POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

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| Airport Communities Coalition,<br><br>Appellant,<br><br>v.<br><br>Department of Ecology and The Port of Seattle,<br><br>Respondents. | No. 01-133<br>No. 01-160<br><br>SECOND DECLARATION OF JAMES C. KELLEY, PH.D. |

JAMES C. KELLEY, PH.D., declares as follows:

1. I am over 18 years of age, am competent to testify, and have personal knowledge of the facts stated herein.

2. I am a professional ecologist with Parametrix, Inc. and the principal consulting ecologist for the Third Runway project at Seattle-Tacoma International Airport. Please see my previous declaration in this matter, dated September 29, 2001, for a description of my qualifications and copy of my resume.

3. On August 10, 2001, the state Department of Ecology issued a §401 Certification for the Third Runway project. In Condition D1g of the certification, Ecology required the Port of Seattle to conduct bi-monthly monitoring of wetlands downslope of the embankment fill in November to May before construction.



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4. Construction of the Third Runway project has already begun in upland areas. Therefore, a requirement that the downslope monitoring occur during November - May "before construction" presumably meant that project construction be halted before the monitoring is completed. For reasons described below, it is unnecessary to halt construction before completing this monitoring. Therefore, when Ecology issued its revised 401 Certification on September 21, 2001, it deleted the requirement that the monitoring occur "before construction".

5. The ACC and its wetlands consultant Amanda Azous have objected to Ecology's change to delete the pre-construction requirement. The ACC and Ms. Azous argue that this change eliminates the opportunity to develop hydrologic performance standards that reflect the normal conditions of the wetlands before further Port construction. The ACC and Ms. Azous assert that the Port construction will alter the drainage basin while the wetlands become increasingly dry. ACC Memo at p. 41; Azous Decl. at ¶ 32.

6. The Port will have more than enough information on the downslope wetlands to evaluate any post-construction changes to them, without having to halt project construction. The Port has collected and will continue to collect both pre-and post-construction hydrologic, vegetation, and soil data from wetlands that are located downslope of the third-runway embankment and other construction projects. This monitoring data, combined with performance standards, contingency standards, and the adaptive management approach identified in the *Natural Resources Mitigation Plan*, coupled with other conditions of Ecology's 401 Certification (Conditions D1h and D1j), provide more than reasonable assurance that the downslope wetlands and their functions will not be adversely affected.

7. The Port has been collecting and will continue to collect the hydrologic data that is the subject of Condition D1g of the 401 Certification. At the request of the regulatory agencies, Parametrix began collecting hydrologic data on the downslope wetlands in February 2001. At this time, monitoring consisted of monthly measurements of the depth from the ground surface to the



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shallow water table in hand-dug holes, as explained in the wetland delineation procedures. Measurements of soil saturation were also taken because, as a result of capillary action, soil saturation extends above the ground surface. In April 2001, the Corps of Engineers requested that additional monitoring sites be established and these sites have thus been included. Since August 2001 groundwater levels have been measured twice per month. In late August and September of 2001, shallow groundwater monitoring wells (consisting of 2-inch PVC pipe extending 24 inches below the ground surface with a screened base) were installed by hand at each monitoring location. Groundwater levels are now measured in these wells rather than in hand dug holes.

8. As described in the *Natural Resource Mitigation Plan* in Section 5.2.3 and the revised 401 Certification, the Port will continue to monitor the hydrology in downslope wetlands[1]. Other data collected in the wetlands include the species of plants present, the prominence of each species (i.e. the percentage cover), and the soil conditions (including soil colors, soil textures, classification as organic or inorganic, presence/absence of redoximorphic features, and the depth of these in the soil profile). These data will be used to determine if wetland areas downslope of the embankment continue to experience wetland hydrology, and if present, whether the duration of soil saturation is sufficient to maintain the existing wetland plant communities and the existing hydric soil conditions observed at various locations in the wetland.

9. This is a scientifically valid monitoring approach. The data collected from hydrologic observations can be related to the wetland indicator status of wetland plants, the information on vegetation tolerance of various hydrologic regimes, and the intensity of reducing soil conditions (i.e. iron reduction (creating mottled and gleyed soil colors) or organic matter accumulation). This analysis provides insight into the <u>long-term</u> hydrologic regime that the wetland has developed under, and will provide an objective methodology for determining whether the post-

[1] The frequency of monitoring reported in the NRMP will be changed to twice per month to comply with the Water Quality Certification D1g.



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construction hydrology observed through monitoring can reasonably be expected to continue to support the wetland soils and vegetation observed.

10. Specific performance standards for downslope wetlands have been developed based upon existing wetland hydrology, observations of soil types, and wetland plant communities (see page 5-108 of the *Natural Resource Mitigation Plan*). The monitoring standards proposed for the areas are as follows:

- Flowing water will be present in the lower portions of the replacement drainage channels from December to June in years of normal rainfall.
- Wetland areas with predominantly organic soils (Portions of Wetland 18, 37a, R14a, A14b, and 44a) will have soils saturated in the upper part to mid-June in years of normal rainfall.
- Other wetlands with predominantly mineral soils will have soils saturated in the upper part to mid-April in years of normal rainfall.
- Condition D1j of the 401 Water Quality Certification requires additional monitoring of wetlands. The condition requires evaluating the wetland indicator status (WIS)[2] of each vegetation strata (trees, shrubs, and emergent plants) using statistically valid sampling procedures to determine potential changes to vegetation in areas where there is a potential change to post-construction hydrology.
- Finally, and perhaps most critical are the requirements of Condition D1h of the Certification. This condition requires that the wetland boundaries adjacent to the embankment and borrow areas be re-delineated at years 5, 10, and 15 following construction. This data will be used by Ecology to determine if the wetland boundaries have changed over time, and to evaluate if additional mitigation is required as a result of any changes to wetland boundaries. This "acid-test" provides a direct measurement of any change in wetland area related to long-term changes in post construction hydrology.

