BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 99-1 SUMAS ENERGY 2 GENERATION FACILITY	EXHIBIT_____(RHG-T)

COUNSEL FOR THE ENVIRONMENT'S PREFILED DIRECT TESTIMONY

WITNESS #__: RICHARD H. GAMMON

Q. Please state your name and occupation.

A. My name is Richard Harriss Gammon. I am a Professor of Chemistry, Oceanography, and Adjunct Professor of Atmospheric Sciences at the University of Washington, Seattle.

Q. Please describe the nature of your testimony.

A. I will dispense with an overview of my qualifications. I supplied my vitae and summary of my qualifications during my first appearance. For ease of reference I have attached another copy of my vitae (RHG-1). You may find an overview of my qualifications on page 2 of Exhibit 41. I will summarize the major advances in the international scientific consensus on man-made climate change as well as major movement on the global policy side of this issue which have occurred since I last testified before EFSEC in 2000. I will refer to recently released reports by the Intergovernmental Panel on Climate Change (TAR Third Assessment Report, 2001), as well as the report by the National Academy of Sciences as requested by President Bush (May 2001). Both of these documents stress that the rate and severity of the global climate change predicted for the coming decades will be primarily determined by the pace of emissions to the atmosphere

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of carbon dioxide (CO2) from the combustion of fossil fuels (coal, oil, natural gas). In addition, I will discuss the Conference of the Parties (COP-6) in Bonn during July when 180 nations (but not the USA) signed the international political agreement defining the terms of the Kyoto Protocol. Ratification of this protocol into binding international law is likely within the coming year. Finally, I will comment on the expected national regulation of carbon emissions and the possible CO2 mitigation strategies and leadership opportunity for early action taken here in the Pacific NW.

Q. What information did you review in preparation for this testimony?

A. I reviewed the SE2 Greenhouse Gas mitigation proposal and the pre-filed testimony of Jim Litchfield, David Montgomery and Charles Martin pertaining to this topic, as well as the testimony on greenhouse gas from the earlier 2000 EFSEC proceeding. I also studied the following documents: (1) "Climate Change 2001, The Scientific Basis: Contribution of Working Group I to the Third Assessment Report (TAR) of the IPCC 2001", J. Houghton ed. (available as 'Summary for Policymakers 'www.ipcc.ch (IPPC-TAR)(RHG-5)(2) "Climate Change Science: An Analysis of Some Key Questions", U.S. National Academy of Sciences, May, 2001(NAS) (www.nap.edu/catalog/10139.html)(RHG-6); (3) US National Assessment of Climate Impacts in the United States, US Global Change Research Program (www.usgcrp.gov/usgcrp/Library/nationalassessment/default.htm), and (4) a summary of the successful Kyoto Protocol negotiations in Bonn this July, as prepared by the PEW Center on Climate Change(PEW) (www.pewclimate.org/bonn/daily.cfm?m).(RHG-7)

Q. Last year, you stated "The SE2 plant would raise the CO2 emissions in Washington State by 2.4 million tons of CO2/yr, which is about a 3% increase relative to current Washington state annual emissions of approx. 74 million tons of CO2...." Mr. Martin indicates this figure is 2.5%. Who is correct and why?

A. The machinations one could go through to justify either percentage is less important than the fact that both of us agree that the percentage is within the range of 2.5%-3%. The acknowledgement of the increase is the key. This relative percentage remains constant notwithstanding the aluminum plant closures reducing some greenhouse gas emissions (CF4), but this has likely been more than balanced by increased emissions from expanding power plants (Centralia) and the rapidly expanding state transportation sector.

Q. Given that these numbers have remained relatively constant, has your opinion changed regarding the need to address the impact now, rather than when there is a regulatory framework in place as Mr. Montgomery suggests in his testimony?

