

**SOAH DOCKET NO. 582-06-1502
TCEQ DOCKET NO. 2006-0195-AIR**

**APPLICATION OF OAK GROVE § BEFORE THE STATE OFFICE OF
MANAGEMENT COMPANY, LLC §
FOR PROPOSED AIR PERMIT NO. §
76474 AND PSD-TX-1056 § ADMINISTRATIVE HEARINGS**

**DIRECT TESTIMONY OF ANDREW DESSLER, Ph.D.
ON BEHALF OF PROTESTANT ROBERTSON COUNTY: OUR LAND, OUR LIVES**

I. EXPERT EXPERIENCE

Q. PLEASE STATE YOUR NAME AND ADDRESS FOR THE RECORD.

A: My name is Andrew Dessler. My address is 5110 Congressional Dr., College Station, TX 77845.

Q: I AM SHOWING YOU WHAT HAS BEEN MARKED AS PROTESTANT'S EXHIBIT P-5. WHAT IS THIS DOCUMENT?

A: It is a true and correct copy of my resume.

Q: DID YOU PREPARE YOUR RESUME AND IS IT UP-TO DATE?

A: Yes.

Q: DOES YOUR RESUME ACCURATELY DESCRIBE YOUR EDUCATION, EXPERIENCE AND TRAINING?

A: Yes.

PROTESTANT OFFERS PROTESTANT'S EXHIBIT P-5.

Q: WHAT IS YOUR CURRENT PROFESSION?

A: I am an associate professor in the Dept. of Atmospheric Sciences at Texas A&M University.

Q: HOW LONG HAVE YOU WORKED THERE?

A: Since June 2005.

Q: WHAT WAS YOUR PROFESSION BEFORE THIS?

1 A: I was on the research faculty in the Dept. of Meteorology and the Earth System Science
2 Interdisciplinary Center at the University of Maryland.

3
4 Q: PLEASE SUMMARIZE YOUR FORMAL EDUCATION.

5
6 A: I have a BA in physics from Rice University, a Ph.D. in chemistry from Harvard
7 University, and I spent two years doing postdoctoral research at NASA in Greenbelt, MD.

8
9 Q: PLEASE DESCRIBE THE WORK YOU HAVE DONE IN RELATION TO GLOBAL
10 WARMING, IF ANY.

11
12 A: My research for the past ten years has focused on water vapor and clouds, both of which
13 play an extremely important role in regulating our climate. On the policy side, I spent 2000 as a
14 Senior Policy Analyst in the White House Office of Science and Technology Policy. I was the
15 office's staff atmospheric scientist. Based on my experience, I recently co-authored a book
16 entitled "The Science and Politics of Global Climate Change: A Guide to the Debate"
17 (Cambridge University Press).

18
19 Q: DOES YOUR CURRENT PROFESSION REQUIRE YOU TO KEEP INFORMED OF
20 DEVELOPMENTS AND TO MAINTAIN YOUR IN-DEPTH UNDERSTANDING OF
21 GLOBAL WARMING ISSUES?

22
23 A: Yes.

24
25 **PROTESTANT OFFERS ANDREW DESSLER, Ph.D. AS AN EXPERT ON GLOBAL**
26 **WARMING ISSUES.**

27
28 **II. BACKGROUND ON GLOBAL WARMING**

29
30 Q: PLEASE SUMMARIZE WHAT YOUR TESTIMONY WILL COVER.

31
32 A: I will be discussing global warming: what it is, what causes it, and the effects of global
33 warming. I'll also discuss steps that are being considered by others to reduce greenhouse gas
34 emissions.

35
36 Q: PLEASE EXPLAIN WHAT GLOBAL WARMING IS.

37
38 A: Global warming, as generally used by most people, refers to the release of greenhouse
39 gases by human activities and an associated rise in the Earth's surface temperature.

40
41 Q: PLEASE EXPLAIN WHAT GLOBAL WARMING OR "GREENHOUSE" GASES
42 ARE.

