POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

AIRPORT COMMUNITIES COALITION, Appellant, v. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY; and THE PORT OF SEATTLE, Respondents.	No. 01-133 No. 01-160 DECLARATION OF DR. JOHN STRAND IN SUPPORT OF ACC'S REPLY ON MOTION FOR STAY (Section 401 Certification No. 1996-4-02325 and CZMA concurrency statement, Issued August 10, 2001, Reissued September 21, 2001, under No. 1996-4-02325 (Amended-1))

Dr. John Strand declares as follows:

1. I declare the following from personal knowledge and am competent to testify thereto before the Board if necessary.

2. I am an internationally recognized fisheries biologist with over 25 years experience specializing in studies to determine potential effects of human activities on aquatic resources. I received my Ph.D. in Fisheries Biology from the University of Washington in 1975 and currently am the Principal Biologist for Columbia Biological Assessments. I am also an adjunct faculty member of the Environmental Sciences and Regional Planning Program at Washington State University Tri-Cities. I am a Certified Fisheries Professional and have extensive experience assessing the ecological risks from discharges of contaminants to surface

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waters on sensitive aquatic species and their habitats. I also have substantive local knowledge, having studied the fate of stormwater residuals in both Miller and Des Moines Creeks for the Airport Communities Coalition (ACC), an organization composed of the Cities of Burien, Des Moines, Federal Way, Normandy Park and Tukwila and the Highline School District. With the King County Department of Natural Resources, I also recently investigated the fate and effects of combined sewer overflows on aquatic life in the Duwamish River. In addition, a considerable part of my professional career has been spent evaluating the environmental impacts of engineered structures on water resources including a wide variety of projects and field studies in Washington, California, Alaska, British Columbia, Guam and Venezuela. Attached hereto as Exhibit A is a true and correct copy of my Curriculum Vitae.

3. I am submitting this declaration to address comments raised by the Port of Seattle (Port), including their consultants, as well as the Washington Department of Ecology (Ecology), when responding to my initial declaration submitted to the Pollution Control Hearing Board (PCHB) in support of the ACC's motion to stay the 401 Certification issued by the Washington Department of Ecology (Ecology) for the U.S. Army Corps of Engineers (USACOE) Public Notice 1996-4-02325. In particular, I will address comments and opinions regarding water quality in the project streams and the Airport Soil Fill Acceptance Criteria. I will also address changes in the amended 401 Certification issued by Ecology on September 21, 2001, when applicable to these topics. I have previously reviewed and evaluated the database that the Port submitted to Ecology in support of their request for a Water Quality Certification.

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Metals Exceedances in Project Streams and the Issue Whether or Not Metals Exceedances Have Continued in Recent Years:

4. Both the Port and Ecology deny that violations of the State's Water Quality Criteria occur in the project creeks as a result of stormwater discharged by Seattle Tacoma International Airport (STIA). In my opinion both the Port and Ecology are incorrect and multiple lines of evidence do exist to support my contention that chemicals, particularly the metals copper, lead, and zinc exceed the State's Water Quality Criteria (WQC). The Port and Ecology argue that I have inappropriately compared end-of-pipe data to the State's WQC. The Port since 1998 has not reported data other than end-of-pipe.

5. The Port's own data documents exceedances of metals criteria, and this evidence is not based on end-of-pipe analyses. 1995-1996 metals data presented by the Port (1997) indicated that concentrations of copper, lead, and zinc in STIA stormwater discharges (downstream of outfall) greatly exceeded the State's WQC, in some instances by more than an order of magnitude. For example, downstream of the outfall in Miller Creek (Port 1997, page 35), total recoverable copper concentrations ranged from 0.7-44 ug/L, where the concentrations at the outfall was 4.2-82.9ug/L, and the concentration upstream was 4.7-14.8ug/L. The State's criterion was 5.3 ug/L, adjusted for hardness. Even after dilution in Miller Creek, the concentrations of copper discharged from the Port's outfall still exceeded the WQC. For total recoverable lead in Miller Creek, the values downstream, at the outfall, and upstream, were <0.5-106 ug/L, <0.5-21.6 ug/L, and 5.2-34.7 ug/L, respectively, again showing that the influence of lead additions persist downstream. The State criterion for lead was 16 ug/L. The values for

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total recoverable zinc downstream, at the outfall, and upstream were 2.3-295 ug/L, 15-525ug/L, and 37-69 ug/L., respectively, again showing a similar relationship. The State criterion for zinc was 33.7 ug/L. Based on the dissolved metals concentrations (Port 1997, page 35), Toxic Substances Criteria were still exceeded.

6. It is evident that the concentrations of copper, lead, and zinc downstream of the discharges exceeded applicable toxic substances criteria. Persistence of the influence of stormwater downstream, and at the magnitudes illustrated above suggests the need for treatment of the waste streams, or connections to the Industrial Wastewater System (IWS). Because the influence of the Port's outfall is evident in these data, the Port is incorrect when it says on page 25 of their Brief (Response to ACC's Motion for Stay) that it is "impossible to attribute to any discharges at STIA."

7. 1998-1999 metals data presented by the Port in 1999 confirm that discharges rich in metals continued to occur at the Port's stormwater outfalls to the creeks. In addition, the downstream stations, where sampled, show that the influences of STIA stormwater discharges persist in the receiving waters. What appears missing in the 1999 report, however, is any indication that the Port sampled upstream of STIA. The Port's failure to maintain the original sampling protocol in this regard greatly diminishes the value of their current stormwater-monitoring program.

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8. While I acknowledge the results of instream testing that indicated no toxicity (Logan Declaration, paragraph 9), I question these results in light of the results of companion whole effluent toxicity (WET) testing (Logan Declaration, paragraph 11). I must ask where in relation to the Port's discharges were the samples collected for testing? It is a rule-of-thumb that toxicity will decrease with increase in distance downstream of a discharge, so where the sample is collected is very important. Actually, none of the locations where samples were collected for instream bioassay were located by distance downstream from their discharges (see Logan Declaration Exhibit B). A map should have been included. Also how soon after discharge were the samples to evaluate instream toxicity collected? Were the samples collected from the "first flush" of the runoff period, or were the samples collected after the "peak" of runoff? Samples collected during the first flush are generally more toxic. The methodology is incomplete if these issues are not addressed. Simply stating that the Port's methodology conformed to both USEPA (1993) and WDOE (1997) methods for determining acute toxicity and whole effluent toxicity, respectively, is not enough. Please note that the instream toxicity results described in Exhibit B are also contained in a study in progress, a "draft" study, which suggests that the results have not been peer reviewed.

9. Review of the Port's 2000 *Annual Stormwater Monitoring Report* indicates that concentrations of copper, lead, and zinc have not diminished. Clearly, the Port's best management practices (BMPs) do not always work. By Dr. Logan's own admission (see page 7) zinc remains a problem in at least one of the Port's outfall (SDN1), where WET testing showed

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that toxicity occurs. Although not acknowledged by Dr Logan in her declaration, Figure 10, on page 30 of the Port's *Annual Stormwater Monitoring Report* (2000) indicates that the concentrations of zinc discharged at the Port's SDE4 and SDS1 outfalls may also be problematic. Zinc concentrations range between 80-130 ug/L and between 200-210 ug/L, respectively. These ranges are for the middle 50 percent of the data and do not include the extreme values. The range of zinc concentrations at SDN1 is 120-320ug/L. The highest value for zinc at SDN1 is 613 ug/L These data actually agree quite well with data reported in the Port's 1997 *Stormwater Receiving Environment Monitoring Report* above. So, I can't agree with the Port's suggestion on page 25 of their Brief (Response to ACC's motion for Stay) that the 1997 data are atypical and contain widely varied results.

