



# Port of Seattle

December 7, 2000

Mr. John Wietfeld  
Washington Department of Ecology  
Northwest Regional Office  
3190 160th Avenue SE  
Bellevue, WA 98008-5452

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DEPT. OF ECOLOGY

Re: Seattle-Tacoma International Airport  
Ground Water Study  
Agreed Order # 97TC-122  
Response to Questions Received in November 16, 2000 Meeting

Dear John:

Thanks to you, Roger, Ching Pi, and Steve for meeting with us on November 16. The session was a valuable step in progressing with the Ground Water Study. We are working on the meeting notes, and will have them ready for your review in a few days.

During the meeting you provided two memoranda for our review. Thank you for passing on these requests for additional information. We have read through both the November 2 and the November 13 memos from Roger to you and others, and hope that the following information satisfies your needs.

Response to November 2 memo on Agreed Order task completion  
(Items numbered as in the November 2 memo.)

1. Research existing information...background hydrogeological description...; completed.
  - Agreed. Note, however, that to a limited degree we are adding new information as it is generated by other construction or other projects. New data are added only to the degree they describe locations or conditions not well represented in the database.
2. Research existing information...known areas of soil and ground water contamination...; completed.
  - Agreed.
3. Research existing information...potential unknown areas of soil and ground water contamination...; not complete.
  - Agree in part, and disagree in part. A detailed discussion follows in the response to the November 13 memo, below.
4. Research existing information...potential preferred pathways...; not complete.
  - Disagree. A detailed discussion follows in the response to the November 13 memo, below.
5. Research existing information...publicly recorded, operational private drinking water wells...; not complete.
  - Disagree. The Phase 1 task is complete. The data base includes all publicly recorded private drinking water supply wells within the target area. The operational status of these wells

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- becomes relevant only in determining whether ground water conditions present a MTCA risk. Therefore, investigation of well operating status would be scoped as an "if necessary" part of Phase 2 should Phase 1 or Phase 2 results indicate wells that are at risk. (Recall also that Agreed Order negotiations included an Ecology commitment to support and assist any survey required to identify the operational status of wells, as it is likely that some property owners would deny access to the Port due to the local political climate.)
- 6. Research existing information and compile a database of wells; completed.
  - Agreed.
- 7. Select representative set of wells, selection to be agreed on by Ecology; completed.
  - Agreed.
- 8. Collect four quarterly rounds of elevation data and report to Ecology; completed.
  - Agreed. Note that the "extra" data mentioned in the memo was obtained from newly installed geotechnical wells associated with the 3<sup>rd</sup> Runway project, and provide useful ground water level data for model calibration purposes.
- 9. Develop a ground water flow model, to be agreed on by Ecology; not complete.
  - Agreed. Our status stems from accidents of sequencing. We received a verbal approval to proceed to run the model, but prior to proceeding received an independent critique of the conceptual model from the 3<sup>rd</sup> Runway Gravel Study consulting team. By the time we fully addressed those comments and made appropriate modifications, we had been advised by Ecology not to rely on verbal approvals. Assuming the November 2 memo constitutes a written approval, we will proceed, subject to other schedule issues discussed during our November 16 meeting.
- 10. Develop a contaminant fate and transport model, to be agreed on by Ecology; not complete.
  - Agree in part, and disagree in part. See discussion of the November 13 memo, below, regarding potential unknown sites. Fate and transport conceptual model and modeling methodology were proposed in our October 4 presentation to Ecology. As discussed in that meeting and in previous conversations, we propose to use MT3D software to simulate contaminant migration.
- 11. Evaluate model data; not complete.
  - Agreed.
- 12. Prepare Ground Water Study report; not complete.
  - Agreed.
- 13. Pollution prevention tasks with respect to deferred and exempt tank systems; not complete.
  - Agreed. Note, however, the following two facts:
    - As discussed at length in development of the Agreed Order, this task is an Ecology lead task, wherein Ecology is to initiate discussions with tenant fuel system operators concerning options for improving pollution prevention techniques beyond the current legal requirements. The role of the Port is to provide Ecology facility access, to facilitate communications, and to provide in-meeting and post-meeting support. If Ecology lets us know when it wants to begin the process, we'll make the initial contacts to establish communication links, set meetings, etc.
    - From a logical sequence perspective, it appears that this task would follow completion of Ecology's UST systems inspection (Agreed Order Task IV 6.b.), which

we understand is still in progress. The discussion described by Task IV 6.a. can be conducted most efficiently after Ecology obtains the detailed information that is generated by the Task IV 6.b inspections.

