

HEARING
BEFORE THE
CALIFORNIA ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:)
)
Application for Certification) Docket No.
for the Metcalf Energy Center) 99-AFC-3
(Calpine Corporation and)
Bechtel Enterprises, Inc.))

COYOTE GRANGE HALL
412 MONTEREY ROAD
COYOTE, CALIFORNIA

FRIDAY, MARCH 2, 2001

2:05 p.m.

Reported by:
James Ramos
Contract No. 170-99-001

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

COMMITTEE MEMBERS PRESENT

Robert A. Laurie, Commissioner, Presiding Member

Gary Fay, Hearing Officer

STAFF PRESENT

Dick Ratliff

Kerry Willis

Paul C. Richins, Jr.

APPLICANT

Jeffery D. Harris, Attorney,
Ellison, Schneider and Harris
for Calpine Corporation/Bechtel Enterprises

Kenneth E. Abreu, Development Manager
Calpine Corporation
Metcalf Energy Center

John L. Carrier, Senior Project Manager
CH2MHILL

Steve DeYoung
Calpine Corporation/Bechtel Enterprises

Gary Rubenstein
Sierra Research, Calpine Corporation

INTERVENORS

Scott Scholz
South San Jose.com

William J. Garbett
T.H.E.P.U.B.L.I.C.

Issa Ajlouny

Jeffrey Wade

Robert Williams

INTERVENORS

Elizabeth Cord
Suzanna Wong
Santa Teresa Citizens Action Group

Roger Beers, Attorney
Kelly R. Tilton, Attorney
Coyote Valley Research Park

ALSO PRESENT

Mollie Dent
City of San Jose

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

I N D E X

	Page
Proceedings	1
Opening Remarks	1
Commissioner Laurie	1
Introductions	2
Evidentiary Topics	
Air Quality and Public Health - resumed	6
CEC Staff Exhibits	6
CVRP witness Steven Radis	8
Exhibits	8/57
Direct Examination by Mr. Beers	10
Cross-Examination by Mr. Harris	32
Cross-Examination by Mr. Ratliff	44
Cross-Examination by Mr. Williams	53
Cross-Examination by Mr. Garbett	54
Santa Teresa Citizen Action Group witness	
Suzanna Wong	59
Direct Examination by Mr. Wade	59
Exhibits	59/85
Public Comment	92
Ms. Robin Johnson	92
Adjournment	94
Reporter's Certificate	95

P R O C E E D I N G S

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

2:05 p.m.

HEARING OFFICER FAY: This is an evidentiary hearing in the Metcalf Energy Center application for certification. And Commissioner Laurie has an opening announcement.

PRESIDING MEMBER LAURIE: I had a discussion with Mr. Abreu and I advised Mr. Abreu that I was personally aware of legislation in the form of a resolution that has just passed the Assembly and may or may not come to the Commission.

And I simply advised Mr. Abreu that should that resolution come to the Commission it will have to be docketed. And should I chose to respond, that response, too, will be docketed.

HEARING OFFICER FAY: Okay.

PRESIDING MEMBER LAURIE: Thank you.

HEARING OFFICER FAY: Thank you, Commissioner.

And just at this time I'd like to go through the formality of taking introduction so we can note for the record who is present.

Mr. Harris, can you begin.

MR. HARRIS: Yes, thank you.

1 Jeff Harris of Ellison, Schneider and
2 Harris, on behalf of the applicant. To my far
3 right is Mr. Ken Abreu, who is the Project
4 Manager. To my immediate right is Gary Rubenstein
5 of Sierra Research. To my left, Steve DeYoung of
6 Calpine/ Bechtel Joint Venture. And to his left
7 John Carrier with CH2MHILL.

8 HEARING OFFICER FAY: Mr. Ratliff.

9 MR. RATLIFF: Dick Ratliff, counsel for
10 staff. On my right is Kerry Willis, also counsel
11 for staff.

12 HEARING OFFICER FAY: Is the City of San
13 Jose present?

14 MS. DENT: Molli Dent for the City of
15 San Jose, but I'm only going to be here for a
16 short time today to make sure that I'm aware of
17 any procedural matters the Commission might want
18 to make the parties aware of, or any questions
19 that you might have for the City.

20 HEARING OFFICER FAY: All right, thank
21 you. City of Morgan Hill. No response. CVRP.

22 MR. BEERS: Roger Beers representing
23 CVRP. And with me is Kelly Tilton, and Steven
24 Radis who will be presenting testimony.

25 HEARING OFFICER FAY: Thank you. And

1 the Racquet Club, anybody present? Santa Teresa
2 Citizen --

3 PRESIDING MEMBER LAURIE: Mr. Fay, that
4 party has always indicated that they wanted to be
5 known as I think the Swimming and Racquet --

6 HEARING OFFICER FAY: Swimming and
7 Racquet Club. My mistake, excuse me.

8 PRESIDING MEMBER LAURIE: Is that right,
9 Mr. Wade, or --

10 MR. WADE: My understanding is it's
11 Rancho Santa Teresa Swim and Racquet Club. It's a
12 homeowners association.

13 MR. SCHOLZ: It's a homeowners
14 association, not a --

15 PRESIDING MEMBER LAURIE: Oh, is that
16 right?

17 MR. SCHOLZ: -- cabana club or something
18 like that.

19 PRESIDING MEMBER LAURIE: Okay, thank
20 you.

21 MR. SCHOLZ: Largest homeowners
22 association.

23 HEARING OFFICER FAY: Okay, thank you.
24 And the Santa Teresa Citizen Action Group. Is
25 anybody here from --

1 MR. WADE: Suzanna Wong is here on
2 behalf of Santa Teresa Citizen Action Group, and I
3 believe other members of the group will be showing
4 up shortly.

5 HEARING OFFICER FAY: Okay, thank you.
6 And Issa. No? Not present. CARE? Not present.
7 Mr. Williams? No. Mr. Garbett, I note is here,
8 I'll just note that for the record. And Mr. Wade
9 is here, and Mr. Scholz.

10 PRESIDING MEMBER LAURIE: Anybody talk
11 to Mr. Ajlouny? Is he feeling okay? I know he
12 went home ill yesterday.

13 HEARING OFFICER FAY: Just a brief
14 announcement. I believe that the Committee is
15 going to want to discuss the briefing schedule
16 with Hearing Officer Valkosky before an order is
17 issued, so there may be some changes to the
18 proposed schedule that I said on the record
19 yesterday. And the Committee will just have to
20 think about that. And certainly, you'll get
21 notice of anything to that effect.

22 PRESIDING MEMBER LAURIE: The record
23 should simply note that Mr. Williams is present.

24 HEARING OFFICER FAY: Mr. Williams, yes.
25 Thank you, he is here now. Thank you.

1 PRESIDING MEMBER LAURIE: And this is a
2 casual dress Friday --

3 (Laughter.)

4 PRESIDING MEMBER LAURIE: Thank you for
5 reminding us, Mr. Williams, Mr. Scholz and Mr.
6 Wade.

7 HEARING OFFICER FAY: All right, any
8 preliminary matters before we begin with the
9 testimony from CVRP?

10 MR. RATLIFF: Mr. Fay, at the end of
11 yesterday's hearing you reminded me that the
12 staff's testimony needs to be moved into evidence
13 and assigned exhibit numbers.

14 And first of all, it's my understanding
15 that the staff's FSA is exhibit number 7. But I
16 believe I'm told that we're moving individually
17 the separate portions of the FSA in at the time
18 that they are actually provided at hearing. So I
19 would move Mike Ringer's public health portion of
20 the FSA and Magdy Badr's portion in at this time.
21 Those need no new exhibit number.

22 I think I --

23 HEARING OFFICER FAY: I believe those
24 were moved and received last night.

25 MR. RATLIFF: Oh, were they? Okay.

1 I've already forgotten the events of the prior
2 evening.

3 There are four additional exhibits that
4 need to be marked, and the first is the rebuttal
5 testimony of Mike Ringer, which I believe would be
6 exhibit number 140, is that correct?

7 HEARING OFFICER FAY: That's correct.

8 MR. RATLIFF: The second would be the
9 FDOC -- I'm sorry, yes, the final determination of
10 compliance from the Bay Area Air Quality
11 Management District. That would be 141.

12 HEARING OFFICER FAY: Correct, 141 for
13 the FDOC.

14 MR. RATLIFF: Third would be the
15 testimony of Glen Long of the Bay Area Air Quality
16 Management District.

17 HEARING OFFICER FAY: That will be
18 exhibit 142.

19 MR. RATLIFF: Yes, 142. And the third
20 would be the testimony of Dr. Ken Lim.

21 HEARING OFFICER FAY: Testimony of Ken
22 Lim, exhibit 143. And in case there was any
23 doubt, I believe you moved all of those last
24 night, was that your intent?

25 MR. RATLIFF: Well, we didn't assign

1 them exhibit numbers, and I'm not sure. I think I
2 said something about moving them into evidence,
3 and I can't remember whether we actually did it or
4 not. So.

5 MR. HARRIS: There's an errata to the
6 FDOC, as well, dated February 8, 2001.

7 HEARING OFFICER FAY: Would you like to
8 move that, as well, Mr. Ratliff?

9 MR. RATLIFF: Yes, I would.

10 HEARING OFFICER FAY: The errata to the
11 FDOC, dated February 8th, is that correct?

12 MR. HARRIS: Yes, February 8, 2001.

13 HEARING OFFICER FAY: Is exhibit 144.

14 Okay, anything further?

15 MR. RATLIFF: No.

16 HEARING OFFICER FAY: All right, thank
17 you. Any other preliminary matters?

18 Then, Mr. Beers, if you're prepared to
19 move ahead we'll receive your witness' testimony.

20 MR. BEERS: At this time we'd like to
21 call Steven Radis and have him sworn.

22 HEARING OFFICER FAY: Please swear the
23 witness.

24 //

25 //

1 Whereupon,

2 STEVEN RADIS

3 was called as a witness herein, and after first
4 having been duly sworn, was examined and testified
5 as follows:

6 MR. BEERS: And I have certain documents
7 that I'd like to mark as exhibits if this is the
8 appropriate time to do that.

9 HEARING OFFICER FAY: Yes, this would be
10 a good time.

11 MR. BEERS: First would be Mr. Radis'
12 February 13, 2000 CVRP Group 3B testimony with
13 attachments.

14 HEARING OFFICER FAY: That's exhibit
15 145.

16 MR. BEERS: And the second one would be
17 the February 21, 2000 errata to that testimony.
18 Also with attachments.

19 HEARING OFFICER FAY: Exhibit 146.

20 MR. BEERS: Third would be the August
21 29, 2000 letter from Grueneich Resource Advocates
22 transmitting two letters dated August 15, 2000 and
23 August 21, 2000 from Dian Grueneich to Dennis Jang
24 regarding BAAQMD application number 27215.

25 HEARING OFFICER FAY: We'll mark that

1 exhibit 147. I wonder if you could describe it
2 again for me, though, the noise interfered.

3 MR. BEERS: Okay. It's an August 29,
4 2000 letter from Grueneich Resource Advocates to
5 the Energy Commission transmitting August 15 and
6 August 21, 2000 letters from Dian Grueneich to
7 Dennis Jang regarding the BAAQMD application.

8 HEARING OFFICER FAY: Thank you.

9 MR. BEERS: Next is May 15, 2000 CVRP
10 comments on the preliminary staff assessment with
11 attachments.

12 HEARING OFFICER FAY: That's exhibit
13 148.

14 MR. BEERS: Next is the May 31, 2000
15 CVRP comments on the preliminary determination of
16 compliance with attachments.

