Park Service; Implementation of comprehensive archaeological monitoring program in hazmat setting, exploratory archaeological excavations in conjunction with a ground-penetrating-radar study, extensive on-going agency consultation/coordination.
- Cortez Gold Project, Nevada - Placer Dome, U.S.; EIS and Cumulative Effects Study - Cultural resources task leader, technical review, permitting and Section 106 compliance/evaluation, and Native American consultation oversight.
- Littlerock Dam and Reservoir Restoration Project, Los Angeles County, California - EIS/EIR interim project manager, cultural resources task manager - responsible for all environmental permitting aspects of project including coordination of Section 404 requirements.
- Los Vaqueros Reservoir Project, Contra Costa County, California (special assistant to prime contractor, J.M. Montgomery Engineers) - Assisted in successful preparation of multi-component document submitted to SHPO containing research design, site evaluations and findings of effect, and provide client technical guidance with Section 106 compliance issues.
- Fort Mojave Land Exchange, Clark County Nevada - Designed cultural resources survey program for proposed 50,000 acre land exchange between BLM and Fort Mojave Indian Reservation.
- Lahontan State Park Land Exchange, Churchill County Nevada - Responsible for Section 106 compliance for 1600 acre land exchange between BLM and State of Nevada. Cuervo Gold, Nevada - Mining Plan of Operation

PUBLICATIONS

Archaeology and Ethnohistory in Santa Clara County, California: Cultural Resources Mitigation for the Tasman Corridor Light Rail Project, with Sally S. Morgan. Prepared for Santa Clara Valley Transportation Authority. Draft 1997.

Book Review, Protecting the Past. George S. Smith and John Ehrenhard editors. CRC Press, Boca Raton, Florida, 1991. In, American Antiquity, Vol. 59, No. 2, 1994.

Archaeology and the Public: Future Directions, In Journal of California and Great Basin Anthropology, Vol. 14, No. 1, 1992.

A Prehistoric Bighorn Sheep Drive Complex, Clan Alpine Mountains, Central Nevada, with Kelly R. McGuire, In Journal of California and Great Basin Anthropology, Vol. 13, No. 1, 1991.

Archaeological Research in Churchill County. A Tale of Changing Perspectives, In Focus Vol. 1, No. 1. Churchill County Museum, Fallon. 1987.

The People of the Past/The Hidden Cave Experience with David Hurst Thomas, in Native American Annual, Vol. 1, No. 1. 1985a.

Management Objectives of the Hidden Cave Project, In Anthropological Papers of the American Museum of Natural History, Vol. 60. 1985b.

The Hidden Cave Archaeological Project: A Case Study in Creative Funding, In Contract Abstracts and CRM Archaeology, Vol. 2, No. 3. 1982.

Cultural Resources Management and the Public: A Case History, In American Society for Conservation Archaeology Report, Vol. 8, Nos. 5 and 6. 1981.

Sedimentological Analysis, In Guitarrero Cave, ed. Thomas Lynch, Academic Press, London, New York, San Francisco. 1980.

Cultural Resource Management at Grimes Point, in Nevada Archaeological Survey Reporter, Vol. 10, No. 2. 1977.

Late Pleistocene Pollen and Sediments: An Analysis of a Central California Locality, with Eric W. Ritter in The Texas Journal of Science, Vol. XXIX, Nos. 3 and 4.

The Mateo Ridge Site, with David Hurst Thomas, In Anthropological Papers of the America Museum of Natural

History, Vol. 53, Part 3. 1976.

Chronological Placement of the Farmington Complex in Central California, with Eric W. Ritter and Louis A. Payen, In American Antiquity, Vol. 41, No. 3.

Archaeological Investigations in the BLM Battle Mountain District, in Nevada Archaeological Survey Reporter, Vol. 8, No. 1. 1975.

Geomorphology and Archaeology, with Eric W. Ritter, In Center for Archaeological Research at Davis Publication No. 4. 1974.

PAPERS PRESENTED AT PROFESSIONAL MEETINGS AND CONFERENCES

Archaeology and the Public: Future Directions, Plenary Session paper presented at the Twenty-Second Great Basin Anthropological Conference, Reno, Nevada. 1990a.

With Eric W. Ritter, "Symbols For Explanation: Scratched Petroglyphs at the Pistone Site in Western Nevada." Presented at the Twenty-Second Great Basin Anthropological Conference, Reno, Nevada. 1990b.