14. Create UST database; completed.
  - Agreed.
15. Update database each year for five years; not complete.
  - Agreed, but we would prefer that the designation be changed to "Completed to date; additional activity required through 2003."
16. Prepare Pollution Prevention report; not complete.
  - Agreed.

With respect to the Ecology task completion status portion of the November 2 memo, we agree with the status conclusion of items 1, 2, 4, 6, and 7. For item 3, see response for Port task 10, above; for item 5, see response for Port task 13, also above.

At the time the Agreed Order was signed, *Forum* was the airport's newsletter. It is no longer being published, however, the Port is currently considering adding construction updates to its website.

#### Response to November 13 memo on "Potential Site" task completion

We appreciate your passing this memo along to us, as it points out what appears to be a potential misunderstanding that we'll have to resolve in order to proceed.

We think we've completed the "Potential Site List" task in accordance with the Agreed Order scope of work, but for the exceptions and the continuing data collection activities noted below. We have, contrary to the implication of the memo, engaged in an "honest, thorough effort" to complete the task we negotiated in Agreed Order scope of work, and have expended very significant time and resources to do so. We have compiled a list of the airport locations for which one could reasonably conclude the potential of historical release and Qva aquifer impact, as is shown clearly in the following information. If, upon reviewing the remainder of this memo, Ecology determines that we've left something out, please provide us with specific additional locations, and the basis for the agency's concern about those locations, and we'll be happy to consider them.

#### Memo Issues 2 and 4

Memo Issues 2 (first sentence) and 4 raise questions about the scope of our inquiry, specifically concerning the difference between historical facilities and operations, and concerning the geographic limits of the inquiry.

In conducting our search for "potential sites", we made no distinction between facilities and operations, as should be apparent from the discussion in the remainder of this letter. Our search required identification of any potential significant historical airport source of contamination that was not already on the Agreed Order list of known sites, or that had not been previously characterized and demonstrated to have no impact on, or no reasonable potential to impact, ground water in the Qva.

As we conducted the study, we identified major classes of "contaminated sites" that had potential to impact the Qva aquifer, including both known and "unknown" sites:

- Sites listed in the Agreed Order;
- Sites for which available data indicated no reasonable risk of impacting the Qva;

- Sites for which available data indicated a Qva impact or reasonable potential for impact;
- Potential sites (based on historical operations) for which no data were available.

Sites for which data were in hand prior to signing the Agreed Order but which were not added to the Agreed Order list due to the low probability of Qva impact were not considered further. Similarly, sites for which available data indicated no reasonable risk of impacting the Qva were not considered further. Sites for which Qva impact was known or could reasonably occur, and sites with no data, but with a potential (by historical operation) to impact the Qva were added to the potential sites list.

Our search to identify "potential sites" consisted of a review of historical documents and maps, and interviews of long time Port employees, focused on the general airport operating property, extending well beyond the AOMA. Although we did not establish limiting geographic boundaries when conducting our search, we could describe the boundaries that resulted from the completed search very roughly, and for gross illustration purposes only, as follows: Highway 518 to the north; South 192<sup>nd</sup> Street to the south; South 24<sup>th</sup>/ International Boulevard/ Air Cargo Road to the east (this boundary shifts to account for airport activity); and 12<sup>th</sup> West Avenue to the west.

Memo Issues 1, 2, and 3

Memo Issues 1, 2 (second sentence), and 3 raise questions about the conduct of our inquiry with respect to the inclusion or exclusion of facilities and operations. The memo specifically requests additional information about hangars, the Olympic Fuel Farm, major former fueling facilities, and aircraft washing detention and drainage facilities as "potential sources" not included in the list of potential sites.

Additional information on the status of these facilities and operations, and the basis for their inclusion or exclusion on the potential sites list follows:

- Memo Issue 2 refers to hangars.

Hangars: Data are available for each of the aircraft hangars that we are aware of, and indicate that, with the exception of sites associated with the Hangars that are independently listed in the Agreed Order, Hangar operations caused no reasonable risk of impacting the Qva aquifer. Unless otherwise noted, it is our understanding that documents referred to below are in Ecology's possession.

- Alaska Hangars: We have no information whether Alaska has performed a site assessment in the area of its hangars, however, the following information leads us to conclude that the facilities are not likely to have caused significant subsurface impacts or to have impacted the Qva aquifer. The buildings were constructed in 1966-67 and in 1985, both preceded by construction of the airport IWS system. Consequently, in contrast to the older hangars, the hangars were designed and constructed to dispose wastes to the existing treatment system (as was the practice at that time), significantly reducing the probability of ad hoc waste management. In addition, all of the tank systems associated with the hangars have been tested, have had environmental characterization performed, and are in compliance with current rules. The tanks noted to have had problems in the past have been removed or repaired. Ecology has issued at least one "no further action" letter to Alaska for Hangar area tanks under the Voluntary Cleanup Program.