17 HEARING OFFICER FAY: Exhibit 149.

18 MR. BEERS: Next is the October 9, 2000
19 CVRP petition to compel production of documents
20 with attachments.

21 HEARING OFFICER FAY: That's exhibit
22 150.

23 MR. BEERS: And finally would be the
24 November 30, 2000 CVRP prehearing conference
25 statement.

1 HEARING OFFICER FAY: That's exhibit
2 151.

3 MR. BEERS: Okay. So at this time I'd
4 like to begin my direct questioning of Mr. Radis.

5 DIRECT EXAMINATION

6 BY MR. BEERS:

7 Q I would ask you first of all to identify
8 by whom you're employed, Mr. Radis.

9 A I'm employed by the company of Arthur D.
10 Little.

11 Q And where are you located?

12 A Santa Barbara.

13 Q Could you describe for us generally your
14 profession for Arthur D. Little?

15 A I'm a Principal in the Global
16 Environmental Risk Practice. Been there since
17 1990.

18 Q And what education do you have in that
19 regard?

20 A I have a bachelors and a masters degree
21 in climatology.

22 Q Can you describe for us briefly the
23 experience you've had here?

24 A More than 15 years experience in
25 conducting dispersion modeling and air quality

1 impact analyses. And about 20 years experience in
2 doing climatological and meteorological studies.
3 Prepared probably hundreds of air quality studies,
4 dozens of health risk assessments.

5 I recently testified on the Elk Hills
6 siting case in both air quality/public health as
7 well as hazardous materials.

8 I have quite a bit of power plant
9 experience both on siting cases before the CEC,
10 cogen plants. Modeled probably every facility in
11 the Southern California Edison or former Southern
12 California Edison/San Diego Gas and Electric
13 system back when they proposed a merger.

14 Q Did you also do modeling analysis and
15 health risk assessments relating to the Unocal
16 Avila Beach cleanup project?

17 A Yes, I did. We prepared, as part of an
18 environmental impact report, health risk
19 assessment and air quality impact analysis.

20 Q Okay. We've have marked as exhibit 145
21 your testimony, and we've had marked as 146 the
22 corrections to your testimony. Are those
23 corrections that you have submitted in fact
24 changes that you wish to make to your testimony?

25 A Yes.

1 Q And the document that we've marked as
2 145, is that a true and correct copy of the
3 testimony that you're presenting?

4 A Yes.

5 Q And is that based on your independent
6 analysis and professional judgment?

7 A Yes, it is.

8 Q Is it your professional opinion that the
9 prepared testimony is valid and accurate with
10 respect to the issues you've addressed there?

11 A Yes.

12 Q And are you personally familiar with the
13 facts and conclusions related in the testimony?

14 A Yes, I am.

15 Q And is the same true of the testimony as
16 it's been modified by the corrections?

17 A Yes.

18 Q Okay. The testimony that you've
19 provided begins with a heading entitled risk
20 assessment or health risk assessment. Could you
21 briefly summarize the testimony that you're
22 providing with respect to a health risk
23 assessment?

24 A Based on the applicant's analysis of
25 health risk, both at 100 percent load and during

1 partial load, which is approximately 75 percent in
2 this case, we reviewed emission factors for a
3 variety of turbines operating at lower loads that
4 may be more representative of startup.

5 I have some overheads which I should
6 probably go up and show at this time.

7 Q Okay.

8 MR. HARRIS: Mr. Radis, just for
9 clarification, are these part of your prefiled
10 testimony? If they are, can you refer to the
11 figure number so we can follow along? Okay,
12 thanks.

13 (Pause.)

14 BY MR. BEERS:

15 Q So, Mr. Radis, could you start off by
16 giving us sort of a general overview of what you
17 were trying to show or analyze in the health risk
18 assessment that you did?

19 A Yeah. Based on a report prepared by the
20 Electric Power Research Institute and the Gas
21 Research Institute, we became aware of the fact
22 that emissions during turbine startup and low load
23 conditions are considerably higher than they are
24 at full load, or even higher partial loads.

25 Based on that, as well as other studies,

1 we felt it was necessary to revised the risk
2 assessment to address startup conditions, since
3 this project would have approximately 400 hours of
4 startup per turbine.

5 Q Now, you said you found it advisable to
6 revise the risk assessment. What risk assessment
7 were you revising with this new information?

8 A I used the applicant's risk assessment
9 in supplement C, as well as their I think it's
10 November 17th letter to the Bay Area AQMD, which
11 had their partial load risk assessment.

12 In evaluating the EPRI report we looked
13 at source testing that was done for a variety of
14 turbines. Some of which are of the same size or
15 similar size to the proposed project, some that
16 are quite a bit smaller.

17 Q And you've now got figure 1 from your
18 testimony up on the projection screen, is that
19 correct?

20 A Correct. Figure 1, in this case, shows
21 carbon monoxide emission factors as a function of
22 load. The way these are presented is we used the
23 lowest load condition to represent 100 percent of
24 the emission factor, and then looked at the
25 fraction of emissions that would occur under full

1 load.

2 In this particular case what you would
3 see is, for example, the Rolls Royce engine at
4 full load, the emission factor's approximately 30
5 percent of what it is under, in this case 25
6 percent load.

7 For some of the other turbines, the
8 Solar turbines, as well as a Westinghouse turbine,
9 they're very efficient when they're running at 100
10 percent, or actually 70 percent and above. And
11 the emissions are less than 10 percent of what
12 they are during startup.

13 Analogous to this would be looking at
14 the proposed project's emission limits. During
15 startup the proposed emission limits are about 30
16 times higher than they are at full load, and the
17 emission factor is about 300 times.

18 And the difference between emission
19 factor and emission levels is that the factor
20 doesn't take into account how much fuel is being
21 burned.

22 And if you're at a startup condition of
23 say 10 percent, you're obviously only burning
24 about 10 percent of the fuel. And so you have to
25 account for that in the emission estimate.

1 We looked at other pollutants besides
2 carbon monoxide. This particular figure is for
3 non-methane hydrocarbons.

4 Q That's figure 2, is that correct?

5 A Figure 2. There's obviously a wide
6 spread here between different turbines that you
7 need to recognize in terms of not all turbines
8 perform the same. And part of that is how the
9 turbines are equipped, what kind of burners they
10 have, and how they're used.

11 Figure 3 is for formaldehyde, getting a
12 closer to the concern over health risks. As we
13 can see on most of these turbines 50 percent and
14 above load performance is very well, and then
15 basically it degrades rapidly at lower loads.

16 There are two points on here in red.
17 One is the Westinghouse 501AA. That's based on
18 source test data. The second one is based on
19 Calpine's source test data which we extrapolated
20 based on their 175 percent load factors using the
21 same emission profile as the other Westinghouse
22 turbine.

23 Q Can you take those two lines that are
24 marked in red and just tell us what the curves
25 illustrate with respect to emissions of

1 formaldehyde?

2 A Yeah, basically these curves would
3 illustrate that the full load emission factors are
4 only on the order of 5 to 8 percent of what they
5 are under startup conditions. Inversely what you
6 would say is that the emission factor's probably
7 about 20 times higher under startup.

8 In this case I'm using 25 percent as
9 startup only because that's the lowest point we
10 have for source test data.

11 Much of the profiles I've seen for
12 turbine startup indicate that many are started up
13 about 10 percent. But I didn't feel it was
14 correct to extrapolate beyond the source test data
15 that we had.

16 Figure 4 shows similar curves for
17 benzene. Again, there's quite a wide spread based
18 on turbine type. One thing that we found
19 reasonably consistent for most of the turbines
20 involved were that the larger turbines tended to
21 have better performance, in the range of 50 to 100
22 percent, and then degrade rapidly from there. But
23 it's not consistent throughout.

24 In looking at turbines, we looked at
25 different applications of turbines. The first --

1 all these figures I had before are based on either
2 power generation or for use in the gas industry.

3 These are from aircraft turbines. This
4 is from an FAA database based on manufacturers
5 source test data, and in this case they only have
6 criteria pollutants, or hydrocarbons and carbon
7 monoxide.

8 But again, it's virtually the same type
9 of characteristic in terms of high performance at
10 high load, which would make sense since the
11 majority of the operations of most turbines would
12 be at high load. And in this case, idle
13 performance at around 25, 30 percent, performance
14 degrades quite a bit.

15 Q So do all of the figures that you
16 presented so far reflect data from either the FAA
17 study or the GRI EPRI study or the Calpine source
18 test data?

19 A Yeah. The first four figures were all
20 based on the GRI-EPRI study, except the one curve
21 I put in to compare for Calpine. The last figure
22 had only the FAA data.

23 Based on those source test data and the
24 source test data that Calpine did at their
25 Pasadena, Texas facility, we actually extrapolated

1 the emission profiles based on the same
2 relationship.

3 In this case we used the 100 percent and
4 75 percent data to then extrapolate down below to
5 25 or 30 percent, to find a characteristic
6 emission factor for startup.

7 One thing that is important on this
8 particular figure is that the health risk
9 assessments that have been done were done at
10 essentially this point here of 100 percent, as
11 well as about 75 percent. And if you go and look
12 at acrolein it would be that point there.

13 These are regions where turbine
14 performance is still pretty good.

15 Q When you say health risk assessments
16 that have been done, are you referring by the line
17 at 100 percent to the health risk assessment
18 that's in supplement C for the staff's reliance,
19 and the other one that's in the November 17, 2000
20 letter from the applicant?

21 A Correct.

22 Q Okay.

23 A The results of these risk assessments,
24 and we really concentrated on the acute health
25 hazard associated with acrolein, the hazard index

1 at 100 percent was .33. The refined hazard index
2 at 75 percent load was .9.

3 When you look at these curves and
4 extrapolate down to lower loads, you can see that
5 the health hazard index goes up substantially for
6 conditions below 50 percent and what we would
7 consider startup.

8 Q Now that particular figure, if you could
9 leave it on there just for a moment, really is
10 taking the curves that you've developed from this
11 other data and applying it to the applicant's
12 proposed facility based on its source test data?

13 A Correct.

14 Q And projecting what the emissions will
15 look like in terms of the aldehydes at lower
16 loads, is that correct?

17 A Correct.

18 Q All right.

19 A And one thing that you can do, and the
20 reason that these are all presented as percentages
21 is that you can actually overlay different
22 figures. And basically find that it's a
23 consistent behavior regardless of which particular
24 compound you're looking at in terms of
25 hydrocarbons or carbon monoxide.

1 And you can use aircraft turbines; you
2 can use power plant turbines; or you can use gas
3 compression turbines. And it comes out to where
4 they all have the same characteristics of
5 relatively good performance at 50 percent and
6 above; and a rapid degradation in emission
7 performance below 50 percent.

8 Q Now did you take those estimates of
9 emission factors for this plant at those lower
10 loads and use that to develop a health risk
11 assessment?

12 A Yes. We took the applicant's risk
13 assessment and modeling files and basically just
14 replaced the emissions that they used with our low
15 load emissions to calculate what the health risk
16 might be under startup.

17 Q And did you make any changes to the
18 emission factors or estimates that they had used
19 in their modeling?

20 A We modified the 75 percent load emission
21 factor to include all samples that were taken. We
22 did not throw out the ones that exceeded the
23 averaging time. Nor did we throw out the one
24 outlier that seemed high.

