BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 99-1	)	
	)	EXHIBIT _____ (PJC-T)
SUMAS ENERGY 2, INC.	)	
SUMAS ENERGY 2 GENERATION FACILITY	)	

WHATCOM COUNTY'S PREFILED TESTIMONY
WITNESS # _____ : PAULA J. COOPER

Q. Please introduce yourself to the Council.

A. Paula Cooper

Q. What is the subject of your testimony?

A. My testimony includes a brief description of my background and addresses concerns regarding potential flood impacts associated with the proposed facility.

Background

Q. What is your occupation and title?

A. I am a water resources engineer specializing in floodplain management. I am employed as Whatcom County's Special Projects Manager, where I manage the County's River and Flood Section within the Public Works Department.

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Q. Please describe your background.

A. For the last twelve years I have worked for both county government and private consultants in the areas of floodplain management and water resources engineering. Throughout my career I have had extensive experience with the application of hydrologic and hydraulic models and related analyses, which has provided me with an in-depth understanding of the limitations in different types of models. I began working for Whatcom County in my current position in August of 1998. Since then I have been involved in numerous issues involving the Nooksack River and its floodplain including sitting on the Nooksack River International Task Force whose primary purpose is to resolve the international flooding problem resulting from Nooksack River overflows into the Sumas River floodplain.

I received Bachelors of Science degree in Agricultural Engineering from Rutgers University in 1986 and a Masters of Science degree in Civil and Environmental Engineering from the University of Wisconsin in 1988. A copy of my resume is provided as Exhibit PJC-1 to this testimony.

Q. What is the County's role in floodplain management issues as related to the Sumas Energy 2 project?

A. The River and Flood Section of Whatcom County's Public Works Department serves as the staff for The Whatcom County Flood Control Zone District (WCFCZD). The WCFCZD is a countywide special district formed to provide for comprehensive flood hazard management and flood hazard reduction. The WCFCZD is currently in the process of implementing the Lower Nooksack Comprehensive Flood Hazard Management Plan (CFHMP). The CFHMP was adopted by Whatcom County in 1999 and includes analyses of alternatives to address the flooding problems in the Nooksack River overflow corridor between Everson and Sumas. The SE2 plant site lies within the overflow corridor floodplain.

Flooding

Q. Please provide a brief characterization of the flooding problems in the Everson-Sumas overflow corridor.

A. During large flood events, Nooksack River floodwaters overtop a low divide between the Nooksack and Sumas Rivers near Everson. These floodwaters flow northeast through agricultural areas of unincorporated Whatcom County and the City of Sumas in Washington State and then cross the international border and follow the Sumas River floodplain flooding areas in the West Sumas Prairie in British Columbia, Canada. The Sumas River flows to the Vedder River which enters the Fraser River shortly downstream. The Barrowtown Dam and Pump Station is located on the Sumas River a

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short distance upstream of where it enters the Vedder River. During large flood events overflows at Everson often coincide with high river levels on the Vedder and Fraser Rivers, and discharge from the Sumas River corridor into the Vedder River in Canada is essentially shut off. Because the system has virtually no discharge during large flood events, it may be more sensitive to changes in floodplain storage.

Flood damages to properties in the overflow corridor have been and will probably continue to be extensive. During the flood event in early November of 1990, damages in the City of Sumas and in Canada were estimated at exceeding $6.5 million. In addition to damage to private properties, numerous roads in the overflow corridor were closed and damaged by flooding. The Trans Canada Highway was flooded for 26 hours.

These flooding problems are described in more detail in excepts from the Lower Nooksack River Comprehensive Flood Hazard Management Plan prepared by the Whatcom County Department of Public Works (Exhibit PJC-2) and The Sumas River Flood Routing Study Interim Report prepared by Wilson Hydrotechnical, Ltd.(Exhibit PJC-3), for the City of Abbotsford.

Q. What materials have you reviewed regarding the impacts of the proposed facility on flood levels?

A. I have reviewed the following materials:

- Floodplains section (3.3.4) of the SE2 Application for Site Certification
- Floodplains section (section 3.2.2.3) of the Draft Environmental Impact Statement (DEIS)
- Appendix A of the DEIS which is a Technical Memorandum prepared by KCM and dated June 19, 1997 regarding the hydraulic modeling performed in support of the floodplain management investigation performed for the City of Sumas
- A Technical Memorandum prepared by KCM and dated July 8, 1997 regarding a comparison of industrial area blockage versus no blockage also performed in support of the floodplain management investigation for the City of Sumas

Q. Please summarize the salient points contained in these materials.

A. The City of Sumas retained KCM to perform hydraulic analysis in support of the development of a Floodplain Management Plan and Environmental Impact Statement. KCM's analysis included the development and calibration of a Finite Element Surface Water Modeling System (FESWMS) hydraulic model and evaluation of the impacts of filling the floodplain areas in the industrial areas south and west of the BN Lynden Spur Railroad and areas north and south of Halerstick Road. These industrial areas are shown in Figure 4 contained in "Appendix A" of the SE2 DEIS, and include the area proposed for the Sumas Energy 2 facility. The analysis was conducted for a 100-year event, based on the peak flow rate. The results of their analysis show increases in water surface of less

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than one foot in the impacted areas. The color graphic depicting changes in water surface elevations is difficult to accurately interpret but does indicate that in some areas increases of 0.3 to 0.5 feet could occur.

Q. In your opinion, does the analysis conducted adequately address the actual flood impacts that could occur?

A. During a flood, floodplain areas within the Everson-Sumas overflow corridor both convey and temporarily store floodwaters. The filling of floodplain areas typically reduces the area available for both storage and conveyance. Fill materials displace floodwaters which can increase flood levels upstream and increase flow rates and velocities in other parts of the floodplain.

The FESWMS model is a two-dimensional flow model that simulates flow in a horizontal plane. The model can simulate both unsteady and steady-state flow conditions. Unsteady flow models route an entire flood hydrograph through the floodplain system and can simulate the relative differences in flood conditions resulting from filling floodplain areas due to the loss of both floodplain storage and conveyance. Steady-state models route only a peak flow rate and can only account for differences in flood levels and velocities resulting from loss in floodplain conveyance. The effects of the loss in floodplain storage are not inherently accounted for in steady-state analyses.

For the Nooksack River system and Everson-Sumas overflow corridor, the FESWMS model was used in the steady-state mode due to problems with model instabilities in the unsteady flow mode. The analysis comparing water surface elevations for the 100-year event before and after filling of the industrial areas only reflected the impacts due to loss of floodplain conveyance. The impacts of the fill in displacing the temporary storage of floodwaters is not reflected in the model results.

During large flood events like the November 1990 event, the discharge of floodwaters at the Barrowtown Dam and Pump Station can be virtually shut off due to high river levels downstream of the dam. In this type of system, temporary storage of floodwaters becomes even more important. The amount of floodwater which would be displaced by the fill proposed for the Sumas Energy 2 site may not be large enough to significantly affect flood levels and velocities off-site; however, in my opinion, an analysis with an unsteady flow model would allow us to evaluate whether or not other floodplain properties are adversely affected. Such an analysis would enable quantification of changes in water surface elevations and velocities off-site and an evaluation as to whether these changes would increase the frequency or magnitude of flooding.

If such an analysis indicates that adverse off-site impacts would be expected, measures such as compensatory storage could then be considered to mitigate these negative impacts. Conversely, if the unsteady flow analysis shows no adverse off-site impacts, we would be better assured that additional mitigation measures would not be necessary.

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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.

Executed at Bellingham, Washington, on this 23rd day of June, 2000.

By: _____
Paula J. Cooper

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