10. Dr Logan mischaracterizes my testimony regarding tissue screening concentrations (TSCs) (Shepherd 1999). TSCs are simply an indication of which chemicals are accumulated by biota and are of concern and should be investigated more thoroughly (see page 11 of my initial declaration). TSC data do not "provide conclusive evidence" of risk to the aquatic resources of Miller and Des Moines Creeks. My reference to the tissue burdens of metals in trout inhabiting the project creeks served to indicate that metals in the creeks from stormwater are readily available and are accumulated to levels in fish that some scientists (Shepherd 1999) say are of concern. However, Dr. Logan is incorrect to say that WQCs, on which Shepherd's TSC concept is based, are "usually driven by sensitive invertebrates, and not

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specifically applicable to trout." Salmonid data (trout and salmon) are included in the datasets used in setting WQCs for metals and other chemicals (USEPA 1994).

11. While Dr. Logan suggests that the approach developed by Parametrix is more useful, she provided no information by which to evaluate her conclusion. All we have is Dr. Logan's word that the Parametrix TSCs are more appropriate. She provides no report or scientific article that described the methods and dataset on which she concludes that the TSCs derived by Parametrix are 10 times higher than those developed by Shepherd. Lacking scientific foundation, her conclusion should be disregarded.

12. The Port indicates that Ecology has reasonable assurance that the WQC will be met because the new project at STIA must comply with site-specific standards to be developed through a Water Effects Ratio (WER) or other site-specific study. The Port goes on to say that they already have evidence, albeit preliminary, that the site specific standard derived using a WER approach will be 7 to 16 times higher than the generic numeric standards. While this is interesting, the Board should be aware that this is preliminary evidence that has had no outside peer review, and should not be considered evidence to indicate that the Port is in compliance, or will be in compliance with the State's WQC. This is also the first time that the general scientific community has heard this information.

13. The Port also criticizes my use of the sediment data that I derived from the 1997 *Stormwater Receiving Environment Monitoring Report.* In my first declaration (see page 9, Strand initial decl.), I included copper data from above and below Lake Reba, into which STIA

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discharges stormwater. The quantities of copper, lead, and zinc below the impoundment were substantially greater than the quantities above the impoundment, indicating the contribution of stormwater discharged by STIA. I offered these data as an additional line of evidence to indicate that stormwater from STIA is affecting the resources of Miller Creek. The Port asserts that the pollutants in the sediments are impossible to attribute to STIA, yet clearly STIA discharges significant volumes of stormwater to Lake Reba during the wet season. Dr. Weitkamp, a consultant for the Port, says that Lake Reba is not a "water of the State," so any comparison to freshwater sediment standards I make is invalid. His point, correct or not, is irrelevant. I am not referring about the sediments in Lake Reba but the sediments in Miller Creek below Lake Reba!

14. Respecting my testimony regarding glycols, the Port asserts that the report on which I based my assessment (Hartwell et al. 1995) was in error; that is, the concentration of glycol in water that was toxic to fish was off by a factor of 1000. The Port also asserts the tests conducted by Hartwell et al (1995) were done on glycol formulations that are different than those that the Port currently uses. In response, let me first say that I can neither confirm nor refute the assertion that the Hartwell et al. (1995) article is in error. Actually Hartwell et al. (1995) reports the work of another author Fisher (1994) who determined that the 48-h LC50s of stormwater runoff from a large commercial airport ranged between 1.9 and 8.7 mg/L total glycols for *Daphnia magna*. I am still waiting to hear back from the authors. The Hartwell et al. (1995) study is not in question; rather it is the data developed by the other scientist (Fisher 1994) that may have been incorrectly reported in Hartwell et al. (1995).

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15. Therefore, the Hartwell et al. (1995) article is still germane to the issue of whether or not fish and other aquatic life in area creeks are at risk from glycols. In their own experiments (not Fisher's studies [1995]), Hartwell et al. (1995) documented moderate gill pathology (edema, respiratory cell hypertrophy, and proliferative bronchitis) in fathead minnow exposed to polypropylene anti-icer for seven days at a relatively low concentration of 17.6 mg/L of propylene glycol. Fathead minnow exposed to ethylene glycol de-icer for seven days developed a mild gill pathology at 275 mg/L. I believe that it is reasonable to assume that a fish with these symptoms will die if the exposure to glycols continues at these same levels.

16. The concentrations of glycols entering the streams at STIA vary widely and are not trivial. For example, glycols of 12, 810, and 364 mg/L were found in SDE4, SDS1, and SDS3 outfall discharges, respectively, following aircraft de-icing on January 11-12, 2000 (Port 2000). The most recent data from February 2001 as individual Discharge Monitoring Reports, indicate that glycols of 46.7, 48.7 and 419.4 mg/L were found in stormwater being discharged from the same three outfalls, respectively (Port 2001). The majority of the glycols at each discharge were propylene glycol.

17. While the Port does not contest that glycols continue to enter the project streams, they assert that the pathology data produced by Hartwell et al. (1995) are not relevant to this issue. Specifically, the Port asserts, even though the concentrations of glycols entering area creeks exceed the thresholds that produce gill pathology, these data are not relevant because 1) the formulations of de-icers and anti-icers have changed since Hartwell et al. (1995) conducted

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their study, and 2) the amount of the more toxic formulations used at the STIA are only a small percentage of the total glycols used at STIA.

18. To the contrary, the Hartwell et al. (1995) data are relevant and highlight the need to determine the toxicity of the de-icers and anti-icers used at STIA. We really don't know if the formulations used at the STIA are different than those used by Harwell et al. (1995). To the best of our knowledge the specific de-icer and anti-icer formulations used at STIA have not been tested for residual toxicity (beyond the tests conducted by the manufacturer during licensing). Clearly testing should be conducted and under site conditions, e.g., using dilution water from area creeks. We also don't know if the formulations currently used at STIA are the same as those tested by the USEPA (2000) as Dr. Logan infers on page 13 of her declaration, so estimates of residual toxicity based on the USEPA study may not apply to the formulations used at the STIA.

19. Dr. Logan states that heavy use of de-icers and anti-icers at STIA is "limited to the infrequent, one to two day winter weather episodes." This is not true. Looking at the Port's (2001) *AirCraft Deicing Report for the period April 1, 2000 to March 31, 2001* indicates that use at STIA is steady for some airlines, e.g., Alaska, Horizon, particularly over the colder months, November through March. Actually, based on this report, at least 100 gallons of glycols per day were used on at least 20 days of each month, over five months of the year at STIA. On seventeen days out of the year, more than 1,000 gallons per day were used; while 10,000 gallons per day were used on two days out of this period.

20. Regarding the retrofit requirements set forth in the 401 Certification, I continue to question the Port's assertion that stormwater quality at STIA will improve as a result of the requirement to retrofit all or most existing outfalls with additional treatment, generally, additional BMPs. In my initial declaration (see pages 14-15, Strand initial decl.), I noted that

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language in the *Comprehensive Stormwater Monitoring Plan* (Parametrix 2000) suggested that retrofits might be delayed or eliminated when costs were prohibitive. The escape clause that allows the Port to avoid retrofit, at least as far as the schedule of retrofit that is required, remains in the 401 Certification, providing that if it isn't feasible, the Port need not retrofit at 20 percent for every 10 percent of new impervious surface constructed. I am also reminded that as part of the Port's retrofit plans, they allegedly transferred all of the SDS basin drainage to the Internal Waste Drain (IWS), yet as recently as February 2001, stormwater from SDS1 still contained total glycols at 48 mg/L, most of it (43 mg/L) propylene glycol.

21. In summary, I still believe there is no reasonable assurance that the Port's discharges comply with the State's numerical metals WQC. There is ample evidence to conclude that exceedences of the State's metals WQC have occurred historically, and continue to occur as a result of stormwater discharged by STIA. I base my opinion on analyses of the Port's own data reported in 1997 that showed the influence (contribution) of the Port's stormwater in Miller Creek. This was possible because the Port in 1995-1996 sampled not only at end-of-pipe but also sampled above and below their outfalls. While the Port no longer reports the concentrations of metals both above and below their outfalls, it is clear that based on metals concentrations in their outfalls (end-of-pipe), the concentrations of metals discharged by STIA have not changed appreciably since surveys were begun in 1995-1996. Recent WET testing shows that zinc remains a problem in some of the discharges at STIA. I also believe that I have adequately established that metals in stormwater, including those contributed by STIA, are bioavailable and

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are accumulated by fish inhabiting the project creeks; and that based on screening levels (TSCs) developed by Shepherd (1999), are high enough to be of concern. Finally, it is my opinion that considerable amounts of glycols are discharged in stormwater at STIA and that concentrations can reach and exceed toxicity thresholds, particularly those resulting in gill pathology in fish.