A. My opinion remains the same and is bolstered by the events of the past year. In the aftermath of the US withdrawal from the international Kyoto process, it may be some time before the Bush administration and the Congress agree on the terms of a domestic, alternative approach to combating climate change. In the meantime, nothing is preventing policy action on the state and local level. Indeed, in anticipation of eventual federal controls, many states (Massachusetts, Oregon, New Jersey, Vermont) are drafting and implementing their own greenhouse gas reduction plans or cap-and-trade carbon markets, as are many major corporations (Dupont, Shell, BP, Johnson and Johnson). Among cities, Seattle is a clear leader with its climate-neutral pledge to meet all present and future electrical power demands for the customers of Seattle City Light with no net climate gas emissions at all. (This means full mitigation of all fossil-fuel generated power purchased to meet current base load as well as any future increase in electrical demand).

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Q. What is the current thinking of the scientific community on the predicted global climate change due to increasing greenhouse gases such as CO2?

A. Since my EFSEC testimony of last year, two important reports on the science of climate change have been published, both of which confirm the seriousness of the greenhouse threat. They are respectively, the Third Assessment by the Intergovernmental Panel on Climate Change: "Climate Change 2001, The Scientific Basis: Contribution of Working Group I to the Third Assessment Report of the IPCC-TAR 2001 (RHG-5) and the fast-track study of the IPCC (by a committee of the US National Academy of Sciences, as requested by the Bush administration in preparation for the climate negotiations this past summer in Germany. (May 2001)(NAS) (RHG-6).

Q. Let's discuss the "Climate Change 2001 Report"(IPPC-TAR 2001) first. Would you please provide us with a brief refresher on who the IPPC is and its purpose?

A. For a more detailed overview, see my prior testimony Exhibit 41. On pages 3-4 it discusses the organization and purpose of the IPCC and the conclusions of the First (1990) and Second (1995) Assessments. In sum, the case for measurable man-made climate change has been progressively strengthened in these series of reports on the state of climate science over the past decade. Notice the cautious language of the Second Assessment report (IPCC-SAR, 1995) "…the balance of evidence suggests a discernable human influence on global climate" with the latest IPCC study. [In contrast, the "Summary for Policymakers" of the recent Third Assessment Report (IPPC-TAR 2001) concludes, "There is new and stronger evidence that most of the warming observed over the past 50 years is attributable to human activity." This means that not only is the world warming measurably, but that human emissions of greenhouse gases are almost certainly (66-90% probability) the dominant cause of this warming. The tone is much more definitive than in earlier reports, as uncertainties have been reduced and the man-made climate signal emerges from the natural variability of worldwide weather. We know now that we have

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entered the greenhouse century (millennium). One of the main conclusions in this most recent report is that the projected global warming in this century (1990-2100) will likely be in the range of 1.4-5.8 Centigrade (C) (2.5-10.4 degrees Fahrenheit, and that the global warming rate in the decades ahead is likely (66-90% confidence interval) to be in the range 0.2-0.4 degrees Fahrenheit per decade. This range spans a variety of global climate models and economic scenarios, but has significantly increased the upper range for the warming, relative to the previous report (IPCC Second Assessment Report, 1995). The possibility of such a warming in so short a time is truly alarming, as 10 degrees F rivals the temperature changes which occurred over many thousands of years as the earth came out of the last ice age before the rise of agriculture and human civilization. It is not merely the magnitude, but also the rate of this climate change which threatens the civilized as well as the natural world.

Q. Based on your review of the Climate Change Report (IPPC-TAR 2001), what is your scientific conclusion?

A. I concur fully with the conclusions of the Climate Change Report (Working Group I, IPCC/TAR 2001) that greenhouse gas induced global climate change is a severe threat to future generations and to the stability of the natural world, and that the first signs of this manmade climate change are already measurable today.

Q. You also mentioned the fast-track study of the (IPCC)(TAR) by a committee of the US National Academy of Sciences(NAS).(RHG-6) Would you please explain the purpose of the report and its conclusions?