25 We took all the data and averaged it

1 across the board.

2 Q And did you make any other adjustments
3 in the data that had been used by the applicant in
4 the modeling of that data?

5 A No, we did not.

6 Q Describe for us the results of modeling
7 with those assumptions.

8 A Based on the revised modeling for what
9 we're going to call startup conditions or 25
10 percent load, the health hazard index in areas of
11 terrain where the plume has the highest impacts
12 would be on the order in the 100s. Or you know,
13 more than two orders of magnitude higher than what
14 would be considered an acceptable level.

15 Down in the area of the neighborhood
16 surrounding the facility and CVRP, because the
17 plume is up higher from the terrain, we found that
18 typically they range from say 40 to 80 times the
19 health hazard index.

20 And this is really all driven by
21 acrolein. The purple colored text in there, those
22 are all schools that are located in the area
23 around this facility.

24 Q What's the nearest school?

25 A I believe the Encinal Elementary School

1 is closest, as I recall from the applicant's
2 testimony, it's about 1.4 miles.

3 Q And can you tell us from figure 7 what
4 the health hazard index reading would be in that
5 area, the assumptions that you modeled?

6 A Actually I have it calculated
7 numerically. It's hard to tell from the figure,
8 but it's on the order of say 50.

9 Q So, Mr. Radis, you also have indicated
10 that there's mitigation that could be employed to
11 address the higher emissions of aldehydes,
12 particularly acrolein, during startup conditions
13 in light of the exceedances of the health hazard
14 index.

15 Can you briefly describe the mitigation?

16 A There's really two things that can be
17 done that are feasible. One would be to limit
18 startups. The second would be to put on an
19 oxidation catalyst of some type that would reduce
20 VOC emissions, and would also reduce CO emissions.

21 Q Now we heard testimony here yesterday by
22 a gentleman I believe from the Air District, and I
23 think the staff of the Energy Commission echoed
24 these remarks, that they didn't want to get into
25 the business of telling a power plant operator how

1 to operate the site, apart from meeting air
2 quality and other kinds of requirements.

3 Are you seriously suggesting that the
4 Commission adopt the limitation on startups as the
5 solution to this?

6 A Actually there will always have to be
7 startups, so you're not going to totally avoid
8 potential impacts based on limiting startups or,
9 you know, limiting it to a very minimal number.

10 I think the preferred alternative would
11 be to evaluate oxidation catalysts of various
12 types and locations within the unit to reduce the
13 emissions at the source. Recognizing that there
14 has to be some startups. And that would minimize
15 potential impacts from acrolein as well as the
16 other VOCs.

17 Q And have you actually done an analysis
18 of what kind of effect that would have on the
19 health hazard index readings you obtained if an
20 oxidation catalyst was installed?

21 A We've basically found that with a 90
22 percent reduction you would limit exposure to
23 acceptable levels in areas that are populated,
24 although the health hazard index would be
25 exceeded, and there is a terrain where you're not

1 likely to have people very frequently.

2 Q But it's the acute health hazard index
3 you're talking about?

4 A Correct. We're really only talking
5 acute health hazard index. This would be a one-
6 hour exposure. We found that the longer term,
7 chronic could be mitigated quite easy, and
8 actually that the cancer risk was not even
9 considered significant.

10 Q Okay. And how would an oxidation
11 catalyst achieve that function of reducing the
12 acrolein emissions?

13 A Basically the oxidation catalyst will
14 oxidize various VOCs and reduces the
15 concentrations of VOCs depending on the location
16 and the temperature, anywhere from say 70 to 90
17 percent plus.

18 Q We heard testimony here, I believe it
19 was from Mr. Rubenstein, expressing some concern
20 that an oxidation catalyst would generate
21 additional PM10. Have you considered that in your
22 recommendation that an oxidation catalyst be
23 installed?

24 A Yes, I have. The amount of PM10 that
25 would be generated by the oxidation catalyst is a

1 function of operating temperature at a typical
2 temperature in HRSG, the oxidation catalyst would
3 probably convert about 5 to 7 percent of the
4 sulfur dioxide into SO3.

5 And that's actually based on vendor data
6 for a Calpine facility that's being permitted in
7 Connecticut.

8 If you were to place the catalyst at a
9 higher temperature location where you would
10 actually get a higher VOC reduction, you would
11 convert larger percentages of the SO2 and form
12 more particulate.

13 However, my opinion is, and we heard
14 this, I think in both applicant and staff
15 testimony, is that even if you don't oxidize the
16 SO2 to SO3 within the unit, it does happen in the
17 atmosphere downwind. And particulate is formed.
18 And we heard, I think, some discussion of
19 different rates yesterday.

20 But it's something that's going to occur
21 relatively rapidly on the order of hours after
22 being emitted from the facility.

23 So it really comes down to whether or
24 not the secondary PM10 forms by the catalyst
25 within the power plant, or if it forms downwind.

1 In both cases the ammonia is available and you're
2 likely to get very very high percentages of the
3 sulfur dioxide that's emitted being converted into
4 secondary particulate anyway.

5 Q Okay, so did you reach a conclusion from
6 that as to whether or not the potential that Mr.
7 Rubenstein had identified was a reason not to use
8 an oxidation catalyst?

9 A No, I don't think it's a reason at all
10 to not use an oxidation catalyst.

11 Q In your testimony that's been prepared
12 you also have a section on PM10 emissions. Would
13 you briefly describe your testimony there?

14 A Yeah. We had some concerns as to
15 whether or not a 9 pound per hour PM10 limit can
16 be achieved consistently, given that vendor
17 guarantees are basically double that. And Calpine
18 is basically committed to a PM10 emission rate on
19 their facility in Connecticut that's also about
20 double what they're proposing for this particular
21 plant.

22 Now, granted, it's a different turbine,
23 but it's very very similar size.

24 Q So what analysis did you do in that
25 regard?

1 A We basically looked at permit limits for
2 a variety of sources throughout the state and
3 found that significant number had PM10 emission
4 limits that were much higher than what are being
5 proposed here.

6 Q And why is it a matter of concern that
7 an applicant is being given a PM10 permit limit
8 lower than what other plants are achieving?

9 A Basically the permit limit would be
10 enforced through very few source tests, probably
11 an annual source test, that may or may not catch
12 whether or not the plant is frequently exceeding
13 that limit.

14 In addition, the type of source test
15 that's used has a significant effect on what PM10
16 emission level you might see.

17 Mr. Rubenstein testified that he
18 believes that much of the PM10 is greater than 10
19 microns. While his argument is interesting and
20 probably deserves a lot more investigation, it's
21 still contrary to what's being enforced right now
22 by EPA, the California Air Resources Board, and
23 most local districts.

24 Q So does your testimony have a
25 recommendation with respect to the PM10 issue?

1 A We're recommending either continuous
2 emission monitoring for PM10 or random independent
3 source testing to try and evaluate that.

4 Q Okay. And you also have, finally, a
5 section on VOC emissions and are you making a
6 similar recommendation there, as to the manner of
7 verifying?

8 A Yeah, we're recommending that source
9 testing be done to establish the relationship
10 between VOCs and CO, so that CO continuous
11 emission monitoring can be used to track VOC
12 emissions.

13 This is something that EPA has
14 recommended on other facilities, including a
15 letter to the Connecticut Department of
16 Environmental Protection on Calpine's project in
17 Connecticut.

18 Q Okay. And again, is the recommendation
19 being made because of a concern that a lower
20 amount is being proposed than looks like it's
21 reasonably to be expected from other facilities?

22 A Correct.

23 Q And finally you've got a section
24 entitled BACT inconsistency with other Calpine
25 facilities. And could you briefly summarize what

1 your testimony is in that regard?

2 A Yeah. We looked at the BACT levels for
3 this project, and then an actual permit that's
4 been issued for a Calpine facility in Connecticut.
5 And they're proposing lower BACT limits than they
6 are on this particular facility. And we were a
7 little bit concerned by that.

8 We feel that they could probably meet
9 the 2 ppm NOx limit that they're proposing on the
10 Connecticut plant. They've got a CO emission
11 limit of 4 ppm for that plant.

12 And also based on staff testimony on the
13 Three Mountain Power Project, we feel that they
14 can further reduce ammonia slip, which would also
15 help reduce potential secondary PM10 emissions.

16 On the Three Mountain Power Project
17 siting case the staff testified that based on
18 source test data for a facility that's currently
19 in operation the ammonia slip levels were on the
20 order of, I think, .02 or .2, or significantly
21 lower than 1 ppm.

22 And based on that source test data we
23 feel that facilities can meet lower ammonia slip
24 levels.

25 Q Okay, so the recommendation in your

1 final section is that the limits for those various
2 pollutants be lowered by the Commission, is that
3 correct?

4 A Correct.

5 Q Do you have any further information to
6 add by way of summarizing the testimony that
7 you've presented here?

8 A No, I don't think so.

9 Q Okay.

10 MR. BEERS: Then I've concluded with my
11 direct examination of the witness. He's ready for
12 cross-examination.

13 HEARING OFFICER FAY: Thank you. Mr.
14 Harris.

15 MR. HARRIS: Mr. Fay, actually I think
16 if I could have a moment to confer with my client
17 and with our experts I might be able to
18 considerably cut this down. So, if I could pass
19 and talk quietly with those folks, and come back
20 to me. Or we could take a short break, whatever
21 you prefer.

22 HEARING OFFICER FAY: Sure. Why don't
23 we take a five-minute break now. Is that going to
24 be enough?

25 MR. HARRIS: Yeah, that's convenient. I

1 just didn't want to interrupt you if --

2 HEARING OFFICER FAY: No, that's fine.

3 MR. HARRIS: Okay, I think it will help
4 move things along.

5 (Brief recess.)

6 CROSS-EXAMINATION

7 BY MR. HARRIS:

8 Q Good morning, Mr. Radis. It is
9 afternoon and I was checking to see whether you
10 were Doctor, so I'm sorry --

11 A Okay.

12 Q I apologize, I should have done that
13 beforehand.

14 A couple of questions for you. You
15 worked on the Elk Hills project, is that correct?

16 A Yes, I did.

17 Q And in the Elk Hills project, in terms
18 of the California air toxics emissions factor, the
19 CAT test, I guess some people call it, you used a
20 default acrolein factor of I think it's 0.02370,
21 is that correct?

22 A It's partially correct. I don't know if
23 you want me to explain exactly what I did there
24 that would clarify things.

25 Q Well, let me ask the question a little

1 more specifically then. In your health risk
2 assessment for the acrolein for the Elk Hills
3 project, did you use the default factor?

4 A I used the default factor for the annual
5 average calculation, or the chronic exposure to
6 acrolein. In the AFC I think it implies that I
7 used that for everything. However, in my oral
8 testimony on Elk Hills I did point out that I used
9 the maximum acrolein emission factor in the
10 database when I performed the health risk
11 assessment for that facility.

12 And that factor is on the order of I
13 want to say about double what was used in this
14 case on the 70 percent load.

15 Q Okay, thank you. Also on the Elk Hills
16 project, in terms of ammonia slip, what was the
17 ammonia slip that you had recommended for the Elk
18 Hills project? Was it 10 ppm or 5 ppm?

19 A I don't think I recommended any ammonia
20 slip. I think the project would specify what the
21 ammonia slip would be.

22 Q I'm sorry, let me ask the question
23 differently then. What was the approved factor?
24 I won't ask you what you recommended.

