BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 99-1: SUMAS ENERGY 2 GENERATION FACILITY	Exhibit _____ (RAD-T) PRE-FILED TESTIMONY OF R. ALLAN DAKIN

Q: Please state your name and business address.

A: Allan Dakin, Piteau Associates Engineering Ltd., North Vancouver, British Columbia.

Q: What subjects do you intend to address in your testimony?

A: Impacts of the proposed increased well field pumping on water supplies and stream flow in British Columbia.

Q: What is your position with Piteau Associates Engineering Limited?

A: I am a Senior Groundwater Engineer and Vice President of hydrogeology. My resume is attached as Exhibit ____ (RAD-1).

Q: Could you describe your background and experience?

A: I graduated as a civil engineer in 1965 and gained my M.Sc. in hydrogeology in 1976. Over the past 31 years I have been working as a groundwater consultant on a wide range of projects in Canada and abroad. These projects have included groundwater supply, protection of aquifers, contaminant migration and impact assessment of well field operation on base flows in streams. Projects located close to the Sumas well field include: an assessment of storm water infiltration into an area that overlies the Abbotsford Aquifer, a water balance assessment of the Aldergrove Aquifer (west of the Abbotsford Aquifer) and a review of the Abbotsford Trout Hatchery well field operation (north of Sumas).

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Q: In preparation for this hearing, what documents did you review?

A: I have read the documents that relate to groundwater that have been posted on the EFSEC web site, a number of reports prepared by Robinson & Noble, Inc. on the Sumas well field capacity, the Associated Earth Sciences, Inc. report on the City of Sumas wellhead protection plan, the US Geological Survey=s LENS groundwater study, the testimony of Burt Clothier submitted during the first hearings, and the pre-filed testimony of Burt Clothier filed in September, 2001. I have also recently re-read portions of BC Environment and Environment Canada=s studies of the Abbotsford Aquifer.

Q: In Order 754, the Council noted that the FEIS concluded that "the large volume of groundwater that would be extracted from the Sumas City well fields to supply the plant would result in increased drawdown in the areas surrounding the well fields" and that this would "in effect, be a permanent condition because the well fields would be pumped continuously." Order No. 754 at 31-32. Did SE2 make any changes that potentially impact these findings?

A: Yes. SE2 has reduced its peak and average water demands. This means that it will be withdrawing less water from the aquifer (via the city of Sumas' wells). However, the reduction is only slight. For instance, annual usage (maximum) is projected to decline from 1053 acre-feet/year to 1025 acre-feet/per year. Ex. 181.3 (Second Rev. Application) at 2.5-1.

Q: Does the current application include any new analysis of groundwater impacts associated with this slight reduction?

A: No.

Q: Last time, the Council noted that the FEIS concluded that "there is not sufficient hydrogeologic information available to determine how much the additional drawdown would be in any particular location or whether any existing well uses would be affected." (Order No. 754 at 32.) The Council noted that an applicant has a duty to provide "detailed descriptions" of "project impacts" and concluded that "the Application has not fully evaluated the impacts of large amounts of groundwater withdrawal on wells located within the cone of influence." (*Id.*) Based on the changes made by SE2 in its revised application, is there any basis for the Council to modify those conclusions?

A: No. As I mentioned, there has been no new analysis and the need for an adequate

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analysis is just as great whether the withdrawal is 1025 or 1053 acre-feet/year.

Q: Is this a concern for the Province of British Columbia?

A: Yes. The aquifer pump tests carried out to date have shown that the well fields will have a relatively significant impact on wells located a long way from the well field into British Columbia. The nearest well in British Columbia is likely less than 1,500 feet from the well field. The City of Sumas= groundwater specialist (Robinson & Noble, Inc.) has provided preliminary information that shows a well located as far as 5,500 feet from the well field could experience one foot of drawdown when the well fields are in operation. See Figure 1 (Exhibit ___ (RAD-2)). As there are many wells located in British Columbia that lie within this extensive cone of influence, there is justifiable concern that yields from some of the shallower wells in British Columbia may diminish and/or completely dry up.

Q: The FEIS states that the groundwater withdrawals for SE2 could reduce baseflow in local streams (FEIS at 3.2-26). How is that possible?

A: There is a connection between groundwater and surface water flows in this area. There is a sand and gravel aquifer (presumably Sumas outwash) at a depth of about 45 feet below the well field sites. This groundwater flows southeast and then eastward and eventually flows back to ground surface. Most of this groundwater is discharged into the Sumas River and its many tributaries, such as Johnson Creek (located near the May Road Well Field).