43
44 A: These are gases that absorb thermal infrared radiation, thereby trapping heat near the
45 surface. These gases include H₂O, CO₂, N₂O, CH₄, and others.

1 **GLOBAL WARMING IS OCCURRING**

2
3 Q: IS THERE A GENERAL CONSENSUS ABOUT WHETHER THE GLOBE IS
4 WARMING? IF SO, PLEASE EXPLAIN.

5
6 A: Yes. We have abundant evidence that surface temperature of the planet is rising. These
7 include 1) direct thermometer measurements, 2) decreases in areal extent and thickness of sea
8 ice, 3) decrease in length of the world's glaciers, 4) increases in ocean temperatures, 5)
9 paleoproxy data, 6) satellite measurements of temperature, and 7) increases in sea level. Under
10 the weight of this abundant, consistent, thoroughly checked evidence, the relevant scientific
11 community has overwhelmingly accepted the claim that the Earth's global and annual average
12 surface temperature has increased by about $0.6 \pm 0.2^\circ\text{C}$ over the past century.

13
14 Q: YOU USED THE TERM "RELEVANT SCIENTIFIC COMMUNITY". WHAT DO
15 YOU MEAN?

16
17 A: What I mean are those who are experts in this scientific area. From a practical
18 standpoint, one can identify an expert as someone that publishes research in the relevant peer-
19 reviewed literature.

20
21 Q: IS THERE CERTAINTY IN THE SCIENTIFIC COMMUNITY THAT CARBON
22 DIOXIDE IS A SERIOUS POLLUTANT OR THAT IT HAS INCREASED SINCE 2000?

23
24 A: There is certainty that humans are responsible for the increase in CO_2 since the industrial
25 revolution in the late 18th century, and that CO_2 emissions are contributing to the warming we are
26 presently experiencing.

27
28 Q: I AM SHOWING YOU WHAT HAS BEEN MARKED AS PROTESTANT'S EXHIBIT
29 P-6. WHAT IS THIS DOCUMENT?

30
31 A: The top plot shows the Northern Hemisphere temperature change over the last 1000
32 years, as inferred from paleoproxy data (tree rings, ice cores, lake sediments, bore holes, etc.). It
33 shows that the temperature was relatively constant until about the middle of the 19th century,
34 after which the temperature began rapidly rising. Also shown on this plot is atmospheric CO_2
35 abundance. One can see that the temperature rise is coincident with the increase in CO_2
36 associated with the industrial revolution.

37
38 The bottom plot shows time series of the changes in global annual temperature, ocean-surface
39 annual temperature, and land annual temperature for the past 125 years. It shows quite clearly
40 the warming of the globe.

41
42 Q: DID YOU PREPARE THESE IMAGES?

43
44 A: The top plot is a combination of Figures 1.1 and 3.8 from my book, *The Science and*
45 *Politics of Global Climate Change* (Cambridge University Press, 2006). I combined them into

1 one figure for this proceeding. I obtained the bottom plot from the NOAA National Climatic
2 Data Center website: <http://www.ncdc.noaa.gov/oa/climate/research/2005/ann/global.html>
3

4 Q: IS THIS EXHIBIT A TRUE AND CORRECT COPY OF THE IMAGES YOU ARE
5 PERSONALLY FAMILIAR WITH?
6

7 A: Yes.
8

9 Q: DOES THIS EXHIBIT RELY UPON SOURCES OF DATA THAT ARE OF THE
10 TYPE TYPICALLY RELIED UPON BY EXPERTS SUCH AS YOURSELF?
11

12 A: Yes.
13

14 **PROTESTANT OFFERS PROTESTANT'S EXHIBIT P-6.**

15 **CAUSES OF GLOBAL WARMING**

16
17
18 Q: IS THERE A GENERAL CONSENSUS ABOUT THE CAUSES OF GLOBAL
19 WARMING? PLEASE EXPLAIN YOUR ANSWER.
20

21 A: The scientific community has concluded that it is likely that most of the warming over
22 the past few decades is due to human activities.
23

