BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

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

COUNSEL FOR THE ENVIRONMENT'S PREFILED DIRECT TESTIMONY

WITNESS #3: RICHARD H. GAMMON

**Q.** Please tell us your name and occupation.

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

**Q.** Please describe the nature of your testimony.

A. First I will provide you with an overview of my professional background and qualifications to address the climate change issue. Then I will summarize the current international scientific consensus on man-made climate change, which will occur with the rapid increase of atmospheric Carbon Dioxide (CO2) and other greenhouse gases (GHG) from the combustion of fossil fuels (coal, oil, natural gas). Dr Phil Mote will present the predicted impacts of this coming climate change on the Pacific Northwest.

**Q.** Please provide us with an overview of your professional background.



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A. Since 1989, I have been on the faculty of the University of Washington, and am currently a Professor of Chemistry, Oceanography, and (Adjunct) Atmospheric Sciences. I teach undergraduate and graduate courses in environmental chemistry and global climate change. My research group conducts climate-related research on the changing chemistry of the atmosphere and ocean as influenced by man-made trace gases (CO2, CH4, CO, chlorofluorocarbons, ...). I have more than twenty years of research experience in the related areas of global carbon cycle, climate change, and stratospheric ozone depletion.

As a federal researcher, I directed the US government program to globally monitor atmospheric carbon dioxide (Geophysical Monitoring for Climate Change, National Atmospheric and Oceanic Administration, Boulder, CO 1982-84). I was a co-author of the Carbon Cycle chapter of the first international assessment of climate change science by the Intergovernmental Panel on Climate Change (IPCC, 1990). I have served on numerous national and international scientific panels addressing aspects of the climate change issue, especially the role of the global ocean in the carbon cycle. I frequently make public presentations and present briefings on global warming/climate change for local and state government, corporations, and civic groups throughout the Pacific Northwest.

I have a B.A. ('61) in Chemistry from Princeton University, and a M.S. ('66) and Ph.D ('70) in Physical Chemistry from Harvard University. A copy of my curriculum vitae is provided as Exhibit (RHG-1).

**Q.** Did you review any information on the Sumas Energy 2 (SE2) proposal in preparation for this testimony?

A. Yes, I reviewed the SE2 Greenhouse Gas Offset Strategy and the testimony of Jim Litchfield, Bradley Smith and Phillip Mote. I also studied parts of the IPCC '95 report, Exhibit (RHG-2), and the US National Assessment by the US Global Change Research Program (draft, USGCRP '00).



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**Q.** How does the projected emission of CO2 from SE2 compare with current emissions from all sources in Washington State?

A. The Sumas Energy 2 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. Another useful comparison is that the projected SE2 annual emissions are equivalent to the tailpipe emissions of approximately 500,000 additional autos, corresponding to a 10% increase in the number of vehicles in Washington State. .

**Q.** Is this increase in CO2 emissions significant enough to require action to mitigate the impact?

A. Yes, while all CO2 emissions are local, all climate effects are global, as the lifetime of fossil fuel CO2 is on the order of a century, and the atmospheric mixing time scale is about one year pole-to-pole. The Sumas Energy2 CO2 emissions may seem like a small percentage increase; however, as explained later in my testimony, the goal for Washington State, the Pacific Northwest, and the USA should really be NO increase in CO2 emissions, and steady progress toward net decreases in CO2 emissions, starting now. A basic principal should be that the 'polluter pays' for the cost of the pollution. So, without offsetting CO2 sinks somewhere, Sumas Energy2 would take us in the wrong direction.

**Q.** What is the Intergovernmental Panel on Climate Change (IPCC)?

A. The Intergovernmental Panel on Climate Change (IPCC) was jointly established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environmental Program (UNEP) in order to: (i) assess available scientific information on climate change, (ii) assess the environmental and socio-economic impacts of climate change, and (iii) formulate response strategies. Three separate Working Groups addressing each of these goals have involved the participation of many thousands of the best scientists from more than 150 countries



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in preparing these reports, which summarize the current state of knowledge about the climate system and the human impact.

The first IPCC First Assessment Report, issued in 1990, was the scientific basis for the Framework Convention on Climate Change (FCCC), signed by the U.S. and most other countries in Rio in 1992. The second IPCC report('95), which provided the scientific underpinning for the Kyoto Protocol('97) states: "The balance of evidence suggests a discernible human influence on global climate . . . ." The draft language of the upcoming report (IPCC '01) is more direct and forceful in declaring that there has been a measurable human influence on global climate. The overwhelming majority of climate scientists around the globe is convinced of the reality of the climate change threat, and that in fact, man-made climate change is already measurable in weather around the world today. A detailed description of the impact of human activity on global climate change is found in Exhibit (RHG-3). (Professor Gammon narrates the CD entitled "Region 10 Sustainability, Holistic Perspectives for the Next Century". The discussion of global climate change is found by going to "Why sustainability"; "Global Climate Change"; "Start Climate Change Presentation" [15 minutes]).

**Q.** What are the implications of the Kyoto Protocol for emissions of GHG?

A. The Kyoto Protocol recognizes the seriousness of the threat of man-made climate change to world stability, and that a stable world climate will eventually require a major, absolute reduction in the atmospheric emission of CO2 and other GHG by 60% or more. These emission reduction targets are to be binding, rather than voluntary, and should begin with the developed nations, which have been mostly responsible for the CO2 emitted in this century (and still in the atmosphere), and the consequent climate disruptions already occurring. It is also recognized that Kyoto alone will not solve the problem, but is only the first step on a long road to a new global energy system, one no longer based on the combustion of coal, oil, and natural gas. Under this Protocol, the U.S. would commit to reducing its emissions to 7% below the 1990 emission rate



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within the 2008-2012 timeframe. The U.S. Senate has not yet ratified the Protocol, which will become international law when approved by 55 countries representing at least 55% of global emissions.

