Port of Seattle

October 2, 2001

Ms. Ann Kenny
Washington Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Re: Seattle-Tacoma International Airport
Washington Department of Ecology
§ 401 Water Quality Certification
Order #1996-4-02325
Condition F.1

Dear Ms. Kenny:

The Port of Seattle presents the attached documents to the Washington Department of Ecology in satisfaction of the above noted Order, Condition F.1. Condition F.1 requires, among other things, that the Port prepare "proposed construction BMPs to prevent interception of contaminated ground water by utility corridors and a plan to monitor potential contaminant transport to soil and ground water via subsurface utility lines".

Please review the two attached documents, *Proposed Construction BMPs To Prevent Interception of Contaminated Ground Water by Utility Corridors*, and *Plan to Monitor Potential Contaminant Transport to Soil and Ground Water via Subsurface Utility Lines* . If you have any questions or comments, please feel free to refer comments and questions to Paul Agid, 206-439-6604, agid.p@portseattle.org.

Sincerely,

Elizabeth Leavitt
Manager, Aviation Environmental Programs

xc: Agid, Newlon

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Seattle Tacoma International Airport
§401 Water Quality Certification #1996-4-02325
Condition F.1

Proposed Construction BMPs
To Prevent Interception of Contaminated Ground Water by Utility Corridors

In accordance with the Washington State Department of Ecology (Ecology) Water Quality Certification for U.S. Army Corps of Engineers Public Notice 1996-4-02325, Condition F. 1, the Port of Seattle (Port) submits this proposal for Best Management Practices (BMPs) for prevention of migration of contaminated ground water via subsurface utility lines at the Seattle-Tacoma International Airport (STIA). A draft of this BMP proposal is due to Ecology no later than September 30, 2001.

Best Management Practices for prevention of migration of contaminated ground water by newly constructed utility corridors will consist of, and will be implemented by modification of standard utility construction design guidelines and specifications. The following construction techniques will be specified for future construction of subsurface utilities below paved areas in the principal aviation operations and maintenance area (AOMA) of STIA. Subject subsurface utilities include, but are not limited to, electrical and communications ductbanks, and pipelines for carrying fuel, water, sanitary sewage, stormwater, and Industrial Waste System drainage.

1. Standard construction specifications will be developed for application to all construction projects located in areas within the AOMA where contaminated ground water is present at the designed construction depth.

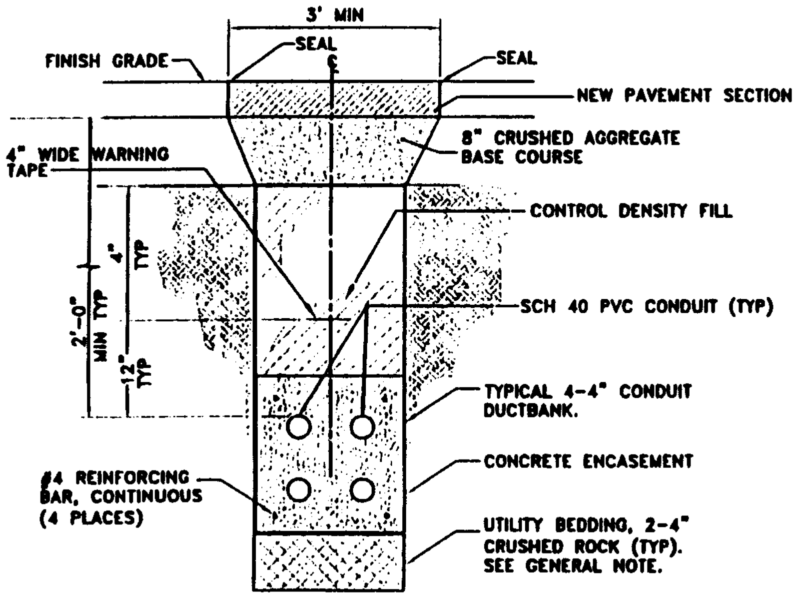
2. The standard specification will include a requirement for the contractor to dewater utility trenches and other construction excavations that contain contaminated ground water, and to appropriately manage the water removed by disposal to an appropriately licensed facility or similar option.