- Delta Hangar. A 1998 Phase 1 site assessment and two 1999 follow up subsurface investigations were conducted by EMCON on behalf of Northwest (as a prospective purchaser of the facility, and in anticipation of demolishing the Delta Hangar to permit construction of a new Northwest Hangar). Investigation results were reported by EMCON in January and July 1999. Excluding the Delta Autogas Cluster site (a separate site included in the Agreed Order list), data from the Hangar and associated operations areas, including historical fuel facilities, demonstrated limited operational impacts (below cleanup levels consistent with the MTCA Interim TPH policy), and indicated no Qva impacts and no potential for discovered releases to impact the Qva. Summer 2000 demolition generally confirmed these findings. Although several areas of shallow contamination were discovered in addition to those identified in the RI, all contamination was sufficiently shallow to be removed by excavation, or demonstrated using MTCA Interim TPH cleanup levels to be of low enough concentration to remain in place with no risk to ground water. We anticipate that Northwest/Delta has or will publish a compiled construction observation and contaminated materials handling report at the conclusion of site construction.
- Northwest Hangar. A 1998 Phase 1 site assessment and 1999 subsurface investigation were conducted by EMCON for Northwest (in anticipation of building demolition and future airport construction). Investigation results were reported by EMCON in November 1999. Excluding the Northwest Hangar Tank area (a separate site included in the Agreed Order list), data from the Hangar and associated operations areas, including historical fuel facilities, demonstrated limited operational impacts (below cleanup levels consistent with the MTCA Interim TPH policy), and indicated no Qva impacts and no potential for discovered releases to impact the Qva. Northwest Hangar demolition is scheduled for late summer 2001.
- Pan Am Hangar. In 1998 a Phase 1 site assessment and a subsurface investigation were conducted by Floyd & Snider, Inc. on behalf of the Port (which stands as potentially liable party following Pan Am bankruptcy). Investigation results were reported by Floyd and Snider in July 1998. Excluding the Pan Am Avgas Tank area (a separate site included in the Agreed Order list), data from the Hangar and associated operations areas (including the areas used by Hangar tenants following Pan AM's bankruptcy) demonstrated limited operational impacts, and indicated no Qva impacts and no potential for discovered releases to impact the Qva. Pan Am Hangar demolition is currently underway, and, as of this writing, the one unanticipated discovery of impacted material has not yet been characterized.
- United Hangar. This site was discovered to be impacted during hangar demolition in 1991 and was remediated during the demolition process. Converse Consultants, on behalf of the Port (as a as potentially liable party with cost recovery from United) conducted a ground water RI in 1994. The Converse August 1994 report concludes that United Hangar releases had no Qva impact.
- Weyerhaeuser. The small Weyerhaeuser hangar on the west edge of the airfield was constructed in about 1981. The hangar is served by the IWS system, and, therefore, ad hoc waste management practices are unlikely. The fuel tanks associated with the hangar have been tested, have had environmental characterization performed, and are in compliance with current rules. We have no reason to include the

Weyerhaeuser hangar on a list of sites that have had a reasonable potential to adversely impact the Qva.

- Memo Issue 2 refers to the Olympic Fuel Farm.

Olympic Fuel Farm: In the Draft Agreed Order Scope of Work the Olympic Fuel Farm was excluded from the AOMA. The Port and Ecology arrived at this result because Ecology had no reason to believe from available information that fuel farm operations had impacted the Qva. Following receipt of public comment, however, in 1997 Ecology requested, and the Port agreed, to expand the AOMA to include the fuel farm. Ecology comments provided in February 2000 indicated that the fuel farm ought to have been included on the potential sites list as well.

While we were of the opinion that any significant release from the fuel farm to the subsurface would have caused observable effects, we agreed that the fuel farm is a significant facility about which there is limited subsurface data. Given the size of the facility, however, rather than making assumptions about a hypothetical release, the Port began a process by which Olympic would conduct a limited site investigation sufficient to determine whether facility operations had significantly impacted the subsurface. The mid-year change in Olympic ownership and management delayed implementation of the investigation, however, the Port has recently approved Olympic's work plan for a preliminary investigation, and drilling is currently scheduled for early December. Results from this investigation will be reviewed when they become available and, if appropriate, will be incorporated into the computer model.

