PERIODIC REVIEW (FINAL)

Continental Airlines Hydrant Fuel System, SeaTac International Airport Facility Site ID#: 77676343

SeaTac International Airport,
Concourse C and North Satellite,
SeaTac, Washington

Northwest Region Office

Toxic Cleanup Program

July 2012

1.0 INTRODUCTION

This document is a review by the Washington State Department of Ecology (Ecology) of post-cleanup Site conditions and monitoring data to ensure that human health and the environment are being protected at the Continental Airlines Hydrant Fuel System (Site). Cleanup at this Site was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC).

Cleanup activities at this Site were completed under the Voluntary Cleanup Program. The cleanup actions resulted in concentrations of petroleum hydrocarbons remaining at the Site which exceed MTCA cleanup levels. The MTCA cleanup levels for soil are established under WAC 173-340-740. The MTCA cleanup levels for groundwater are established under WAC 173-340-720. WAC 173-340-420 (2) requires that Ecology conduct a periodic review of a Site every five years under the following conditions:

(a) Whenever the department conducts a cleanup action
(b) Whenever the department approves a cleanup action under an order, agreed order or consent decree
(c) Or, as resources permit, whenever the department issues a no further action opinion, and one of the following conditions exists:

    1. Institutional controls or financial assurance are required as part of the cleanup;
    2. Where the cleanup level is based on a practical quantitation limit; or
    3. Where, in the department's judgment, modifications to the default equations or assumptions using Site-specific information would significantly increase the concentration of hazardous substances remaining at the Site after cleanup or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long-term protection of human health and the environment.

When evaluating whether human health and the environment are being protected, the factors the department shall consider include [WAC 173-340-420(4)]:

(a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the Site;
(b) New scientific information for individual hazardous substances of mixtures present at the Site;
(c) New applicable state and federal laws for hazardous substances present at the Site;
(d) Current and projected Site use;
(e) Availability and practicability of higher preference technologies; and
(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

The Department shall publish a notice of all periodic reviews in the Site Register and provide an opportunity for public comment.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site Description and History

The Continental jet fuel hydrant distribution system at SeaTac International Airport was installed in the early 1970s and was operated by Crawford Aviation, under contract to Continental, until the fall of 1991. The inactive distribution system runs from the former underground storage tank (UST) farm on Air Cargo Road, around the North Satellite, and along the west and north sides of Concourse C. The jet fuel hydrant distribution system consists of approximately 4,110 feet of underground piping, and supplied Jet A fuel to 16 hydrant dispensing valves located along the route. A new system was installed approximately parallel to the closed system.

The geology beneath the inactive fuel hydrant system consists of glacial deposits. Typically, the uppermost unit consists of approximately 15 feet of dense, gravely sand and silt to sandy gravel (glacial till). The thickness of this unit decreased to approximately 10 feet near borings 100 and 101 (south end of hydrant distribution system). Beneath this uppermost unit is a fine to coarse grained sand (outwash sand). Occasional lenses of gravel and silty sand were present in some borings. Groundwater was not observed in any of the borings.

2.2 Site Investigations and Sample Results

ENSR Consulting and Engineering (ENSR) conducted a Site assessment in April 1994 to determine if any releases had occurred from the jet fuel hydrant distribution system. Sixty-one soil borings were advanced to 10 to 15 feet below ground surface (bgs) at 100-foot intervals along the pipeline and adjacent to high point vents, low point drains, hydrant valve pits, and hydrant line junctions. Most of the soil samples containing elevated total petroleum hydrocarbon (TPH) concentrations were collected between 5 and 10 feet bgs in borings drilled adjacent to valve pits, high point drains, and low point drains. TPH concentrations ranging from 210 to 6,100 parts per million (ppm) were found in soil samples collected from borings drilled near 10 of the 16 hydrant valve pits. TPH concentrations of 11,000 and 18,000 ppm were found near two low point drains.

The results of ENSR's investigation show that petroleum-impacted soil appears to be isolated, and associated with the hydrant valve pit areas, two low point drains (sample locations B34 and B21), and one high point vent (sample location B15) located along the main pipeline. The ENSR field activities did not determine the vertical extent of TPH in soil along the fuel hydrant distribution system.

Foster Wheeler Environmental conducted field activities from April 22 through May 5, 1999 associated with the subsurface investigation at SeaTac International Airport. Field activities included:

- locating utilities using magnetometer and GPR equipment;
- drilling 13 soil borings using hollow-stem auger drilling equipment;

- performing sampling and field monitoring during drilling activities;
- preparing and submitting samples for chemical analysis; and,
- conducting waste characterization sampling of soil and water generated during drilling activities.

Two soil samples from each boring were submitted for chemical analysis. At boring B89 only one sample was submitted for analysis due to insufficient sample recovery at the other sampling depths in the boring. The sample yielding the highest field kit screening and/or the photoionization detector (PID) result, and the sample collected at the base of each boring were submitted for chemical analysis. The samples were analyzed for diesel-range TPH (Jet A) using the Washington Total Petroleum Hydrocarbons - diesel range (NWTPH-D) analytical method using a Jet A standard. Three soil samples showing the highest PID and/or field kit reading from borings B90, B92, and B101 were also selected for TPH fractionation analysis using Ecology's analytical methods recommended under the Interim TPH Policy (Ecology 1997; Ecology 1998). The samples were analyzed for volatile petroleum hydrocarbons (VPH); extractable petroleum hydrocarbons (EPH); carcinogenic polynuclear aromatic compounds (cPAHs); and benzene, toluene, ethylbenzene, and xylene (BTEX), including methyl tert-butyl ether (MTBE) and naphthalene. Chemical analyses were performed by CCI Analytical Laboratories, Inc. (CCI) of Everett, Washington.