"Wetlands Archaeology and the Public," Conference on the Nevada State Historic Preservation Plan, sponsored by the Nevada Division of Historic Preservation and Archaeology, Reno, Nevada. 1989.

"Cultural Resources Interpretive Techniques," Western Interpreters Association - National Park Service Annual Conference, Yosemite, CA. 1986a

Co-Chairman for Symposium on Western Great Basin Prehistory and Co-Presenter "Archaeology on Black Mountain: 26Mn2001" at the 20th Great Basin Anthropological Conference, Las Vegas. 1986b.

"Seventy Years of Archaeology in Western Nevada," Churchill County Museum Association, Fallon. NB. 1985

Organizer and symposium chairman at 1981 SAA Annual Meeting, San Diego, CA. Symposium entitled, "The Interface of Federal Cultural Resource Management Programs and the Public." 1981.

"Cultural Resource Management and the Public: A Case History" paper presented in above symposium.

"The Hidden Cave Project" with David Hurst Thomas, Great

Basin Anthropological Conference, Salt Lake City. 1980a.

"Hidden Cave: From Excavation to Interpretation," Churchill County Museum, Fallon, NV. 1980b.

"Federal Employment Opportunities in Anthropology," Hamilton College, Clinton, New York. 1979.

"Cultural Resource Management at the Grimes Point Area," Society for California Archaeology, San Diego. 1977.

"Cultural Resource Contracts and the BLM: Reconciling the Needs of a Multiple Resource Planning Agency and Research-Oriented Contractors," Great Basin Anthropological Conference, Las Vegas, NV. 1976.

"The Gatecliff Excavation and Central Nevada Archaeology," Southern Nevada Historical Society - Archaeo-Nevada Meeting. 1976.

"Strategy Report: The Pine Valley Archaeological project," Great Basin Anthropological Conference, Carson City, NV. 1974.

"Temporal and Cultural Placement of the Farmington Complex in Central California," Society for California Archaeology, Riverside, California. 1974.

"Palynology of a Central California Bog," Society of California Archaeology, Sacramento, CA. 1970.

SPECIAL PRESENTATIONS

Guest of Shaanxi Institute of Archaeology, Xian, People's Republic of China, to lead Seminar on History of Archaeology in the Western U.S. 1986.

AREAS OF EXPERTISE

- Air Emissions Evaluation
- Hazardous Waste Management
- Regulatory Compliance
- Project Management

EDUCATION

California Polytechnic State University, San Luis Obispo, M.S., Environmental Engineering, 1993

University of California, Santa Barbara, B.S., Chemical Engineering, 1985

University of California, Santa Barbara, Hazardous Materials Management Certificate, 1991

REGISTRATION

Registered Environmental Assessor, State of California, REA-04696

REPRESENTATIVE EXPERIENCE

Ms. Heredia is a Senior Project Engineer in the field of Air Quality Management. She provides regulatory compliance expertise with an emphasis in the areas of air quality and hazardous materials and waste management. Her experience includes:

- Site-specific fugitive emission factor development for an oil and gas refinery; including testing protocol, field sampling and statistical analysis of analytical results.
- Environmental audits for compliance with RCRA, OSHA, air quality and other environmental regulations.
- Project manager and evaluated applicability of Title V for 20 pipeline transfer stations in four states. Developed emission inventory, and evaluated state and federal rule applicability.
- Air quality and RCRA permit application preparation, development of permit language and negotiation with regulatory agencies.
- Reviewed and provided additional recommendations for a waste minimization plan at a natural gas processing facility. Served as a team member for air quality compliance for a facility-wide audit.
- Prepared air permit applications at 3 bulk gasoline distribution terminals. Performed compliance audits as part of the permit process and developed operator compliance manuals to assure ongoing compliance.
- Responsible for modifying a computer model to simulate refinery performance for training operators for the Shell Oil Company.
- Various regulatory agency interaction including: Integrated Waste Management Board, Department of Toxic Substance Control, Regional Water Quality Control Boards, Fire Departments, Fish and Game, Corp of Engineers, and Air Quality Districts and EPA.
- Reviewed emission calculations and prepared Title V application regulatory assessment for State and Local regulations for a petroleum refinery located in Hawaii. Assessed compliance of facility operations and identified compliance monitoring procedures. Developed proposed permit conditions.