3. The standard specification will include a requirement that utility backfill be constructed such that any ground water present at the utility depth not be transported along the utility, within the utility backfill material acting as a preferential flow pathway. The potential for transport in backfill will be minimized by use of construction techniques and/or materials that reduce utility backfill permeability. Generic engineering designs for preventing transport will be offered as examples, such as:

    a. Construct backfill by placing controlled density fill (a lean concrete mixture), or similar low permeability material, into the entire utility trench, to the bottom of the pavement base course layer.

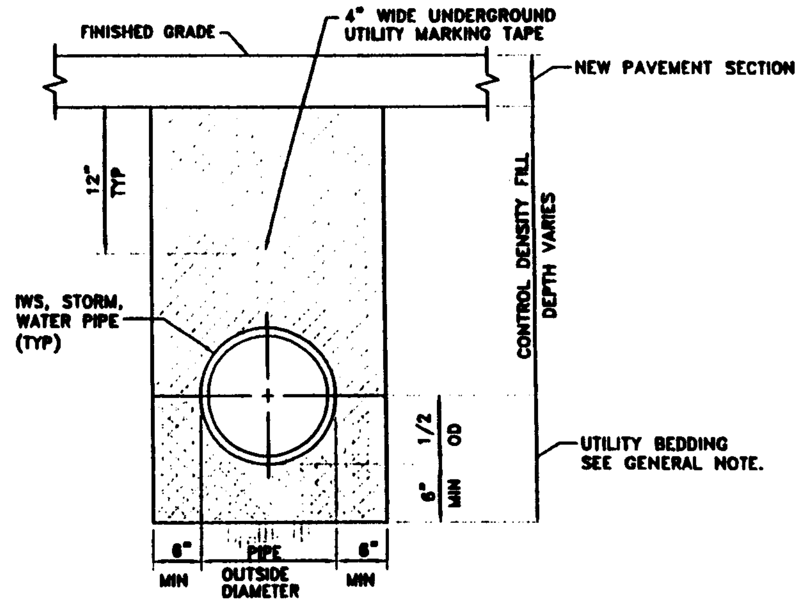
    b. Construct backfill by placing standard pipe bedding material for a maximum depth of 6" plus one-half of the diameter of the utility pipe (except as noted below); backfill the remainder of the trench to the bottom of the pavement base course layer with controlled density fill or similar low permeability material; at a maximum interval of 500' along the utility alignment, eliminate the pipe bedding material and construct full trench profile concrete dams. (Illustrations of typical utility installation construction drawings consistent with option 3.b. are provided in Figure 1.)

    Project-specific construction designs will be developed consistent with the standard specifications to meet the site-specific engineering requirements of the planned construction.



TYPICAL SECTION

TYPICAL ELECTRICAL/COMMUNICATION DUCTBANK
UNDER ALL PAVED AREAS
SCALE: NTS



TYPICAL SECTION

PIPE BEDDING AND TRENCH BACKFILL
UNDER ALL PAVED AREAS
SCALE: NTS

GENERAL NOTE

UTILITY AND DUCTBANK BEDDING MATERIAL ELIMINATED AT 500' INTERVALS AND REPLACED BY FULL DEPTH CONCRETE OR CONTROL DENSITY FILL (CDF) BARRIER.