Based on the field screening and soil sample analytical results, TPH was detected in soil samples from 10 of the 13 soil borings. Borings B89, B91, and B92 did not show concentrations of TPH above the laboratory's method reporting limit. TPH was detected above the MTCA Method A Cleanup Level in the following samples:

- four samples from the 20-foot depth (B90, B94 and B99),
- four samples from the 15-foot depth (B95, B97, B100, and Bl0l),
- two samples from the 10-foot depth (B93 and B98),
- one sample from the 5-foot depth (B95).

TPH concentrations in general when present, were found in soil between 10 foot and 20 foot bgs In most cases, the TPH was present within the dense, glacial till and the upper 5 to 10 feet of the outwash sand. In B90 and B96 the TPH concentration extended to a depth of 25 feet bgs, based on field screening results. At B94, TPH concentrations were detected (830 milligrams per kilogram [mg/kg]) at a depth of 20 feet bgs, but were not detected at a depth of 25 feet. Soil samples CON-B90-20, CON-B95-15, and CON-B96-20 were also analyzed for TPH fractionation. The TPH fractionation data were collected to evaluate the potential health risks posed by the residual TPH in the soil. BTEX, MTBE, and cPAHs were not detected above the method reporting limit in these samples except for relatively low levels of total xylenes (3 ppm) in sample CON-B90-20.

2.3 Cleanup Actions

An Interim TPH Policy evaluation was conducted (see next Section) and included the assessment of two exposure pathways consistent with the policy: direct contact with impacted soil and leaching from soil to groundwater. Carcinogenic compounds were not detected in the soil samples and consequently, no carcinogenic risks were calculated. Non-carcinogenic risks were evaluated for three samples submitted for VPH/EPH analyses. The calculated hazard indexes (HIs) for industrial land-use for samples CON-B90-20, CON-B95-l5, and CON-B96-20 are 0.04, 0.01, and 0.03, respectively. According to Interim TPH Policy guidance, since these HIs are all below 1.0, the risk associated with direct contact with impacted soils in the vicinity of Continental's abandoned fuel hydrant distribution system is not considered significant.

The theoretical groundwater concentrations calculated based on Ecology's soil-to- groundwater modeling for samples CON-B90-20, CON-B95-15, and CON-B96-20 are 0.4 milligrams per liter (mg/L), 0.6 mg/L, and 0.4 mg/L, respectively. These values are lower than the Method A cleanup level of 1.0 mg/L, which is based on the protection of a drinking water source. Therefore, soil concentrations are considered to be protective of groundwater since they are below 1.0 mg/L.

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The Interim TPH Policy guidance was also used to calculate a Method C cleanup level for TPH for soils in the vicinity of Continental's fuel hydrant distribution system. A Method C soil cleanup level of 153,477 mg/kg was calculated for TPH based on direct contact with impacted soils, using the fractional distribution determined from the VPH/EPH analyses. However, since free product is required to be removed to the extent practical and in a manner which minimizes the spread of hazardous substances according to MTCA, residual saturation (free product) must be also be considered in addition to the calculated Method C level (Interim TPH Policy recommends the use of literature values). The literature search conducted by Foster Wheeler found estimated residual saturation concentrations ranging from 13,333 to 22,857 mg/kg for the soil and product types encountered at the Site. All TPH results for soils sampled during Site characterization activities and previous work conducted by ENSR are below the more limiting residual saturation concentrations, with the exception of one sample collected in 1994.

The consultant summarized that the Interim TPH Policy Evaluation indicates that petroleum impacted soil located in the vicinity of Continental's fuel hydrant distribution system does not pose a risk to human health under an industrial land use scenario. Soil impacts in the vicinity of the fuel distribution system are present to a depth of approximately 20 feet bgs and have not migrated to the upper aquifer, which is located at approximately 90 feet bgs. This can likely be attributed to the shallow soil (glacial till) which impedes petroleum hydrocarbon migration due to low permeability.

If the fuel hydrant distribution system is removed in the future, exposure of workers to soil through direct contact could occur during excavation or construction activities. Although direct contact to the impacted soil is not considered a significant risk based on the Interim TPH Policy Evaluation presented herein, the excavation or construction activities should be planned so to minimize exposure to workers and to address the appropriate handling, characterization, and disposal/treatment of petroleum-impacted soil that may be encountered.

Ecology agreed with the remedy and issued a 'No Further Action' letter October 10, 2003 after appropriate institutional controls were implemented. A restrictive covenant we not used, but instead an effective alternative mechanism controlled by the Port of Seattle was used.