The Conditions for Acceptance of Fill for Use in Construction of the Third Runway and the Issue Whether or Not the Fill Stockpile Already Contains Contaminants:

22. In responding to concerns that the Port's *Airport Fill Acceptance Criteria* are flawed, Ecology asserts in paragraph 10 of the Declaration of Mr. Fitzpatrick that under Condition E(1)(d) of the 401 Certification, the Port is "restricted to using only naturally occurring uncontaminated soils as fill material." The Port's assessment is cagier stating that the Port is "prohibited from using fill from known contaminated sources" and that "extensive investigation of each fill source is required to assure that no fill is accepted from a contaminated site" (Port Brief on Response to ACC's Motion for Stay, page 18). Both Ecology and the Port are wrong because Condition E(1)(b) of the Certification allows the Port to use fill material from contaminated sites where the contamination falls below the numeric criteria specified in the Certification. While the Certification does call for a Phase I and Phase II assessment of fill sites [Condition E(1)(a)], the very purpose of that sampling is to compare the results "to the fill criteria to determine the suitability of the fill source for Port 404 projects [(Condition E(1) (b)]." We now have clear and documented examples of the Port's accepting fill from sources other than "naturally occurring uncontaminated soils." In fact the Port has accepted fill that is clearly

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contaminated and which exceeds the standards that they established for the protection of the aquatic ecosystem down- gradient of the third runway embankment.

23 For example, the 80,000 cubic yards of fill materials obtained from Hamm Creek (see letter from Elizabeth Clark, Port of Seattle, to Roger Nye, Department of Ecology ,dated February 4, 2000[Exhibit B]) are not "naturally occurring uncontaminated soils." These materials are sediments dredged from the Duwamish River and Hamm Creek that were tested for residual contamination and failed toxicity tests for open-water disposal (see memo from Beth Doan, U.S, Army Corps of Engineers, to Paul Agid, Port of Seattle, dated March 24, 1999 [Exhibit C]). The sediments contained DDT and PCBs at 14 and 160 ug/Kg, respectively. The decision to accept these materials was based on the analyses of only four sediment samples, which were composited-down to two samples. It is interesting to note in the memo from Beth Doan to Paul Agid, dated March 24, 1999, there is a caveat that "indicates the samples were composited over large areas and depths, and that there is potential for hotspots to go unprotected."

24. Another 85,000 cubic yards of fill from the First Avenue Bridge were accepted from the Washington Department of Transportation (WDOT) in the Second Quarter 2000 (see memo from Paul Agid, Port of Seattle, to Chung Yee, Department of Ecology, dated July 27, 2000 [Exhibit D]). Initially in this case, five samples were chemically analyzed, with one of the samples indicating 200mg/Kg petroleum hydrocarbons (TPH) in the diesel range (actual value was 870 mg/Kg) (see letter from Tom Madden, Washington Department of

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Transportation to Beth Clark, Port of Seattle, dated November 29, 1999 [Exhibit E]). At this time, the Method A Soil Cleanup Level was 200mg/Kg. The Port or their consultant collected only three additional samples to delineate the hotspot. These samples contained TPH in access of the Method A Soil Cleanup Level but no other samples were collected. Even though the hotspot was not fully delineated, the vast majority of the fill was accepted and transferred by the Port. I should point out that the concentration of 870 mg/Kg for TPH in the diesel range found in soils from the First Avenue Bridge still exceeds, in part, the most recent version of the Ports' Soil Fill Acceptance Criteria [see 401 Certification-Condition E(1)(b)]. The criterion for what is called diesel is 460/2000 mg/Kg, which prohibits the use of the First Avenue Bridge fill materials within the first six feet of the embankment.

25. As a third example of the Port's willingness to accept contaminated fill, I would like to call your attention to a memo from Beth Clark to Paul Agid, both of the Port, dated April 30, 2001 (Exhibit E). This internal Port Memorandum revealed TPH as diesel exceeding the MTCA Method A Soil Fill Cleanup Level (200mg/Kg) in candidate fill from the Black River Quarry. This finding was based on a single sample collected and analyzed on June 9, 2000. Based on subsequent testing of triplicate samples on June 22, 2000, which showed that the fill did meet the MTCA standard, fill was accepted and transferred to STIA beginning May 15, 2001. Yet additional testing of duplicate samples of Black River Quarry soil on September 29, 2000 and again on October 2, 2000, unfortunately again showed TPH in excess of the MTCA Soil Cleanup Level of 200mg/Kg. The Port believed the contamination was due to residual asphaltic

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materials left in crushing equipment used to recycle pavement at the site. The same equipment was used to also process natural soils at the site. The point is that soils were accepted and transferred by the Port to the STIA that violated an agreed to process and set of standards. What is even more disturbing is learning that the testing of the Black River Quarry soil samples was undertaken June 9, 2000 and again July 6, 2000, nine or ten months before the Beth Clark Memo containing the results of above testing was sent to Paul Agid. It appears that the Port did not want these results released, perhaps because the *Soil Fill Acceptance Criteria* have already been criticized. Is it also possible that the Port did not want these data released until a new 2000 mg/Kg standard for TPH (diesel) took effect on August 15, 2001? This way the contaminated fill might not have had to be removed from the STIA. Also if these data had been reported to Ecology in a timely manner, e.g., in the Second Quarterly Report 2000, the Agency could have stopped the transfer of the petroleum hydrocarbon-contaminated soils.

26. Neither Ecology nor the Port responded to my comment that the 401 Certification lacked a consistent and statistically meaningful approach to determine the location and extent of any contamination contained in candidate fill materials. Clearly, rigorous sampling approaches exist, e.g., systematic grid system (Gilbert 1982), over sampling and compositing (Skalski and Thomas 1984) and are used routinely to survey sites for buried waste, yet no such approach is adopted in the 401 Certification Soil Fill Acceptance Criteria. Ecology (1995) even rejected guidance from their own Toxics Cleanup Program (Publication 91-30) that recommends a much higher sampling effort than proposed in the *Soil Fill Acceptance Criteria* (Condition E (1)(a).

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For example, for a 200,000-cubic yard candidate fill stockpile, the Toxics Cleanup Program guidance recommended a minimum number of 226 samples as compared to six samples as provided in the *Soil Fill Acceptance Criteria*.

27. The *Airport Soil Fill Acceptance Criteria*, as articulated in the 401 Certification, does not appear to meet the requirements of the U.S. Fish & Wildlife Service (USFWS) *Biological Opinion* (2001), despite what the Port says in this regard. The USFWS requires that candidate fill must be rejected where it exceeds the upper bounds of MTCA Method A Soil Cleanup Levels. The Port appears to ignore this requirement and states that as long as a candidate fills pass a Synthetic Precipitation Leaching Procedure (SPLP), they can be accepted for use at most locations in the fill embankment. This clearly reduces the level of protection intended by the USFWS. There does not appear to be any rational given for this change. This issue is addressed in more detail by Dr. Lucia's Declaration.

28. Given the knowledge that fill already stockpiled at STIA contains DDT and PCBs from Hamm Creek, and TPH from both the First Avenue Bridge and the Black River Quarry, and that the fill already stockpiled at STIA is imperfectly characterized, it is my opinion that the Port's *Soil Fill Acceptance Criteria* in the 401 Certification remains flawed and do not preclude the acceptance of chemically contaminated fill in the future. This increases my concern that chemical contaminants at the fill placement site have the potential, if not the probability, to percolate through the fill pile into the groundwater, ultimately contaminating wetlands and surface waters that may be connected to the groundwater stream.

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

DATED this _____day of October, 2001, at _____, Washington.

_____
John Strand, Ph.D.

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References

Fisher, D.J. 1994. Investigation of the Impact of Whole Effluent Toxicity of Storm Water to Aquatic Life. WREC-94-D1. Maryland Department of Environment, Baltimore , Maryland.