25 A I honestly am not sure I remember what

1 the factor was.

2 Q Okay, would you accept, subject to
3 check, that it was either 5 or 10 ppm?

4 A I know those numbers were bantered
5 about, yes.

6 Q Okay. Did you recommend in that case a
7 level of 2 ppm like you're recommending in this
8 case?

9 A I didn't make any recommendations on the
10 ammonia slip, and I was unaware that there was
11 source test data that implied you could go lower.
12 It was my impression at that time that 5 ppm was
13 what they could achieve.

14 Q On the issue of the California air
15 toxics emissions factors, are there two
16 different -- let me back up. There's only one set
17 of factors there, isn't that correct, in terms of
18 an oxidation catalyst? Are there separate factors
19 for those emissions for units with and without
20 oxidation catalysts?

21 A They're all the same factors.

22 Q Thank you. Are you aware of any source
23 test results that demonstrate the effectiveness of
24 an oxidation catalyst on acrolein emissions?

25 A Not acrolein specifically.

1 Q Thank you. And an oxidation catalyst
2 works at startup, is that correct?

3 A It does not immediately work on startup,
4 based on the startup profiles I've seen for
5 different turbines. Under a cold start the
6 catalyst would achieve operating temperature
7 probably on the order of 20 minutes. Under a warm
8 startup it's probably more like 5 to 10 minutes.

9 So the --

10 Q But the --

11 A -- effective --

12 Q Sorry.

13 A -- for a big percent of the time.

14 Q I'm sorry, I didn't mean to interrupt
15 you. Were you able to finish?

16 A Yes.

17 Q Okay, sorry. So then the answer is the
18 oxidation catalyst does not work immediately at
19 startup, it takes some time to become effective?

20 A Takes a little bit of time to be
21 effective.

22 Q Okay. If you wanted that oxidation
23 catalyst to be most effective wouldn't you place
24 it in the turbine or closest to the turbine
25 exhaust?

1 A Yes, you would.

2 Q And why is that?

3 A It would operate at a higher temperature
4 and be more efficient in reducing VOCs.

5 Q So the higher temperature is very
6 important there?

7 A It's important if you want to the
8 maximum reduction, yes.

9 Q So that's important to the maximum
10 conversion of --

11 HEARING OFFICER FAY: Excuse me, Mr.
12 Harris, I've got to interrupt. Dr. Wong, could
13 you please go outside for your discussion, or
14 discontinue it? It's interrupting and it's making
15 it hard for us to hear.

16 DR. WONG: I'm sorry.

17 HEARING OFFICER FAY: Mr. Harris, could
18 you repeat the question?

19 BY MR. HARRIS:

20 Q So we were talking about the oxidation
21 catalyst and placing it near the turbine exhaust,
22 so that's important for the maximum conversion of
23 SO₂ to particulates at that location, is that
24 correct?

25 A I'm sorry, it's what?

1 Q It's important to the conversion of SO2
2 for the effectiveness of the oxidation catalyst
3 related to SO2 conversion.

4 A Are you talking about VOC or SO2 in this
5 case?

6 Q SO2 conversion to sulfates.

7 A It would be higher at that location.

8 Q Okay, so that can affect particulate
9 production?

10 A Particulate what?

11 Q Production.

12 A Yes, it would.

13 Q And that affects particulate production
14 at all times, no just during startup, is that
15 correct?

16 A That's correct.

17 Q Are you aware of -- changing subject
18 here. Are you aware of any methods approved by
19 any regulatory agencies for measuring acrolein?

20 A No, I think as we heard in the
21 applicant's testimony there are currently no
22 approved methods.

23 Q And the fact that there are no approved
24 methods is not affected at all by whether the
25 units have an oxidation catalyst or not, is that

1 correct?

2 A Correct.

3 Q With regard to the Connecticut project
4 you mentioned, the Tawantic project, --

5 A Yes.

6 Q -- Calpine project. Were you aware that
7 the permit for that project has not been issued?

8 A I believe we included a draft copy of
9 that permit as one of our attachments.

10 Q Okay, but specifically my question, were
11 you aware that the permit has not yet been issued?

12 A Correct, it's not finalized.

13 Q Okay, thank you. In terms of startup
14 issues, are there any source test data for
15 acrolein from startup that you're aware of?

16 A No, there are not.

17 Q Could I ask you to return to the
18 overhead with two figures, figure 6 and figure 4?
19 Could you start with figure 6, please.

20 This figure 6 you're looking at the
21 acrolein emissions and you've extrapolated. I
22 guess you have two points down there I want to
23 focus on. You have a point down in the far right-
24 hand corner of the graph, the red line is what I'm
25 focused on here.

1 Near 100 percent, do you see that point?

2 A Yes, I do.

3 Q There's a second point that I want to
4 focus on, the 70 percent. Do you see that on the
5 red line, as well?

6 A Yes, I do.

7 Q From my bad eyes here those both appear
8 to be zero, but I think in your testimony you said
9 they weren't. So could you let us know what those
10 two numbers were?

11 A Those two numbers are the 100 percent
12 load factor that the applicant used, based on
13 source testing. The 75 percent number is the
14 average of all the source tests done by the
15 applicant at roughly 75 percent load.

16 Q Okay, so the numbers in both cases are
17 numbers based on actual source tests that were
18 conducted?

19 A Correct.

20 Q Okay, so those are real data?

21 A Those are the real data.

22 Q Okay. From then taking from the second
23 point, the 70 percent acrolein number to the left
24 then, that curve represents the numbers that you
25 extrapolated, is that correct?

1 A That's correct.

2 Q Okay, so everything from the 70 percent
3 to the left on the red line is an extrapolation
4 based upon the two data points you had, one data
5 point at 70, and a second data point at 100, is
6 that correct?

7 A That's correct.

8 Q Pretty fair representation?

9 A Yes.

10 Q Okay. What mathematical algorithm did
11 you use to extrapolate I think you said .3 and .9
12 up to 100 percent?

13 A It's extrapolated using a power function
14 and a least squares fit method based on -- the
15 power function is basically what all the other
16 curves displayed based on source testing. And
17 then the least squared fit calculates the curve of
18 that line or the equation of that line based on
19 the difference between the first two points at 100
20 percent and 75 percent.

21 Q Okay, now I'm going to ask you to do a
22 little magic and put the figure 4 on top of figure
23 6, and see if we can line those up.

24 A Okay.

25 Q I want to focus on the two red lines

1 here, the top red line of these two overlaid
2 figures is the benzene number for the 501 engine,
3 is that correct?

4 A I believe so, I can't see it from here,
5 but it looks like it says benzene under there.

6 Q Okay, thank you. And the bottom red
7 line is the acrolein number?

8 A Correct.

9 Q And the benzene number is based upon
10 real source test data, is that correct?

11 A Real source test for a different
12 turbine, yes.

13 Q Okay, so that information if not at all
14 an extrapolation, it's an actual real world
15 measured set of numbers?

16 A Correct.

17 Q If you had used this benzene curve,
18 again which has real emissions, to extrapolate how
19 low loads would have worked on figure 6, wouldn't
20 your bottom red line look very different?

21 A You can calculate the -- or extrapolate
22 below 70 percent using a variety of different
23 numbers. To look at the sensitivity of the two
24 numbers that I used, in other words extrapolating
25 using the least squared fit based on the source

1 test at 75 and 100 percent, you can change the
2 shape of that curve based on the change observed
3 between 100 and 75 percent.

4 I actually used the applicant's analysis
5 for 75 percent acrolein emission factor, and
6 recalculated that particular curve. It looks
7 similar, the emission factors were lower, but they
8 still resulted in a risk that was significantly
9 higher than 1.

10 Even if you take the two emission
11 factors that are in the applicant's source test
12 data analysis and used in the risk assessments and
13 draw a straight line and ignore any degradation in
14 performance of the turbine, you're going to be in
15 an area where you have a higher health hazard
16 index than 1.

17 When you start at .33 at 100 percent, by
18 the time you're down to 75 percent you're at .9.
19 If you continue to draw that line, even as a
20 linear relationship, by the time you get down to
21 25 or lower percentage, you're going to be well
22 over a hazard index of 1.

23 So no matter how you manipulate this
24 data you're going to show a degradation of
25 performance of this turbine, and it's going to

1 have a health hazard index greater than 1. And in
2 most cases substantially.

3 Q The curve is pretty steep here, and is
4 it your testimony that you've done that
5 extrapolation based really on just those two
6 points, the .3 and the .9?

7 A You're talking about the hazard index?

8 Q Yes.

9 A Well, I didn't extrapolate the hazard
10 index data, but I did extrapolate the emission
11 factors.

12 Q Okay.

13 A Yeah, that's all the data I had to work
14 with.

15 Q So the extrapolation of the emission
16 factors was based on those two points?

17 A That's it.

18 Q Just those --

19 A But, again, having all of this other
20 turbine data to show that it's a consistent
21 relationship, it at least let's us know that we're
22 probably within an order of magnitude on our
23 estimate.

24 Q All right, I guess it's fair to say,
25 though, that the benzene curve is a lot less

1 steep?

2 A Yes, it is.

3 Q Okay.

4 A There is quite a bit of variation, as I
5 pointed out earlier.

6 Q Okay, and those are actual measured
7 numbers and not extrapolated numbers?

8 A Correct.

9 Q And there were no actual acrolein
10 numbers in the EPRI report?

11 A The EPRI report did not evaluate
12 acrolein.

13 Q Okay.

14 MR. HARRIS: I think that's all I have
15 for this witness.

16 HEARING OFFICER FAY: All right, thank
17 you. Mr. Ratliff. Will you be calling the
18 witness back to the overhead?

19 MR. RATLIFF: No.

20 CROSS-EXAMINATION

21 BY MR. RATLIFF:

22 Q Hello, Mr. Radis. I wanted to start by
23 asking you about one of the things that was most
24 intriguing about your testimony, and that had to
25 do with the issue of continuous emission

1 monitoring for PM10.

2 Is there any continuous emission
3 monitoring for PM10 in California?

4 A There is none in California. To my
5 knowledge the only place it's being done right now
6 is in Europe.

7 Q Where in Europe is it being done?

8 A I'm pretty sure it was in Germany.

9 Q Do you know why it's not being done in
10 the United States?

11 A I believe it's relatively new and has
12 not been established as a method everywhere.

13 Q Thank you. Just in terms of my basic
14 understanding, am I correct in my understanding
15 that as power plants become more efficient they
16 use less fuel and when they use less fuel the
17 emissions constitute fewer hydrocarbons, is that
18 a --

19 A That's probably a reasonable assumption.

20 Q Okay. And toxic air contaminants are
21 essentially hydrocarbons, is that correct?

22 A Yes, they're classified under volatile
23 organic carbons.

24 Q If hydrocarbon emissions go down in
25 their totality would you expect toxic air

1 contaminants to go down?

2 A Could you repeat that?

3 Q If hydrocarbon emissions go down in
4 their totality would you expect toxic air
5 contaminant emissions to go down, as well?

6 A Yes.

7 Q I realize this is somewhat out of your
8 field of expertise, but I know that you have a
9 very varied experience working on energy products
10 and working for utilities. Do you know what the
11 relative efficiency of this power plant is
12 compared to older power plants, maybe 30 years
13 old?

14 A I just know that it's higher. I don't
15 know the relative percentages.

16 Q You don't know how much higher it is?

17 A No.

18 Q A few additional questions. You made
19 reference to the EPRI study concerning, well, it's
20 the 1996 study on gas-fired turbines. Was there
21 any actual discussion -- I thought you said that
22 there was discussion in that study of startup
23 emissions. Was there actual discussion of startup
24 emissions in that document?