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FIGURE 1
TYPICAL UTILITY SECTIONS

Seattle Tacoma International Airport
§401 Water Quality Certification #1996-4-02325
Condition F.1

Plan to Monitor Potential Contaminant Transport to Soil and Ground Water via Subsurface Utility Lines

1. INTRODUCTION AND BACKGROUND

In accordance with the Washington State Department of Ecology (Ecology) Water Quality Certification (WQC) for U.S. Army Corps of Engineers Public Notice 1996-4-02325, Condition F. 1, the Port of Seattle (Port) submits this plan to monitor for potential contaminant transport via subsurface utility lines (SULs) at the Seattle-Tacoma International Airport (STIA). A draft of this Subsurface Utility Line Monitoring Plan (SUL Monitoring Plan) is due to Ecology no later than September 30, 2001.

Ecology has requested this plan in response to concerns expressed by members of the public commenting on the proposed issuance of the Water Quality Certification. The commenter assert that the permeable backfill with which subsurface utilities are sometimes constructed may act as preferred pathways for migration of contaminated ground water to the Third Runway Embankment drain layer, and from the drain layer to area surface waters.

A related document, ***Draft Technical Memorandum, Analysis of Preferential Ground Water Flow Paths Relative to Proposed Third Runway, Seattle-Tacoma International Airport,*** prepared by Associated Earth Sciences, Inc. dated June 19, 2001 (AESI, 2001) provides the foundation and supporting data for the development of this SUL Monitoring Plan. The SUL Monitoring Plan presents a methodology to further evaluate the nature of SULs at appropriate contaminated ground water sites and the potential that these SULs act as preferential contaminant transport pathways. The planned monitoring approach will, in a first phase, evaluate contaminated sites, associated ground water presence and flow properties, and the properties of constructed SULs. The evaluation will demonstrate the probabilities that contaminated sites could act as contaminant sources to SULs, and that SULs could act as migration pathways for those contaminants. The second phase of the monitoring program will be developed at the conclusion of the first phase evaluation. Under the second phase, the Port will develop and implement field monitoring activities that are demonstrated appropriate by results of the first phase. The second phase plan will be provided to Ecology for review and approval.

2. SITE EVALUATION

a. Ground Water in Perched Zones and in the Qva Aquifer

The SUL Monitoring Plan will focus on the potential that select contaminated sites act as sources of contamination to SULs. The typical as-built construction depth of STIA SULs is between 5 to 10 feet below ground surface. The SUL Monitoring Plan will therefore concentrate on sites that contain impacted perched ground water that could enter SULs.

Sites that contain perched ground water provide the greatest probability for SUL transport of contamination. Perched ground water occurs in isolated, discontinuous zones. Perched zones are typically found within the range of about 10 – 35 feet below ground surface. Due to the shallow depth of perched zones, perched ground water has the greatest potential to intersect SULs and move along permeable backfill material

Transport along SUL backfill of contaminated ground water in the regional Qva aquifer is improbable for several reasons:

- Ground water levels in the Qva aquifer at STIA are typically at a depth between 55 to 90 feet below ground surface, which is well below the depth of typical SULs.

- Impacted Qva ground water has been well documented and is contained within the AOMA; the maximum migration of impacted ground water is no greater than 550 feet in length from its contaminant source area.

- Ground water data generated from monitoring wells completed downgradient from known Qva impacted ground water sites are below Model Toxics Control Act (MTCA) standards and, therefore, provide a defined plume boundary.

Therefore, monitoring for contaminant transport by SULs in the Qva aquifer is not planned.

b. SUL Monitoring Plan Site Selection

Locations with contaminated ground water that may have a reasonable potential for migration by SUL are defined by the following criteria:

- Site contains perched ground water;
- Perched ground water is impacted above MTCA standards;
- SULs intersect the site footprint.

Data indicate that five sites within the STIA principal aviation operations and maintenance area (AOMA) contain impacted perched ground water that has exceeded MTCA Method A or Method B clean up standards (AESI, 2001). Sites that are impacted by previous fuel releases and contain fuel related compounds in the perched ground water system elevated above MTCA standards include the United/Continental Fuel Farm, Pan Am Avgas Tanks, Northwest Airlines Bulk Fuel Farm, and the Delta Auto Gas Cluster. In addition two areas in the AOMA, the Northwest Airlines Former Hangar Tanks and Monitoring well AGC-5 at the Delta Autogas Cluster site, represent areas that contain solvent impacted perched ground water. Each of the five sites meets the criteria listed above and are proposed for further detailed evaluation regarding shallow contaminant transport mechanisms via SULs.