Gilbert, R.O. 1982. Some Statistical Aspects of Finding Hot Spots and Buried Radioactivity. TRANS-STAT: Statistics for Environmental Studies, Number 19. PNL-SA-01274. Pacific Northwest Laboratory.

Hartwell, S.I., D.M. Jordahl, J.E. Evans, and E.B. May. 1995. Toxicity of aircraft de-icer and anti-icer solutions to aquatic organisms. *Environ. Toxicol. And Chem.* 14:1375-1386.

Parametrix, Inc. (Parametrix) 2000. Comprehensive Stormwater Management Plan Seattle-Tacoma International Airport Master Plan Update Improvements. For Agency Review. Prepared for the Port of Seattle by Parametrix, Inc., Kirkland, Washington.

Port of Seattle (Port). 1997. Storm Water Receiving Environment Monitoring Report for NPDES Permit No. WA-002465-1. Volume 1, and 2 (Technical Appendices). June 1997. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 1998. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period June 1, 1997 through June 30, 1998. November 1998. Port of Seattle, Seattle, Washington.

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Port of Seattle (Port). 1999. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period July 1, 1998 through June 30, 1999. September 1999. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 2000. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period July 1, 1999 through June 30, 2000. September 2000. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 2001. AirCraft Deicing Report. April 1, 2000-March 31, 2001. Port of Seattle, Seattle Washington.

Shepherd, B. J. 1999. Quantification of Ecological Risks to Aquatic Biota from Bioaccumulated Chemicals. Proc. National Sediment Bioaccumulation Conference September 11-13, 1996, Bethesda, Maryland. U.S. Environmental Protection Agency, Office of Science and Technology and Office of Research and Development, Washington, D.C.

Skalski, J.R., and J.M. Thomas. 1984. Improved Field Sampling Designs and Compositing Schemes for Cost Effective Detection of Migration and Spills at Commercial Low-Level Radioactive Chemical Waste Sites. PNL-4935. Pacific Northwest Laboratory, Richland, Washington.

U.S. Environmental Protection Agency (USEPA). 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Water for Freshwater and Marine Organisms. EPA/600/4-90/027F. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 1994. Water Quality Standards Handbook: Second Edition Appendices. EPA-823-B-94-005b. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 2000. Preliminary Data Summary Airport Deicing Operations. EPA 821-R-00-01. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Fish and Wildlife Service (USFWS). 2001. Biological Opinion-Master Plan Update Improvements, Seattle-Tacoma International Airport. 1-3-00-F-1420. U.S. Fish and Wildlife Service, Olympia, Washington.

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Washington Department of Ecology (Ecology). 1995. Guidance for Remediation of Petroleum Contaminated Sites. Publication 91-30. Washington Department of Ecology, Olympia, Washington.

Washington Department of Ecology (Ecology). 1997. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Publication No. WQ-R-95-80, revised March 1997. Washington Department of Ecology, Olympia, Washington.

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

DATED this 8th day of October, 2001, at Richland, Washington.

John Strand, Ph.D.

g:\lu\scc\pchb\azous-decl-stay.doc

References

Fisher, D.J. 1994. Investigation of the Impact of Whole Effluent Toxicity of Storm Water to Aquatic Life. WREC-94-D1. Maryland Department of Environment, Baltimore , Maryland.

Gilbert, R.O. 1982. Some Statistical Aspects of Finding Hot Spots and Buried Radioactivity. TRANS-STAT: Statistics for Environmental Studies, Number 19. PNL-SA-01274. Pacific Northwest Laboratory.

Hartwell, S.I., D.M. Jordahl, J.E. Evans, and E.B. May. 1995. Toxicity of aircraft de-icer and anti-icer solutions to aquatic organisms. *Environ. Toxicol. And Chem.* 14:1375-1386.

Parametrix, Inc. (Parametrix) 2000. Comprehensive Stormwater Management Plan Seattle-Tacoma International Airport Master Plan Update Improvements. For Agency Review. Prepared for the Port of Seattle by Parametrix, Inc., Kirkland, Washington.

Port of Seattle (Port). 1997. Storm Water Receiving Environment Monitoring Report for NPDES Permit No. WA-002465-1. Volume 1, and 2 (Technical Appendices). June 1997. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 1998. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period June 1, 1997 through June 30, 1998. November 1998. Port of Seattle, Seattle, Washington.

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Port of Seattle (Port). 1999. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period July 1, 1998 through June 30, 1999. September 1999. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 2000. Annual Stormwater Monitoring Report for Seattle-Tacoma International Airport for the Period July 1, 1999 through June 30, 2000. September 2000. Port of Seattle, Seattle, Washington.

Port of Seattle (Port). 2001. AirCraft Deicing Report. April 1, 2000-March 31, 2001. Port of Seattle, Seattle Washington.

Shepherd, B. J. 1999. Quantification of Ecological Risks to Aquatic Biota from Bioaccumulated Chemicals. Proc. National Sediment Bioaccumulation Conference September 11-13, 1996, Bethesda, Maryland. U.S. Environmental Protection Agency, Office of Science and Technology and Office of Research and Development, Washington, D.C.

Skalski, J.R., and J.M. Thomas. 1984. Improved Field Sampling Designs and Compositing Schemes for Cost Effective Detection of Migration and Spills at Commercial Low-Level Radioactive Chemical Waste Sites. PNL-4935. Pacific Northwest Laboratory, Richland, Washington.

U.S. Environmental Protection Agency (USEPA). 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Water for Freshwater and Marine Organisms. EPA/600/4-90/027F. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 1994. Water Quality Standards Handbook: Second Edition Appendices. EPA-823-B-94-005b. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 2000. Preliminary Data Summary Airport Deicing Operations. EPA 821-R-00-01. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Fish and Wildlife Service (USFWS). 2001. Biological Opinion-Master Plan Update Improvements, Seattle-Tacoma International Airport. 1-3-00-F-1420. U.S. Fish and Wildlife Service, Olympia, Washington.

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EXHIBIT A

John A. Strand, Ph.D., Fellow A.I.F.R.B.
Fisheries Biologist

Dr. Strand is an internationally recognized fisheries biologist specializing in studies to determine potential effects of human activities on aquatic resources. During his 25 years of experience (post Ph.D.), he has conducted and managed a wide variety of projects, large and small, in Washington, California, Alaska, British Columbia, Guam, and Venezuela. These included field studies to evaluate environmental impacts of engineered structures, and field and laboratory studies to assess ecological risks from discharge of contaminants to surface waters, including sewage, storm water, oil, other organic chemicals, radionuclides, and heavy metals. Of key interest is the design of strategies to mitigate impacts on threatened, endangered, or sensitive aquatic species, and their habitats.

Address, Phone, and E-Mail:

1314 Cedar, Richland, WA
(509) 943-4347; jstrand427@aol.com, or jstrand@tricity.wsu.edu

Education:

Ph.D.; University of Washington; Fisheries Biology; 1975
M.S.; Lehigh University; Biology; 1962
B.A.; Lafayette College; Biology; 1960

Employment:

1999- Principal Biologist, Columbia Biological Assessments, Richland, WA. Also, Adjunct Faculty, Environmental Sciences and Regional Planning Program, Washington State University Tri-Cities, Richland, WA.
1996-1999; Water Quality Planner,
King County Department of Natural Resources, Seattle, WA.
1993-1995; Senior Biologist and Group Leader,
EA Engineering, Science, and Technology, Inc, Redmond. WA.
1990-1993; Manager and Co-Chair, *Exxon Valdez* Oil Spill Restoration Planning Working Group,
NOAA/NMFS, Auke Bay, AK.
1969-1990; Senior Research Scientist and Manager, Battelle, Pacific Northwest Laboratory; Richland and
Sequim, WA. Also, Affiliate Faculty (1987-1991), School of Fisheries, University of Washington, Seattle, WA.

