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**BEFORE THE POLLUTION CONTROL HEARINGS BOARD  
STATE OF WASHINGTON**

AIRPORT COMMUNITIES  
COALITION,

Appellant,

CITIZENS AGAINST SEA-TAC  
EXPANSION,

Intervenor/Appellant,

v.

STATE OF WASHINGTON,  
DEPARTMENT OF ECOLOGY; and  
PORT OF SEATTLE,

Respondents.

PCHB No. 01-160

DIRECT TESTIMONY OF CHING-PI  
WANG SUBMITTED ON BEHALF  
OF THE DEPARTMENT OF  
ECOLOGY

**AR 003000**

1 Ching-Pi Wang declares as follows:

2 1. I am an Environmental Engineer 4 in the Toxics Cleanup Program of the  
3 Northwest Regional Office of the Department of Ecology in Bellevue, Washington. I am the  
4 Unit Supervisor of the Uplands Unit at the Northwest Regional Office. I supervise a staff of  
5 hydrogeologist and environmental engineers responsible for implementation of the Model  
6 Toxics Act (WAC 173-340). My resume is provided in Attachment A.

7 2. I have been working in the profession of environmental investigation and  
8 cleanup since 1983. My specialty is in the field of hydrogeology. I have practiced  
9 hydrogeology primarily in application to contaminated soils and groundwater. I have  
10 completed and participated in numerous projects involving contamination of soil and water.

11 3. In the spring of 2001, I assumed responsibility for the SeaTac groundwater  
12 modeling project. I directed the development of the pathways analysis which examined the  
13 flow of groundwater and subsurface contaminants from beneath the airport operations and  
14 maintenance area (SeaTac AOMA). I am currently involved in the development of the  
15 groundwater flow model for the area beneath the airport.

16 4. The pathways analysis was a component of Ecology's Clean Water Act § 401  
17 Certification (401 Certification) for the Port of Seattle's Master Plan Improvement Updates  
18 project. The work to be performed for the pathways analysis was specified in Ecology's  
19 Agreed Order #97TC-N122 (see State of Washington Department of Ecology Agreed Order  
20 #97TC-N122, In the Matter of Sea-Tac International Airport, p. 6, section IV, 1b).

21 5. The pathways analysis work evaluated four potential pathways:

22 a. The potential for chemical contaminants to migrate from beneath the  
23 SeaTac AOMA to the perched and regional water table aquifer;

24 b. The potential for contaminants to migrate vertically and laterally in the  
25 perched and regional water table aquifer (referred to as the Qva aquifer);

26 **AR 003001**

1 c. The potential for contaminants and groundwater contamination to affect  
2 water quality in the 3<sup>rd</sup> runway area; and

3 d. The potential for subsurface utility lines to act as conduits of  
4 contaminant migration.

5 6. As part of the pathways analysis, the Port conducted a comprehensive  
6 identification of subsurface contaminant sources at the SeaTac AOMA. The contaminant  
7 identification effort included a careful evaluation of the extent of vertical and lateral migration  
8 of contaminants and contaminated groundwater. The Port also conducted a comprehensive  
9 identification of groundwater flow directions at the SeaTac AOMA. Finally, the Port  
10 conducted a careful evaluation of available data to identify the directions, and extent of vertical  
11 and lateral migration of groundwater in the perched and Qva aquifers.

12 7. Contractors for the Port of Seattle compiled the data for the pathways analysis  
13 and its components (contaminant migration and groundwater flow). I instructed the Port  
14 contractors to utilize the data to develop conceptual models, maps, and diagrams for me to  
15 conduct the pathways analysis. I evaluated the potential impacts to water quality by  
16 developing an understanding of the extent of contaminant migration and the potential pathways  
17 of contaminant migration.

18 8. The data provided the following results:

- 19 • The available **groundwater quality data** indicate:
- 20 • Contaminants beneath the SeaTac AOMA have not migrated far from  
21 contaminant source areas, and
  - 22 • Contaminant migration has not approached the western boundary of the  
23 AOMA.
- 24 • The available **groundwater flow data for the perched aquifers** indicate the  
25 groundwater flow directions are variable and generally away from the 3<sup>rd</sup>  
26 runway.