3. SUBSURFACE UTILITY LINE INFORMATION

As part of previous evaluations, SULs have been identified throughout STIA and compiled on a base map (AESI, 2001). SULs that have been identified include: existing and proposed fuel lines, electric lines, Industrial Waste System (IWS) lines, sewer lines, storm drains, water lines, and Satellite Transit System (STS) and Baggage Tunnels. A number of these SULs are constructed within the boundaries of impacted perched ground water of the five sites presented in Section 2. The following additional detail will be compiled from available documentation for SULs at each of the subject sites.

a. Utility line depth – Typical utility depth is 5 to 10 feet below ground surface, with a typical maximum depth of 20 feet below ground surface. Engineering drawings will be researched to identify the as-built construction depth of each SUL intersecting the subject sites.

b. Utility line backfill composition – Information on the type of backfill material used for infill of the SUL will be compiled, if available.

c. Utility line excavation slope – The elevation of the as-built SUL excavation will be researched and information compiled, if available.

d. Construction Observations - Records will be researched to determine if observations were recorded during construction activities regarding soil or ground water contamination, saturated soil conditions, soil type, SUL condition, etc. Observations of recent capital improvement construction projects (e.g., those associated with the South Terminal Expansion Project (STEP)) will provide useful information regarding observed subsurface conditions in the vicinity of historic contaminated sites and older SULs. Available information will be summarized for each subject site.

4. GEOLOGIC/GROUND WATER CONDITIONS

Existing data and field observations of the geologic and ground water conditions at each of the subject sites will be evaluated in detail in regards to its influence on potential contaminant migration pathways. Cross sections will be developed for each site to graphically depict the relationship of geologic and ground water conditions in relationship to SULs. The analysis will focus on the following elements:

a. Fill or Native Soil Types in Relation to Utility Line – The soil conditions surrounding SULs at each site will be evaluated. Interpretations will be developed based on surrounding soil borings and well logs regarding the nature of fill or native soil types. This information will be evaluated in relation to the as-built construction depth of the SULs.

b. Slope of Till or Impervious Surface – The slope of the glacial till surface or any identified impervious surface will be evaluated. The effect of the slope of the low permeability surface will be analyzed regarding its effect on the control of perched ground water flow directions.

c. Depth to Perched Ground Water – The depth to perched ground water will be compiled from shallow monitoring well water level data and observations made on associated environmental and soil boring logs. This data will be correlated to a common vertical datum to allow for the calculation of the elevation of the ground water surface.

d. Perched Ground Water Flow Direction – For each site evaluated, the perched ground water flow directions will be determined and a contour map showing the flow directions will be developed. Typical wet season and dry season perched ground water elevations will be used to determine any change in flow direction as a result of seasonal precipitation fluctuations.

e. Relationship of Perched Ground Water to Utility Line Excavation – The depth to perched ground water will be compared to the as-built excavation depth of various SULs intersecting subject sites. An evaluation will be made concerning the ability of the SULs to act as a potential contaminant transport pathway. Particular consideration will be made during the evaluation of the ability of the SULs to transport contaminant via perched ground water towards the proposed Third Runway Embankment project area.

5. Report

A report will be developed which presents the findings outlined in the SUL Monitoring Plan. The report will present graphical maps which show ground water and geological conditions in relation to SULs, tabulated information on select SULs, and an evaluation regarding the potential of the SULs to act as preferential pathways for contaminant transport. Conclusions will be developed and an appropriate scope of work and work plan for any appropriate follow-on monitoring will be developed for Ecology review and approval.