3.10 Center for Biological Diversity

Letter from Julie Teel, Staff Attorney, January 22, 2007

CENTER FOR BIOLOGICAL DIVERSITY

CALIFORNIA AND PACIFIC OFFICE

VIA ELECTRONIC MAIL

January 22, 2007

Will Nelson
Contra Costa County
651 Pine Street
4th Floor, North Wing
Martinez, CA 94553
(925) 335-1208
Email: wnels@cd.cccounty.us

Re: Comments on the DEIR for the ConocoPhillips (Rodeo) Refinery Expansion, State Clearinghouse Number 2005092028

Dear Mr. Nelson:

These comments are submitted on behalf of the Center for Biological Diversity on the Draft Environmental Impact Report ("DEIR") for the ConocoPhillips (Rodeo) Refinery Expansion, State Clearinghouse Number 2005092028. The Center for Biological Diversity ("Center") is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 30,000 members throughout California and the western United States, including in Contra Costa County.

According to the information provided on CEQAnet, refinery production following implementation of the proposed project would increase by up to approximately 1,000,000 gallons/day or 30% over current Refinery production levels. Gasoline production is expected to increase by up to approximately 791,000 gallons per day or 35% over current levels. Diesel and jet fuel production is expected to increase by up to approximately 290,000 gallons per day or 21.5% over current levels. Yet the DEIR does not appear to analyze the project's emission of greenhouse gases, let alone mitigate them as required by the California Environmental Quality Act (CEQA). This is an oversight that must be corrected in a revised DEIR. 1

The Center has had difficulty accessing the DEIR on-line. The County's website indicates that the DEIR is available for on-line viewing, but the link only provides the table of contents. Please send a CD with the full DEIR to the address on this letterhead and add me to your mailing list for 2

Julie Teel, Staff Attorney
PO BOX 7745 • SAN DIEGO, CA 92167
TEL.: (619) 224-3400 • Email: jteel@biologicaldiversity.org
www.biologicaldiversity.org

all notices relating to this project. A hard copy of this comment letter, including its references, will follow via Federal Express. 2 (cont.)

I. THE DEIR FAILS TO ANALYZE AND MITIGATE GREENHOUSE GAS EMISSIONS FROM THE PROJECT

The DEIR makes no mention of climate change, greenhouse gases or global warming. This is a significant omission and must be remedied in a revised DEIR. Concentrations of greenhouse gases are increasing in the earth's atmosphere, primarily from society's burning of fossil fuels for energy and destruction of forests for other human activities. These gases cloak the earth like a blanket, absorbing solar radiation that would otherwise be radiated back into space, causing the earth's climate to warm much like the interior of a greenhouse. This phenomenon is called global warming and is leading to profound changes in the earth's climate. The world's leading scientists agree that society's production of greenhouse gases, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), is responsible for the unprecedented rate of warming observed over the past century. (ACIA 2004; IPCC 2001). 3

Carbon dioxide accounts for approximately 85% of total emissions, and methane and nitrous oxide together account for almost an additional 14%. Because of the persistence and mixing of these gases in the atmosphere, emissions anywhere in the world impact the climate everywhere equally. Therefore, the impact of greenhouse gas emissions produced in California (the 12th largest emitter in the world) will impact not only California, but the rest of the world as well. In the absence of substantial reductions in greenhouse gas emissions, global warming and its impacts on human health, the environment, and the economy will rapidly worsen in this century. 4

Attached at Appendix A is detailed information on the global implications of climate change and greenhouse gas emissions including the following: the rising temperatures as a result of global warming; the impacts of global warming generally; the impacts of global warming on threatened, endangered, rare, and special status species outside California; and the economic cost of carbon.

A. California Laws Require the Analysis and Reductions of Green House Gases

The DEIR must analyze the impacts posed by greenhouse gas emissions resulting from the Project. The State of California recognizes the threats posed by global warming. To address and rectify the State's increasing contributions to greenhouse gas emissions the State of California has enacted requirements for state and local agencies to address the issue of global warming by analyzing and reversing the emissions of greenhouse gases. Executive Order S-3-05 calls for greenhouse gas emission reductions and analysis of the impacts of climate change. The legislature and the Governor again reaffirmed their commitment to address the issue of climate change by passing the "The California Global Warming Solutions Act of 2006." AB 32. Despite the recognized threats posed by global warming and the implications for the community the EIR fails completely to discuss the project's contribution to greenhouse gas emissions. 5 6

California is extremely vulnerable to the impacts of global warming and is also responsible for a significant portion of the U.S. and global emissions of greenhouse gases. The significant risks

climate change poses to California as well as the considerable benefits the state could realize if it addresses these risks prompted Governor Schwarznegger to issue Executive Order S-3-05 on June 1, 2005. *See* F.Chung et al. 2006 at Appendix 1.7. The Executive Order called for specific emissions reductions and a periodic update on the state of climate change science and its potential impacts on sensitive sectors, including water supply, public health, coastal areas, agriculture and forestry. The Executive Order established the following greenhouse gas (GHG) emissions targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

In response to Executive Order S-3-05, the California Environmental Protection Agency (CalEPA) formed a Climate Action Team with members from various state agencies and commissions, The Team has issued a series of reports, including a March 2006 Climate Action Team Report to Governor Schwarznegger and the Legislature. This and other reports issued by CalEPA, the California Energy Commission (CEC), Department of Water Resources and other California agencies are available at http://www.climatechange.ca.gov/documents/index.html and should be used by local jurisdictions like Contra Costa County in preparing environmental documents under CEQA.