Registration/Certification:

Fellow, American Institute of Fisheries Research Biologists; 1993
Certified Fishery Scientist (No. 442), American Fishery Society; 1969

Specialized Training:

Health and Safety Training for Hazardous Waste Sites; 1996; 1997; 1998
Wetland Delineation, Shoreline Community College; 1996
Litigation Support Short Course, EA Engineering, Science, and Technology, Inc.; 1994
Project Manager Training, EA Engineering, Science, and Technology, Inc.; 1994
NEPA Refresher Training, US Forest Service; 1991

Experience:

Resource Management and Planning--- From 1992-1993, was Federal Co-chair of *Exxon Valdez* Oil Spill Restoration Planning Work Group in Anchorage, Alaska. Responsible for developing a restoration plan, and for designing, implementing long-term restoration and monitoring projects for injured resources and human services. Served as member of the Sequim Bay Watershed Management Committee from 1987-1990 and helped prepare the *Sequim Bay Watershed Management Plan*. The Plan focused on mitigation of cumulative effects on salmon and other fishery resources of nonpoint source pollution from timbering, road building, agriculture, marina operations, and failed septic systems throughout the watershed. In 1999, served as member of King County Biological Review Panel with responsibility to evaluate King County policies and programs (e.g., Sensitive Areas Ordinance, Clearing and Grading Code, Surface Water Design Manual, and basin plans) most relevant to conservation of threatened chinook salmon.

Regulatory Compliance----From 1970 to 1990, conducted and managed numerous reviews of Section 316 (a) (b) Demonstrations of Compliance with the Clean Water Act. As a basis for applying Section 316 requirements and procedures, conducted assessments of power plant impacts on marine and estuarine resources. In 1988, performed chemical analyses and bioassays in support of National Pollution Discharge Elimination System (NPDES) Permit renewals at oil industry facilities in Port Valdez and Cook Inlet, Alaska. In 1994, designed monitoring plans to address "special conditions" of NPDES permit renewals at two coastal power plants in California. Following provisions of Endangered Species Act (ESA), in 1995 evaluated agency biological opinion and conducted field studies to assess potential impacts of construction and operation of a proposed gold mine on habitat use by endangered spring and summer run chinook salmon in the Salmon National Forest, Salmon, Idaho.

Environmental Impact Assessment----From 1970 to 1994, conducted and managed numerous studies to assess impacts of technology development on aquatic and terrestrial ecosystems, including wetlands. Assessed environmental impacts for nuclear power plants, petroleum and synthetic fuel refineries, mines and smelters, an acoustic measurement station, a marine mammal holding area, a solid waste management facility, an aviation fuels pipeline, and a bridge. In 1994, directed an environmental assessment of alternate sites for construction of replacement housing at McChord Air Force Base, Washington.

Aquatic Toxicology and Risk Assessment----From 1970 to 1999, studied fate and effects of chemical contaminants in aquatic systems. In 1980, developed exposure pathway models and determined potential ecological and human health risks associated with metals and radionuclides released from a hypothetical uranium mine and smelter at three locations in British Columbia. In 1989, studied persistence of spilled Bunker C fuel oil in beach sediments and in shellfish found intertidally in Olympic National Park, Washington. In 1990, evaluated survey design and sampling procedures to determine the fate of oil refinery and coking plant wastes in sediments and benthic biota in Amuay Bay, Venezuela. In 1995, prepared sampling plans to study fate of metals and organic contaminants in groundwater and marine sediments in Liberty Bay, Washington. From 1996 to 1998, studied ecological risks of combined sewer overflows in the Duwamish River and in Elliott Bay, Washington, with particular interest on potential impacts to out migrating chinook and chum salmon. From 1999 to the present, assessed risks to fish and other aquatic life from stormwater additions to the Miller Creek, Walker Creek, and Des Moines Creek Watershed, King County, Washington.

Selected Publications and Presentations:

Concannon, D., D. Finney, R. Fuerstenberg, H. Haemmerle, G. Lucchetti, A. Johnson, and J. Strand. Chapter 6. Biological Review Panel. 1999. *In* Return of the Kings, Strategy for the Long-Term Conservation and Recovery of the Chinook Salmon. King County's Response Report to the Proposed Endangered Species Act Listing. King County Endangered Species Act Policy Coordination Office, Seattle, Washington.

Strand, J., K. Stark, K. Silver, C. Laetz, T. Georgianna, T. McElhany, K. Li, and S. Mickelson. 1998. Bioaccumulation of Chemical Contaminants in Transplanted and Wild Mussels in the Duwamish River Estuary, Puget Sound, Washington. *In* Proceedings of Puget Sound Research '98. Puget Sound Water Quality Action Team. March 12-13, 1998, Seattle, Washington.

Strand, J.A. 1993. Restoration Planning Following the *Exxon Valdez* Oil Spill. *In Exxon Valdez* Oil Spill Symposium. Abstract Book. *Exxon Valdez* Oil Spill Trustee Council, University of Alaska Sea Grant College Program, and the American Fisheries Society. February 2-5, 1993, Anchorage, Alaska.

Strand, J.A., V.I. Cullinan, E.A. Crecelius, T.J. Fortman, R.J. Citterman and M.L. Fleischmann. 1992. Fate of Bunker C fuel oil in Washington coastal habitats following the December 1988 Nestucca oil spill. *Northwest Sci.* 66 (1):1-14.

Cullinan, V.I., E.A. Crecelius, and J.A. Strand. 1991. Evaluation of Lagoven, S. A., Refinery Environmental Monitoring Plan of Amuay Bay, Venezuela. Final Report. Prepared for Bariven Corporation by Battelle, Pacific Northwest Laboratories, Richland, Washington.

EXHIBIT B

Port of Seattle
Sea-Tac International Airport
Third Runway Fill
WQ 3.13

Port of Seattle

February 4, 2000

Mr. Roger Nye
Department of Ecology
Northwest Regional Office
3190 169th Ave. SE
Bellevue, WA 98008-5452

Dear Roger:

This letter transmits the environmental documentation for fill material used for the Third Runway Project during 1998 and 1999. Portions of this information have been previously submitted to Ecology. This documentation was developed consistent with the requirements of the 1998 and 1999 Airfield Project Soil Fill Acceptance Criteria and updates and corrects prior submittals. One of the fill sources. STIA sediment ponds, previously reported (November 3, 1999) was never actually constructed. Please delete this site from prior lists.

If you have any questions regarding this information, I can be reached at (206) 431-4918.

Sincerely,

Elizabeth Clark

Elizabeth Clark
Environmental Management Specialist

Cc: Jim Thomson, John Rothnic, Barbara Hinkle and Paul Agid (Port of Seattle)

Seattle-Tacoma International Airport
P.O. Box 68727
Seattle, WA 98168 U.S.A.
TELEX 703433
FAX (206) 431-5912

Third Runway Cumulative Fill Summary

Material Placed 1/98 through 12/99

Source Name	Supplier	Category	Description	Env. Approv. (Year)	Placed (Year)	App. Volume (CY)
Crawford Parking	Crawford (Port)	A	Crawford Parking Area	1998	1998	800
Dieringer	City Transfer	Borrow	Borrow Pit Sumner, WA	N/A	1998	90,000
Lakeland Pit	City Transfer	Borrow	Borrow Pit Sumner, WA	N/A	1998	400,000
Lonestar Pit	City Transfer	Borrow	Borrow Pit Dupont, WA	N/A	1998	50,000
Stellacom Pit	City Transfer	Borrow	Borrow Pit University Place, WA	N/A	1998	50,000
North Emp. Park Lot	Port	A	Former FAA Transmitter Site	1998	1998	120,000
UAL/CAL Facility	United (Port)	A	Site Overexcavation	1998	1998	190
Stoneway Pit	City Transfer	Borrow	Borrow Pit Ravensdale, WA	N/A	1998	300,000
Sunset North	City Transfer	A	Development Bellevue	1998	1998	1,500
Parking Garage	Port	A	Toll Plaza, Coding Towers	1998	1998/9	25,000
West Side - Taxi C	Port	A	Taxiway C - 1998 and 1999	1998	1998/9	345,000
Hamm Creek	USCOE	A	Duwamish River Restoration Site	1999	1999	80,000
Concourse B	Port	A	Panel Replacement B-9,11	1999	1999	4,000
Airborne Exp.	Port	A	Former Airborne Express Property	1999	1999	1,500
Bellevue NE12th St	City Transfer	A	Bellevue Office Complex	1999	1999	13,000
North Hardstand	Port	A	North Hardstand	1999	1999	10,000

N/A: Not applicable. Environmental review of state certified borrow pits is not required.

ec2/3/00

EXHIBIT C

MEMORANDUM
TO: Paul Agid
FROM: Beth Doan
DATE: March 24, 1999

RE: Hamm Creek Soil Quality Review

Background
The Corp of Engineers (USCOE) has supplied the Port of Seattle with soil quality information for the Hamm Creek Restoration Project Site located along West Marginal Way, south of Boeing Field. This information includes partial copies of a 1990 site assessment by the Boeing Company, a 1997 USCOE Sampling and Analysis Plan, and a 1997 USCOE Sediment Characterization Report including Appendix C and E. These reports will be placed in the Port files.