25 A I believe the document mentioned, or

1 probably not the document, it was a letter
2 actually that was in the applicant's testimony and
3 staff's as well, that these were steady state
4 source tests, or source tests done at steady state
5 conditions at low load. They're not true startup
6 conditions.

7 However, based on the startup profiles
8 I've seen for various turbines, they tend to hold
9 a low load for a relatively long period of time.
10 I think we heard 30 minutes to an hour and a half,
11 or something. But it's a majority of the startup
12 period.

13 And those conditions would be very
14 similar to holding the turbine at low load.

15 Q Where did you hear that the startup
16 would hold a low load for 30 minutes to an hour?

17 A I thought Gary Rubenstein had given
18 those numbers. They may not be the exact numbers
19 that he stated.

20 Q Well, he's shaking his head, but --

21 A I see that.

22 (Laughter.)

23 MR. RADIS: Regardless of that --

24 BY MR. RATLIFF:

25 Q I don't recall them, but --

1 A Regardless of source, the startup
2 profiles I've seen for various turbines, GE
3 turbines, for example, show it holding at 10
4 percent load for extended periods on a cold start
5 for more than two hours.

6 Q I take it because I think you've
7 testified, haven't you, that there was very
8 limited information about startup emissions?

9 A In terms of source testing?

10 Q Right.

11 A Correct.

12 Q We don't have any measurements, is that
13 correct?

14 A We only have things like carbon oxide
15 measurements through CEMs.

16 Q Right.

17 A Which do demonstrate that combustion
18 efficiency is very poor during startup --

19 Q Right.

20 A -- which is why this project has a
21 startup emission limit 30 plus times higher than
22 full load.

23 So we have evidence that there's poor
24 performance, but we don't have, for example,
25 specific acrolein source testing done during

1 startup.

2 Q Right. And it's for that reason that
3 you use a steady state number, a steady state load
4 I should say, for determining the acrolein
5 emissions on startup, is that a fair thing to say?

6 A Well, under startup, if you're holding
7 the turbine at a constant load, and this is only
8 really applying to a combined cycle facility, it
9 would be different under simple cycle, the
10 facility would hold at a certain load while the
11 rest of the unit heats up.

12 And every startup performance criteria
13 table I've seen, or figure I've seen shows that
14 the turbine is held at low load for extended
15 periods.

16 Q And as the turbine heats up is there
17 going to be any difference in performance in terms
18 of the hydrocarbons, or are the emissions going to
19 be linear?

20 A The emissions are going to be a function
21 of load because it's independent of what's
22 happening with the steam turbine. The emissions
23 are coming from the combustion turbine. And as
24 that turbine sits at a certain load, the emissions
25 will be relatively constant.

1 Q Now, I believe it was the EPRI report
2 that you were referring to says that emissions
3 will vary as a function of load, I believe that
4 it's agreeing with what you're saying here.

5 Did it also say you need to look at the
6 variation among turbines to determine what, in
7 fact, the emissions are going to be?

8 A Yeah, we only used the EPRI data just to
9 demonstrate that virtually every turbine that was
10 tested as part of that study showed almost the
11 same degradation in performance at low load. We
12 didn't use the data to establish the emission
13 profile for this facility, but only to verify that
14 it would experience the same degradation in
15 performance during startup and low load.

16 It was the source test data from the
17 Calpine Pasadena, Texas facility that we used to
18 then extrapolate the startup emissions.

19 Q And I think you made reference to a
20 letter from EPRI regarding the determination of
21 startup emissions, did you not?

22 A Yes.

23 Q A letter that is attached to at least
24 the staff's testimony, I'm not sure if it's a part
25 of --

1 A It's a couple places --

2 Q Yeah, I think so, too. And what was the
3 direction from EPRI in that letter, as you
4 understand it?

5 A Not knowing what the questions were,
6 made kind of just seeing the answers a little odd,
7 and I'm not quite sure on the first one what they
8 were even implying, but they did just verify that
9 their source testing were not startup tests, but
10 were tests done at low load.

11 Q Okay. Final question, Mr. Radis, you've
12 proposed an oxidation catalyst on an annualized
13 basis, or have you calculated on an annualized
14 basis what you expect the reduction would be for
15 toxic air contaminants or formaldehyde in
16 particular, if you would know on an annualized
17 basis?

18 A I think we did make calculations of what
19 those numbers would be. I can't recall what they
20 are. I'm not sure if we included that or not.
21 But there would obviously be significant
22 reductions.

23 Q And in your testimony I think you
24 suggested that such a catalyst would reduce toxic
25 air contaminants by 90 percent.

1 A It could reduce it by 90 percent if it's
2 near the turbine.

3 Q And that was -- was that meant to be on
4 an annualized basis or on a daily basis, on a
5 startup basis, it wasn't clear to me?

6 A It's basically I would consider that
7 just the average performance of the turbine if
8 it's -- or the catalyst if it's located near the
9 turbine.

10 We did not imply that it would achieve
11 that, for example, during the first five minutes
12 or ten minutes of startup.

13 When we were looking at calculating
14 mitigated risk we took into account that under
15 cold starts it would probably be a 20-minute
16 period where the catalyst did not function at 90
17 percent; in fact, we assumed zero.

18 And for a warm start I think I assumed
19 conservatively about 10 minutes, even though I
20 believe it could be as short as five minutes for a
21 warm start.

22 MR. RATLIFF: Okay. Could I pause for
23 just a moment to talk --

24 HEARING OFFICER FAY: Yes.

25 (Pause.)

1 MR. RATLIFF: No further questions.

2 HEARING OFFICER FAY: Thank you, Mr.
3 Ratliff. The City of San Jose. Apparently no
4 questions. City of Morgan Hill. The Swim and
5 Racquet Club. How about Santa Teresa Citizen
6 Action Group, any questions? No questions. All
7 right. Issa. Apparently not here. CARE. No
8 response. Mr. Williams.

9 MR. WILLIAMS: I'll ask just a couple of
10 brief questions.

11 CROSS-EXAMINATION

12 BY MR. WILLIAMS:

13 Q Yesterday I asked the staff if they
14 could possibly estimate the increase in the
15 emissions that would occur if the plant were
16 operated in cycling service, and they were
17 evasive, they didn't want to make any estimate
18 unless I went to a great deal of specificity about
19 the startup and shutdown profiles.

20 Have you ever made, yourself,
21 personally, such an estimate of how the emissions
22 from the plant would increase if the plant
23 operated in peaking service rather than baseload
24 service?

25 A I don't think I've made the calculation.

1 I do recall just looking at the data, and it's
2 obviously going to be pollutant-specific. But I
3 have not made the calculation, and I am not sure
4 which would have higher emissions. I wouldn't
5 want to speculate, either.

6 Q I understand. Would it be a fair use of
7 the data if someone were to develop a hypothetical
8 operating profile for the plant to take your part-
9 load emission factors and calculate the emission
10 release, if someone such as myself were to do
11 that, would that be a fair use of your data?

12 A It would be an approximate approach to
13 calculate what the emissions could be based on two
14 different operating scenarios.

15 Q Thank you.

16 MR. WILLIAMS: That's all I have.

17 HEARING OFFICER FAY: All right, thank
18 you. Mr. Garbett.

19 MR. GARBETT: Yes, William Garbett on
20 behalf of the public.

21 CROSS-EXAMINATION

22 BY MR. GARBETT:

23 Q When you changed the risk factors in
24 your data you relied upon the report from
25 Richardson, Texas, made last summer, about a 40-

1 page report, is that correct?

2 A The Pasadena, Texas --

3 Q Yes, Pasadena.

4 A Yes.

5 Q In that report did you notice, for
6 instance, there were a couple of pages that were
7 identical except for the page numbers on them,
8 such as page 13 and 39?

9 A Not really.

10 Q Okay.

11 A I mean I look at those reports, I didn't
12 scrutinize them in that much detail.

13 Q Okay. In picking off numbers, I was
14 wondering if there was a credibility index as to
15 whether the report might have been a fabrication
16 rather than true data?

17 A I couldn't speculate on whether or not
18 the data was fabricated. I really wouldn't know.

19 Q But you did rely upon that. In
20 adjusting your risk factors for startup, did you
21 also look at, for instance, the startup of Calpine
22 Metcalf in general, for instance the construction
23 phase, which is supposed to last about 20 months,
24 and any lacking data or any skewing of the data
25 that would be caused by, for instance, fugitive

1 dust from the serpentine soil such as asbestos,
2 and there is no monitoring program?

3 A I did not evaluate construction
4 emissions or impacts. I strictly looked at the
5 issue of health impacts from the plant, since that
6 would be the duration of the -- or the longest
7 duration for this project.

8 I only looked at the issue really of the
9 effect of startup emission increases on the
10 overall risk.

11 I did not look at construction at all.

12 MR. GARBETT: Thank you.

13 HEARING OFFICER FAY: Is that all? All
14 right. Mr. Wade.

15 MR. WADE: I have no questions.

16 HEARING OFFICER FAY: No questions. Mr.
17 Scholz.

18 MR. SCHOLZ: No questions.

19 HEARING OFFICER FAY: No questions. All
20 right. Any redirect, Mr. Beers?

21 MR. BEERS: Can I spend a couple of
22 minutes with my witnesses --

23 HEARING OFFICER FAY: Yes.

24 MR. BEERS: -- to determine whether
25 redirect is necessary.

1 HEARING OFFICER FAY: Okay. Go ahead.

2 MR. BEERS: Can we take a brief break
3 for that?

4 HEARING OFFICER FAY: I'm sorry?

5 MR. BEERS: Can we take a brief break
6 for that? Would that be appropriate?

7 HEARING OFFICER FAY: Yes. We're off
8 the record.

9 (Brief recess.)

10 HEARING OFFICER FAY: We're back on the
11 record. Mr. Beers, did you have any redirect?

12 MR. BEERS: I don't have any redirect,
13 and so at this time I would move that the witness'
14 testimony, exhibit 145, as corrected by 146 and
15 the other exhibits be received in evidence. So
16 that would be 145 through 151.

17 HEARING OFFICER FAY: Okay, is there any
18 objection to receiving those exhibits?

19 MR. HARRIS: I'm not going to object. I
20 just want to note that the revised came in on the
21 23rd instead of the 21st.

22 HEARING OFFICER FAY: Okay, thank you.
23 All right, hearing no objection, so moved.

24 And I'd like to ask, Mr. Beers, if you
25 could provide copies of all those exhibits --

1 MR. BEERS: Yes.

2 HEARING OFFICER FAY: -- because I'm not
3 sure I have them all, and I want to be sure to
4 have that.

5 Thank you. And thank you for your
6 testimony, Mr. Radis, you're excused.

7 We'll now move to the direct testimony
8 of Dr. Wong for the Santa Teresa Citizen Action
9 Group.

10 MS. CORD: I just want to say that I'm
11 not feeling too well and I'm going to be leaving.
12 I'd ask that my fellow intervenor, Mr. Wade, if he
13 would take over the testimony of Dr. Wong. I hope
14 that's okay with you.

15 HEARING OFFICER FAY: Does anybody have
16 any objection to that? I certainly don't. Mr.
17 Wade --

18 MS. CORD: So, -- them for having to
19 confer at the last minute, this wasn't planned.
20 Thank you.

21 HEARING OFFICER FAY: We've obviously
22 having an unhealthy impact on the audience.
23 You're the second one --

24 (Laughter.)