Some of the major impacts identified in recent reports include:

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- Reduction of Sierra snowpack up to 90 percent during the next 100 years threatens California's water supply and quality as the Sierra accounts for almost all of the surface water storage in the state.
- Impacts to the health of Californians due to increases in the frequency, duration, and intensity of conditions conducive to air pollution formation, oppressive heat, and wildfires. Increasing temperatures from 8 to 10.4°F, as expected under the higher emission scenarios, will cause a 25 to 35 percent increase in the number of days Californians are exposed to ozone pollution in most urban areas. This will slow progress toward attainment of air quality standards and impede many of the state's efforts to reduce air pollution. Temperature increases are likely to result in an increase in heat-related deaths. Children, the elderly, and minority and low-income communities are at greatest risk.
- Potential impacts from limited water storage, increasing temperatures, increased carbon dioxide concentrations, pests and weeds threaten agriculture and its economic contribution to the state. Direct threats to the structural integrity of the state's levee system would also have immense implications for the state's fresh water supply, food supply, and overall economic prosperity.
- Erosion of our coastlines and sea water intrusion into the state's delta and levee systems may result from a 4 to 33-inch rise in sea level during the next 100 years. This will further exacerbate flooding in vulnerable regions.
- Increasing temperatures and pest infestations would make the state's forest resources more vulnerable to fires. Large and intense fires threaten native species, increase pollution, and can cause economic losses.

- Increasing temperatures will boost electricity demand, especially in the hot summer season. By 2025 this would translate to a 1 to 3 percent increase in demand resulting in potentially hundreds of millions of dollars in extra energy expenditures

CalEPA 2006; Cayan et al. 2006; Chung 2006; Drechsler et al. 2006.

The California Global Warming Solutions Act of 2006 (AB 32), acknowledges the threats of global warming and places a cap on California's greenhouse gas emissions and thus brings the state closer to meeting these targets. The state of California recognizes the significant threats to the natural environment posed by global warming:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

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AB 32 § 38501(a) 2006.

Global warming will also have significant impacts on the California economy, which must be addressed by all levels of government.

> Global warming will have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry. It will also increase the strain on electricity supplies necessary to meet the demand for summer air-conditioning in the hottest parts of the state.

AB 32 § 38501(b) 2006. In order to address the threats and impacts of global warming the California Global Warming Solutions Act requires the state to reduce the levels of greenhouse gas emissions to 1990 levels by the year 2020. AB 32 § 38550.

CEQA requires an EIR analyze any "significant environmental effects" of a proposed project. Pub. Res. Code § 21 100(b)(l); Cal. Code Regs., Title 14, §§ 15126(a), 15126.2(a), 15143. "'Significant effect on the environment' means a substantial, or potentially substantial, adverse change in the environment." Pub. Res. Code § 21068. CEQA also provides that the CEQA guidelines "shall" specify certain criteria that require a finding that a project may have a significant effect on the environment:

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> (1) A proposed project has the potential to degrade the quality of the environment, curtail the range of the environment, or to achieve short-term, to the disadvantage of long-term, environmental goals.

(2) The possible effects of a project are individually limited but cumulatively considerable. As used in this paragraph, "cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

(3) The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

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Pub. Res. Code § 21083(b).

The effects of a project must be fully analyzed and mitigation imposed if any of the above triggers are reached. Refinery production following implementation of the proposed project would increase by up to approximately 1,000,000 gallons/day or 30% over current Refinery production levels. Gasoline production is expected to increase by up to approximately 791,000 gallons per day or 35% over current levels. Diesel and jet fuel production is expected to increase by up to approximately 290,000 gallons per day or 21.5% over current levels. In light of the severe impacts fuel has on the level of greenhouse gas emissions in this state, the project clearly "has the potential to degrade the environment." See *id.,* subd. (b)(l). The cumulative effects of this project on greenhouse gas emissions, when taken in consideration with the impacts statewide of increased population and vehicular travel over the next quarter century, are undeniable. See *id.*, subd. (b)(2). Finally, when considering the impacts of climate change on California, it is impossible to ignore that the impacts of this project will have either direct or indirect effects on human beings. See *id,* subd. (b)(3). Given the scope of the Project, there is no question that the impacts of this Plan on greenhouse gas emissions and climate change may, and likely will, have significant cumulative environmental impacts for California. These impacts should have been considered and analyzed in the DEIR.

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B. The impacts of Global Warming on California

The precise nature of the impacts over the next decades will depend upon whether global greenhouse gas emissions continue to increase at current rates, or whether the current rate of increase is slowed, and emissions actually reduced. Scientists model future impacts based on different emissions scenarios (Cayan et al. 2006). Under a low emissions scenario, by the end of this century heat waves and extreme heat in Los Angeles will quadruple in frequency and heat-related mortality will increase two to three times (Hayhoe et al. 2004). Alpine and subalpine forests are reduced by 50-75%, and Sierra snowpack is reduced 30-70% (Hayhoe et al. 2004). Under a higher emissions scenario, heat waves in Los Angeles will be six to eight times more frequent, with heat-related excess mortality increasing five to seven times (Hayhoe et al. 2004). Alpine and subalpine forests would be reduced by 75-90%, and snowpack would decline 74-90%, with impacts on runoff and streamflow that, combined with projected declines in winter precipitation, could fundamentally disrupt California's water rights system (Hayhoe et al. 2004).

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As of 2002, California's main source of greenhouse gases was the transportation sector (41.2%) followed by the industrial sector (22.8%), electric power sector (19.6%), agriculture & forestry

sector (8.0%), and other sources (8.4%) (CalEPA 2006). Transportation is also the main source of emissions from the Project. Mitigation of the state's emissions, therefore, will result from addressing each of the sources, with a primary focus on transportation.

C. The Impacts of Global Warming on Threatened, Endangered, Rare, and Special Status Species in California

Climate change is a leading threat to California and the world's biological diversity. Species have already been profoundly impacted by the worldwide average temperature increase of 1° Fahrenheit (.6° Centigrade) since the start of the Industrial Revolution (IPCC 2001). Yet the warming experienced to date is small compared with the 2.5- 10.4° F (1.4-5.8° C) or greater warming projected for this century. The ways in which climate change threatens species are varied and sometimes complex. Below we present an overview of impacts observed to date and projections for the future.