11. Using these performance standards, as well as data gathered after standard groundwater monitoring wells are installed, it will be possible to identify if shallow groundwater conditions are not supporting the downslope wetlands as anticipated.

12. The hydrologic monitoring data specified in Condition D1g of the 401 Certification (that is now being collected) is not particularly important in evaluating the impacts of construction

[2] The WIS of vegetation is described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. Army Corps of Engineers.



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on the downslope wetlands. Data relating to vegetation and soil conditions are far more useful than the hydrologic data because they are free of the short-term variations and aberrant conditions to which groundwater levels are subject. More importantly, with hydrologic data, there are no scientific standards that could be used to establish an impact threshold[3], and even if there were such standards, it would take many years of post-construction measurements to statistically establish that post-construction conditions were the same or different from pre-construction conditions. In reality, since precipitation is different each year, there is no real way to relate a change in ground water elevation to a precipitation trend or a project impact. Relying solely upon hydrologic data to determine whether the wetland is functioning is problematic because hydrologic data is not always conclusive and can be misleading. For example, the hydroperiod within a particular wetland is not the same each year and can vary according to trends in recent rainfall, antecedent soil moisture conditions, and other climatic factors.[4]

13. There is no "normal" rainfall year that would serve as baseline to determine if hydrologic changes have occurred. Even in a year of overall average rainfall, periods of high and low rainfall occur and these trends could affect groundwater in wetlands. For example, a very wet period during the winter months followed by several dry spring months could result in a period of above average rainfall. However, because much of the rainfall occurred in the winter when the soils are saturated, it would not be stored in the slope wetlands, and would runoff as stream flow. Later, the lack of rain during the spring months would result in a faster than normal decline in water levels because soils water was not being recharged by precipitation. Ultimately, the wetland could dry out sooner than in a year of more evenly distributed rainfall, but any conclusions regarding project impacts on hydrology could be erroneous. Given the variety of rainfall patterns that could affect groundwater in the wetlands, the insensitivity of vegetation to minor changes in hydrology, and the

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[3] See discussion on page 138 in B.Wheeler. 1999. *Water and Plants in Freshwater Wetlands*. In: *Eco-Hydrology*. A. Baird and R. Wilby eds. University of Cambridge, London, U.K.
[4] Mitsch, William J. and James G. Gosselink. 1993. *Wetlands*. Van Nostrand Reinhold, New York.



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lack of valid criteria to establish impacts, groundwater measurements are not reliable indicators of potential project impacts to wetlands. This is especially true given that the impact assessment of the embankment to wetland hydrology (see **Attachment L** to my Declaration of September 29, 2001) could result in minor positive changes to wetland hydrology.

14. Ms. Azous offers no argument as to why she believes that hydrologic monitoring data will indicate the wetlands would become "increasingly dry". The relevant scientific literature and analysis completed for the project predict otherwise:

- The impact of placing permeable fill materials upslope of wetlands has been analyzed. Fill material has been found to infiltrate substantial amounts of rainwater. This water is then able to pass through the fill and recharge the underlying soils. Factors that increase the ability of the embankment to infiltrate water are its relatively permeable soil material and flat surface. The time delay of water moving through the embankment results in a delay in the discharge of water to wetlands of 1 to several months, depending on the embankment thickness. This delay would result in greater amounts of water in wetlands during the summer months, which would predictably extend the period of wetness in downslope wetlands. This analysis is summarized in Section 4.3.2.4, Attachment L to my Declaration of September 29, 2001. It is further supported by analysis reported in *Effects on Infiltration and Base Flow-Proposed Third Runway Embankment,* Hart Crowser, October 2000; see Section 3.6.4 of *Sea-Tac Runway Fill Hydrologic Studies* Washington Department of Ecology, Bellevue, Washington; and *Port of Seattle Sea-Tac Third Runway Embankment Fill Modeling*, Pacific Groundwater Group, August 2001.
- Changes in vegetation from forest to grass would occur as a result of embankment construction. This change would predictably increase the amount of groundwater available to downslope wetlands. This is because hydrologic studies show that the loss of rainfall through interception[5] by vegetation and evapotranspiration is less on cleared grassy areas versus forested or shrub covered areas[6]. This decrease in interception will result in greater amounts of groundwater recharge. This would predictably increase groundwater discharge to the slope wetlands during the late spring and summer months. This increase in recharge can predictably increase summer low stream flows, as has been found in most small watersheds studied in the Pacific Northwest[7].

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[5] Interception loss, in hydrologic studies refers to rain water that lands on vegetation and thus does not reach the ground. Since this water does not reach the ground surface it fails to become surface water or groundwater.

[6] The increased recharge that occurs under pasture vegetation versus mixed and coniferous forest vegetation in the Puget Sound area is reported in Table 7, Bauer, H. and M. Mastin. 1997. *Recharge from Precipitation in Three Small Glacial-till Mantled Catchments in the Puget Sound Lowland, Washington.* U.S. Geological Survey Water Resources Investigations Report 96-4219. Tacoma, Washington.

[7] see page 95 in *Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska*, L. MacDonald et al., Center for Streamside Research, Seattle Washington, and analysis discussed in Harr, R.D., A. Levno, and R. Mersereau. 1982. *Streamflow Changes after Logging 130-year-old Douglas Fir in Two Small Watersheds.* Water Resources Research, 18:637-634.



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206-447-4400

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

Executed at Seattle Washington, this 9th day of October, 2001.

JAMES C. KELLEY, Ph.D.



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206-447-4400