25 INTERVENOR: It's that ambient air.

1 HEARING OFFICER FAY: All right, Mr.
2 Wade. Has Dr. Wong been previously sworn as a
3 witness?

4 MR. WADE: No, I don't believe she has.

5 HEARING OFFICER FAY: Swear the witness.
6 Whereupon,

7 SUZANNA WONG
8 was called as a witness herein, and after first
9 having been duly sworn, was examined and testified
10 as follows:

11 DIRECT EXAMINATION

12 BY MR. WADE:

13 Q Dr. Wong, would you please state your
14 name for the record?

15 A My name is Suzanna Wong, S-u-z-a-n-n-a
16 W-o-n-g.

17 Q Are you here today to testify in the
18 area of public health?

19 A Yes.

20 Q Did you file your prefiled testimony in
21 a timely manner?

22 A Yes.

23 Q Do you have any changes today to your
24 prefiled testimony?

25 A No.

1 Q Was your testimony prepared by you or at
2 your direction?

3 A Yes, I prepared it.

4 Q And are the facts therein true to the
5 best of your knowledge?

6 A Yes.

7 Q Are the opinions stated therein your
8 own?

9 A Yes.

10 Q And do you adopt this as your testimony
11 for this proceeding?

12 A Yes.

13 Q Did you file your statement of your
14 qualifications in a timely manner?

15 A Yes.

16 Q Would you please briefly summarize your
17 qualifications?

18 A Yes. I'm testifying as a local resident
19 of San Jose. I have lived in this part of San
20 Jose since 1977, for about 15 years. I'm also
21 testifying as a concerned citizen.

22 My professional expertise is in
23 biostatistics. I have received a PhD degree in
24 statistics from Stanford University in 1979, a
25 masters degree in statistics from the University

1 of Missouri Columbia, a masters degree in
2 mathematics from Illinois State University, and a
3 bachelors degree from University of Hong Kong with
4 majors in physics and mathematics.

5 I have practiced as a statistician for
6 about 21 years, mostly in the health-related
7 organizations like pharmaceuticals, biotechnology
8 and medical device companies. A couple are in
9 chemical engineering related companies.

10 My positions ranged from mathematician
11 of statistician positions performing analysis to
12 director of a biostatistics group.

13 The projects that I have worked on
14 include toxicology, risk assessment, environmental
15 health, clinical trials, metabolism -- kinetics,
16 biorehability, pharmacology and basic research
17 studies.

18 The medical or biologically related
19 products that I have worked on include
20 cardiovascular, neurological, ophthalmic, anti-
21 inflammatory, gastrointestinal, allergy,
22 antifungal, antibiotics, agriscience products and
23 vaccines.

24 Q Thank you, Dr. Wong. Could you --
25 before we begin with a summary of your testimony

1 could you state for the record where you got the
2 information supporting your document?

3 A At the beginning I do not know anything
4 about the power plant or at least very little
5 beyond what's generally known.

6 But since the power plant I have done a
7 lot of the research into looking into articles,
8 general articles, text books, medical text books,
9 as well as some from the internet information, and
10 some from magazine articles.

11 And I have also used my judgment based
12 on my professional experience in statistics, as
13 well as my medical background in relation to that.

14 Q Okay, now you've identified in great
15 detail a number of deficiencies in the overall
16 risk assessment. Could you please summarize the
17 testimony?

18 A Yes. My testimony is on my assessment
19 of Calpine's public health risk assessment in
20 relation to the siting of the 600 megawatt Metcalf
21 natural gas power plant in the proximity of
22 residential neighborhoods in Coyote Valley.

23 Calpine has performed a risk assessment
24 on public health based only on a set of toxic
25 noncriteria emissions from what are termed

1 combustion and cooling tower related sources.

2 My assessment on Calpine's public health
3 risk assessment is that it is inadequate.
4 Calpine's risk assessment has underestimated the
5 health risk to the public.

6 Number one, through omissions and
7 exclusions of air releases and non-air release
8 hazards in the health risk assessment.

9 Number two, through inadequate
10 assessments of air and non-air release hazards
11 levels, and of the public's general environment
12 and characteristics.

13 And number three, through inappropriate
14 application of methodologies for its particular
15 situation.

16 For example, there are biased
17 conventions used on missing data, incomplete
18 aggregation of risks, and use of bias estimation
19 methods. Because some estimate -- some analysis
20 methods do have limitations, applications of these
21 methods need to be applied with precautions
22 according to the limitations.

23 An OEHHA guideline has described a risk
24 assessment methodology and its limitations in this
25 document. As well as the intent to protect the

1 public. Calpine's risk assessment has not
2 addressed these issues and limitations in its
3 public health risk assessment. Details of these
4 points are described in my written testimony.

5 As a local resident it is my assessment
6 that the risk associated with the power plant at
7 this location is not acceptable. It is not
8 uncommon that some people may harm others just for
9 their benefit. I do not believe that anyone shall
10 have the right to pose an individual or the public
11 at risk of their health and their lives.

12 Q Thank you, Dr. Wong. Could you briefly
13 expand on the item which you've entitled,
14 omissions of air releases? In what way has the
15 applicant failed to account for air releases?

16 A I think the risk assessment that's
17 performed have omitted a number of the pollutants
18 or airborne releases in the risk assessment.

19 As I mentioned, the risk assessment only
20 encompasses only a very limited, you know, only
21 the criteria -- noncriteria pollutants, so
22 components like criteria pollutants, carbon
23 dioxide, water vapor, accidental releases, as well
24 as those that might come from fires and
25 explosions, transportations, diesel engines during

1 operations and constructions, wastewater treatment
2 or retreatment, whatever that terminology might be
3 referring to, all those are not in the risk
4 assessment.

5 There are also other omissions that come
6 from elsewhere. That includes the omissions
7 coming from synergistic effects of various
8 aspects. The synergistic effects which contribute
9 to hypoxia; the synergistic effects that's coming
10 from the adverse effects.

11 There are synergist effects coming from
12 heat, humidity and high pollutant environment
13 which, I think, the power plant creates that kind
14 of environment. And there are synergistic effects
15 from coming from organ damages to a person
16 synergistically.

17 And then there are also other omissions
18 that I have found out. I have done some research
19 in relations to eye exposures. I have found a
20 good reference book on the toxicology of eyes.
21 And have discovered that because the risk analysis
22 has been performed based on the most sensitive end
23 points, so they only accounted for the adverse
24 effects on only a number of the pollutants.

25 So there are a list of other pollutants

1 whose effect also affects the eyes, but are not
2 included in the analysis.

3 So that's kind of like my summary of the
4 omissions.

5 Q You've also mentioned on page 9 that
6 there were inadequacies by the applicant and staff
7 in addressing guidelines. In what ways do you
8 feel these inadequacies were made?

9 A Yes. I think there are a number of
10 areas in which they are limited, as I mentioned,
11 they are limitations on the methodologies that's
12 used. And it was described in the guidelines.

13 As a professional statistician it has to
14 be recognized that analysis methods have certain
15 limitations. And people who are applying those
16 methodologies will need to know that they are
17 within the limitations in order that the
18 methodology is valid.

19 And in that aspect of it I think there
20 are a number of issues in which, while the
21 applicant has applied a certain methodology, and
22 they have been warned in the guideline that there
23 are certain limitations, I think the applicant
24 should recognize those and compensate for it in
25 some way, or use different types of methods which

1 addresses those issues.

2 And in specific terms the inadequacies,
3 in terms of addressing the guidelines will be on
4 the incomplete of the database, about the repeated
5 exposures that they have not allowed for the
6 duration of exposures that local residents are
7 going through.

8 There are also the time extrapolations
9 which I feel has not been incorporated. And then
10 the synergistic effects.

11 Q Do some of the -- is this part related
12 to some of the information that was presented
13 yesterday by Morgan Hill which questioned the
14 basic modeling which produced the distributions of
15 the toxins over the population?

16 A Would you please repeat the question?

17 Q I'm wondering if the testimony given
18 yesterday by the Professors in meteorology and the
19 doubts that were cast on the modeling support your
20 testimony here with regard to the inadequacies in
21 addressing guideline methods.

22 A I was not here last night, so I do not
23 know what has been presented.

24 Q Okay. On page 3 you have indicated that
25 there was an underaccounting of air releases. I

1 think you've --

2 A Underaccounting of air releases. Yes.
3 As I mentioned, the underaccounting of the
4 emissions, I have described some of those before
5 when I referred to the air releases.

6 What I want to add to it the omissions
7 coming from the eye exposure. And also the fact
8 about the omissions is that in using the
9 methodologies in the guideline which only takes
10 account of the most sensitive end point, that, in
11 itself, has lead to a number of the omissions.

12 And then also the relations that the
13 acute route is based mostly on inhalation. That
14 means exposures through other routes than
15 inhalation, you know, eye exposure, dermal
16 exposure, those are undermined in the analysis.

17 And I want to read you the components
18 that I have obtained, you know, from my research
19 of looking into the book.

20 I think a number has been mentioned and
21 included in the analysis, you know, like acrolein,
22 formaldehyde, ozone, propyl oxide, toluene,
23 xynese, as I understand, those are included in the
24 analysis. If those are the ones that I included
25 in the database.

1 The ones that I have identified as also
2 irritating to the eyes but not included, and they
3 may be coming from, it's not the most sensitive,
4 you know, each of these chemicals might have other
5 most sensitive effects.

6 And so the effect on the eyes is not
7 included in the analysis. But, nevertheless, are
8 there. This list includes natural gas,
9 acetaldehyde, arsenic, benzene, 1,2 butadiene,
10 ether benzene, anhexane, lead, mercury,
11 naphthalene, nickel, silver, carbon monoxide,
12 carbon dioxide, PCB, hydrogen sulfide, copper,
13 ethylbenzene, which I think are a list of the
14 pollutants.

15 And also the kind of -- I can read
16 roughly the range of the eye problems that can
17 come from these pollutants. I have to admit that
18 at this stage this is preliminary, but this are
19 what the irritants that were identified.

20 They include, the eye problems that were
21 discussed in that book include cataract, color
22 vision, corneal damages, irritations like
23 lachrymal burning, itching, nystagmus, optic
24 nerves, optic neuropathy, visual fields and
25 retinal damages.

1 Q On page 23 you've listed several reasons
2 why this project is not acceptable. Could you
3 summarize those attributes and --

4 A Yes, I think from the perspective of a
5 local resident, a number of the items are
6 different. We look at it in a different way as a
7 local resident who's exposed to the air emissions.

8 And one of the thing is the undermining
9 of the mild adverse -- so-called mild adverse
10 effects that will be imposed on us. Because mild
11 adverse effects like simply like things like
12 irritations, eye irritations, or headaches, or
13 coughs, it may be looked at as not important
14 because we are not dead yet, or you know, very
15 seriously sick, or cancer or that sort of thing,
16 but nonetheless, you know, headaches or cramps or
17 constant coughs, those are very important to local
18 residents, because they affect local residents'
19 daily lives and, you know, maybe I couldn't sleep
20 because I have these other symptoms that's coming
21 to me. And so we look at it in a very different
22 way.

23 And also another aspect to local
24 residents is the long-term exposure. We live in
25 this place. We are spending a lot of time. Many

1 people may be sick and stay home to rest and
2 recover from their sickness. Many people might
3 have worked in their occupations in which they are
4 exposed to higher exposures, and so when they come
5 home it's not really healthy for them, not even to
6 have some time of a break, and still be exposed to
7 dirty air.