Both the City of Sumas and May Road Well Fields pump water from this sand and gravel aquifer and thereby intercept water that would otherwise replenish surface flows in the Sumas River and its tributaries. Figure 2 (Exhibit ___ (RAD-3)) is a conceptual flow system drawing depicting this phenomenon. When the May Road wells were aquifer pump tested, it was possible to confirm that there was a reduction of flow from a nearby spring that discharged into Johnson Creek.

Q: Given that relationship, how might the withdrawal of large quantities of groundwater for the project impact surface water flows?

A: SE2's proposed withdrawals from this aquifer are very large in comparison to the City=s existing withdrawals. There is a clear potential for those withdrawals to decrease surface water flows in the Sumas River and its tributaries.

Q: Could these impacts be felt in Canada?

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A: Yes. The decrease in flows would occur in the Sumas River system just upstream of where the Sumas River flows into Canada.

Q: What are the implications of the changes SE2 has made in its Second Revised Application as it relates to this potential impact to the Sumas River flowing into British Columbia?

A: It's impossible to assess the implications quantitatively because the application does not quantify base flow in the Sumas drainage area and the impact of well field pumping on surface water flow has not been addressed. However, assessing the implications qualitatively, I think it is safe to say that given the relatively slight reduction in groundwater withdrawal reflected in the revised application, there would be very little difference in the impact on base flows in local streams. The magnitude of that impact remains unassessed.

Q: SE2 has amended its application to include a proposal to monitor groundwater levels before and after its withdrawals begin. Do you consider this proposal an adequate response to the groundwater and surface water issues you have been discussing?

A: No, and for several reasons. Let me address the surface water issue first because it is the easiest. The monitoring proposal makes no reference to monitoring surface water levels or groundwater levels near where the aquifers feed back into surface water. The monitoring program doesn't address the surface water issue at all.

Moreover, even if it did, it's not clear what sort of remedial action would be practical if the monitoring program disclosed a problem with recharge of surface waters. It's not enough to propose monitoring if it's not accompanied by some realistic approach to addressing any problems identified during the monitoring.

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Q: What about the adequacy of the monitoring program as it relates to groundwater?

A: The monitoring program is aimed at evaluating the impacts of the withdrawals on groundwater, but it is incomplete in several respects. SE2 has proposed to survey some wells that are located within the projected drawdown cone. SE2 also proposes to install dedicated monitoring wells and measure the water level response during the controlled test of the well fields prior to the commencement of the plant operation. This information apparently will be used to assess potential impacts. The first problem is that SE2 has not stated which wells in British Columbia will be included in the monitoring program. It is vital that all wells in British Columbia within the cone of influence be included in the monitoring program.

Second, there is also a problem of timing. It is only after the first year of operation that there is provision for SE2 to submit for the Council=s approval a mitigation plan to replace lost well production capacity and prevent further loss. In my opinion, the impact of the pumping will become apparent within a month of the commencement of full scale pumping from the well field and there is no need to wait a year to carry out the assessment.

Third, SE2 has not provided any details of either the proposed monitoring program (e.g. frequency of monitoring and water quality parameters etc.) or their mitigation plan for the period leading up to the end of the first 12 months of operation in British Columbia.

I believe that the details of the entire monitoring and mitigation plan should be specified now, to be sure that SE2 will adequately address British Columbia=s concerns.

Q: In Order No. 754, the Council noted that the Applicant did not know whether the withdrawals for its facility would accelerate the transport of nitrates to the Sumas portion of the aquifer and expressed its concern that "no mitigation has been identified if the increased pumping from the City well fields results in nitrate exceedances in the wells of those residents who do not use City water." Order No. 754 at 32. The Council found that the Applicant "did not bear its burden to describe the means to be used to mitigate such adverse impacts on other people's water supply." *Id.* What are the implications of the changes SE2 proposes as they relate to the potential nitrate contamination of private wells?

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A: Again, it's difficult to assess the implications because the basic analysis has not yet been completed for either the original application or the current one. That is, the Applicant has not made any effort to evaluate the potential nitrate problem in individual wells in British Columbia and so assessing the implications of the recent project modifications as they relate to this issue can only be done subjectively.

With that understanding, I think it's fair to say that it is unlikely that the slight reduction in water withdrawals contemplated by the recent revised application will have any significant effect on the nitrate problem. Whatever that problem was before the modifications, it likely remains the same now. Further, given that there's no change in that assessment, there remains a need for a mitigation plan for those private wells. But the revised application does not propose anything new in that regard. Thus, the Council's statements you just quoted remain valid for this revised proposal. The implications of the recent project modifications are nil.

END OF TESTIMONY

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