**AR 003002**

- 1 • The available groundwater flow data for the Qva aquifer indicate  
2 groundwater flow directions are west-northwesterly from the SeaTac AOMA to  
3 the 3<sup>rd</sup> runway.
- 4 • The water quality and soil quality data indicate the subsurface utilities are not  
5 deep enough to affect the Qva aquifer.
- 6 • The data also indicate very limited contaminant impact to the perched aquifers  
7 based on the limited extent of contaminant migration within the subsurface  
8 utility areas.

9 9. It is my opinion that it is very unlikely subsurface contaminants and  
10 contaminated groundwater from the SeaTac AOMA area will affect water quality in the  
11 vicinity of the 3<sup>rd</sup> runway. Based on the data and analyses summarized briefly above, I am  
12 “reasonably assured” that subsurface contaminants beneath the SeaTac AOMA will not reach  
13 the 3<sup>rd</sup> runway. (See documents listed in memorandum from Roger Nye to Colleen Bradford  
14 dated September 20, 2001; see Draft Technical Memorandum, Analysis of Preferential  
15 Groundwater Flow Paths Relative to Proposed Third Runway, dated June 19, 2001; and see  
16 Groundwater Flow Pathways Analysis diagrams dated May 3, 2001 prepared by AEIS for the  
17 Port of Seattle). The principal foundations of this opinion are:

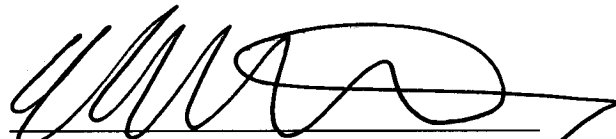
- 18 • Limited lateral extent of contaminant migration from contaminant source areas  
19 in groundwater.
- 20 • Long-term presence of contaminants in the subsurface within the labyrinth of  
21 subsurface utility lines.
- 22 • Flow directions of groundwater and contaminants in the perched zones are  
23 generally away from the 3<sup>rd</sup> runway.
- 24 • The low likelihood of viable pathways for contaminant transport from the  
25 SeaTac AOMA to the 3<sup>rd</sup> runway.

26 **AR 003003**

1           10. Under Condition F.1 of Ecology's 401 Certification the "Port shall submit to  
2 Ecology proposed construction BMPs to prevent interception of contaminated groundwater by  
3 utility corridors and a plan to monitor potential contaminant transport to soil and groundwater  
4 via subsurface utility lines at the STIA and submit to Ecology for review and written approval  
5 no later than November 9, 2001." The Port has submitted the proposed construction BMPs and  
6 the monitoring plan to Ecology. (See October 2, 2001 letter from Elizabeth Leavitt to Ann  
7 Kenny and attached "Proposed Construction BMPs" and "Plan to Monitor Potential  
8 Contaminant Transport to Soil and Ground Water via Subsurface Utility Lines"). At Ann  
9 Kenny's request, I have reviewed both the proposed construction BMPs and the monitoring  
10 plan. On March 6, 2002, I conveyed to Ms. Kenny that I concur with the proposed  
11 construction BMPs and the monitoring plan and recommend their immediate implementation.

12           I declare under penalty of perjury under the laws of the state of Washington that the  
13 foregoing is true and correct.

14           DATED this 7<sup>th</sup> day of March, 2002.

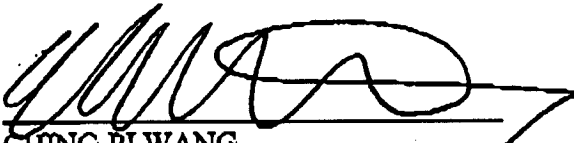
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 17 CHING-PI WANG  
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# Ching-Pi Wang

Washington Department of Ecology  
Toxics Cleanup Program  
Northwest Regional Office  
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(425) 649-7134  
[cwan461@ecy.wa.gov](mailto:cwan461@ecy.wa.gov)