The review of the site data does not indicate any exceedences of MTCA cleanup levels. The material, therefore, should be suitable for use as fill material for the third runway. Several source issues have been evaluated, and should be considered before the Port makes the final decision to accept the material. Our evaluation of these issues are discussed below, and include responses from the USCOE project manager Pat Cagney, and information received informally from Pete Rude, a sediment specialist for Landau Associates, Inc..

Data Summary
The following is a brief summary of some of the detected constituents:

Constituent	Maximum Level (USCOE)	Maximum Level (Boeing)	PSDDA SL	Draft MTCA Method A (Residential)
Total DDT	14 ppb	ND	6.9 ppb	1000 ppb
Total PCB	160 ppb	ND	130 ppb	400 ppb
PAHs (Carc)	ND	459 ppb	1,800 ppb (HPAH)	700 ppb
Mercury	0.074 ppm	0.51 ppm	0.21 ppm	1.0 ppm

ND = Not detected

Discussion
- The USCOE study detected PCBs and DDTs above the PSDDA screening levels but below MTCA cleanup levels. Since the samples were composited over large areas and depths, there is a potential for "hotspots" to go undetected. However, the Boeing study, which did look for problem areas, did not detect PCBs and DDTs.
- Pat Cagney indicated that the USCOE did follow up bioassay tests in accordance with PSDDA protocol (this data was not supplied) and there were some failures. They believe the failures were caused by the oxidized nature of the site as compared to a marine environment (from which the test

organisms are obtained) and have nothing to do with the low levels of PCBs and DDTs.

- Some of the USCOE data indicated PCBs above MTCA cleanup levels (12,000 ppb). Pat explained that this was data TOC normalized in accordance with PSDDA requirements. The actual high concentration was 160 ppb (see table). Pete confirmed that the normalized data was not relevant to MTCA.

- TPH was not analyzed at this site. According to Pat there was no indication of TPH at this site based on site uses and sampling observations. This is consistent with a review of the logs and with the lack of detection of associated organics.

- The Boeing data indicated levels of mercury and PAHs above what they considered to be background levels. However, these values are below MTCA cleanup levels and the USCOE samples had much lower values (see table).

- The USCOE sampling plan mentions that 10,000 yards of material was not analyzed. According to Pat, that material was closely associated with material that was analyzed and he has no reason to believe that it should be any different. The Boeing data looked at the entire site.

- The issue of changes in chemical environment from the Duwamish area to the airport was discussed briefly with Pete. He said there were two general issues, the change in the oxidation state, and the potential marine impacts (salt water). Based on location, there should not be significant impacts from saltwater. He also felt that change in oxidation states (anaerobic to aerobic) would only be a potential concern if metals were at elevated levels. Except for mercury in the one sample, Boeing concluded metals were at background levels.

Conclusions

The Boeing and USCOE reports provide sufficient information to evaluate the soil quality of the Hamm Creek site. The evaluation of the data relative to MTCA indicates that the Hamm Creek material is suitable for third runway fill. The material does not meet PSDDA requirements for open water disposal which could potentially cause some public perception concerns about using this material; however, given the intended use of this material as upland fill these concerns are not technically supported.

EXHIBIT D

Port of Seattle

July 27, 2000

Mr. Chung Yee
Department of Ecology
Northwest Regional Office
Water Quality Program
3190 160th Ave S.E.
Bellevue, WA 98008-5452

Dear Mr. Yee:

This letter transmits the environmental documentation for fill material used for the Third Runway Project during the second quarter 2000. This documentation was developed consistent with the requirements of the 1999 Airfield Project Soil Fill Acceptance Criteria.

If you have any questions regarding this information, I can be reached at (206) 439-6604.

Sincerely,

Paul W. Agid
Environmental Program Manager

Cc: John Wietfield (Ecology)
John Rothnie, Jim Thomson (Port of Seattle)

Attachments:
Fill summary table
Environmental documentation

Seattle-Tacoma
International Airport
P.O. Box 68727
Seattle, WA 98168 U.S.A.
TELEX 703433
FAX (206) 431-5912

THIRD RUNWAY FILL SUMMARY -- SECOND QUARTER 2000

Source Name	Supplier	Category	Description	Month Initial Receipt	Year Initial Receipt	Month Final Receipt	Year Final Receipt	Final Est. Volume (CY)
Airborne Express/ FAA	FAA (Port Property)	A	New FAA Tower -- Phase 2	April	2000	Ongoing		
Airfield 2000 -Taxiway B	Port	A	Taxiway B Improvements	April	2000	June	2000	5,300
First Avenue Bridge	WSDOT	A	First Avenue Bridge, Seattle	April	2000	June	2000	85,000
No. Esplanade	Port	A	No. Esplanade - Conc. D	May	2000	May	2000	1,700
NW Hangar Project	NW/CTI (Port Property)	A	New NW Hangar	June	2000	Ongoing		
Lakeland Pit (2000)	CTI	A	Borrow Pit, Sumner	June	2000	Ongoing		
CTI Pit No. 3 (a)	CTI	Borrow	Borrow Pit, Sumner	June	2000	Ongoing		
Auburn Pit (a)	CTI	Borrow	Borrow Pit, Auburn	June	2000	Ongoing		
Stoneway Pit (a)	CTI	Borrow	Borrow Pit, Ravensdale	June	2000	Ongoing		
Airfield 2000 - So. Sat. (b)	Port	A	Duct Bank, IWS Improve.	June	2000	Ongoing		

(a) State Certified Borrow Pit. Environmental documentation not required.

(b) This project is being conducted in phases. Samples are being collected as access becomes available to each phase of the project. Samples for the initial phase were all below MTCA Method A Cleanup Levels. The complete documentation for this project will be provided third quarter 2000.

EXHIBIT E

Washington State Department of Transportation
Sid Morrison
Secretary of Transportation

Northwest Region
6431 Corson Avenue South
Seattle, WA 98108

(206) 768-5700

November 29, 1999

Port of Seattle
Beth Clarke, POS environmental Section
17900 International Blvd., Suite 402
Seattle, WA 98188

RE: First Avenue South Bridge Vicinity
Available Fill Material

Dear Beth:

This letter is written to fulfill the Port of Seattle's requirements to accept the fill material from the First Avenue Bridge construction site. As you are aware, there are approximately 120,000 cubic yards of excess material available southwest of the First Avenue Bridge. A copy of a memorandum from Mike Stephens of WSDOT Environmental Affairs Office, summary and sampling results from the stockpile by Health Risk Associates, Inc. and a site map showing where samples were taken are attached to this letter.

According to Health Risk Associates, Inc., the top few feet of soil on the original ramp embankments contain slightly elevated levels of Petroleum Hydrocarbons. The levels of contamination may have come from several sources, including the past practice of oiling the city streets by the City of Seattle in this area. Please refer to the attached report for more details.

WSDOT is willing to set aside the top few feet of the contaminated material and analyze it again using a different procedure. If further analysis indicates the material is contaminated above the levels acceptable to the Port, the WSDOT will not propose transporting the material to your site. The remaining majority of material on the site doesn't appear to be environmentally impaired based on the analytical testing.