24 Q: WHAT TYPE OF HUMAN ACTIVITIES?
25

26 A: "Activities" refer to those that lead to the release of greenhouse gases. The single most
27 important is the combustion of fossil fuels, which produces CO₂. Of all the fossil fuels, coal is
28 the worst in terms of CO₂ produced per unit of energy produced. In other words, burning coal is
29 worse for the climate than burning oil or natural gas. CO₂ is also produced during biomass
30 burning. CH₄, another greenhouse gas, is produced and is emitted from rice cultivation,
31 livestock, biomass burning, and landfills. Another gas, N₂O is emitted from various agricultural
32 and industrial processes. And there are a number of other, less important gases.
33

34 Q: IN YOUR OPINION WILL THE PROPOSED OAK GROVE POWER PLANT EMIT
35 GREENHOUSE GASES? PLEASE EXPLAIN YOUR RESPONSE.
36

37 A: Yes, Oak Grove is planning to burn coal as the main fuel source for its power plant. As
38 previously discussed, the burning of a fossil fuel, such as coal, will emit greenhouse gases. Also,
39 I am not aware of any plans by Oak Grove to eliminate these greenhouse gas emissions.
40

41 Q: HOW DO THESE GREENHOUSE GASES WARM THE CLIMATE?
42

43 A: The Earth is warmed by the Sun and cooled by emitting radiation to space. The Earth's
44 temperature is determined by the relationship between the incoming radiation the Earth absorbs
45 from sunlight and the radiation it emits back to space. Greenhouse gases warm the planet by
46 impeding the cooling associated with infrared radiation to space.

1
2 Specifically, because the Sun is so hot (about 5400°C), sunlight is strongest in the visible
3 and near-infrared region of the electromagnetic spectrum (with wavelengths from about 0.4 to 1
4 micron). The Earth is much cooler, so the radiation it emits is of longer wavelengths, lying in the
5 infrared region (with wavelengths from about 5 to 20 microns). While the air in a clear sky is
6 nearly transparent to the visible wavelengths coming in from sunlight, air absorbs the infrared
7 radiation emitted by the Earth fairly strongly. This absorption is not caused by the main
8 components of the atmosphere, molecular nitrogen and oxygen: these gases are as transparent to
9 infrared radiation as they are to visible light. Rather, the absorption comes from infrared-active
10 greenhouse gases. By absorbing and re-emitting infrared radiation throughout the atmosphere,
11 these gases impede the passage of radiation from the Earth's surface to space. This process
12 warms the Earth's surface.

13 14 **IMPACTS OF GLOBAL WARMING**

15
16 Q: WHAT WARMING CAN WE EXPECT IN THE FUTURE?

17
18 A: In the most recent report by the Intergovernmental Panel on Climate Change, the global
19 and annually averaged temperature rise by 2100 was projected to be 1.4°C to 5.8°C (2.5°F-
20 10°F).

21
22 Q: IS SUCH A TEMPERATURE RISE IMPORTANT?

23
24 A: Yes. The global and annual average surface temperature of the globe is quite stable, and
25 changes that seem small can be associated with significant changes in the climate of the Earth.
26 For example, the last ice age was about 5°C colder than today. Thus, we need to take predictions
27 of a few degree rise in temperature seriously.

28
29 Q: IS IT IMPORTANT TO CONTROL GLOBAL WARMING GASSES? PLEASE
30 EXPLAIN YOUR RESPONSE.

31
32 A: Experts on global warming impacts generally agree that increases in globally averaged
33 temperature by more than 3°C will result in extremely dangerous disruption of the climate
34 system. Given that this is well within the predicted increase over the next century, it is my
35 judgment that prudence dictates that we reduce our emissions of greenhouse gases in order to
36 head off a potential calamity.

37
38 Q: WHAT, IF ANY, IMPACTS CAN GLOBAL WARMING GASES HAVE IN
39 GENERAL AND SPECIFICALLY IN TEXAS?