Scientists have predicted three categories of impacts from global warming: (1) earlier timing of spring events, (2) extension of species' range poleward or upward in elevation, and (3) a decline in species adapted to cold temperatures and an increase in species adapted to warm temperatures (Parmesan and Galbraith 2004). A recent survey of more than 30 studies covering about 1600 hundred species summarized empirical observations in each of these three categories and found that approximately one half of the species were already showing significant impacts, and 85-90% of observed changes were in the direction predicted (Parmesan and Galbraith 2004). The statistical probability of this pattern occurring by chance, as opposed to being caused by climate change, is less than one in a billion (Parmesan and Galbraith 2004). 9 (cont.)

Changes in the life cycles and behaviors of organisms such as plants blooming and birds laying their chicks earlier in the spring were some of the first phenomena to be observed. These changes may not be detrimental to all species, but depending on the timing and interactions between species, may be very harmful.

The Edith's checkerspot butterfly, which occurs along the west coast of north America, has been severely impacted by such changes in the lifecycles of organisms. The Edith's checkerspot's host plant, *Plantago erecta*, now develops earlier in the spring while the timing of caterpillar hatching has not changed. Caterpillars now hatch on plants that have completed their lifecycle and dried up, instead of on young healthy plants (Parmesan and Galbraith 2004). The tiny caterpillars are unable to move far enough to find other food and therefore starve to death (Parmesan and Galbraith 2004). Because of this, many Edith's checkerspot butterfly populations have become extinct. Many more populations have been lost in the southern portion of the species' range than in the northern portion, resulting in a net shift of the range of the species northward and upwards in elevation. All these changes have occurred in response to "only" 1.3° Fahrenheit regional warming (Parmesan and Galbraith 2004).

The southernmost subspecies, the Quino checkerspot butterfly, already listed as endangered under the Endangered Species Act due to habitat destruction from urban development and other impacts, has disappeared from nearly 80% of otherwise suitable habitat areas due to global

warming (Parmesan and Galbraith 2004). The Bay checkerspot and Taylor's checkerspot butterflies, also listed under the Endangered Species Act, have been similarly impacted (Parmesan and Galbraith 2004).

Butterfly species are impacted in other ways as well. The northward expansion of the treeline into alpine meadow butterfly habitat can impede dispersal, fragment habitat, and increase mortality via bitterly collisions with the trees (Krajick 2004; Ross et al. 2005).

While theoretically some species can adapt by shifting their ranges in response to climate change, species in many areas today, in contrast to migration patterns in response to paleoclimatic warming, must move through a landscape that human activity has rendered increasingly fragmented and inhospitable (Walther 2002). When species cannot shift their ranges northward or to increased elevations in response to climate warming, they will become extinct (Parmesan and Galbraith 2004). Therefore, the least mobile species will be the first to disappear.[1]

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D. The DEIR Entirely Overlooks the Project's Greenhouse Gas Emissions

The DEIR is inadequate because it neglects to analyze global warming and the project's greenhouse gas emissions. The CEQA Guidelines provide that, in discussing the environmental effects of a project, an EIR must include "a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences." 14 Cal. Code Regs. § 15151. The Project will allow foreseeable and quantifiable emissions of carbon dioxide and other greenhouse gases during its lifetime. These emissions, although relatively small in comparison to worldwide greenhouse gas emissions, will contribute directly and cumulatively to the increase in atmospheric greenhouse gases, and will thus contribute directly and cumulatively to global warming.

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Under CEQA, it is irrelevant that the emissions associated with the project are small in comparison to total emissions. On the contrary, CEQA's cumulative impact analysis requirement exists to capture precisely this type of impact that may be individually small but cumulatively significant. *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal. App. 3d 692, 721. ("The EIR improperly focused upon the individual project's relative effects and omitted facts relevant to an analysis of the collective effect this and other sources will have upon air quality.") Here, the EIR completely omits any quantification of the project's cumulative contribution to the emissions of criteria pollutants, hazardous air pollutants, or greenhouse gases. A revised DEIR must calculate the project's greenhouse gas emissions, and then avoid, minimize, and mitigate them to the maximum extent feasible.

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[1] Appendix A further documents the impacts of global warming on threatened, endangered, rare, and special status species throughout the world

II. THE EIR MUST BE RECIRCULATED FOR PUBLIC REVIEW AND COMMENT

A lead agency must re-circulate an EIR for further public comment under any of four circumstances:

(1) When the new information shows a new, substantial environmental impact resulting either from the project or from a mitigation measure;
(2) When the new information shows a substantial increase in the severity of an environmental impact, except that recirculation would not be required if mitigation that reduces the impact to insignificance is adopted;
(3) When the new information shows a feasible alternative or mitigation measure that clearly would lessen the environmental impacts of a project and the project proponent declines to adopt the mitigation measure; or
(4) When the draft EIR was "so fundamentally and basically inadequate and conclusory in nature" that public comment on the draft EIR was essentially meaningless.

CEQA Guidelines §15088.5. 12

Based on the comments above, it is clear that the EIR must be re-drafted and re-circulated.

III. CONCLUSION

In summary, the DEIR as it stands violates CEQA because, *inter alia,* it has not adequately disclosed, analyzed, minimized, and mitigated the greenhouse gas emissions from the proposed project. Because of the document's shortcomings, the public and decision makers cannot make informed decisions about the proposed project's true environmental costs. The Center urges you to revise and recirculate the DEIR for public review. Please do not hesitate to contact me if you have any questions regarding these comments. Thank you for your consideration of our concerns. 13

Sincerely,

/s/ Julie Teel

Julie Teel
Center for Biological Diversity

APPENDIX A- Global Implications of Climate Change and Greenhouse Gas Emissions

1. Rising Global Average Temperatures 14

The Intergovernmental Panel on Climate Change ("IPCC") has concluded that the global average temperature has risen by approximately 0.6° C ± 0.2 C during the 20th Century (IPCC 2001). There is an international scientific consensus that most of the warming observed has been caused by human activities (ACIA 2004; IPCC 2001). Carbon dioxide emissions, carbon dioxide concentrations, and temperature over the last 1,000 years are all correlated (ACIA 2004). Mean temperatures during the 20th century were the highest in 1,000 years (Albritton et al. 2001). Global climate has changed in other ways as well. For example, precipitation has increased by 0.5 to 1% per decade in the 20th century over most mid- and high latitudes of the Northern Hemisphere continents, and to a lesser degree over the tropical land areas in the Northern Hemisphere (IPCC 2001).