If the Port of Seattle decides to accept the fill material, it is available for use immediately. The existing fill material could be used for embankment construction during dry weather, but may not be suitable for use during wet weather. The Port will need to notify the State where the fill material will go including a haul route and any restrictions to the route if an agreement is reached.

We are also aware that the Port has geotechnical concerns over the material. Please advise us as to the acceptability of the material environmentally so we can begin the engineering required to assure the fill will be placed in a manner that will provide the stable base required to meet your project needs.

We are looking forward to working with the Port of Seattle in wrapping up this matter. If you require additional information or have questions, please feel free to contact me at (206) 768-5861.

Sincerely,

Thomas R. Madden, P.E.
Project Engineer

File: C4962 project file
cc: C. Arnold NB82 - 230

TRM:ms
MS

Tom Copy

RECEIVED
NOV 3 1999
TOM MADDEN'S OFFICE

Washington State Department of Transportation

Memorandum

November 1, 1999

TO: Tom Madden
MS: NB82-60

FROM: Mike Stephens
360-570-7256

SUBJECT: Fill Material Certification for the Port of Seattle

This memorandum report is prepared to fulfill a fill material certification requirement for the Port of Seattle so the Washington State Department of Transportation (WSDOT) may provide material from the First Avenue Bridge construction site to the SEATAC third runway construction project. A geo-technical assessment is not included in this memorandum. It could be attached as a separate report if required by the Port of Seattle.

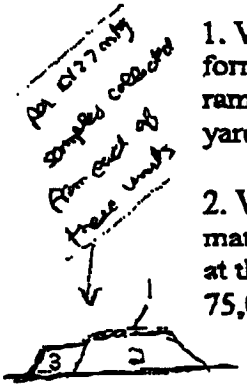
Fill Site Description

Site Location: The site, jointly owned by the City of Seattle and WSDOT, is located southwest of the recently constructed First Avenue South Bridges between Marginal Way Southwest and Southwest Michigan Street, Seattle, Washington. It is further described as a portion of Government Lot 2 and a portion of the NE1/4, SE1/4, Section 30, Township 24N, Range 4E, Willamette Meridian.

Site Description: The site was the location of former on and off-ramps to the original First Avenue South bridge. The site is currently an open field with limited access. The trace of the removed roadway is apparent both in aerial photographs and in site reconnaissance. There are three distinct materials available for removal from the site, described as follows:

1. Very dense, highly compacted light brown, poorly graded, gravelly, sand. This material formed the top surface of the ramps and is approximately 2-4 feet deep over the entire ramp surface. The asphalt road cap has been removed. There is an estimated 5,000 cubic yards of this material.

2. Very dense, light gray, silty to sandy silt, and fine to coarse gravelly, clay. This material formed the foundation of the ramp embankments. The depth ranges from 2 feet at the west end of the site to 20 feet on the east end of the site. There are approximately 75,000 cubic yards available for removal.



DoH samples from similar units okay
no buried sediments - no organic smell

3. Loose, dark gray to black, silty sands. This material is Duwamish Alluvium excavated from the new bridge piers. There is approximately 40,000 cubic yards of this material available for removal. None of this material includes any river sediments. This material was moved from under the new bridge after it was determined there was no further use for it on the bridge project. The material is currently piled along the edges of the ramp embankments.

Site Reconnaissance

The site was visually inspected by staff from the WSDOT Environmental Affairs Office (EAO) in October 1999. The site consists of an open lot with built up surface embankments for highway ramps. There are numerous pieces of concrete in various sizes that came from the old demolished First Avenue Bridge. Some limited solid waste dumping is evident. None of this solid waste appears hazardous. There was no evidence of other hazardous material disposal on the site.

Review of Existing Environmental Information

Literature: A review of a June 1991 Shannon and Wilson, *First Avenue South Bridge Hazardous Waste and Waste Discipline Report*, also confirms that this site has remained essentially undeveloped land from prior to 1920 to the present. There were a number of adjacent industries which often are associated with generation or use of hazardous materials, but none were directly on the site. No soil sampling was conducted for this report. Duwamish Waterway Sediments were analyzed and found to exceed in-water disposal criteria for several compounds. None of these sediments are included in the site materials.

In 1994 Shannon and Wilson evaluated the suitability of the embankment materials for reuse elsewhere on the bridge project. Their findings are in the report, *Geotechnical Report Parallel Structure to the First Avenue South Bridge Over Duwamish Seattle, Washington Volumes I and II, August 1994*. It is accepted practice for geo-technical reports to note the possible existence of contamination. A review of the test pit logs revealed no indications of contamination or suspect materials. There were no odors noted in the field logs. The material description in the Shannon and Wilson report logs is consistent with the material presently on site.

Dames and Moore conducted an extensive Hazardous Waste Assessment for the First Avenue Bridge Project in 1992 and 1993. The report is titled *Hazardous Waste Assessment Site Investigation, Route 99- First Avenue South Bridge Project Seattle, Washington, March 10, 1994*. This assessment included sampling of soil and groundwater in numerous locations throughout the project corridor. Dames and Moore concluded that none of the deeper soils were likely contaminated. The report did identify several isolated pockets of petroleum contaminated soil, including some areas south of the river. These

soils were identified as shallow and likely less than 5 feet deep. Although some sampling was conducted to define extent and identify a source in two locations, no conclusions were reached. None of the boring or test pit logs of deeper material in the vicinity of the site identified any potential contamination, based on accepted field screening techniques or laboratory analysis.

During construction of the bridge numerous deep shafts were excavated for bridge piers. Some of that material was moved to the site in 1999. WSDOT's construction practices require excavation to cease if suspected contamination is apparent. These construction guidelines were followed on this project. It is reasonable to assume none of the material appeared to be contaminated during excavation.

Summary of Testing

In October 1999, five samples of the available materials were analyzed for petroleum contamination and toxic RCRA metals by Health Risk Associates, Inc. The samples were analyzed by On Site Environmental of Redmond, Washington. These samples were taken from a depth of less than 2 ½ feet and contained some vegetation residue. All the samples were below MTCA Method A standards for all items tested except for a sample taken on the east face of the embankment. That sample contained Total Petroleum Hydrocarbon (TPH) contamination in the diesel range at 870 PPM. The MTCA Method A cleanup standard for TPH is 200 PPM. Three additional samples within a radius of 10 feet were analyzed on 25 October 1999. These soils contained TPH as diesel between 200-310 PPM.

Interview Summary: EAO interviewed Mr. Tom Madden, Project Engineer for the First Avenue South Bridge Project. Mr. Madden provided historical information about handling and source of materials during construction. He also provided information about the ramp removal activities. According to him Seattle had oiled the local streets for dust control for a time in the 1950's and 1960's. Mr. Madden affirmed that WSDOT conducted no activities on the site which would have contributed extensive contamination and did not move any known contaminated soil to the site during construction.

Review of Historic Operations

Prior to the construction of the First Avenue South bridge in the mid 1950's the site was situated in a tidally influenced alluvial plain. The surrounding areas were in the process of being filled in for creation of industrial property. During the construction of the original bridge an on-ramp was constructed at this location. The source of the material for the ramp embankment is unknown, but based on the lithology it most likely came from the immediate area impacted by construction. Such use of material was consistent with highway construction practices. The top layer of compacted soil is dissimilar to the

EXHIBIT F

Port of Seattle

Memo

To: Paul Agid

From: Beth Clark

CC: Elizabeth Leavitt, Jim Thomson

Date: 04/30/01

Re: Black River Quarry

Rock aggregate was imported to the Third Runway embankment from the Black River Quarry during August through October 2000. The site, owned by Stoneway Rock & Recycling, also operates as a concrete crushing and recycling center. Blasting and crushing of bedrock derived from the quarry produces aggregate that is used for various construction projects in the Puget Sound. Chemical testing was conducted on samples of the aggregate by AMEC, environmental consultant to the supplier City Transfer, Inc. (CTI). The initial test results for this site were submitted to Ecology in the Port's Third Quarterly Report 2000. On the request of the Port, AMEC conducted additional chemical testing on the aggregate. These test results have been discussed with Mr. Chung Yee of the Department of Ecology (various telecommunications fall, 2000) and are discussed further below.