40
41 A: Unfortunately, precise regional predictions are beyond our present scientific capabilities.
42 Therefore, I cannot tell you exactly what will befall Texas over the next 100 years. However, I
43 can tell you in general terms the kinds of impacts we expect. First, note that we are adapted to
44 our present climate. When it changes, it will necessarily affect the way we live. How it affects
45 any individual depends on how that individual relies on the stability of the climate. A farmer
46 relies on growing season-precipitation, while an electricity operator is strongly affected by

1 summertime peak temperatures. A ski resort operator is reliant on wintertime snowfall, while the
2 Pacific Northwest is reliant on wintertime snowfall for their drinking water during the summer.

3
4 Over the next 100 years, we can expect the following general impacts: temperature increases,
5 precipitation changes, sea level increase, hurricane intensification, and possible abrupt changes.

6
7 Q: LET'S ADDRESS EACH OF THESE IMPACTS SEPARATELY. FIRST, DISCUSS
8 THE IMPACTS ON TEMPERATURE.

9
10 A. Increasing globally and annually averaged temperature is the most certain impact of
11 climate change. We further predict that:

- 12 a) Surface temperature will likely increase,
- 13 b) Land will heat more than ocean,
- 14 c) Nighttime temperatures will warm more than daytime temperatures,
- 15 d) There will be more hot days and heat waves, fewer cold days and cold
16 waves,
- 17 e) In Texas, recent regional simulations suggest average temperature
18 increases of 5-10°F by 2100.

19
20 Q: WHAT DO YOU MEAN THAT "LAND WILL HEAT MORE THAN OCEAN"?

21
22 A: Because of the large thermal inertia of water (something you've noticed if you ever
23 waited for a hot tub to heat up), water heats up more slowly than land. Thus, if the global
24 average temperature rises by 3°C, we can expect the land to heat by more than that and the ocean
25 to heat by less. You can see this clearly in the bottom panel of Protestant's Exhibit *AD3

26
27 Q: WHAT DO YOU MEAN THAT "NIGHTTIME TEMPERATURES WILL WARM
28 MORE THAN DAYTIME TEMPERATURES"?

29
30 A: The minimum temperature, usually found at night, will increase by more than the daytime
31 temperature owing to decreased efficiency of nighttime infrared cooling. This will lead to a
32 decreased diurnal (day-night) temperature range.

33
34 Q: IF TEXAS TEMPERATURES INCREASE BY 5-10°F BY 2100, WHAT IMPACTS
35 MIGHT HAPPEN?

36
37 A: The US National Assessment identified five areas of concern for the "Midwest" region,
38 which covers most of Texas. These include:

39 1) Alteration in timing and amount of water: The projected changes in water resources
40 are likely to exacerbate the current competition for water among the agricultural sector, natural
41 ecosystems, and urban, industrial, and recreational users. Water stress might be the single most
42 important effect of climate change over much of the globe, not just Texas.

43 2) Changes in climate extremes: Our society is adapted, to a great extent, on the climate
44 we have today, including the extremes. The potential for new patterns in climate extremes
45 (severe storms, droughts, floods, heat waves, etc.) suggests the possibility of great social and
46 economic disruptions.

1 3) Invasive species effects on economy and ecology: A possible migration of invasive
2 species across the Great Plains is a concern to stakeholders because the rapid rate of climate
3 change is likely to be disadvantageous to native species.

4 4) Stress on human communities: A changing climate is a stress with significant
5 socioeconomic implications. Many poorer people cannot afford air conditioning, insulation,
6 substantial housing, and other means of coping with climate extremes. As the Katrina experience
7 taught us, environmental disruption preferentially targets the poorest in any society.

8 5) Conservation of soil organic matter: Soil carbon is vital for retaining water and
9 nutrients. The amount of carbon stored in the soil is strongly influenced by past and present land
10 management practices and weather patterns. Overall, soil carbon is projected to decline in
11 response to higher temperatures in both climate scenarios.