2.4 Cleanup Levels

Foster Wheeler evaluated petroleum impacts in soils in the vicinity of Continental's fuel hydrant distribution system according to the technical approach and analytical procedures described in Ecology's "Interim Interpretive and Policy Statement, Cleanup of TPH" (Interim TPH Policy) dated January 1997. The Interim TPH Policy was later codified and made permanent in the regulations. Risks were evaluated for two exposure pathways, direct contact to impacted soils under an industrial land use scenario (industrial workers) and leaching from soil-to-groundwater. A cleanup level was calculated for soils based on these two exposure pathways. As described in the Interim TPH Policy, calculated soil cleanup levels are limited by residual saturation (defined as petroleum concentration in soil where product will begin to flow downward under the force of gravity). Therefore, estimates of residual saturation were obtained through a literature search (recommended in the Interim TPH Policy) for products similar to Jet-A, and for the soil type in the vicinity of Continental's fuel hydrant distribution system.

The Interim TPH Policy was developed to be consistent with the current MTCA rule and provides the methodology to calculate Method B and C soil and groundwater cleanup levels for TPH using surrogates to represent specific fractions of petroleum compounds. The policy allows for a detailed evaluation of complex petroleum mixtures that takes into account changes that occur as a result of weathering and degradation. The policy requires use of new analytical methods VPH and EPH that quantify hydrocarbon fractions in two groups: aliphatics and aromatics. Carcinogenic compounds were not detected in soil samples and consequently, carcinogenic risks were not evaluated.
The conceptual Site model (CSM) for Continental's fuel distribution system area is similar to CSMs that have been developed for other properties located at the airport. The airport is zoned

for industrial activity (airport industrial, according to City of SeaTac records), has controlled access, and is paved with concrete approximately 16 inches thick. There are no water supply wells in the vicinity of the Site, which are screened in the upper aquifer located at approximately 90 feet bgs (Emcon 1999).

The source of petroleum contamination in soils in the vicinity of Continental's fuel hydrant distribution system is likely to be from spills and leaks associated with the hydrant pits and low point drains, according to the environmental consultant. This system was disconnected from the tank farm in the fall of 1991. Site characterization activities conducted by Continental in the vicinity of their fuel hydrant distribution system indicate that petroleum hydrocarbon concentrations detected in soil these areas (vicinity of Concourse C and the North Concourse) have not reached the groundwater. Petroleum hydrocarbon concentrations in soil have not migrated beyond a depth of approximately 20 feet bgs and the upper aquifer is located at a depth of approximately 90 feet bgs. Furthermore, the consultant concluded that due to the thickness of the concrete at the surface, surface water infiltration is likely to be minimal and has not, nor is it likely to, aide in transport of petroleum hydrocarbons to the groundwater. Therefore, an evaluation by the consultant of potential exposure pathways indicates that the most likely complete exposure pathway is for industrial workers that may come in direct contact with impacted soils in the vicinity of Continental's fuel hydrant distribution system during future excavation activities. In general, exposure via inhalation is not considered to be significant since the source is aged (weathered and degraded) and is known to be Jet A fuel which is not very volatile.

Samples were analyzed using the VPH/EPH analyses required by the Interim TPH Policy. The VPH analysis is used to quantify lighter hydrocarbon fractions and the EPH analysis is used to quantify heavier hydrocarbon fractions. Both the VPH and EPH analysis divide the petroleum hydrocarbons into two major fractions based on their carbon structures, aliphatic compounds, and aromatic compounds. The results are reported in specified groups of equivalent carbon (EC) chain lengths (e.g., EC8-l0).

Three soil samples (CON-B90-20, CON-B95-15, and CON-B96-20) were submitted for VPH/EPH analyses. Sample CON-B96-20 was selected because the highest TPH concentration (7,900 ppm) was detected in this sample. Sample CON-B90-20 was selected for comparison with sample CON-B96-20 since the TPH concentration detected in this sample (6,200) is very similar to CON-B96-20. Sample CON-B95-15 was also selected for analysis since this sample has an intermediate TPH concentration (880 ppm). Fractionation results were used to evaluate risk consistent with the Interim TPH Policy and to calculate a TPH cleanup level for soils at the Site.

The airport is zoned for industrial activity and potential receptors that may come into contact with impacted soils in the vicinity of the fuel distribution system are industrial workers. Therefore, a MTCA Method C industrial evaluation was conducted. Non-carcinogenic risks were calculated for a Method C industrial scenario using the methodology provided in the Interim TPH Policy. Non- carcinogenic risks are quantified in terms of the hazard quotient (HQ), which is a ratio of the actual dose of a chemical to a reference dose considered to be protective of human health. HQs are added for all chemicals in a single sample to calculate the hazard index

(HI). HIs in excess of 1.0 are considered to be an unacceptable risk. The equations and assumptions for calculating HQs are described in the Interim TPH Policy. The calculated HIs for industrial land-use for samples CON-B90-20, CON-B95-15, and CON-B96-20 are 0.04, 0.01, and 0.03, respectively. Since these HIs are all below 1.0, the consultant concluded the risks associated with direct contact with impacted soils in the vicinity of Continental's fuel hydrant distribution system are not considered significant.