Testing for Petroleum Hydrocarbons

Table 1, prepared by AMEC, summarizes the test results for petroleum hydrocarbons. The initial test results indicated the presence of diesel and heavy oil range petroleum (TPH diesel and oil) at 200 and 310 ppm respectively. This exceeds the current Method A standard of 200 ppm, but is well below the new MTCA Method A standard of 2000 ppm which becomes effective August 15, 2001. The presence of TPH was attributed to the inadvertent mixing of residual asphaltic materials found in the recycling operations with the stockpiled soil. Subsequent samples collected on 6/22/00 and 7/6/00 of newly blasted rock also detected TPH but at levels below current and proposed MTCA Method A standards. Based on the results of the initial chemical testing, the Port agreed to accept only newly blasted rock and required AMEC to conduct ongoing TPH testing as a condition to the acceptance of the material to the Third Runway embankment. The initial test results were submitted to Ecology.

The results of the ongoing sampling of the aggregate are also summarized in Table 1 (9/25/00 through 10/11/00). The results indicate the continued presence of low levels of TPH (primarily oil). The results varied from non-detect up to 270 ppm. After careful review of the site operations, AMEC concluded that the only apparent source of TPH was residual material in the crushing equipment left from the asphalt recycling operations. The Port stopped the import of material from the Black River Quarry in October and instructed CTI and Stoneway to evaluate potential modifications in procedures to better separate the asphalt recycling and rock crushing operations. Based on their evaluation, Stoneway modified operations to include:

(1) Thorough cleaning of the crushing equipment after the asphalt recycling operations and before the switch to rock crushing, and
(2) Discard of the first hundred tons of rock crushed after the use of the equipment for asphalt recycling.

DRAFT

Subsequent on-site testing conducted by AMEC on 10/2400 through 10/30/00, after the modifications in operations, indicate levels below current and proposed Method A standards. Although there were no exceedances of Method A standards, none of this material was placed at the Third Runway.

Testing for Metals

After review of the Port's Third Quarterly Report 2000, Mr. Chung Yee of Ecology called the Port to discuss the metal data. He particularly noted the presence of copper at levels above typical background levels for Puget Sound, but for which there is not MTCA Method A standard. The initial test results are summarized on Table 2 (6/9/00). Based on Mr. Chung Yee's evaluation, the Port requested AMEC to conduct additional sampling of the aggregate for total metals. AMEC and the Port also discussed the potential sources of copper and concluded that copper was naturally occurring in the rock formation and that there were no known on-site sources of copper contamination.

These results of the additional metals testing are also summarized on Table 2 (11/30/00). The results of the testing are compared to current and proposed MTCA Method A standards for analytes for which these standards are published, and MTCA Method B standards when there are no published Method A standards. The Method B standards were developed based on protection of groundwater using the Three Phase Partitioning Model (WAC 173-340-747). Ecology uses this conservative model to back-calculate soil concentrations that are protective of drinking water. The default assumptions used by Ecology in the regulations were used in the calculations. Metal test results in Table 2 in all cases are below the published MTCA Method A and calculated Method B standards.

Status

The Port stopped the import of material from the Black River Quarry in mid-October to allow time for the operational changes and additional testing discussed above. CTI did not bring any additional material from this site after mid-October 2000.

AR 007299

TABLE 1
SUMMARY OF ANALYTICAL RESULTS ON SOIL SAMPLES:
PETROLEUM HYDROCARBONS
BLACK RIVER QUARRY, KING COUNTY, WASHINGTON

Date Collected	Sample No.	TPH-G	TPH-D	TPH-O
6/9/00	S-1	<20	>50	>100
6/9/00*	S-1*	NT	[illegible]	[illegible]
6/22/00	S-2	NT	29.4	65.6
	S-3	NT	48.4	83.4
	S-4	NT	28.4	50.6
7/6/00	S-1	NT	<10.0	31.5
	S-2	NT	<10.0	35.0
9/25/00	S-3	NT	<10	<25
	S-4	NT	<10	<25
9/27/00	S-2	NT	<10	<25
	S-4	NT	<10	<25
9/29/00	S-2	NT	<25	150
	S-4	NT	<10	[illegible]
10/02/00	S-3	NT	19	130
	S-4	NT	31	[illegible]
10/9/00	S-3	NT	<10	43
	S-4	NT	<10	26
	S-7	NT	<10	<25
	S-8	NT	<10	<25
10/11/00	S-3	NT	<10	<25
	S-4	NT	<10	<25
10/24/00	S-1	NT	<10	<25
	S-2	NT	<10	<25
10/25/00	S-1	NT	<10	87
	S-2	NT	<10	33
10/27/00	S-1	NT	<10	<25
	S-2	NT	<10	33
	S-3	NT	<27	<53
	S-4	NT	<27	<53
10/30/00	S-1	NT	13	62
	S-2	NT	[illegible]	<25
MTCA Method "A" Cleanup Level		100	200	200

MTCA = Washington State, Model Toxic Control Act
(NT = Not Tested)
Sample collected on 6/9/00 was tested for TPH-G, TPH-D, TPH-O = Gasoline-, diesel-, and heavy oil-range petroleum hydrocarbons, (respectively), by Washington State Method WTPH-HCID.
* Sample re-tested for TPH-D and TPH-O = diesel-, and heavy oil-range petroleum hydrocarbons, (respectively), by Washington State Method WTPH-D (extended).
Samples collected after 6/9/00 were tested for TPH-D, TPH-O = Diesel-, and heavy oil-range petroleum hydrocarbons, (respectively), by Washington State Method WTPH-D (extended)
All results in parts per million (ppm)
Shaded Numbers = In excess of MTCA Method "A" Cleanup Levels

AR 007300

TABLE 2
SUMMARY OF ANALYTICAL RESULTS ON SOIL SAMPLES: METALS
BLACK RIVER QUARRY, KING COUNTY, WASHINGTON

Sample	Date	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
S-1	6/8/00	ND	3.5	<0.2	0.26	22	101	111	0.1	34	ND	4.3	ND	92.5
S-1	11/30/00	ND	ND	ND	ND	20	83	ND	ND	32	ND	ND	ND	81
S-2	11/30/00	NA	NA	NA	NA	NA	59	NA	NA	NA	NA	NA	NA	NA
S-3	11/30/00	ND	ND	ND	ND	26	96	ND	ND	40	ND	ND	ND	78
S-4	11/30/00	NA	NA	NA	NA	NA	77	NA	NA	NA	NA	NA	NA	NA
S-5	11/30/00	ND	ND	ND	ND	25	91	ND	ND	36	ND	ND	ND	59
S-6	11/30/00	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	NA	NA
S-7	11/30/00	ND	ND	ND	ND	31	83	ND	ND	41	ND	0.64	ND	59
S-8	11/30/00	ND	ND	ND	ND	23	96	ND	ND	43	ND	ND	ND	68
S-9	11/30/00	NA	NA	NA	NA	NA	180	NA	NA	NA	NA	NA	NA	NA
S-10	11/30/00	NA	NA	NA	NA	NA	66	NA	NA	NA	NA	NA	NA	NA
MTCA Standards														
MTCA Method A Current		N/A	20	N/A	2	100	N/A	250	1	N/A	N/A	N/A	N/A	N/A
MTCA Method A Proposed		N/A	20	N/A	2	2000 (Cr III)	N/A	250	2	N/A	N/A	N/A	N/A	N/A
MTCA Method B GW (a)		--	--	--	--	--	260	--	--	417	--	74	--	5,970

Notes:

All values reported in mg/kg

ND = Not Detected

NA = Not Analyzed

N/A=Not applicable; no published standard

(a) Method B Standards for protection of drinking water calculated using MTCA WAC 173-340-747 Three Phase Partitioning Model. Calculated for those *detected* constituents for which Method A standards are not available.