12 I would add to those the threat of increased hurricane intensity combined with sea level
13 rise. As a state with a long coastline, Texas is particularly vulnerable to this impact. Hurricane
14 Katrina showed how Louisiana was devastated by a direct strike by a hurricane, and we can
15 expect similar harm from a direct strike by a major storm on Houston. The impact would be
16 both economic as well as humanitarian, as millions of evacuees from the Houston area flood the
17 rest of the state (and neighboring states).

18
19 Q: PLEASE DISCUSS THE IMPACTS ON PRECIPITATION.

20
21 A. Impacts on precipitation include the following:

- 22
23 a) More precipitation,
24 b) A larger fraction will fall in the heaviest downpours,
25 c) Increased run-off, erosion, and flooding,
26 d) Combined with warmer temperatures, this will lead to decreased soil moisture and
27 increased chance of drought,
28 e) More falling as rain rather than snow, and
29 f) Earlier snow melts.

30
31 Q: PLEASE DISCUSS THE IMPACTS ON SEA LEVELS.

32
33 A. Sea level increases are one of the most certain impacts of climate change. We can
34 expect:

- 35
36 a) Approximately 0.5 m to a few meters increase in the sea level is expected over the
37 next century,
38 b) Millions of people will be directly affected,
39 c) Damage to coastal infrastructure will occur such as salinization of wells,
40 enhanced erosion, and saltwater intrusion, and
41 d) There will be increased vulnerability to severe storms like Katrina.

42
43 Q: PLEASE DISCUSS THE IMPACTS ON HURRICANES.

44
45 A. Because hurricanes feed on warm water, it is likely that hurricanes will grow more severe
46 in a warmer world. This means higher wind speeds, higher rain amounts, and a larger storm

1 surge. These changes all add up to an overall increase in destructiveness. Combined with an
2 increase in our vulnerability to such storms, this is one of the more serious potential
3 consequences of global warming.

4
5 Q: PLEASE DISCUSS IMPACTS CAUSED BY ABRUPT CHANGES.

6
7 A. Abrupt changes may occur as a result of global warming. An example is the
8 disintegration of the West Antarctic Ice Sheet. This will cause sea level to rise 6-7 m, or about
9 20 ft. The scientific community views this as a remote possibility (in the next 100 years), but
10 given the uncertainties in the system we cannot rule it out. If it did happen, it would be a
11 catastrophe of unimaginable proportions. Other unlikely but catastrophic abrupt changes, such
12 as a slowdown in the so-called thermohaline circulation, are also possible.

13
14 Q: PLEASE EXPLAIN WHAT THE “THERMOHALINE CIRCULATION” IS.

15
16 A: The thermohaline circulation describes the global density-driven circulation of the
17 oceans. Warm surface water flowing poleward in the Atlantic transports heat to the Northern
18 Hemisphere high latitudes before the water sinks and heads equatorward. This circulation plays
19 an important role in maintaining the present-day warm temperatures of Western Europe as well
20 as being an important component of the global climate system. We know that this circulation
21 has shutdown in the past, and when that happened the temperature of the Northern Hemisphere
22 plummeted. Some scientists have speculated that it is possible that increasing greenhouse gases
23 might stop this circulation again, leading to a catastrophic cooling. While there is general
24 agreement that such a shutdown is unlikely, there is also agreement that we cannot rule it out.

25
26 Q: IS IT A FAIR STATEMENT THAT THESE IMPACTS WILL CAUSE NOT ONLY A
27 PHYSICAL HARM TO THE PUBLIC, BUT ALSO AN ECONOMIC HARM? PLEASE
28 EXPLAIN YOUR ANSWER.

29
30 A: Yes. Much research has gone into attempting to put a dollar value on the impacts of
31 climate change. For impacts on goods or services that are exchanged in competitive markets –
32 for example, changes in production of agricultural products or commercial timber – the market
33 value of projected changes is a reasonable estimate of total social harm or benefit. But many
34 impacts are projected to affect resources and aspects of the environment that clearly matter to
35 people, but for which only limited markets exist, or none. Examples would include the
36 satisfaction New Englanders derive from their climate and the landscape that depends on it, such
37 as bright, snowy winter days, colorful fall foliage, and forests that support maple syrup
38 production. In addition, valuing a small risk of a catastrophic impact (e.g., shutdown of the
39 thermohaline circulation) is difficult. Finally, valuing the moral dimension of climate change
40 (e.g., what rights do future generations have to inherit a climate similar to ours?) is also difficult.
41 Despite the difficulties, many researchers have estimated the costs of climate change. In terms
42 of marginal cost per ton of carbon emissions, most estimates are between \$10 and \$100.