A. Yes, this report was requested by the Bush administration. The administration needed a quick assessment by top US scientists of the scientific conclusions of the IPPC-TAR 2001, a clarification of certainties vs. uncertainties in the science and a look for possible bias in the translation of the technical results into the Summary for Policymakers. In less than one month, a

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committee of 11 leading US climate scientists issued a 20 page report which reviewed the findings of the IPCC-TAR Working Group I, (RHG-5 is the Summary for policy makers) which by comparison is a work of 800 pages, summarizing the published advances in climate science assembled by the world community of several thousand climate scientists from 150 countries over the past 5 years. The National Academy of Sciences (NAS) Committee endorsed the key IPCC conclusion that the warming over the past 50 years was likely due to human emission of greenhouse gases as "accurately reflecting the current thinking of the scientific community on this issue." In essence, this NAS report put a US 'stamp-of-approval' on the IPCC document. The Academy committee did highlight some uncertainties which they felt were not sufficiently clear in the IPCC Summary for Policymakers, although they found the full Working Group I document and its Technical Summary to be 'an admirable summary of research activities in climate science." The NAS committee also concluded that no significant changes had been made in the Summary for Policymakers without the express consent of the scientific lead authors of the chapters in the full IPCC report. Therefore, there was no evidence suggesting that the information was slanted or biased in its conclusions.

Q. Do you have any disagreements with the NAS report?

A. I have no substantive disagreements with the NAS report but prefer the more detailed and documented treatment of the climate science in the IPCC-TAR (2000) document, which represents the consensus of a much broader community of climate scientists. The NAS report was a quick US review of TAR, and does not represent an independent study.

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Q. Let's turn to the revised greenhouse gas mitigation plan. Does the revised plan address the concerns you raised the last time you testified?

A. The revised greenhouse gas mitigation plan is an important step in the right direction; however, in my opinion, using the 17% standard and calculations for carbon mitigation contained in the Oregon Facility Siting Council standard is not adequate.

Q. Why is the proposed carbon mitigation plan not adequate in light of all the changes the applicant has made in the revised application?

A. I want to start out and commend NESCO/SE2 on the many changes in their revised application. They all appear designed to reduce the environmental impact. (e.g. elimination of backup fueling, reduced NOx and PM controls,..). As with each new approved energy facility under EFSEC's authority, it should be better than the last one. Certainly, the proposed SE2 plant would be much preferred over the multitude of diesel generators which were operating with waivers of emission standards during our recent power situation. I would definitely favor SE2 in a swap to shut down a large, coal-fired facility in the regional power grid. However, I see no evidence that SE2 coming on line would lead to a net decrease in CO2 emissions from our state. In fact, without full mitigation, the SE2 plant would certainly lead to an increase in the CO2 emissions from Washington State. This would take us in the wrong direction, as our goal in the coming years and decades must be to stop the growth of greenhouse gas emissions and begin their absolute reduction. Full mitigation of CO2 emissions from new fossil fuel (natural gas) plants is needed to achieve this goal. Regulation (state/federal/international) of carbon dioxide emissions is certainly coming, and the price of carbon ($/ton)[1] will never be cheaper than it is now. Fully mitigated SE2 output would be marketable as truly 'green' power, for which NW citizens have shown a willingness to pay at least a modest premium. (Seattle City Light will

[1] I defer to others with expertise in the area of calculating the cost per ton for mitigation. I note that the Supplemental DEIS Exhibit #204 suggests $2-$4/ton.

'green-up' its purchase from Klamath Falls with full mitigation). While NESCO/SE2 may disagree with the imposition of a new standard of 100% mitigation, if required here by EFSEC, the standard should equally apply to all future such generating facilities under the EFSEC authority. The difference would be that the cost would only be higher for the next in line as the price of carbon mitigation steadily increases.

Q. If other producers of CO2 do not participate in full mitigation efforts, will the CO2 mitigation efforts of an industry such as energy facilities make enough of a difference?

A. Absolutely, yes. I do not disagree that there are many contributors to the CO2 issue such as the transportation industry. They too should be required to mitigate their emissions. However, lack of regulation within that industry is not an excuse to do nothing or an inadequate amount with this industry and each applicant. Each facility that mitigates 100% of its emissions is a step in the right direction.

Q. Do you have a recommendation which would address the concerns posed by the scientific community pertaining to the impact of greenhouse gas on climate change?

A. Yes, however, it is a general recommendation and I defer to others how best to implement the concept. The IPCC (TAR) Working Group I, and the NAS report address only the prediction of climate change. Working Group II deals with the possible regional impacts and Working Group III with possible policy responses. The US Global Change Research Program (USGRP) has investigated the possible impacts on climate change on different regions of the USA. Most of the work on the Pacific NW was done by the Climate Impacts Group at the University of Washington.