The long-term implications for the U.S. energy industry are clear--begin at once to improve efficiency (more energy produced per pound of CO2 emitted, e.g., moving from coal to natural gas), mitigate any new additional emissions with offsets, and make strategic investments to stimulate an accelerated transition to alternative (non fossil fuel) energy systems. The goal is not just a slower growth rate of CO2 emissions, but a sustained and substantial decrease in net GHG emissions, year after year, continuing throughout this century.

**Q.** The applicant notes that this is a high-efficiency natural gas turbine with lower GHG emissions than coal or oil plants. Why should we be concerned about its GHG emissions?

A. Wherever highly efficient gas turbines can displace coal-fired electrical generation, there would be a net reduction in CO2 emissions for the same amount of power generated. If gas turbine plants are brought on line to augment a predominantly hydro-based electrical power system, as here in the Pacific NW, the net CO2 emissions from the region would increase, and the percentage increase will be quite substantial, since the fossil fuel component of the regional power generation is initially small.

In contrast, 'new' power coming either from conservation and more efficient use of existing hydropower (i.e., reduced demand), or from renewable sources (e.g., wind, solar, geothermal) makes NO contribution to the regional CO2 emissions. From our clean hydro-power base, the Pacific NORTHWEST is uniquely placed to lead the nation in making a transition to ever-lower CO2 emissions, and the development of alternative energy systems (e.g., fuel cells, wind turbines) for the world market.

**Q.** Does the Offset Strategy adequately address this issue?



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A. Offset strategies, especially reforestation/afforestation programs, appear to offer an important tool to mitigate increased emissions from additional, gas-turbine electrical power stations. However, the offset strategy offered by Sumas Energy2, while a good first step, is insufficient if the goal is to balance the costs to the environment with the costs of production of new energy production.

**Q.** Do you have an opinion about what type of strategy would be sufficient?

A. Yes. When looking at the emissions this plant would be responsible for in comparison to the offset strategy proposed, it does seem to me to adequately address or take responsibility for its fair share of the environmental costs of this method of energy production. Instead, I would suggest looking at other established benchmarks as a better indicator of what is a fair share. For example, in Oregon, new energy producers must meet a standard of reducing CO2 emissions by 17% of BACT for the most efficient base-loaded gas-fired plant operating in the US. According to the Sumas Energy2 offset strategy, this would cost approximately 5.3 million dollars. Another benchmark would be to look at the Kyoto protocol and require that the anticipated SE2 emissions be fully offset so as to meet the US emission reduction targets and timetables. In other words, a responsible and forward looking company should act as though Kyoto had been ratified by the US. In my opinion, these benchmarks should be used as guidance to achieve the desired reduction in CO2 emissions.

**Q.** Can you give us an example of how this might be implemented?

A. Yes, Oregon requires the mitigation costs to be front-loaded, while the Kyoto protocol does not establish a particular mechanism. Any reasonable CO2 reduction policy should consider how to do this in a way which addresses the energy producer's need to be economically viable and does not punish the producer for efforts taken now. How this might actually be achieved (‘acknowledgement for early action’) is best left to economists and energy policy specialists;



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however, I understand that voluntary offset strategies elsewhere are now being implemented at a scale which exceeds the current Sumas Energy 2 proposal. For example, Gov. Whitman of New Jersey has pledged as part of the state's "Sustainable State Project" to reduce GHG emissions to 3.5% below the 1990 level by 2005. Furthermore, the City of Seattle passed a resolution which committed to no net increase of GHG in the future. Such programs would not be undertaken if there were not a perceived benefit while maintaining competitiveness.

**Q.** Do you think the U.S. will be regulating in this area during the life of this proposal?

A. Yes, absolutely. Even though the Kyoto Protocol seems hopelessly mired in the U.S. Congress today, changing world weather events will eventually press upon the consciousness and wallet of even the most hardened climate change skeptic. It is even possible that the Kyoto protocol will become international law without U.S. participation. In any event, I am certain that we will have binding national and international legislation on carbon emissions within the coming 10-20 years. Therefore, whatever the producer does before regulation becomes mandatory in Washington State, the Sumas Energy2 should, in my opinion, get 'early action' acknowledgement towards the inevitable future regulation, so that the producer's early efforts will not result in their paying twice.

**Q.** What is the risk of not addressing this issue now?

A. Much of the current resistance in the US Congress to ratifying the Kyoto Protocol is rooted in a concern about the impact the proposed CO2 reductions might have on the U.S. economy. Taking a longer view, the cost of doing nothing now will be greatly multiplied in the not so distant future. In a letter dated December 22,1999 and first published in the British newspaper "The Independent" on December 30, 1999 the top meteorologist for the U.S., Dr. D. James Baker, Chief, NOAA, U.S. Dept of Commerce and his British counterpart, Dr. Peter Ewins, Head, U.K. Meteorological Office said:



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> "Our climate is now changing rapidly. Our new data and understanding now point to the critical situation we face. Ignoring climate change will surely be the most costly of all possible choices, for us and for our children."

The complete text is found at Exhibit (RHG-4).

**Q.** Does this conclude your testimony?

**A.** Yes.



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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 July, 2000.

By_____
RICHARD H.GAMMON



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