The Interim TPH Policy was used to calculate projected/theoretical groundwater concentrations, which may result from leaching or migration of the petroleum present in impacted soils in the vicinity of Continental's fuel hydrant distribution system. These calculations were performed using a soil/pore water equilibrium partitioning model (Raoult's Law) for the vadose zone and a simple mass balance mixing model for the saturated zone, as described in the Interim TPH Policy. The calculations were performed for each hydrocarbon fraction using the surrogate fate and transport values published in the Interim TPH Policy; Ecology's default dilution factor of 20 for the mixing model; and Ecology's spreadsheet for Interim TPH calculations available on their web Site. The theoretical groundwater concentrations calculated based on Ecology's soil-to-groundwater modeling for samples CON-B90-20, CON-B95-15, and CON-B96-20 are 0.4 mg/L, 0.6 mg/L, and 0.4 mg/L respectively. These values are lower than the Method A cleanup level 1.0 mg/L, which is based on the protection of an aquifer for drinking water purposes. Therefore, the soil concentrations in the vicinity of the fuel hydrant distribution system are considered to be protective of groundwater since the calculated impact to groundwater is less than 1.0 mg/L. In addition, the groundwater is not used for drinking water purposes.

MTCA requires that "at Sites where investigations indicate free product is present, the owner or operator shall remove the free product to the maximum extent practical and in a manner which minimizes the spread of hazardous substances" (Ecology, 1996). Consistent with MTCA, Interim TPH Policy defines residual saturation concentration as the upper limit to any pore water partitioning model. If petroleum is present in soils above the residual saturation concentration, product will begin to flow downward under the force of gravity (free product). The residual saturation concentration is dependent on properties of the product and soils at the Site. As recommended in the Interim TPH Policy, a literature review was conducted to obtain estimates of residual saturation for soils in the vicinity of Continental's fuel hydrant distribution system. Soils in the vicinity of the fuel distribution system are heterogeneous and typically comprised of a layer of till (approximately 10 to 15 feet thick) above a layer of mostly fine to medium sand containing varying percentages of coarse sand and silt. Jet A fuel is in the middle distillates range similar to diesel and kerosene, and is estimated to have a density of approximately 0.8 grams per cubic centimeter (g/cm^3). A literature value for residual saturation of 17,000 mg/kg was obtained for fine sand/silt and a liquid hydrocarbon density of 0.8 g/cm^3 (API 1989). Literature values for middle distillates with hydrocarbon densities of 0.8 g/cm^3 have also been estimated by Cohen and Mercer and are very similar to this value. Cohen and Mercer estimate residual saturation concentrations of 13,333 mg/kg for fine to medium sand and 22,857 mg/kg for silt to fine sand (1993).

All TPH concentrations detected in soils during Site characterization activities in the vicinity of the fuel distribution system are below these literature values with the exception of one sample

collected in March 1994, in which TPH was detected at a concentration of 18,000 mg/kg. With the exception of this sample, TPH concentrations detected during the March 1994 event ranged from non-detect to 11,000 mg/kg. TPH concentrations detected in soil samples collected during the Site characterization activities in May 1999, range from non-detect to 7,900 mg/kg. More than likely, some weathering and degradation of the petroleum have occurred. Visual evidence of free product in soil was not reported in the samples collected in 1994 or 1999, including the samples with the highest concentrations of TPH. Furthermore, data collected during the Site characterization events in the vicinity of the fuel distribution system show that hydrocarbon soil impacts are present to a depth of approximately 20 feet bgs and have not migrated to the upper aquifer which is located at approximately 90 feet bgs. This can likely be attributed to the shallow soil (glacial fill) which impedes petroleum hydrocarbon migration due to low permeability.

A Method C soil cleanup level was calculated for TPH based on direct contact with soil under an industrial land use scenario (industrial workers) and impact to groundwater using the fractional distribution determined from the VPH/EPH analyses. Using Interim TPH Policy guidance, Method C TPH cleanup level calculations were conducted for each of the three soil samples submitted for VPH/EPH analyses (sum of the aliphatics and aromatics) that results in an HI of 0.99 (assuming the same proportion of aliphatics, aromatics, and BTEX as the submitted sample). Of the three samples analyzed, the Method C soil cleanup level based on the fractional distribution of Sample CON-B95-l5 was the lowest and was calculated to be 153,477 mg/kg. This calculated cleanup level, based on direct contact of an industrial worker with impacted soil, is also protective of groundwater since the projected groundwater concentration for this sample is less than 1.0 mg/L. However, this calculated cleanup level is greater than the literature cited residual saturation values of 13,333 to 22,857 mg/kg reference previously. Therefore, for the area near Continental's fuel hydrant distribution system, the appropriate soil cleanup level will, in turn, be based on residual saturation since these concentrations are below the calculated cleanup level. TPH concentrations detected in soil near the fuel hydrant distribution system are all below the more limiting residual saturation values with the exception of one soil sample collected in 1994.

2.5 Restrictive Covenant

Based on the Site use, surface cover and cleanup levels, it was determined that the Site was eligible for a 'No Further Action' determination if institutional controls and an effective alternative mechanism was used for the property. A remedy was put in place for the Site in 2003 which imposed the following limitations:

1) Site access is restricted with fencing and property signage.