Global average temperature increases mask significant regional variation. Due to a number of positive feedback mechanisms, warming in the Arctic has been and will be greater and more rapid than in the rest of the world (ACIA 2004). Warming in the Arctic is in many ways a harbinger of what is to come in other areas. Changes already observed in some areas of the Arctic dwarf global averages. In extensive areas of the Arctic, air temperature over land has increased by as much as 5° C (9° F) over the 20th century (Anisimov et al. 2001).

All climate models predict significant warming in this century, with variation only as to the rate and magnitude of the projected warming (ACIA 2004). Determining the degree of future climate change requires consideration of two major factors: (1) the level of future global emissions of greenhouse gases, and (2) the response of the climate system to these emissions ("climate sensitivity") (ACIA 2004a). Global warming will continue and accelerate if greenhouse gas emissions are not reduced.

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As hard data are not available for events that have not yet occurred, the future level of society's greenhouse gas emissions must be projected. The IPCC has produced a Special Report on Emissions Scenarios ("SRES") (Nakićenović et al. 2000) that describes a range of possible emissions scenarios based on how societies, economies, and energy technologies may evolve, in order to study a range of possible scenarios (ACIA 2004a; Albritton et al. 2001).

Climate models make different assumptions regarding how various aspects of the climate system will respond to increased greenhouse gas concentrations and warming temperatures. These differing assumptions are expressed as "climate sensitivity," defined as the equilibrium response of global mean temperature to doubling levels of atmospheric carbon dioxide (Stainforth et al. 2005). The IPCC (2001) used climate sensitivities of 1.3-5.8K for projections of warming from 1990-2100 (Stainforth et al. 2005).

Using the SRES emissions scenarios and the world's leading climate models, the IPCC predicts that the global average temperature will warm between 1.4 and 5.8°C by the end of this century. Warming will be greater in the Arctic, where the annual average temperatures will rise across the entire Arctic, with increases of approximately 3-5° C over the land areas and up to 7° C over the oceans. Winter temperatures are projected to rise even more significantly, with increases of approximately 4-7° C over land areas and approximately 7-10° C over oceans

(ACIA 2004a). Year-to-year variability is also projected to be greater in the Arctic than in other regions (ACIA 2004a).

For a number of reasons, IPCC (2001) and ACIA (2004) projections may be significant underestimates of the amount and rate of warming. First, the planet is already committed to an additional 1° F warming from the excess solar energy already in our climate system, due to lag time in the climate response (Hansen 2005). Second, actual worldwide greenhouse gas emissions may be on the high end or above the range of the IPCC scenarios. All scenarios utilized by the IPCC assume that energy use will shift away from fossil fuels to a greater percentage of sustainable energy sources and that worldwide greenhouse gas emissions will begin to decline during this century (IPCC 2001). Yet the most recent energy projections show that if current policies continue, worldwide greenhouse gas emissions will be 52% higher in 2030 than they are today (IEA 2005).

Third, climate sensitivity may be substantially greater than the levels used by IPCC (2001). Results from the *climateprediction.net* experiment indicate that much larger climate sensitivities of up to 11.5K are possible (Stainforth et al. 2005). Chapin et al. (2005) studied the warming amplification caused by the expansion of shrub and tree cover in the Arctic and resulting increase in solar absorption. This amplification could be as much as two to seven times (Chapin et al. 2005), and is not accounted for in the climate models used in IPCC (2001) (Foley 2005).

Recent data on the unexpectedly fast rate of warming in the Arctic also reinforces the likelihood that the IPCC (2001) projections will need to be revised upwards. Overpeck et al. (2005) concluded that the Arctic is on a trajectory towards an ice-free summer state within this century, a state not witnessed in at least the last million years (Overpeck et al. 2005). These scientists conclude that there are few, if any processes or feedbacks within the arctic system that are capable of altering the trajectory toward this ice-free summer state. In September, 2005, scientists reported a new record Arctic sea-ice minimum for the month of September (NSIDC 2005). These scientists called the sea ice reduction "stunning" and concluded that Arctic sea ice is likely on an accelerating, long-term decline (NSIDC 2005).

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2. The Impacts of Global Warming Generally

Global warming consists of more than just increases in global average temperature. In 2001 the IPCC predicted a 90-99% chance of the following weather changes:

- Higher maximum temperature and more hot days over nearly all land areas;
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
- Reduced diurnal temperature range over most land areas;
- Increase of heat index over land areas;
- More intense precipitation events.

Albritton et al. 2001.

The IPCC also predicted a 66-90% chance of the following:

- Increased summer continental drying and associated risk of drought;
- Increased in tropical cyclone (hurricane) peak wind intensities;
- Increase in tropical cyclone mean and peak precipitation intensities.

Albritton et al. 2001.

Greenland ice cores indicate that the climate can change very abruptly. Scientists caution that thresholds may be reached that trigger rapid and extreme climatic changes that are difficult to predict but could be devastating. Examples include the shut down of the North Atlantic thermohaline circulation, which transfers heat from the equatorial regions to the Arctic, which could plunge northern Europe into a new ice age. The more rapid melting of the Greenlandic ice sheet, once thought to be several centuries away, could trigger this impact and also result in global sea level rise of up to six meters, completely eliminating many coastal areas. As in the case of the shift to an ice-free Arctic summer, scientists warn that we may be very close to crossing thresholds of rapid climate change from which there is no return.