43
44 Q: HOW MUCH TIME DO WE HAVE TO ACT TO REVERSE THE TREND OF
45 GLOBAL WARMING?

1 A: Based on our best science, in order to head off a “dangerous” temperature increase of
2 3°C, we need to begin reducing emissions from baseline within a decade. Emissions must peak
3 and begin declining within a few decades.
4

5 Q: DOES THIS NECESSARY “PEAK AND DECLINE” APPEAR TO BE HAPPENING?
6 PLEASE EXPLAIN YOUR ANSWER.
7

8 A: No. In fact, CO₂ emissions are accelerating and all indications are that they will continue
9 to do so. This trend will be amplified by the fact that as the world runs out of cheap oil and gas,
10 countries like China and India are shifting to coal, which is the worst fossil fuel on a CO₂ per
11 unit energy basis. The Kyoto Protocol is making a small dent in greenhouse gas emissions, but
12 without more stringent follow-on agreements it will have little long-term effect.
13

14 Q: ARE OTHERS TAKING STEPS TO DECREASE CO₂ AND OTHER GLOBAL
15 WARMING GASSES? PLEASE EXPLAIN YOUR ANSWER.
16

17 A: Yes, the U.S. Senate recently took action and other states are taking actions.
18

19 Q: WHAT ACTION HAS THE U.S. SENATE RECENTLY TAKEN ON GLOBAL
20 WARMING?
21

22 A: In July 2005, the U.S. Senate affirmed the science of global warming and for the first
23 time called for "mandatory market-based limits" on greenhouse gas emissions. The resolution
24 was not binding, but it repudiated the long-standing White House position that research and
25 voluntary action are preferable to limits.
26

27 Q: PLEASE DISCUSS THE PROPOSED “MANDATORY MARKET-BASED LIMITS”.
28

29 A: The Senate resolution did not discuss a particular plan, just that the reductions be
30 mandatory (rather than voluntary) and should be market based, such as a carbon tax or cap-and-
31 trade system.
32

33 Q: WHAT IS THE ELECTRIC POWER RESEARCH INSTITUTE?
34

35 A: The Electric Power Research Institute (EPRI) is an independent, nonprofit center for public
36 interest energy and environmental research. EPRI brings together members, participants, the
37 Institute's scientists and engineers, and other leading experts to work collaboratively on solutions
38 to the challenges of electric power.
39

40 Q: DOSE EPRI HAVE A POSITION ON GLOBAL WARMING GASSES?
41

42 A: Yes. Their statement accepts global warming as a real and serious problem.
43

44 Q: HAVE OTHER STATES BEGUN TO DEVELOP PLANS TO REDUCE CARBON
45 DIOXIDE AND OTHER GLOBAL WARMING GASSES?
46

47 A: Yes, many states are.

1
2 Q: ARE THERE OTHER STATES WORKING TOGETHER ON A PLAN TO REDUCE
3 GLOBAL WARMING GASSES?
4

5 A: Yes. The most well known is the Regional Greenhouse Gas Initiative, or RGGI, a
6 cooperative effort by Northeastern and Mid-Atlantic states (Connecticut, Delaware, Maine, New
7 Hampshire, New Jersey, New York, and Vermont) to reduce carbon dioxide emissions.
8 California is also discussing an aggressive greenhouse-gas reduction plan. Many states are
9 investigating emissions reductions. These include Alabama, California, Colorado, Hawaii,
10 Illinois, Iowa, Kentucky, Maryland, Minnesota, Missouri, Montana, North Carolina, Oregon,
11 Pennsylvania, Rhode Island, Tennessee, Utah, Washington, and Wisconsin. Examples of the
12 types of actions being investigated to reduce emissions include offsets, carbon sequestration, and
13 energy efficiency.
14