2) Construction activity conducted by the Port, Port tenants, and all contractors, or other work that might involve exposure to residual contamination, must be performed in compliance with airport procedures. Compliance with these procedures is required of the Port and all tenants and contractors. The procedures require that Port environmental staff review and approve any such work before it is performed. In addition, most construction or other work mentioned above at STIA requires issuance of a Building/Grading Permit from the Port of Seattle Airport Building

Department and/or a Certificate of Port Standards Compliance (COPS) issued by the Port Project Management Group. These approvals are not issued until the Environmental Programs have reviewed and approved the project. See STIA Project Design Manual (1/01), and STIA Tenant Design and Construction Process Manual (10/02).

The Airport Building Department and COPS processes provide an effective alternative system to meet the requirements of a restrictive covenant. Compliance by the Port, Port tenants, and their contractors with the procedures discussed above results in environmental staff review of proposed projects to verify that such projects do not interfere with a cleanup action (e.g., verify that cap integrity is maintained) or result in a release of hazardous substance.

Should the Port transfer its ownership in any portion of Sea-Tac International Airport that is associated with this Site, the Port will refer to and comply with the MTCA requirements for institutional controls, including deed restrictions, that are in effect at the time of that transfer.

The full institutional control statement is available as Appendix 6.4.

3.0 PERIODIC REVIEW

3.1 Effectiveness of completed cleanup actions

The effective alternative mechanism instead of a restrictive covenant for the Site was and is in place. This alternative prohibits activities that will result in the release of contaminants at the Site without Ecology's approval, and prohibits any use of the property that is inconsistent with the alternative mechanism. This alternative mechanism serves to ensure the long term integrity of the remedy.

Ecology conducted a Site visit on May 5, 2011. A photo log is available as Appendix 6.5. Based on visual observation during the Site visit, the thick runway concrete surface (remedy) at the Site continues to eliminate exposure to contaminated soils by ingestion and contact. The surface appears in satisfactory condition and no repair, maintenance, or contingency actions have been required of the runway surface itself. SLR was contracted by Continental Airlines to close the fuel hydrant system in November 2011, which was discovered not closed properly during Ecology's Site visit. Closure activities included: drain and inert fuel hydrant lines; remove the remaining hydrant valves; cap the pipeline at each remaining valve pit; and fill concrete in the hydrant valve pits.

Soils with TPH concentrations higher than MTCA cleanup levels are still present at the Site. However, the remedy prevents human exposure to this contamination by ingestion and direct contact with soils. The effective alternative mechanism for the property will ensure that the contamination remaining is contained and controlled.

3.2 New scientific information for individual hazardous substances for mixtures present at the Site

There is no new scientific information for the contaminants related to the Site.

3.3 New applicable state and federal laws for hazardous substances present at the Site

The cleanup at the Site was governed by Chapter 173-340 WAC. WAC 173-340-702(12) (c) [2001 ed.] provides that,

"A release cleaned up under the cleanup levels determined in (a) or (b) of this subsection shall not be subject to further cleanup action due solely to subsequent amendments to the provision in this chapter on cleanup levels, unless the department determines, on a case-by-case basis, that the previous cleanup action is no longer sufficiently protective of human health and the environment."

Although cleanup levels changed for petroleum hydrocarbon compounds as a result of modifications to MTCA in 2001, these changes do not appear to affect this cleanup. Even so, the cleanup action is still protective of human health and the environment. A table comparing MTCA cleanup levels from 1991 to 2001 is available below.

Analyte	**1991 MTCA Method A Soil Cleanup Level (ppm)**	**2001 MTCA Method A Soil Cleanup Level (ppm)**	**1991 MTCA Method A Groundwater Cleanup level (ppb)**	**2001 MTCA Method A Groundwater Cleanup Level (ppb)**
Cadmium	2	2	5	5
Lead	250	250	5	15
TPH	NL	NL	1000	NL
TPH-Gas	100	100/30	NL	1000/800
TPH-Diesel	200	2000	NL	500
TPH-Oil	200	2000	NL	500

NL = None listed

3.4 Current and projected Site use

The Site is currently used for commercial and industrial purposes. There have been no changes in current or projected future Site or resource uses.

3.5 Availability and practicability of higher preference technologies

The remedy implemented included containment of hazardous substances, and it continues to be protective of human health. While higher preference cleanup technologies may be available, they are still not practicable at this Site.

3.6 Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the remedial action were capable of detection below selected Site cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

4.0 CONCLUSIONS

The following conclusions have been made based on Ecology's draft periodic review report dated April 2011 and a review of the fuel hydrant system closure report dated January 17, 2012.

- The cleanup actions completed at the Site appear to be protective of human health and the environment.

- Soils cleanup levels have not been met at the standard point of compliance for the Site. The cleanup action had been determined to comply with cleanup standards since the long-term integrity of the containment system was thought to be ensured, and the requirements for containment technologies were believed to be met.

- The effective alternative mechanism instead of a Restrictive Covenant for the property is in place and continues to be effective in protecting public health and the environment from exposure to hazardous substances and protecting the integrity of the cleanup action.

Based on this periodic review, the Department of Ecology has determined that the requirements of the alternative mechanism continue to be met. No additional cleanup actions are required by the property owner. It is the property owner's responsibility to continue to inspect the Site to assure that the integrity of the remedy is maintained.

4.1 Next Review

The next review for the Site will be scheduled five years from the date of this periodic review. In the event that additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years from the completion of those activities.