- Memo Issue 3 refers to major former fueling facilities.

Major Former Fueling Facilities: Excluding the Olympic Fuel Farm, which is discussed above, there are eleven facilities that we assume fall under what the memo refers to as "major fueling facilities". Each will be discussed below. In sum, however, eight of these eleven facilities are listed in the Agreed Order, two of the facilities are included in the December 13, 1999 potential sites list, and one of the facilities has been investigated and determined to represent no reasonable risk of impacting the Qva aquifer. (In addition, an operating portion of a partially closed facility is not categorized.) Unless otherwise noted, it is our understanding that documents referred to below are in Ecology's possession.

- Continental Fuel Farm: Included in Agreed Order list. Tank removal was completed in 1992. Remediation in shallow subsurface is ongoing. Data confirm that there has been no impact to the Qva aquifer above MTCA cleanup levels (Burns and McDonnell, on behalf of PLP group, 1996).
- Continental Hydrant System: Included in Agreed Order list. Characterization investigation completed 1999 and reported by Foster Wheeler, on behalf of Continental, in September 1999. Data indicate no Qva impacts and no potential for discovered releases to impact the Qva. Ecology issued a "no further action" letter in April 2000, in response to Continental's MTCA independent cleanup using Interim TPH Policy.
- Delta Fuel Farm: Included in Agreed Order List. Tank removal completed in 1999. Cleanup was conducted consistent with Interim TPH Policy and reported by ATC Associates, on behalf of Delta, in November 1999 and February 2000. Data indicate no Qva impacts and a review of data consistent with MTCA Interim TPH Policy indicates no potential for discovered releases to impact the Qva.

- Delta Hydrant System: Excluded from both Agreed Order list and Potential Sites list. Characterization investigation was completed in 1998, and reported by ATC Associates, on behalf of Delta, in July 1999. Data indicate no Qva impacts and a review of data consistent with MTCA Interim TPH Policy indicates no potential for discovered releases to impact the Qva.
- Northwest Fuel Farm: Included in Agreed Order list. Tank removal was completed in 1998, and reported by EMCON, on behalf of Northwest, in May 1999. Site contamination was remediated using soil bioventing technology, from March 1999 – January 2000, at which time confirmation sampling demonstrated that Interim TPH Policy cleanup levels had been achieved (EMCON May 2000). Ground water monitoring is ongoing.
- Northwest Hydrant System: Included in Agreed Order list. Consists of a trunk line that provided fuel to two hydrant loops. The older hydrant loop is referred to as the "abandoned" system, which was taken out of service in 1976; the trunk line and the newer loop are referred to as the "closed" (or "current") system, which was taken out of service in 1997.
  - Northwest "Abandoned" Hydrant System: Characterization investigation completed 1998 and reported by EMCON, on behalf of Northwest, in January 1999. Data indicate Qva impacts adjacent to two hydrant pits at one location along the fuel system. Ground water monitoring ongoing.
  - Northwest "Closed" Hydrant System: Characterization investigation completed 1997 and reported by EMCON, on behalf of Northwest, in February 1998 (revised December 1998). Data indicate Qva impacts adjacent to two hydrant pits at two locations along the fuel system. Prior data describe a third "closed" hydrant system Qva impact location, associated with a 1992 fuel release (included separately in the Agreed Order list as the South Satellite Baggage Tunnel). Ground water monitoring ongoing.
- Pan Am Fuel Farm: Included in Agreed Order list. Constructed-in-place tanks were partially removed in 1990, and site investigations were completed in 1991 and 1992. Site contamination was localized near the floor of the tanks, which were left in place to prevent destabilizing area utilities (including high pressure fuel lines) and surface road. Five years of ground water monitoring demonstrated no impact to the Qva aquifer.
- Pan Am "Avgas" Tanks: Included in Agreed Order list. Four tanks were closed in 1988; two were removed in 1992, and the remaining two will be removed in 2001. (Although aviation fuel, "avgas", was originally stored in the tanks, Jet A fuel storage was the primary use of the tanks, and is the only fuel contaminant identified in the subsurface.) Various investigations indicate the Qva was impacted by releases of Jet A from tank operations. Ground water monitoring is ongoing.
- Pan Am Hydrant System: Included in Potential Sites list. Characterization investigation planned for 2001- 2002.
- United Fuel Farm: Included in Agreed Order list. Consists of one closed and one operational fuel farm areas.