My general recommendation as a physical climate scientist and not an economist is that we will best be able to deal with the threat of the coming climate change if we can slow, stop, and eventually reverse the emission trends of the greenhouse gases—especially CO2. We know

that the impacts will be worse for higher atmospheric levels and faster emission rates. So we must prepare for the impacts (adaptation) and reduce the severity (mitigation) of climate change. Both mitigation and adaptation are essential aspects of our policy response to the climate change challenge. It is past time to begin to wean our society away from the dependence on fossil fuel energy sources, using both market and regulatory approaches. To that end, a logical first step is 100% mitigation of CO2 emissions from new thermal power plants.

Q. Last year you opined that, notwithstanding the obstacles to ratification of the Kyoto protocol by the US, you believed that it would become international law. Is this still your opinion?

A. Yes, I am more confident than ever that the Kyoto Protocol, signed in Germany this past July by essentially every nation in the world (except the USA), will be speedily ratified into binding international legislation for the reduction of greenhouse gases globally. (This will require ratification by at least 55 countries responsible for 55% of the global emissions as of 1990, which is possible even without US participation). See (RGH-7). For now, the US will proceed independently with domestic climate protection measures yet to be determined. Eventually the US will almost certainly rejoin the international community under Kyoto or a subsequent treaty and will submit to binding reductions of greenhouse gases along with other industrialized and developing nations.

The alternative proposals promised in the wake of the Bush administration's rejection of the Kyoto Protocol when the US withdrew from the climate negotiations this past summer have not yet been made public. Pressure for some type of domestic regulation of emissions has been steadily building in the Congress. In August, the Senate Foreign Relations Committee voted 19-0 for the Bush administration to secure the US participation in a revised Kyoto Protocol or other future binding agreement on climate change, and Senators Lieberman and McCain have

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announced their intention to propose legislation this fall which would set mandatory limits on US greenhouse gas emissions.

Q. What in your opinion is the risk if the current greenhouse gas proposal of SE2 is adopted by the EFSEC?

A. If EFSEC approves the present SE2 proposal for carbon mitigation using the modified Oregon standard, an important opportunity will have been lost to stem the rapid growth of CO2 emissions in Washington State. If this standard were to be applied to all the new proposed gas-fired facilities in the state under the EFSEC authority, the growth in CO2 emissions would be explosive—rivaling the rapidly growing transportation sector—since our current hydro-based power system is 'green' with respect to greenhouse gas emissions. As the true nature of the climate change threat becomes more apparent to the public and to their elected representatives in government, carbon mitigation standards will certainly be imposed and progressively tightened. (One UN study estimates the current worldwide losses due to climate change at $300 billion/yr and rising.) This means that the price of emitted carbon will steadily increase. A wise policy for the state and for the power generation industry now is to be proactive in meeting and exceeding current standards.

I recommend that EFSEC incorporate strong, forward-looking carbon mitigation requirements if a Site Certification Agreement is recommended. Washington State can lead the way to a less carbon-intensive energy future, while protecting its citizens and positioning itself for the new business opportunities this energy transformation will bring.

Q. Do the events of September 11, 2001, have an impact on your testimony regarding climate change and the future energy supply to the Pacific NW?

A. Yes. We have all been suddenly and sadly reminded of the vulnerability of our open society to terrorist attack. Natural gas pipelines and all centralized power generating facilities

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(fossil fuel, nuclear, hydro) are also vulnerable. From the perspective of climate change and energy security, a robust energy system which includes a portfolio of energy generating capacities including a significant stock of local, renewable power generators, such as could be provided by distributed wind and solar systems, coupled with a vigorous ongoing programs in conservation and efficiency would both decrease the emissions of CO2 and decentralize the energy system leaving it less vulnerable to attack. Increased conservation and efficiency in turn would contribute to decreasing demand and therefore, emissions.

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END OF TESTIMONY

I declare under penalty of perjury that the above testimony is true and correct to the best of my knowledge.

DATED this _____ day of October, 2001.

By_____
RICHARD H.GAMMON

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