8 So the long-term exposure, I think, is
9 not apparent to me from the other situations,
10 because for example, like in occupational hazards,
11 you know, you go to work and you are exposed to
12 maybe like eight hours a day.

13 And here, as local residents, we are
14 really have no obligations. And many of us, our
15 interest have very, have limited our lifestyles to
16 preserve that.

17 And so I do not feel that local
18 residents have the same obligations or feeling the
19 same sort of acceptance as other people might
20 impose on them.

21 And also from the perspective of the
22 deregulation of the energy industry, I feel that
23 this is a relation between consumers and, you
24 know, commerce. As consumers, from that
25 perspective, if we are consumers we pay money for

1 the product. And I don't think we should be
2 overcharged with the additional health effect or
3 adverse health effect burdens on us. And I don't
4 think we have any obligation to have that imposed
5 on us.

6 We also do not think in the same way,
7 because I heard a number of people mentioning
8 that, you know, we are using the best available
9 control technology. From our perspective, the
10 best available control technology that's being
11 used is very limited to combustion power
12 generation. From our perspective the best
13 available control technology can include solar
14 energy, and other energy generating energy
15 technologies. So in that sense I don't think that
16 is the best available control technology to us.

17 So in those senses, I do not feel that
18 it is acceptable. And I think certainly not at
19 this close distance to residential neighborhoods.

20 Q So, is it your testimony that your
21 recommendation to the Commission would be, in
22 light of the research that you've done, that the
23 power plant should not be sited in this location?

24 A Yes.

25 MR. WADE: Okay, I have no further

1 questions.

2 HEARING OFFICER FAY: Is the witness
3 available for cross-examination?

4 MR. WADE: Yes, she is.

5 HEARING OFFICER FAY: All right. Mr.
6 Harris.

7 DR. WONG: Oh, I want to respond --

8 MR. WADE: Just one moment. I
9 apologize, I think we have one more statement.

10 DR. WONG: Yeah, I want to have the
11 opportunity to respond to the staff's rebuttal, as
12 well as some of the points that were made by the
13 other people when they testified.

14 HEARING OFFICER FAY: Sure, go ahead.

15 DR. WONG: Okay, the first rebuttal is
16 on the staff's rebuttal on item number 1. And it
17 relates to whether accidents are covered under the
18 Health and Safety Code section 44303 for risk
19 characterization.

20 I think they should be because actual
21 and potential air releases are included there.
22 And they are already a number of items that
23 reflect accidents: spilling, leaking, escaping.
24 These are, you know, if not intentional, and I
25 hope they are not intentional, these are

1 accidents.

2 And also there was some mention about
3 things that are unpredictable and hence, should
4 not need to be included in the risk assessment. I
5 want to point out that when certain accidents, if
6 there's a manufacturer or company or whatever,
7 certain kinds of accidents are prone to happen.

8 Then in the statistical sense of it, and
9 I am a statistician, I think they are, in that
10 sense, somewhat predictable. And in my opinion
11 those accidents should be included in the risk
12 assessment.

13 Number two of the staff rebuttal is on
14 the multiple pathway analysis. Even though there
15 were no descriptions from the document that I have
16 on the computer program, users guide, there were
17 no explicit descriptions of it, I do not think
18 that the chronic noninhalation exposure report,
19 the computer program has sufficiently based on
20 exposures with the eye and the dermal and the
21 accumulation, as well as it's not representing
22 those of the individual exposure. So it's
23 different from what I was discussing on item 2C.

24 On the third item that was mentioned by
25 staff is about the separation of the three risk

1 assessments into acute noncancer, chronic
2 noncancer and cancer risk assessments, I think the
3 origin of the separation is for ease of adopting
4 the information from typical toxicology studies
5 for inference to the human population. And is not
6 really for the purpose of inferences. So there
7 are a lot of these limitations on it.

8 The most part that I am objecting to,
9 I'm not so much objecting to the separation of the
10 cancer portion of the risk assessment from the
11 other ones, but I am -- I really feel that there
12 is a big gap in the separation of acute with the
13 chronic noncancer risk assessment.

14 Because there is in the acute analysis,
15 the acute noncancer risk assessment is based on
16 the one-hour acute REL. And that one-hour acute
17 REL is based on one-hour exposure, as well as a
18 limited time in which the event can manifest
19 itself.

20 And what I mean by that is I think
21 everybody understands the duration of exposure,
22 you know, one-hour duration of exposure. The
23 manifestability of an event will mean that certain
24 things or certain symptoms can come up very
25 readily, so those are the acute events that we are

1 talking about.

2 But then there are certain kind of
3 diseases that takes a longer time to develop. And
4 as a result of it, do not manifest in just a
5 couple of hours, do not manifest in even a couple
6 of days.

7 And so this acute analysis has a lot of
8 problems because I think the guideline has not
9 really make that distinction of one-hour exposure
10 with, you know, the acute manifestability of these
11 events. And so basing on the safety, basing on
12 this one acute index, I think is very limited.

13 Also the chronic versus the chronic
14 analysis, the chronic analysis is based on long-
15 term exposure, and for long-term effects. So
16 there is a really very big gap in between where,
17 you know, the exposure is longer than one hour,
18 but not as long as, you know, 70 years or that
19 length of exposure.

20 And in that portion of it I think there
21 is a very big gap there in which the guidelines
22 methodology is not protective.

23 And I want to emphasize that in reality,
24 as a local resident, our exposure duration is much
25 much longer than one hour. And that's where many

1 of the claims on conservatism, on, you know, these
2 are extremely over-estimated, as a statistician
3 and with analysis on medical data, I really do not
4 believe in that.

5 Okay, the fourth rebuttal is about my
6 written testimony, basically most of them are
7 disagreements with what's on the methodologies.
8 And it's not completely because of that. I think
9 I want to make that distinction about the
10 methodology as well as the application of
11 methodology.

12 Methodologies generally have
13 limitations, but you know, is for many purposes.
14 And the people who propose those methodologies
15 have a certain framework in which they work with
16 that they want to, you know, to be used.

17 But on the other hand, when it comes to
18 application of a methodology the application
19 should really have to recognize the circumstances
20 in which they are applying these methodologies.
21 As well as whether the environment for applying
22 those methods are correct or appropriate to them
23 or not.

24 And so that in that sense of it I do
25 agree with some of the limitations that were

1 described in the guideline, and I just feel that
2 they are not addressed by the applicant in this
3 particular situation.

4 The rebuttal also mentioned about I did
5 not provide any alternative solution. I believe I
6 am doing my civic responsibility in pointing out
7 these problems. And I have also made some
8 recommendations on the uncertainty factors as to
9 how maybe the agencies can look into it and
10 organize those items to better be able to identify
11 what uncertainty factors should be used.

12 And I also want to emphasize that I do
13 not have time, I hardly have time even to put down
14 my issues, let alone to be able to think of, you
15 know, the alternative solutions.

16 And also I feel that at least in my line
17 of work, in the private industry, most of my jobs
18 are in the private industry, I think the sponsors
19 are the ones who should provide those solutions.
20 That should be in their research budget.

21 I want to point out perhaps a number of
22 quick fixes that can be done, you know, like for
23 example, the reason why I didn't point it out is
24 because I thought it's automatic, if there are
25 certain items that are omitted in the analysis, I

1 think it's a quick fix to include those items, so
2 that there is, would not be underestimated. And
3 think there are also recommendations that I have
4 on the uncertainty factors.

5 Statistically there may be circumstances
6 in which there are statistic methods then can
7 maybe combine risk in different aspects. But one
8 person has to go into it in very detailed level to
9 be able to do that. And I certainly don't have
10 the accessibility to all to do that.

11 And then there are other portions of the
12 inadequacies in which it has to be addressed as a
13 long-term research problem.

14 The fifth item is on the risk of hypoxia
15 in which I think the rebuttal says that the risk
16 of hypoxia coming from the displacement of oxygen
17 is exaggerated.

18 I want to point out a number of things.
19 First of all, the risk of hypoxia is a synergistic
20 effect, itself. It's synergistic effect from the
21 different air release components like carbon
22 monoxide and nitrates, nitrites, sulfur dioxide,
23 irritants and other gases, which I have already
24 described.

25 And my testimony points out several

1 underlying factors. The depletion of oxygen from
2 combustion and secondary reactions. The reduction
3 of oxygen carrying capacity of hemoglobin. The
4 restriction of air flow and the displacement of
5 oxygen by the total volume of exhausts.

6 And I think the risk of hypoxia is real;
7 at least it's real to me. Because of the large
8 amount of oxygen that's being used up, you know,
9 based on the large amount of natural gas that will
10 be burned.

11 And since the risk of hypoxia is a
12 synergistic effect, it needs to be included in the
13 risk assessment. And so that's the point that I
14 am making. And so I do not think that I have made
15 any exaggeration in believing that it should be
16 included in the risk assessment.

17 As to whether the displacement of
18 oxygen, itself, I do not know what that
19 contribution of that portion is. You know, that
20 portion is a synergistic effect, even though it's
21 a component of the -- synergistic effect, it,
22 itself, is a synergistic effect. I do not know
23 the contribution of that portion on its own.

24 But I think other experts in the area
25 may be able to do it. I, myself, cannot do it on

1 my own in that regard.

2 I think that -- there's also mention
3 about conventional analysis. I think the
4 displacement of air is not a new concept. In
5 fact, I got that idea from one of the internet
6 material that I got. It is a material safety data
7 sheet on natural gas that I have.

8 And it has this statement for the health
9 hazardous data. Under that section for health
10 hazards, acute and chronic, what's written there
11 is, it says: TLV, simple asphyxiate, natural gas
12 is nontoxic, however it acts as a simple
13 asphyxiate by displacing or partially displacing
14 the air required to support life.

15 That's the original place that I got the
16 idea of the displacement. And when I think about
17 the power plant, I think, yes, there are a lot of
18 emissions coming out, and just looking at the
19 water vapor, itself, and it seems to me that it is
20 a really large volume, together with there are
21 also lots of other emissions, you know, the
22 criteria pollutants and others, so I thought that
23 is something that needs to be pointed out into the
24 analysis.

25 And I feel that if the effects are

1 dismissed as exaggeration without going into
2 evaluation that will underestimate the risk. And
3 like the many other exclusions and omissions, you
4 know, they are leading to underestimation of the
5 public health risk.

6 I do not believe that an analysis has
7 two be conventional, because otherwise probably
8 the world might have to stop there. And no
9 progress can be made. So, in that sense I don't
10 think I'm worried about that not being convention.

11 As to the staff's point of view, I think
12 the staff's responsibility is to do an independent
13 evaluation. If the staff has to be bound by a
14 conventional analysis the staff's evaluation is
15 not an independent assessment.

16 BY MR. WADE:

17 Q So, would you say it's your testimony
18 that you have done a more than conventional
19 analysis? You have superseded the conventional
20 approach?

21 A I think I have done an independent
22 analysis.

23 Q Yes. Did you base this testimony on
24 running the HRA, the health risk assessment
25 computer program?

1 A No. I based it on my knowledge of
2 statistics and I based on what I have read on a
3 number of these articles that were used. I have
4 gotten from the internet the different guidelines
5 on the acute, the chronic and the cancer risk
6 assessments. And I have also had a copy of the
7 health risk assessment program users guideline
8 that I go through.