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Manager, Air Quality Services, 1994 - Present

University of California Santa Barbara Extension Instructor, 1996

Metcalf & Eddy, Project Manager, 1990-1994

County of Santa Barbara Air Pollution Control District, Engineer III, 1985-1990

AFFILIATIONS

Air and Waste Management Association

- Developed emission quantification methodology for mining industry consortium, including sources such as leach pads, open sumps, electrowinning, and open solvent basins.
- Performed BACT/LAER analysis for combustion sources, piping components, resin manufacturing facilities, paint and solvent operations and other industrial facilities.
- Developed health & safety and work plans for source testing. Identified source test methods and laboratory analysis. Specified quality control/quality assurance procedures.
- Public meeting participation and response to public inquiries concerning air pollution control policies and procedures.
- Air dispersion modeling and health risk assessment for contaminated soil remediation projects. Evaluation of alternatives for treatment systems which remove organics from groundwaters and soils.
- Air emission control device efficiency analysis. Identification of maintenance procedures and operational changes to increase efficiency of control device(s).
- Emissions evaluation for crushing and screening boilers, flares, internal combustion engines, turbines, contaminated soil remediation projects, fugitive dust, landfills, leach pads, and ethylene oxide sterilizers.
- Environmental Impact Review and Negative Declaration development, including evaluation of potential environmental impacts and preparation of a mitigation measures management plan.

AWARDS

Ms. Heredia received a Switzer Fellowship award for her dedication to the air quality field and her superior academic performance.

She also received recognition from the Santa Barbara County Board of Supervisors as the County Employee of the Month for her technical and negotiation skills and development of efficient and expeditious procedures for air quality compliance.

AREAS OF EXPERTISE

- Project management
- National Environmental Protection Act (NEPA)
- California Environmental Quality Act (CEQA)
- Project description development and Environmental assessment
- Environmental planning and permitting

EDUCATION

California Polytechnic State University, San Luis Obispo: B.S., Natural Resources Management/Environmental Services, 1977

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Staff Scientist to Associate Scientist, 1977 to present

REPRESENTATIVE EXPERIENCE

Over the past 20 years, Mr. Ray has served in management positions on a variety of environmental planning (NEPA/ CEQA) permitting and compliance projects including:

- Project manager for an Application for Certification (AFC) (EIR equivalent) to the California Energy Commission for a 500 MW cogeneration plant and ancillary facilities in the City of Pittsburg.
- Project Manager for an AFC (EIR equivalent) for the Fellows Cogeneration Project in Kern County for U.S. Generating Company, including consideration of 400 MW cogeneration plant, 230 kV electrical transmission lines (100 miles), and associated natural gas and water pipelines and access roads.
- Technical Project Manager for an Environmental Impact Statement (EIS) for Appalachian Power Company's proposed 765 kV transmission line project in W. Virginia and Virginia; prepared for U.S. Forest Service, National Park Service, and U.S. Army Corps of Engineers.
- Assistant Project Manager for EIS/EIR for the 500 kV Adelanto-Lugo Transmission Project in San Bernardino County, California for Western Area Power Administration, MSR, and various municipalities in California.
- Assistant Project Manager for the CEC Application prepared for Pacific Waste Management's proposed resource recovery facility in Irwindale, California.
- Assistant Project Manager for two FERC License Applications (including Environmental Assessments) for Mojave and Transwestern Pipeline Companies' proposed natural gas pipelines in Texas, New Mexico, Arizona, and California.
- Project Manager for EIR for the City of Santa Barbara, Emergency Desalination Project, including regulatory permit reconnaissance and environmental assessment of desalination, water tankering, and groundwater supply projects.
- Project Manager for Program EIR for Casitas MWD, City of Ventura and United WCD's Joint Agencies Water Supply Project in Ventura and Los Angeles counties, including consideration of seawater or groundwater desalination and/or importation by pipeline of 20,000 acre feet per year of State Project water.
- Project Manager for the EIR and associated NEPA compliance and permitting related services for the City of San

REGISTRATION

Registered Environmental Assessor
(California REA # 01426)

AFFILIATIONS

Association of Environmental Professionals (AEP)

Luis Obispo's Salinas Reservoir Expansion Project.