15 Q: HOW IS RGGI PLANNING ON REDUCING CARBON DIOXIDE EMISSIONS?
16

17 A: Participating states will implement of a multi-state cap-and-trade program with a market-
18 based emissions trading system. The proposed program will require electric power generators in
19 participating states to reduce carbon dioxide emissions.
20

21 CONCLUSION 22

23 Q: DR. DESSLER, BASED ON YOUR EDUCATION, TRAINING, AND EXPERIENCE
24 WITH THE GLOBAL WARMING ISSUE AND ON THE RESEARCH CONDUCTED,
25 STUDIES, AND REPORTS YOU HAVE REVIEWED FOR YOUR TESTIMONY, HAVE
26 YOU FORMED ANY OPINIONS OR REACHED ANY CONCLUSIONS?
27

28 A: Yes.
29

30 Q: PLEASE STATE YOUR OPINION(S) AND CONCLUSION(S).
31

32 A: Based upon my professional experience, it is my professional opinion that the warming of
33 the last few decades is likely occurring because human activities are releasing greenhouse gases
34 to the atmosphere. In the absence of a concerted effort to reduce greenhouse-gas emissions, we
35 can expect a temperature rise during the 21st century of 1.4°C-5.8°C (2.5°F-10°F). The upper
36 end of this range may represent a climate change that has no precedent over the 4.5-billion year
37 history of the Earth.
38

39 In order to stabilize the climate, we need to reduce CO₂ emissions by about 80% relative to
40 today's emissions. Failure to do so will expose our society to possibly severe impacts. Ignoring
41 this risk is a fundamental abdication of our responsibility to be a steward of the Earth and our
42 responsibilities to future generations. It is a failure to protect the public health, general welfare,
43 and physical property. The construction of Oak Grove's proposed coal-fired power plant, which
44 will release additional CO₂ to the atmosphere and contribute to the global warming problem, is
45 exactly the wrong action to take with respect to this important risk.
46

1 Q: DO YOU THINK THE INCREASE IN GREENHOUSE GAS EMISSIONS FROM THE
2 PROPOSED OAK GROVE PLANT IS REASONABLE CONSIDERING THE CHARACTER
3 AND DEGREE OF POTENTIAL INJURY TO THE PUBLIC'S HEALTH AND PROPERTY?
4

5 A: No. Emitting CO₂ to the atmosphere is essentially irreversible. Once emitted, it will stay
6 in the atmosphere for at least several centuries. As a result, climate change is also essentially
7 irreversible. The temperature is never coming down. Glaciers that melt are never coming back.
8 Neither are species that become extinct due to climate change. However, putting off the
9 construction of the proposed power plant is tentative. In five years, we can revisit the issue to
10 see if the scientific, political, or technical landscape has changed. Because of this, we must be
11 *certain* that building the proposed power plant is the right thing to do. Any uncertainty should
12 cause us to delay building the plant in order to wait for better information. Since there is
13 pervasive uncertainty in this question, I conclude that it poses an unacceptable risk to the Earth
14 and our society.
15

16 Q: IN THE COURSE OF YOUR TESTIMONY, YOU HAVE REFERRED TO A
17 NUMBER OF REPORTS, STUDIES, AND THE LIKE TO SUPPORT YOUR OPINIONS
18 AND CONCLUSIONS. IS EACH OF THESE A DATA SOURCE UPON WHICH
19 AUTHORITIES IN THE FIELD OF GLOBAL WARMING AND ATMOSPHERIC SCIENCE
20 WOULD REASONABLY RELY ON IN FORMULATING OPINIONS AND
21 CONCLUSIONS?
22

23 A: Yes.
24

25 Q: DOES THIS CONCLUDE YOUR TESTIMONY?
26

27 A: Yes.