5.0 REFERENCES

Site Assessment for Jet Fuel Hydrant System at Sea Tac International Airport, dated July 1994, by ENSR;

Fuel Hydrant System Investigation Report, Sera Tac International Airport, dated September 8, 1999, by Foster Wheeler Environmental Corporation;

Seattle Tacoma International Airport Construction Projects, Environmental Agent Work Plan, dated April 2002, by Lovely Consulting, Inc.;

Letter, Request for No Further Action, dated March 4, 2003, by Perkins Coie;

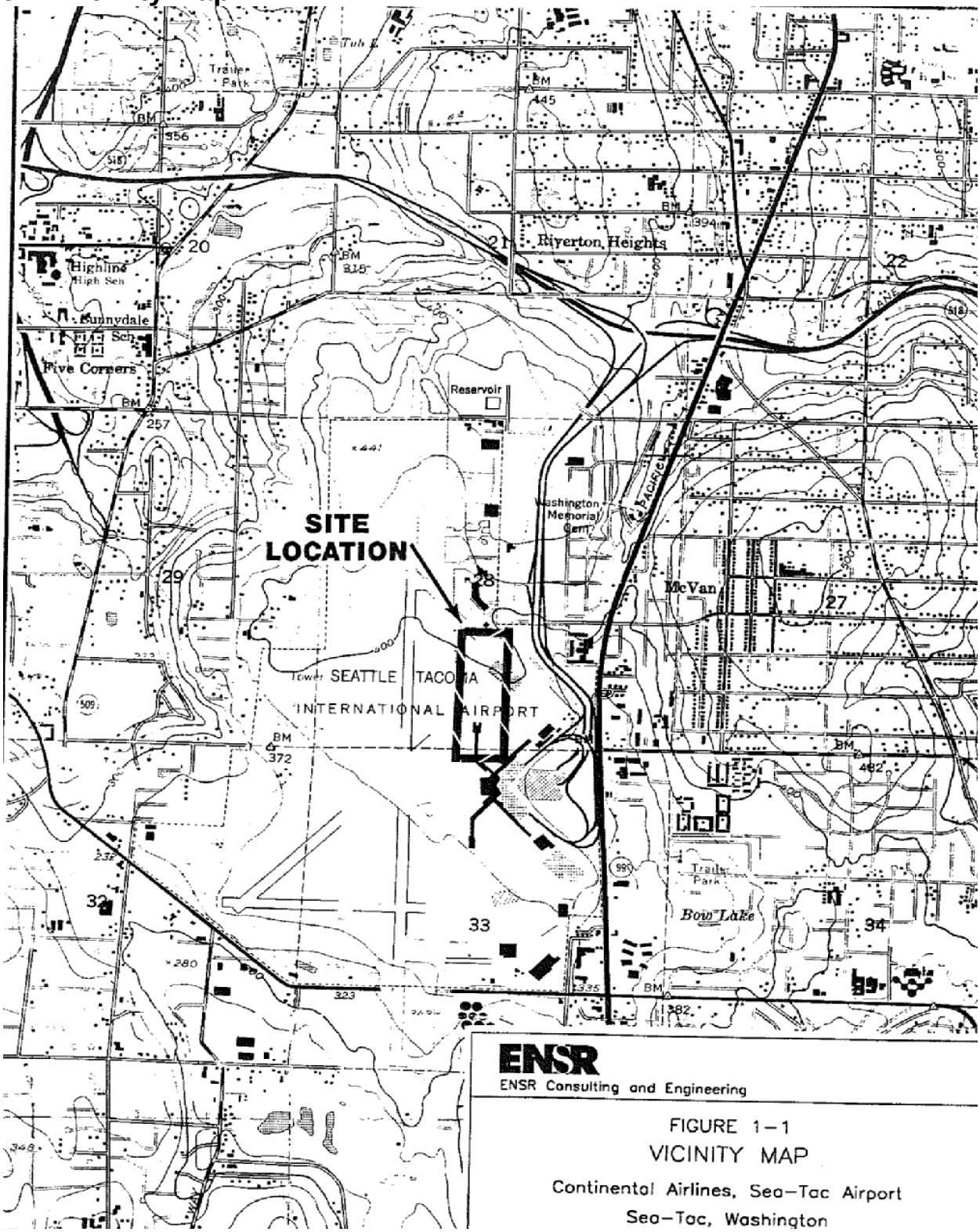
2003 Effective Alternative Mechanism (instead of a Restrictive Covenant);

Ecology, 2011 Site Visit;