- Project Manager for environmental and permitting related services for the Metropolitan Water District of Southern California Cajalco Creek Dam and Detention Basin Project for protection of water quality in Lake Mathews in Riverside County.
- Assisted the County of Santa Barbara, the Minerals Management Service, and the California State Lands Commission with their review of the EIS/R for Exxon's proposed oil and gas development in the Santa Ynez Unit near Santa Barbara.
- Task Manager for development of inland route alternatives for the EIR for the California High Speed Rail Project (Bullet Train) between Los Angeles and San Diego for CalTrans.
- Task Manager for regulatory reconnaissance and associated environmental assessments/environmental monitoring related to Santa Barbara's Gibraltar Dam Project.
- Project Manager for CEQA Environmental Assessment/Categorical Exemption for UC Davis Center for Neuroscience – Neurophysiology Facility.
- Assistant Project Manager and/or Task Leader (soils, agriculture, water resources, land use, vegetation) for numerous EISs and EAs including those done for:
  - Frontier Pipeline Company's hydrocarbon pipeline in Utah and Wyoming
  - Exxon's proposed Road Hollow gas plant project in Wyoming
  - Public Service Company of New Mexico's coal-fired power plant project
  - La Sal Pipe Line Company's proposed shale oil pipeline in Wyoming and Colorado
  - Energy Transportation Systems Incorporated's proposed coal slurry pipeline running between Wyoming and Louisiana
  - MAPCO's liquefied hydrocarbon pipeline between Wyoming and Texas
  - Provident Energy Company's proposed crude oil pipeline in Arizona
  - Shell's proposed coal strip mine on the Crow Indian Reservation in Montana
  - ARCO's petroleum development projects on the Northern Cheyenne, Blackfeet, and Crow Indian Reservations in Montana

- Prepared the Exploration and Development Plans for Amoco's lease holding in the Navarin Basin off Alaska.

Mr. Ray is a Registered Environmental Assessor in the State of California, and a member of the Association of Environmental Professionals.

Lawrence C. Headley Headley & Associates

Landscape Architect

- US Forest Service Interdisciplinary Team Experience
- Licensed Landscape Architect specializing in Visual Assessment and Visual Simulation
- Developed two methodologies for Programmatic EIS Visual Assessments
- Over 20 Years experience with NEPA, CEQA

EDUCATION

M.L.A. Landscape Architecture, Utah University, 1982
A.B., Communications, Division of Journalism, Stanford University, 1968

WORK SUMMARY

Headley and Associates is a Landscape Architectural firm founded by Lawrence Headley in January of 1984 as a sole proprietorship. Since then, Mr. Headley has primarily engaged in visual assessment and visual simulation of projects as the principal investigator for the Visual Resources section of environmental documents (EIS, EIR, EA). He is licensed in the State of California to practice Landscape Architecture and is a member of the American Society of Landscape Architects. Prior to founding his own firm, Mr. Headley had six years experience in visual resource impact assessment, land management planning and site design, including 4½ years as a Landscape Architect for the US Forest Service. Relevant experience includes substantial Oil and Gas Development EIS projects as well as a number of prominent national projects EISs. Special expertise includes state-of-the-art 3-D CADD solid modeling and rendering serving in legally defensible visual simulation of projects.

RELEVANT EXPERIENCE

Mr. Headley is thoroughly familiar with the Visual Management Systems of the USDA-Forest Service, USDI-Park Service, and USDI-Bureau of Land Management. His experience as a landscape architect with the U.S. Forest Service includes a seasonal tour with the Gallatin National Forest, Montana, and assignments to the R-6 Regional Office, Oregon, and the Cleveland and Sierra National Forests in California. On the Sierra National Forest he served 2½ years as a member of the core interdisciplinary land management planning team as the physical science planner. The Sierra NF was one of ten lead Forests in the nation implementing the regulations of FNMA (1976) which were concurrently being finalized. In his interdisciplinary role, he helped develop a programmatic approach to assessing visual impacts for the EIS associated with the Forest Plan. The approach was adopted by three of the National USFS Regions during the early 1980's.

In addition to Forest Service experience, Mr. Headley has substantial visual assessment experience with Oil and Gas-related EIR/EIS projects within Santa Barbara County (the Point Argullo field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans Project; the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin

Area Study; and the Exxon Lompoc Pipeline Project.) As well he has contributed to major national projects EIS's (the Superconducting Super Collider (Dept. of Energy), several Air Force Projects (ECTC, GWEN, MX missile).