## EDUCATION and REGISTRATION

B.A., 1979, History, Vassar College  
M.S., 1983, Geological Engineering, University of Idaho  
1989, Professional Engineer, (Civil) State of Washington

## PROFESSIONAL ENVIRONMENTAL EXPERIENCE

**1996 - Present. Environmental Engineer IV, Dept. of Ecology, Toxics Cleanup Program, Northwest Regional Office, Bellevue, WA**

Supervisor of site management unit. Responsible for cleanup of contaminated sites in the northwest regional office under the jurisdiction of the Model Toxics Cleanup Act. Responsible of the negotiations and implementation orders and decrees. Provides guidance and review of staff projects. Provides technical advice on hydrogeology and environmental engineering. Manages complex environmental cleanup projects. Completed numerous site assessments, remedial investigations, feasibility studies, and cleanup actions at a variety of municipal, industrial, and military sites in the jurisdiction of the northwest regional office.

**1993 - 1996. Environmental Engineer IIIA, Dept. of Ecology, Toxics Cleanup Program, Northwest Regional Office, Bellevue, WA**

Supervisor of site management unit. See description above.

**1989 - 1993. Environmental Engineer III, Dept. of Ecology, Toxics Cleanup Program, Northwest Regional Office, Bellevue, WA.**

Member and supervisor (1990) of the site management unit. See description above.

**1988 - 1989. Hydrogeologist III, Dept. of Ecology, Toxics Cleanup Program, Northwest Regional Office, Bellevue, WA**

Member of the site management unit. See description above.

**1990 - Present. Lieutenant Commander, Civil Engineer Corps, U.S. Naval Reserve.**

Presently assigned to Joint Task Force Pacific Command. Previous assignments in

Environmental Engineering Unit Pacific and Construction Battalion Eighteen.

**1984 - 1988: Project Hydrogeologist, Dames & Moore, Seattle, WA.**

Project manager for several CERCLA and RCRA investigations in the Pacific Northwest.

Supervised field teams for monitor well drilling and environmental sampling. Conducted environmental assessments. Produced analytical and numerical models of ground-water flow and contaminant transport. Prepared client and regulatory agency reports.

Responsible for client relations and development. Key member in regulatory negotiations, proposal preparations, and presentations.

**1983 - 1984: Hydrologist, Golder Associates, Inc., Bellevue, WA.**

Field hydrologist for investigations at mining developments and environmental projects in

Washington and Alaska. Responsible for installation of test wells, collection of environmental samples, and assessments of mine hydrology. Conducted data analyses and prepared client reports.

**Publications**

Wang, C. and N. D. Peck, 1989. "Ground Water Contamination Assessment, Acme, Washington," Washington Department of Ecology Publication 89-15.

Wang, C. and R. E. Williams, 1984. "Aquifer Testing, Mathematical Modeling, and Regulatory Risk," Ground Water, Volume 22, No. 3.

Wang, C. 1983. "A Mathematical Model of a Pumpback System for a Contaminated Aquifer," Proceedings of the American Geophysical Union Hydrology Conference, Colorado State University, Fort Collins, Colorado.

**Representative Client Project Reports**

Wang, C., et al., 1987. "Geologic and Hydrogeologic Site Characterization Report, Chemical Security Systems, Arlington, Oregon," Client application for RCRA Part B permit in U.S. EPA Region 10.

Wang, C. et al., 1987. "Underground tank Leak Investigation, Boeing-Everett Facility, 40-56 Building." Client proprietary report.

Wang, C. et al., 1986. "Investigation for Restoration of Contamination Area "A" Fuel Contaminated Ground Water, McChord Air Force Base, Washington." Client proprietary report.

Wang, C. et al., 1985. "Boeing-Auburn Site Characterization Study, Auburn, Washington," Client application for RCRA Part B permit in U.S. EPA Region 10.

Wang, C., 1984. "Hydrologic and Geotechnical Site Investigations, Yarrow Village Project,



Kirkland, WA.” Client proprietary report.