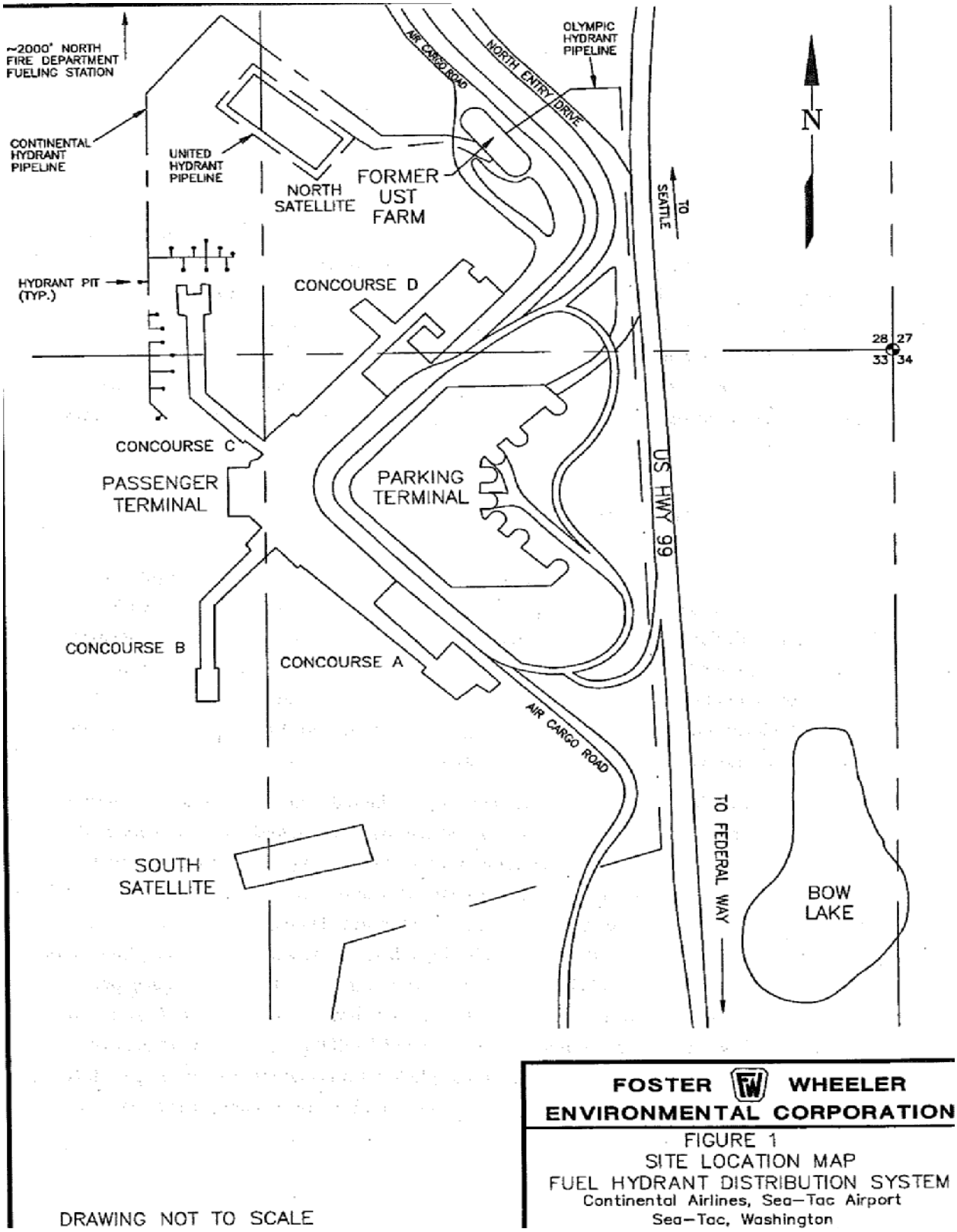
Closure of Continental Fuel Hydrant System, SeaTac International Airport, dated January 17, 2012, by SLR International Corp.