Los Padres National Forest: Anderson Peak-Big Sur Radio Project Environmental Assessment. Headley & Associates was the prime contractor to Pacific Bell to prepare an Environmental Assessment in conjunction with a permit application submitted to the Los Padres National Forest for Pacific Bell's proposed Anderson Peak-Big Sur Radio Project. The EA was prepared in compliance with NEPA and CEQ regulations. The project entailed installing a passive repeater on LPNF land as part of a microwave communication system serving the Big Sur area. Impacts on visual resources were of prime concern to the LPNF, given that the project site was adjacent to a recreation trail, was within the coastal zone, and within the viewshed of State Highway 1, a designated scenic highway, and a state park in the Big Sur valley. Mr. Headley was the Principal Planner and Team Leader on the project, as well as the technical lead the preparation of the visual assessment.

Sierra National Forest: Land Management Plan. Mr. Headley was employed as an Landscape Architect functioning as the Physical Science Planner on the core interdisciplinary planning team. Responsibilities included 1) identifying critical issues to be resolved by the Forest Plan and formulating alternative planning strategies to resolve these issues (setting goals & objectives, land allocation, management intensity, standards and guidelines, outputs); 2) developing models for estimating environmental effects and evaluating alternative strategies relative to physical resources. Emphasis was placed on integrating the Visual Resource Management System with FORPLAN, a specialized mainframe computer optimization model for formulating feasible and cost efficient alternative plans. Visual resource coefficients for this linear program were developed with the aid of visual simulations using Perspective Plot on a desktop computer. The coefficients reduced timber yields according to desired objectives for visual resource management.

San Bernardino National Forest: Crystal Creek Pumped Storage Hydroelectric Project. On February 26, 1993, the Federal Energy Regulatory Commission (FERC) accepted and "Application for a Major Unconstructed Project" submitted by Creamer and Noble Energy Inc., St. George, Utah, regarding its Crystal Creek Pumped Storage Hydroelectric Project (Project No 10847-001-CA). The "Exhibit E" part of that Application contained, along with other analyses, a report on the Project's impact on Aesthetic Resources, prepared by Headley and Associates, Santa Barbara, California. The visual assessment was done in compliance with CEQA standards, as described in the Project Description for the Fellows Cogeneration Project, above.

The issues for this project centered on the impact on views from a nationally recognized scenic trail, recreation sites, and designated scenic highways within the San Bernardino National Forest; and views of the transmission line and afterbay seen from residential areas and a scenic highway crossing private lands. Also at issue was the appearance of the drawdown zones in other the afterbay and forebay reservoirs.

Visual impact were assessed by generating three-dimensional, rendered computer assisted models of the Forebay and Afterbay, and wire-frame perspectives of the transmission line

structures and mountain background. The models were integrated with digitized photographs of critical views and the final images assessed across parameters indicating the degree of contrast between the project features and their context and how noticeable the features would be. Conclusions of significance were made using criteria in a matrix relating the magnitude of the impact to the sensitivity of the affected views.

AREAS OF EXPERTISE

- Infrastructure Management Models Database Applications and Analysis
- Computer Software and Systems

EDUCATION

University of California, Berkeley: M.S., Electrical Engineering and Computer Science, 1974

University of California, Berkeley: B.S., Electrical Engineering, 1959

PROFESSIONAL HISTORY

Woodward-Clyde Consultants, Project Engineer, 1985-date

Independent Consultant, Piedmont, California, 1979-1985

University of California, Institute of Transportation Studies, Senior Development Engineer, 1974-1979

Hewlett-Packard Corp., Cupertino, California, Project Manager, 1969-1971

IBM Corporation, Poughkeepsie, New York, Development Engineer, 1959-1969

TRAINING

REPRESENTATIVE EXPERIENCE

At Woodward-Clyde Mr. Reid has developed micro- and minicomputer database and infrastructure management applications for transportation, public utility, and waste management agencies and corporations. Prior to this, he spent 5 years with the University of California Berkeley's Institute of Transportation Studies and 6 years as an independent consultant developing databases and statistical forecasting models for many transportation and public utility projects in government and industry. His experience in data management has ranged from data collection and validation to system implementation and administration. He also has experience in survey research and sampling, statistics, econometric forecasting, software development, and computer communications. Representative projects include:

- Designed and implemented database software application and network optimization programs for a life-cycle pavement management system. The integrated database application includes all screen menus and forms for selecting system options, inputting, editing, reviewing, and reporting data, and interfaces to the Fortran prediction, optimization, and policy analysis programs and to a portable field data collection computer. Client: Ventura County, California, Public Works Department.
- Manager and principal designer of an on-line network database system for technology transfer between highway maintenance agencies. Includes network communications software and hardware specifications, database application design, user PC terminal interface standards, system administration and editing procedures, user and systems documentation, implementation procedures, training, costs and staging plan. Client: National Cooperative Highway Research Program of the National Research Council.
- Managed development of a set of programs for life-cycle gas pipe maintenance, risk, and cost optimization in a user-friendly decision support system. Software is a transparent integration of database and procedural language subroutines for failure prediction and iterative optimization. Implementation is menu-driven with forms for user parameters, error checking and defaults, is portable, and has complete user and installation documentation. Clients: Gas Research Institute, Consolidated Edison of New York, Northern Illinois Gas

Training

AFFILIATIONS

Institute of Electrical and Electronic Engineers

Transportation Research Forum

Tau Beta Pi Engineering Honor Society

Co.

- Wrote database management plans, developed database applications, and implemented them for several groundwater, soil, and air chemistry monitoring projects for hazardous materials sites under EPA/Superfund, U.S. nuclear repository program, and state and county groundwater regulations. Applications involved forms entry and quality assurance/control of data, statistical and graphical analyses, and convenient menus, forms, and documentation for users. Clients: California counties, U.S. Department of Energy, and oil and chemical companies.

SPECIAL COMPUTER AND ANALYTICAL SKILLS

Experienced in Oracle, Rbase, Informix SQL databases; SPSS, NCSS, and Minitab statistical packages; GIS Plus, GDT/Tiger, Etak, geographic information systems and data; Fortran and Basic; MSDOS, OS/2 & Unix on Prime, IBM 386/486, Sun hardware; 3Com Network

SELECTED PAPERS AND PUBLICATIONS

"Field Experience with CIMOS: Living with 3rd Party Software," with Thomas Cowan, et al, in Proceedings of Conference on Personal Computers in the Gas Industry, Institute of Gas Technology, Chicago, IL, May 6-8, 1991.

"Interactive Microcomputer Network for [Highway] Maintenance Operations," presented at Transportation Research Board 68th Annual Meeting, Washington, D.C., January 1989.

"Minimizing Error in Aggregate Predictions from Disaggregate Models," Transportation Research Record No. 673, Transportation Research Board, Washington, D.C., 1978.

STATE OF CALIFORNIA

State Energy Resources Conservation
And Development Commission

In the Matter of:	)	
	)	
Application for Certification	)	Docket No. 98-AFC-1
For the PITTSBURG DISTRICT	)	
ENERGY FACILITY	)	
	)	

PROOF OF SERVICE

I, Diane M. Gilcrest, declare that March 25, 1999 I deposited copies of the attached **Pittsburg District Energy Facility Prehearing Conference Statement, Comments Upon Staff Assessment and Witness and Exhibit List** in the United States mail in Concord, CA with first class postage thereon fully prepaid and addressed to the following:

DOCKET UNIT

CALIFORNIA ENERGY COMMISSION DOCKET UNIT, MS-4
Attn: Docket No.: 98-AFC-1
1516 Ninth Street
Sacramento, CA 95814

INTERVENORS

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San Francisco, CA 94120

City of Antioch
City Att: William R. Galstan, Esq.
Third and "H" Streets
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Antioch, CA 93431-5007

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San Jose, CA 95113

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Attn: Pittsburg Energy Facility
Enron Capital & Trade Resources Corp.
101 California Street, Suite 1950
San Francisco, CA 94111

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21 "C" Orinda Way, #314
Orinda, CA 94563

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Woodward-Clyde
130 Robin Hill Road, Suite 100
Goleta, CA 93117

INTERESTED AGENCIES

Jeffrey C. Kolin, City Manager
City of Pittsburg
2020 Railroad Avenue
Pittsburg, CA 94565

Michael Ramsey, City Mgr.'s Office
City of Antioch
P. O. Box 5007
Antioch, CA 94531-5007

I declare that under penalty of perjury that the foregoing is true and correct.

Diane M. Gilcrest