Increased intensity of precipitation events due to global warming has long been predicted by climate models and remains a consistent result of the most advanced modeling efforts (Cubasch and Meehl 2001). In global simulations for future climate, extreme precipitation events over North America are predicted to occur twice as often (Cubasch and Meehl 2001).The impacts of global warming, once envisioned to be experienced by future generations, are already upon us, bringing profound climactic and ecological changes, great loss of human life, and likely extinction for many of the planet's non-human species. As written recently in the New England Journal of Medicine, 14 (cont.)

> Since [the release of the *Third Assessment Report* in] 2001, we've learned substantially more. The pace of atmospheric warming and the accumulation of carbon dioxide are quickening; polar and alpine ice is melting at rates not thought possible several years ago; the deep ocean is heating up, and circumpolar winds are accelerating; and warming in the lower atmosphere is retarding the repair of the protective "ozone shield" in the stratosphere....Given the current rate of carbon dioxide build-up and the projected degree of global warming, we are entering uncharted seas.
>
> As we survey these seas, we can see some of the health effects that may like ahead if the increase in very extreme weather events continues. Heat waves like the one that hit Chicago in 1995, killing some 750 people and hospitalizing thousands, have become more common. Hot, humid nights, which have become more frequent with global warming, magnify the effects.

Epstein 2005.

In 2002, more than 1,000 people died in a spring heat wave in India (Gelbspan 2004). In the spring of 2003, 1,400 people died in another heat wave in India and Pakistan. Also in 2003, a summer heat wave in Europe killed between 21,000-35,000 people (Epstein 2005).

In 1998, Hurricane Mitch dropped six feet of rain on Central America in three days, and was followed by soaring incidences of malaria, dengue fever, cholera, and leptospirosis (Epstein 2005). In 2000, after rain and three cyclones hit Mozambique over a six week time period, the incidence of malaria rose by five times (Epstein 2005). In June, 2001, Houston suffered the single most expensive storm in modern history when tropical storm Allison dropped thirty-five inches of rain in one week, resulting in $6 billion in damages (Gelbspan 2004). In November, 2001, record flooding killed more than 1,000 people in Algeria (Gelbspan 2004). Also in 2002, more than 12 million people were displaced by severe flooding in South Asia (Gelbspan 2004).

In the Eastern United States, the effect of sea level rise over the last century (primarily from thermal expansion as the oceans warm) has also exacerbated the beach erosion and flooding from modern storms that would have been less damaging in the past (Folland and Karl 2001). In August, 2005, Hurricane Katrina killed hundreds and destroyed the city of New Orleans (Epstein 2005). Katrina was quickly followed by Rita, and then Wilma, putting 2005 on track to setting a new record for hurricane season destruction.

While it may not be possible to link individual episodes to global warming, this overall pattern of increasingly violent weather is very likely linked to human-caused warming. But even more subtle, gradual changes can profoundly damage public health (Epstein 2005). During the past two decades, the prevalence of asthma in the United States has quadrupled, at least in part because of climate-related factors (Epstein 2005). Increased levels of plant pollen and soil fungi may also be involved, as experiments have shown that ragweed grown in twice the ambient levels of carbon dioxide produces 60% more pollen (Epstein 2005). High carbon dioxide levels also promote the growth and spore production of some soil fungi, and diesel particles then help to deliver these aeroallergens deep into human lungs (Epstein 2005).

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Widening social inequities and changes in biodiversity caused by global warming have also contributed to the resurgence of many infectious diseases (Epstein 2005). Global warming is credited with the current spread of Lyme disease, as well as malaria, hantavirus, and West Nile virus (Epstein 2005). Floods are also frequently followed by disease clusters, as downpours can drive rodents from burrows, deposit mosquito-breeding sites, foster fungus growth in houses, and flush pathogens, nutrients, and chemicals into waterways (Epstein 2005). Droughts also weaken trees' defenses against infestations and promote wildfires, which can cause injuries, burns, respiratory illness, and deaths (Epstein 2005).

Shifting weather patterns are jeopardizing water quality and quantity in many countries, where groundwater systems are overdrawn (Epstein 2005). Most montane ice fields are predicted to disappear during this century, further exacerbating water shortages in many areas of the world (Epstein 2005).

An even greater threat to human health comes from illnesses affecting wildlife, livestock, crops, forests, and marine organisms (Epstein 2005). One recent report found that 60% of resources examined, from fisheries to fresh water, are already in decline or being used in unsustainable ways (Epstein 2005). This is a grim prognosis indeed as global population continues to rise even as global warming accelerates.

As discussed further below, global warming will also have profound impacts on the earth's biological diversity and threatens many thousands of species. The primary prevention and mitigation of all of these climate impacts is to reduce the nation's energy use and halt the extraction, mining, transport, refining and combustion of fossil fuels (Epstein 2005). Experts believe that a substantial reduction in energy use would have innumerable health and environmental benefits along with stabilizing the climate (Epstein 2005).

3. The Impacts of Global Warming on Threatened, Endangered, Rare, and Special Status Species

The pika is a small, vegetarian relative of the rabbit, which is adapted to life on high, treeless mountain peaks. Because pikas need cold, bare habitat, it is not surprising that their numbers are plummeting all over the globe (Krajick 2004). Fossil evidence shows that pikas once ranged widely over North America but their range has contracted to a dwindling number of high peaks during the warm periods of the last 12,000 years (Krajick 2004). Alpine species like the pika are unable to shift their ranges as warming temperatures and advancing treelines, competitors, and predators impact their mountain habitat (Krajick 2004). Pikas are further limited by their metabolic adaptation to their cold habitat niche, which allows them to survive harsh winters but also causes them to die from heat exhaustion at temperatures as low as 77.9° F (25.5° C) (Krajick 2004).

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American pika populations at seven of twenty-five previously recorded localities in the Great Basin of the western United States have disappeared in recent years (Beever 2003). Based on work conducted in the late 1990s, researchers documented that the average elevation of surviving pika populations was 8,310 feet, up from a pre-historic average of about 5,700 feet between 7,500 and 40,000 years ago (Beever 2003; Grayson 2005). Most recently, researchers announced in December, 2005, that at least 2 additional populations have become extinct, and the average elevation of surviving populations has increased by another 433 feet.