9 Q Okay.

10 A I may want to also take the opportunity
11 to respond to a number of the issues that were
12 raised from the summaries of the other parties, if
13 I may.

14 Okay. First of all is about the
15 conservativeness of this methodology, and in some
16 places I had to go talk in that is extremely
17 conservative. I do not agree with that because of
18 the one-hour REL that were used, and the much
19 longer one-hour exposures that local residents are
20 subjected to.

21 I think the most sensitive end point
22 portions of it have already underestimated a lot
23 of the risk that local residents will be exposed.

24 I think the noncompliance of many of the
25 industries which leads to part of the not-so-

1 faithful, I mean not-so-trusting relationship,
2 about, you know, the two- to five-hundredfold
3 about the acute REL occurrence of this
4 noncompliance from industry, the lack of
5 reporting, you know, to regulatory agencies.
6 Those are not things that makes me feel
7 comfortable as a local resident.

8 And certainly in the methodology,
9 itself, there are things like default values,
10 uncertainty factors. Those I don't think they
11 were also done at a conservative level.

12 And so I do not agree with that
13 extremely conservative or conservative or over-
14 estimates. I do not agree with those wordings.

15 About the acrolein, there was mention
16 about the five minute extrapolating to one hour.
17 I think the statistically, just that
18 extrapolation, itself, means that the
19 extrapolation is not an over-estimation.

20 As to the ground level impact that was
21 added onto it, I think last time, one of the
22 session we have already pointed out that for the
23 criteria pollutants, alone, even without the
24 ground background imposed on it, the hazard index
25 has already gone above the criteria of 1.

1 There are also concerns of me in terms
2 of being protected that the severity levels are
3 not really developed. And then the subjective
4 judgments that some people feel, you know, above 1
5 is not such a big thing. I'm not really so sure
6 about the subjective judgment over there.

7 The screening analysis I think is
8 basically to cut down the job. And I think with
9 all the omissions there, they don't necessarily
10 reflect the highest impact or the most
11 conservative estimates that I feel.

12 So, basically I feel that there are a
13 lot of omissions that need to be taken into
14 account in order to properly assess the health,
15 public health risk to local residents.

16 Thank you.

17 MR. WADE: I think those are all the
18 questions that we have. At what point would it be
19 proper to move the testimony into evidence? I'd
20 like to move that we put it in evidence at this
21 time. Is that appropriate?

22 HEARING OFFICER FAY: All right. We'll
23 take that to be your motion to enter the evidence
24 into the record. Is there objection?

25 I hear none. So moved.

1 MR. WADE: Out witness is then available
2 for cross.

3 HEARING OFFICER FAY: Right. I'm sorry,
4 you have a concern?

5 INTERVENOR: Exhibit numbers?

6 HEARING OFFICER FAY: Yes, we should --
7 would you like to mark exhibit numbers on Dr.
8 Wong's testimony?

9 MR. WADE: The item is titled,
10 assessment of Calpine's public health risk
11 assessment, in siting the 600 megawatt Metcalf
12 natural gas power plant in the proximity of
13 residential neighborhoods in Coyote Valley.

14 HEARING OFFICER FAY: Okay, that will be
15 exhibit 152.

16 Is Dr. Wong available for cross-
17 examination?

18 MR. WADE: Yes, she is.

19 HEARING OFFICER FAY: All right.
20 Mr. Harris?

21 MR. HARRIS: No, we thank the witness
22 for appearing today. We have no questions.

23 HEARING OFFICER FAY: All right, thank
24 you. Mr. Ratliff.

25 MR. RATLIFF: No questions.

1 HEARING OFFICER FAY: Okay. Does the
2 City of San Jose have any cross-examination?
3 Looks like no one is present. City of Morgan
4 Hill? No response. CVRP, any cross?

5 MR. BEERS: No questions.

6 HEARING OFFICER FAY: No questions, I
7 see. Okay. The Swim and Racquet Club? No
8 response. And Issa, any cross-examination?

9 MR. AJLOUNY: I think I said zero
10 yesterday.

11 HEARING OFFICER FAY: All right. CARE?

12 MR. AJLOUNY: I'm sticking to my word.

13 MS. CORD: I think Mike Boyd's out sick
14 today.

15 HEARING OFFICER FAY: He's sick, as
16 well?

17 MS. CORD: Yeah, he called in and said
18 he had planned some cross, but he won't be able to
19 be here.

20 HEARING OFFICER FAY: All right. He's
21 not present. Mr. Williams, do you have questions?

22 MR. WILLIAMS: No, sir.

23 HEARING OFFICER FAY: No questions, all
24 right. Mr. Garbett?

25 MR. GARBETT: No questions.

1 HEARING OFFICER FAY: No questions. All
2 right. Mr. Wade, do you have any questions?

3 MR. WADE: As an intervenor, no, I have
4 no questions.

5 HEARING OFFICER FAY: And you are a
6 separate party. And, Mr. Scholz, you, too, are a
7 separate party.

8 MR. SCHOLZ: No questions.

9 HEARING OFFICER FAY: All right. Fine.
10 Thank you.

11 Thank you, Dr. Wong, for coming and
12 providing your testimony. You're excused.

13 DR. WONG: Thank you. Thank you for
14 giving us the opportunity.

15 HEARING OFFICER FAY: You're welcome.

16 I would like to ask the parties who are
17 present if any of you have plans to cross-examine
18 Dr. Ken Lim on March 14th?

19 MS. CORD: I would just like to make one
20 comment.

21 HEARING OFFICER FAY: Well, first of
22 all, I'd like to get a response. Nobody's
23 responding. Nobody plans to --

24 MR. WILLIAMS: My answer is no. I
25 thought the cross-examination yesterday by CVRP

1 was adequate and addressed the matter
2 sufficiently.

3 HEARING OFFICER FAY: I do want to know,
4 because we won't have Dr. Lim come down on the
5 14th unless someone actually plans to cross-
6 examine him.

7 MR. GARBETT: There was a motion made
8 prior, partway through his testimony on a motion
9 to strike. Did you rule on that?

10 HEARING OFFICER FAY: Yes, we did
11 overrule the motion, deny the motion, rather.

12 MR. AJLOUNY: I feel the cross-
13 examination yesterday showed and proved enough
14 evidence to at least myself that there's no need
15 for me to cross-examine at this point.

16 HEARING OFFICER FAY: Okay. Ms. Cord?

17 MS. CORD: I really just have to confer
18 with my colleagues. I don't know, I'm not aware
19 that we are going to, but I don't know that we're
20 prepared to give up that right at this point.

21 HEARING OFFICER FAY: Okay, --

22 MS. CORD: I'll have to get back to you.
23 I'm sorry, they're not all here.

24 HEARING OFFICER FAY: -- could you get
25 back to me by Wednesday?

1 MS. CORD: Of course.

2 HEARING OFFICER FAY: Okay. I
3 appreciate that. You can call the same number as
4 Mr. Valkosky's, or send it email to me, gfay, and
5 then the rest is @ the same as Mr. Valkosky's.

6 MS. CORD: Right, I have it. Good.

7 HEARING OFFICER FAY: And it's on the
8 notice, I believe.

9 MR. AJLOUNY: Is this going to conclude
10 our day today?

11 HEARING OFFICER FAY: Yes.

12 MR. AJLOUNY: And since we got out early
13 I was just wondering if we could go off the record
14 and then I can ask a question?

15 PRESIDING MEMBER LAURIE: Yes, but
16 just -- Gary, do you know, or does anybody know
17 where our next series of meetings are being held?
18 Here?

19 HEARING OFFICER FAY: I think they're
20 here. I believe they're here.

21 PRESIDING MEMBER LAURIE: Okay. What
22 about the meeting on the 23rd, do we know, the
23 public comment meeting?

24 HEARING OFFICER FAY: Is it scheduled
25 for here?

1 SPEAKER: Reserved here, as well.

2 HEARING OFFICER FAY: It's reserved --

3 PRESIDING MEMBER LAURIE: Here.

4 HEARING OFFICER FAY: It hasn't been
5 noticed yet.

6 PRESIDING MEMBER LAURIE: Well, I have
7 to think about that. A long time ago I was an
8 Army Sergeant and the first thing I learned that
9 was most important to me was to develop an exit
10 strategy.

11 (Laughter.)

12 PRESIDING MEMBER LAURIE: And I have to
13 make sure that this building provides such an
14 opportunity. So, we'll think about that one.
15 Okay.

16 Absent that, --

17 HEARING OFFICER FAY: Well, I do have --
18 we have a request for public comment, and that was
19 the next thing I was going to bring up. I did
20 want to ask if anybody would like to make a public
21 comment. Yes, please come up to one of the
22 microphones. Perhaps where Dr. Wong was sitting
23 would be good. And if you could just state your
24 name and then give your comment. Just say
25 whatever you'd like.

1 Oh, please sit down and make yourself
2 comfortable.

3 MS. JOHNSON: I have to -- I speak
4 better standing up.

5 HEARING OFFICER FAY: Okay. That's
6 fine, wherever you're comfortable.

7 MS. JOHNSON: My name is Robin Johnson,
8 and I am a member of the community. I live in the
9 Santa Teresa area.

10 I am opposed to the power plant. But
11 what I wanted to share with you guys is my family
12 has been a victim of the Fairchilds. I am raising
13 two ADD children. I have fought very hard to keep
14 them off Ritalin. I have been extremely involved
15 with Morgan Hill Unified School District.

16 With the unexplained amount of ADD/ADHD
17 children within the area my heart also goes out to
18 these children that I'm raising now because they
19 have lost their mother with an unexplained cancer.

20 Understanding that the area needs a
21 power plant, or the power within the area, I don't
22 think that it is sufficient in the area of which
23 our community has already been gun-shy. And as
24 Dr. Wong was speaking, my concerns within the
25 community is the long-term effect.

1 Although a lot of these children that
2 were affected by Fairchild are now grown, my heart
3 goes out to any other children within the area,
4 and other families, if there is something that
5 does desperately go wrong, that it's going to
6 affect our community a second time.

7 And that's all basically what I have to
8 say.

9 PRESIDING MEMBER LAURIE: Thank you very
10 much.

11 HEARING OFFICER FAY: Thank you. I
12 appreciate you putting that on the record.

13 Any other public comment? Okay, I see
14 no indication.

15 Thank you all for coming today, and we
16 are adjourned.

17 PRESIDING MEMBER LAURIE: Issa wanted
18 to --

19 HEARING OFFICER FAY: Oh, I'm sorry.
20 Issa?

21 PRESIDING MEMBER LAURIE: -- off the
22 record.

23 HEARING OFFICER FAY: Did you want to
24 put something on the record?

25 MR. AJLOUNY: Well, no, it doesn't have

1 to be on the record.

2 HEARING OFFICER FAY: Okay, all right.
3 Fine. Then what I do want to say is we will be
4 getting a notice out early next week as to the
5 future hearings.

6 And then there will also be a briefing
7 order that will guide the parties in preparing
8 their briefs for submittal at the end.

9 Thank you all for coming, and we are
10 adjourned.

11 (Whereupon, at 4:25 p.m., the hearing
12 was adjourned.)

13 --o0o--

14

15

16

17

18

19

20

21

22

23

24

25

CERTIFICATE OF REPORTER

I, JAMES A. RAMOS, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Hearing; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said hearing, nor in any way interested in outcome of said hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 6th day of March, 2001.

JAMES RAMOS

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345