- United "Closed" Fuel Farm Area: Tank removal was completed in 1993. Remediation is ongoing. Data confirm that there has been no impact to the Qva aquifer above MTCA cleanup levels (Burns and McDonnell, on behalf of PLP group, 1996).
- United "Operating" Fuel Farm Area: Fuel farm is fully operational. Closure currently planned for 2004.
- United Hydrant System: Consists of one abandoned system and one operational system.
  - United "Abandoned" Hydrant System: Included in Potential Sites list. Partially removed in 1991-1992 reconstruction of Concourse D. No environmental data exist for system elements that remain in place.
  - United "Operating" Hydrant System: Excluded from both Agreed Order list and Potential Sites list. System was last tested using Tracer technology in 1993, and determined to be leak-free. System closure is planned in stages, from 2002 - 2004.
- Memo Issue 1 refers to historic detention and drainage of aircraft washing fluids which contained solvents.

Aircraft Washing Lagoons: Prior to receiving the information provided by Ecology in February 2000, the Port included in the December 1999 Potential Sites list one of the two facilities suggested by the Ecology information. While that site (named in Port documents as the Northwest Lagoon or Northwest Sump) does appear on the Potential Sites list, 2000 construction in the vicinity has provided opportunities to acquire site data. Those data are now being reviewed and, if appropriate, will be included in the model.

Information provided by Ecology suggested a potential that another such structure was present, on the North end of the airport. Since receipt of the Ecology information, we have conducted additional research, which indicates a possibility that such a facility may have been employed on the north side of the AOMA, associated with the "settling pond" referred to by Ecology (which was fully remediated, and was shown to have caused no ground water impacts, in 1991-1994). At this time, prior to completion of our review, it appears that data collected from unrelated site investigations, by happenstance, describe the subsurface conditions associated with what may have been a former wash water detention facility. At the conclusion of our review we will discuss with Ecology whether available data warrant inclusion of the possible former facility in either the Agreed Order site list or the Potential Sites list.

Response to Additional Related Issue: November 2 Memo, Item 4

Item 4. of the November 2 Memo designates as incomplete a task to "Research existing information to identify potential preferred pathways of contaminant transport". We have no record of having specifically negotiated about the intent of this term. However, several facts lead us to conclude that the existing study data base and conceptual hydrogeologic model, together with the Potential Sites list, as those may be added to or amended, provide a sufficiently complete picture of the presence and location of significant contamination at the airport to conduct the Ground Water Study computer modeling without specific inclusion of additional preferred



contaminant pathways data. We also presume that generation of an additional preferred pathways presentation is unnecessary.

Our primary focus in our evaluation of preferential pathways has been to identify vertical pathways from the AOMA to the Qva. This work has consisted of mapping the presence and absence of till and other shallow fine-grain units. Places where the till is absent are identified as preferred pathways between the AOMA and the Qva. Some of these pathways are naturally occurring. Others are the result of construction activities, such as portions of the parking garage and the south satellite tunnel, which have been excavated through the till.

Our geologic interpretation of the till thickness has been presented to Ecology within previous hydrogeological submittals and has been reviewed by an Ecology contractor (Pacific Ground Water Group, in the context of the Sea Tac "Gravel Study"). The interpretation has also been peer reviewed by an independent reviewer. Neither Ecology nor either of the independent reviewers voiced significant disagreement with our interpretation of these vertical preferred pathways. Consequently, we have considered this effort to be complete.

With respect to horizontal pathways, the AOMA is underlain throughout by a very significant number of individual utilities of various types: piping for fuel, water, storm water drainage, Industrial Waste System drainage, and sanitary sewer drainage; electrical and communication systems ductbanks; security system ductbanks; subsurface tunnels housing systems for transporting people and baggage between the main terminal and the satellite gate areas; etc. Typical construction practices associated with each of these systems would have created utility backfill zones that act as preferential pathways in the vadose zone and in any perched water zones above the Qva aquifer for migration of liquids and any contaminants that may be present. In macro scale, it is unlikely that any of these represents a major preferred horizontal pathway, as opposed to all of these representing an area-wide spider-web of smaller preferred pathways.

We have concluded that the effort to model the flow, and fate and transport of contaminants, in the Qva would not be significantly enhanced by specifically defining the subsurface utilities in the AOMA, rather than by expressing a general understanding about the presence of these utilities throughout the AOMA. If, on reflection, Ecology desires a different conclusion, we'll be happy to discuss options.

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Again, we hope this response satisfies your needs. Please feel free to call me at 206-439-6604 if you have any questions, or to set another meeting to discuss these issues further.

Sincerely,



Paul W. Agio  
Sr. Environmental Program Manager

cc: Leavitt

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