In the Yukon, collared pikas declined 90% between 1999 and 2000, when unprecedented midwinter snowmelts, rain, and refreezing eliminated the insulating snow and then iced over the pika's forage plants (Krajick 2004). A pika species endemic to the mountains of northwest China, discovered only in 1986, was not located in extensive surveys in 2002 and 2003 and may be extinct.

Alpine dwelling marmots which rely upon the treeless tundra to visually spot and avoid predators, are also at risk as treelines advance, providing cover for predators like wolves and cougars.

Alpine plants, which have little or no capability to shift their range to higher elevations as the climate warms, may be most at risk. One study predicts that a 3° Centigrade temperature rise over the next century will eliminate eighty percent of alpine island habitat and cause the extinction of between a third and a half of 613 known alpine plants in New Zealand (Krajick 2004).

A study of 15,148 North American vascular plants found that 7%-11% of all species (1,060 to 1,670 plants) could be entirely out of their climate envelopes with just a 5.4° F (3° C) warming, the lower limit of climate change predicted for this century by the IPCC (Morse et al. 1995). At the upper boundary of climate change predicted for this century, 10.4° F (5.8° C), the percentage of plants completely outside their envelope increases to 25-40% (Morse et al. 1995). By contrast, about 90 North American plant species are believed to have become extinct in the past two centuries (Morse et al. 1995).

Species are also at great risk because climate change can alter conditions for diseases and their vectors in a way that allows the incidence of disease to increase and spread. Global warming can exacerbate plant disease by altering the biological processes of the pathogen, host, or disease-spreading organism (Harvell et al. 2002). For example, cold winter temperatures limit disease in some areas because the cold kills pathogens. Warmer winter temperatures can decrease pathogen mortality and increase disease (Harvell et al. 2002). Warmer temperatures can also increase pathogen growth through longer growing seasons and accelerated pathogen development (Harvell et al. 2002). The most severe and least predictable disease outbreaks will likely be when climate change alters host and pathogen geographic ranges, so that pathogens introduced to new and vulnerable hosts (Harvell et al. 2002). 14 (cont.)

Climate change will also influence wildlife diseases by affecting the free-living, intermediate, or vector stages of pathogens (Harvell et al. 2002). Many vector-transmitted diseases are currently climate limited because the parasites cannot complete development before the vectors are killed by cold temperatures (Harvell et al. 2002). Well studied vector borne human diseases such as malaria, Lyme disease, tick-borne encephalitis, yellow fever, plague, and dengue fever have expanded their ranges into higher latitude areas as temperatures warm (Harvell et al. 2002).

Increased ocean temperatures also cause marine pathogen range expansions. One example is the spread of eastern oyster disease on the east coast of the United States from Long Island to Maine during a winter warming trend in which the cold-water barrier to pathogen growth was removed (Harvell et al. 2002).

A study published in *Nature* has linked the extinction of dozens of amphibian species in the tropical highland forests of Central and South America to global warming due to the creation of ideal conditions for growth of the chytrid fungus, a disease which kills frogs by growing on their skin and attacking their epidermis and teeth, as well as by releasing a toxin (Pounds et al. 2006). Seventy-four of the 110 species of brightly colored harlequin frogs of the genus *Atelopus* have disappeared in the past 20 years due to the spread of the fungus (Pounds et al. 2006). The study's lead author stated "Disease is the bullet killing frogs, but climate change is pulling the

trigger" (Eilperin 2006). The golden toad (*Bufo periglenes*), endemic to the same tropical mountain forests, was also driven extinct by climate change. These amphibian extinctions from the Monteverde Cloud Forest are one of the largest recorded vertebrate extinction events of at least the last 100 years.

Projected increases in atmospheric carbon dioxide and temperature over the next 50 years will rapidly and substantially exceed the conditions under which coral reefs have flourished over the past 500,000 years (Hughes et al. 2003). Coral reefs are already experiencing a major decline (Hughes et al. 2003). Thirty percent of reefs are already severely damaged, and sixty percent of reefs could be gone by 2030 (Hughes et al. 2003). The link between increased greenhouse gases, climate change, and regional-scale bleaching of corals, questioned by some researchers as recently as ten to twenty years ago, is now incontrovertible (Hughes et al. 2003). In the face of elevated ocean temperatures, corals "bleach" by expelling the symbiotic algae that provide them nourishment. Such bleaching events are often fatal, and as they become more frequent with global warming, threaten not just individual coral species but the entire reef ecosystem.

Corals face an additional threat from greenhouse gas emissions: increasing levels of dissolved carbon dioxide in the oceans from society's fossil fuel use reduces the rate of calcification corals need for growth. The frequency and intensity of hurricanes is also projected to continue to increase, leading to a shorter time for recovery between damaging storm events (Hughes 2003). Two species of Caribbean coral, the elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) have been listed under the Endangered Species Act, in part due to elevated ocean temperatures from global warming and ocean acidification from anthropogenic carbon dioxide emissions. U.S. Fish and Wildlife Service (USFWS) 2006. 14 (cont.)

Species in areas of the globe experiencing more rapid warming than the average, such as the Arctic, are also particularly vulnerable to climate change. The Arctic has warmed at over twice the rate of the rest of the world and has been impacted particularly early and intensely by climate change. Winter temperatures in parts of the Arctic have increased by as much as 3-4° C (5-7° F) in just the past 50 years. Over the next 100 years, under a moderate emissions scenario, annual average temperatures are projected to rise 3-5° C (5-9° F) over land and up to 7° C (13° F) over the oceans. Winter temperatures are projected to rise by 4-7° C (5-9° F) over land and 7-10° C (13-18°) over the oceans (ACIA 2004b:2).