6.0 APPENDICES

6.1 Vicinity Map



6.2 Site Plan


~2000' NORTH
FIRE DEPARTMENT
FUELING STATION
CONTINENTAL
HYDRANT
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OLYMPIC
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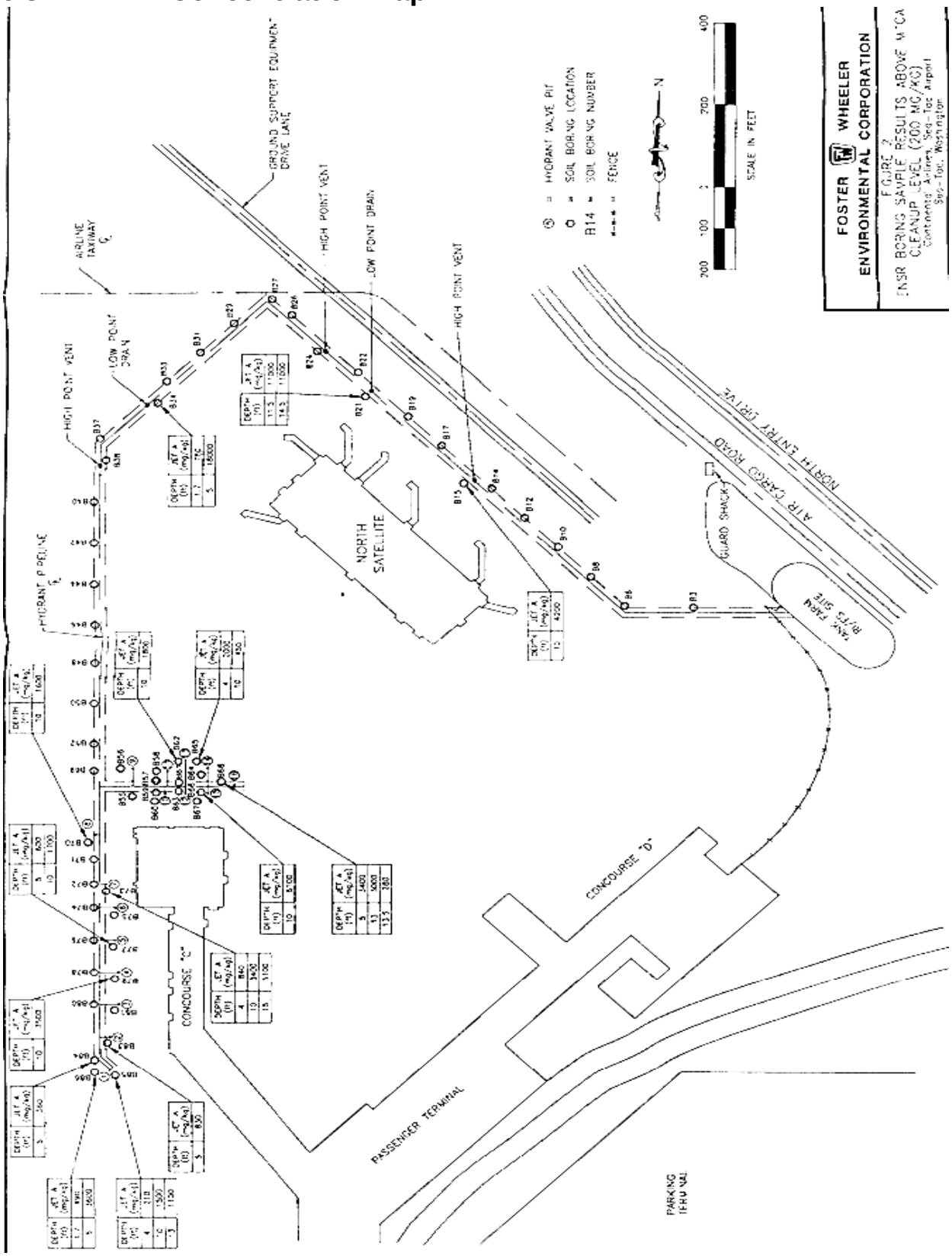
(TYP.)
CONCOURSE D
28 27
33 34
CONCOURSE C
PASSENGER
TERMINAL
PARKING
TERMINAL
US HWY 99
CONCOURSE B
CONCOURSE A
AIR CARGO ROAD
SOUTH
SATELLITE
TO FEDERAL WAY
BOW
LAKE
DRAWING NOT TO SCALE
FOSTER WHEELER
ENVIRONMENTAL CORPORATION
FIGURE 1
SITE LOCATION MAP
FUEL HYDRANT DISTRIBUTION SYSTEM
Continental Airlines, Sea-Tac Airport
Sea-Tac, Washington

6.3 TPH-Dx Concentration Map



6.4 Environmental Covenant

PORT OF SEATTLE
SEA-TAC INTERNATIONAL AIRPORT
AIRPORT OPERATIONAL AREA
INSTITUTIONAL CONTROLS

The following information is provided consistent with WAC 173-340-440(8)(b).

The Port of Seattle is the local government entity that owns and operates Sea-Tac International Airport (STIA). The Port does not routinely file with the county recording officer records related to the Port's interests at Sea-Tac International Airport.

STIA is an industrial property and will remain an industrial property for the foreseeable future. Port properties are zoned Aviation Operations or Aviation Commercial by the City of SeaTac. (See City of SeaTac zoning map and classification description, attached.) The subject environmental management site is located within the Aviation Operations zone.

Institutional controls implemented at Sea-Tac International Airport properties and facilities, both within and outside the Aircraft Operations Area, include the following:

1) Site access is restricted with fencing and property signage.

2) Construction activity conducted by the Port, Port tenants, and all contractors, or other work that might involve exposure to residual contamination, must be performed in compliance with airport procedures. Compliance with these procedures is required of the Port and all tenants and contractors. The procedures require that Port environmental staff review and approve any such work before it is performed. In addition, most construction or other work mentioned above at STIA requires issuance of a Building/Grading Permit from the Port of Seattle Airport Building Department and/or a Certificate of Port Standards Compliance (COPS) issued by the Port Project Management Group. These approvals are not issued until the Environmental Programs have reviewed and approved the project. See *STIA Project Design Manual* (1/01), and *STIA Tenant Design and Construction Process Manual* (10/02).

The Airport Building Department and COPS processes provide an effective alternative system to meet the requirements of a restrictive covenant. Compliance by the Port, Port tenants, and their contractors with the procedures discussed above results in environmental staff review of proposed projects to verify that such projects do not interfere with a cleanup action (e.g., verify that cap integrity is maintained) or result in a release of hazardous substance.

Should the Port transfer its ownership in any portion of Sea-Tac International Airport that is associated with this Site, the Port will refer to and comply with the MTCA requirements for institutional controls, including deed restrictions, that are in effect at the time of that transfer.

6.5 Photo log

Photo 1: The old and new hydrant fuel lines run underground. North Satellite at left.

Photo 2: Concourse C at left.

Photo 3: New hydrant fuel line access pt. at left (yellow circle). Old one is in the rusty spot.

Photo 4: Hydrant fuel line access point (bucket) with cover off. Others have no water.