The disproportionate regional warming is caused by several unique characteristics and feedback mechanisms in the Arctic. Chief among these is the decrease in Arctic snow and ice cover and northward expansion of boreal forests and shrubs as temperatures warm. These changes greatly decrease the amount of solar radiation reflected back into space and speed regional warming in a positive feedback loop of enormous magnitude. As temperatures go up, Arctic sea ice melts. Summer sea ice extent is already declining at up to 10% per year, and experienced a new record minimum in September 2005 (NSIDC 2005). An area of sea ice of about half a million square miles, or roughly twice the size of Texas, has been lost (NSIDC 2005). If current trends continue, the Arctic will be ice free in the summer in just a few decades. Decreases in winter sea ice extents in the Arctic have also been documented, approaching

reductions of 3% per decade (Meier et al. 2005). The Arctic may already be on a trajectory towards a summer ice-free, "super interglacial" state that has not existed for at least a million years (Overpeck et al. 2005). There appear to be no feedback processes in the Arctic system capable of altering this trajectory towards dramatically less permanent ice than at present (Overpeck et al. 2005).

The rapid warming threatens the entire Arctic web of life, including the polar bear (*Ursus maritimus*), the largest of the world's bear species and an icon of the North. Polar bears live only in the Arctic where sea ice is present for substantial portions of the year. Polar bears are the Arctic's top predator and completely dependent upon the sea ice for all of its essential behaviors. Polar bears are specialized predators of seals in ice-covered waters. Polar bears also use the sea ice to travel, to mate, and some mothers even give birth to their cubs in snow dens excavated on top of the sea ice. The polar bear's dependence on sea ice is so complete that, like whales and seals, they are classified as a marine mammal by scientists and the federal government.

Due to the overwhelming risk to polar bears caused by global warming, in February, 2005, the conservation organization Center for Biological Diversity submitted a Petition to the U.S. Fish and Wildlife Service to list polar bears as a threatened species under the Endangered Species Act. *See* http://biologicaldiversity.org/swcbd/species/polarbear/petition.pdf. In February, 2006, the Fish and Wildlife Service found that listing of polar bears "may be warranted," and the listing process is currently ongoing. 71 Fed.Reg. 6,745 (February 9, 2006).

The number and magnitude of the impacts already recorded from a 1° F increase in average global air temperature is profoundly disturbing. And the projected increase, even under moderate greenhouse gas scenarios, for this century of 2.5- 10.4° F (1.4-5.8° C) is many times the warming already experienced. Not surprisingly, the projections for the future are more disturbing still.

14 (cont.)

The leading study on the quantification of risk to biodiversity from climate change, published in 2004 in *Nature*, included over 1,100 species distributed over 20% of the earth's surface area (Thomas et al. 2004). Under a relatively high emissions scenario, 35%, under a medium emissions scenario 24%, and under a relatively low emissions scenario, 18% of the species studied would be committed to extinction by the year 2050 (Thomas et al. 2004). Extrapolating from this study to the earth as a whole reveals that over a million species may be at risk. The clear message is that immediate reductions in greenhouse gas emission may save preserve many thousands of species. It is also clear that some impacts from climate change are inevitable, and thus adaptation strategies will be an essential component of any comprehensive strategy to manage the impacts of climate change.

4. The Economic Cost of Carbon

The economic cost of greenhouse gas pollution is the estimated cost of the net impact on economies and societies of long term trends in climate conditions related to anthropogenic greenhouse gas emissions (Downing et al. 2005). The economic cost is generally expressed as the marginal cost of climate change impacts, and is usually estimated as the net present value of

the impact over the next 100 years (or longer) of one additional ton of carbon emitted to the atmosphere today, and is expressed in dollars (or other currency) per ton of carbon (tc).2

Estimating the economic cost of greenhouse gas pollution is a rapidly developing field, and very few studies conducted to date have included any non-market damages such as species extinction, or the risk of potential extreme weather such as hurricanes, droughts, and floods (Watkiss et al. 2005). None have included socially contingent effects, or the potential for longer-term effects and catastrophic events (Watkiss et al. 2005). This indicates that values in the literature are a sub-total of the full economic (or social) cost of greenhouse gas pollution, and therefore by definition an underestimate, though researchers cannot yet say by how much (Watkiss et al. 2005).

Researchers have concluded that $64/tc (year 2000) is a reasonable figure for decision makers to use as a lower benchmark of the economic cost of greenhouse gas emissions (Downing et al. 2005). An upper benchmark is more difficult to deduce from the current literature but the risk of higher values for the social cost of carbon is significant (Downing et al. 2005, Watkiss et al. 2005). Decision makers should use the best available range of values displayed in Table 1.

14 (cont.)

Table 1: Economic Cost of Carbon: Values for Use in Project Appraisal (USD per ton carbon) (Source: Adapted from Watkiss et al. 2005:ix)3

Year of Emission	Central guidance	Lower Central Estimate	Upper Central Estimate
2000	$101	$64	$238
2010	$119	$73	$293
2020	$146	$91	$375
2030	$183	$119	$475
2040	$256	$165	$603
2050	$384	$238	$768

Using the central guidance figure and the year 2010 baseline, the cost per ton of CO_2 would be $32.48. This measure, as well as qualitative measures of environmental and social impacts must be analyzed in the DEIR and taken into consideration when determining what is and is not a feasible mitigation measure or alternative.

2 The cost can also be expressed per ton of carbon dioxide, where 1tc=3.664t CO_2.
3 Figures from Watkiss et al. 2005:ix were converted from GBP (£) to USD ($) with the exchange rate calculator at http://coinmill.com/GBP_USD.html on July 18, 2006 and rounded to the nearest dollar.

3.10 Center for Biological Diversity

Letter from Julie Teel, Staff Attorney, January 22, 2007

3.10 Center for Biological Diversity

Responses to Letter from Julie Teel, Staff Attorney, January 22, 2007

CBD-1 *CBD states that the DEIR does not appear to analyze or mitigate the project's emission of greenhouse gases "as required by CEQA." CBD requests this omission be corrected in the revised EIR.*

RESPONSE: Greenhouse gas emissions have been estimated for the Proposed Project, and shown in See Section 2.2, Master Response – Greenhouse Gases. CEQA guidelines have not yet addressed the issue of assessing the impact of greenhouse gas emissions from a project. Therefore, without established thresholds it is not possible to draw conclusions about the significance of a project's impacts. CEQA section 15145 states that in such circumstances, the lead agency "should note its conclusion and terminate discussion of the impact."

CBD-2 *CBD states that while the County's website indicates that the DEIR is available for online viewing, the link only provides access to the document's table of contents. Commenter requested a CD copy of the DEIR and inclusion on the mailing list for public notices related to the project.*

RESPONSE: The commenter is addressing the public review process, not the DEIR's analysis of possible impacts on the environment and ways in which those impacts might be avoided or mitigated. County response to this comment is not required. However, the County is responding in order to clarify the record.

Regarding access to the DEIR on the County website, when one accesses the web document, the table of contents appears with blue boxes highlighting the various sections that are viewable. It is necessary to click the box for the section that the reader desires to view. The document was posted this way so that the reader would not have to download the entire file in order to view a specific section. The County received three reports that the document could not be accessed online and received several reports that it could be accessed. It appears that certain settings on individual computers are prohibiting access to the document.

Regarding the request for a CD copy of the DEIR, the County received a subsequent request from the commenter's San Francisco branch office for a hard copy of the document, which was provided. The commenter has been added to the notification list for hearings on the Proposed Project.

CBD-3 *CBD notes that the DEIR does not mention climate change, greenhouse gases, or global warming. CBD requests this omission be corrected in a revised DEIR.*

RESPONSE: An analysis of the Proposed Project's GHG emissions has been developed and is included in Section 2.2, Master Response – Greenhouse Gases. The analysis includes total refinery emissions, total direct emissions from

Proposed Project sources as well as indirect electricity emissions. However, as discussed in Section 2.2, there is no established methodology to determine climate change or global warming that would result from any given project. See also Section 2.1 Master Response – Recirculation.

CBD-4 *CBD provides information about greenhouse gases and global warming and attaches an Appendix on the global implications of climate change and greenhouse gas emissions.*

RESPONSE: The information submitted by the commenter supplements information presented in Section 2.2, Master Response – Greenhouse Gases.

CBD-5 *CBD states that the DEIR must analyze the impacts posed by greenhouse gas emissions that result from the project.*

RESPONSE: See Section 2.2, Master Response – Greenhouse Gases and response CBD-1.

CBD-6 *CBD describes various government actions taken to combat global warming and some of the impacts that recent reports have identified.*

RESPONSE: The information submitted by the commenter supplements information presented in Section 2.2, Master Response – Greenhouse Gases.

CBD-7 *CBD restates the CEQA requirements of an EIR in analyzing "significant environmental effects" of a proposed project.*

RESPONSE: A significant impact cannot be identified because significance criteria do not exist. See Section 2.2.5 of Master Response – Greenhouse Gases.

CBD-8 *CBD asserts that the scope of the project will have impacts on greenhouse gas emissions and climate change that likely will result in significant cumulative environmental impacts for California, which should have been considered and analyzed in the DEIR.*

RESPONSE: The State of California has not provided guidance as to significance thresholds for assessing the impact of greenhouse gas emissions on climate change and global warming concerns. Further, there is no established methodology to determine the secondary impacts that would result from greenhouse gas emissions. Without established thresholds, any conclusion about these impacts or their mitigation is speculative.

See Responses CBD-1, CBD-3 and CBD-7. See also Section 2.2, Master Response – Greenhouse Gases.

CBD-9 *CBD discusses sources of greenhouse gasses and the impacts of global warming on California and threatened, endangered, rare, and special status species in California.*

RESPONSE: The commenter incorrectly states that transportation is the main source of emissions from the Proposed Project. The information submitted by the commenter regarding impacts and sources of global warming in California supplements information presented in Section 2.2, Master Response – Greenhouse Gases.

CBD-10 *CBD asserts that the DEIR is inadequate because it does not analyze global warming and the Project's greenhouse gas emissions. CBD notes that the project will allow emissions of carbon dioxide and other greenhouse gases which will contribute directly and cumulatively to the increase in atmospheric greenhouse gases, and therefore, will directly and cumulatively contribute to global warming.*

RESPONSE: See responses CBD-3 and CBD-8 and Section 2.2, Master Response – Greenhouse Gases.

CBD-11 *CBD asserts that the fact that the emissions associated with the project are small in comparison to total emissions is irrelevant and a cumulative impact analysis is required. CBD stated that because the EIR omitted any "quantification" of the emissions' cumulative contribution, such cumulative analysis must be revised in the DEIR with calculations and mitigation measures.*

RESPONSE: See Section 2.1, Master Response – Recirculation, Section 2.2, Master Response – Greenhouse Gases and responses CBD-1, CBD-3, CBD-7 and CBD-8.

CBD-12 *CBD asserts that the DEIR must be recirculated and restates the CEQA requirements for recirculation.*

RESPONSE: The commenter is stating an opinion. There is no basis in CEQA for the DEIR to be recirculated. The requirements for recirculation of an EIR are discussed in Section 2.1, Master Response - Recirculation.

CBD-13 *CBD asserts that under CEQA section 15088.5, the EIR must be redrafted and recirculated. CBD states that the DEIR violates CEQA because it has not adequately disclosed, analyzed, minimized and mitigated the proposed project's greenhouse gas emissions.*

RESPONSE: The comment is not correct. See responses CBD-1, CBD-3, CBD-7, CBD-8 and CBD-13 and Section 2.1, Master Response - Recirculation.

CBD-14 *CBD adds an Appendix discussing the global implications of climate change and greenhouse gas emissions. The discussion includes rising global average*

temperatures, the impacts of global warming generally, the impacts of global warming on threatened, endangered, rare, and special status species, and the economic cost of carbon.

RESPONSE: The information submitted by CBD supplements information presented in Section 2.2, Master Response – Greenhouse Gases.