



Responsiveness Summary

For The ARCO – Harbor Island Final Cleanup Action Plan (CAP)

November 19, 1999

Introduction

The Draft Cleanup Action Plan (CAP) and Consent Decree for the ARCO Harbor Site in Seattle, Washington were available for public review and comment from November 10, 1997 through February 18, 1998. A Public Hearing was held on February 18, 1998.

The Final Cleanup Action Plan, which is based on information presented in the Remedial Investigation/Feasibility Study Report, and revisions to the draft CAP due to comments received during the public comment period and at the public hearing, will be implemented under a Consent Decree. The Final CAP names the selected cleanup actions for the site. The plan also specifies cleanup standards and other requirements for the cleanup of the site.

Under the proposed Consent Decree, ARCO may receive an agreement from Ecology and the Office of the Attorney General that protects the company from future liability (a covenant not to sue). The decree also protects ARCO from third-party contribution lawsuits.

Background

From 1903 to 1905, Harbor Island was created from marine sediments dredged from the Duwamish River. Approximately 70% of Harbor Island is covered with buildings, roads or other impervious surfaces except for the above-ground storage tank areas where the oil companies are located. Harbor Island was placed on the National Priorities List in 1983, as a Superfund Site due to elevated lead concentrations in soil, as well as elevated levels of other hazardous substances.

EPA divided Harbor Island into 5 Operable Units; Unit 1 consists of the Tank Farms (Equilon or Former Texaco, ARCO, and GATX or Former SHELL); Unit 2 consists of the Marine Sediments; Unit 3 consists of Lockheed Shipyard Facility, and Unit 4 consists of Upland Soil and Groundwater, Unit 5 consists of the Shipyard sediment.

Under a Memorandum of Agreement (MOA) between EPA and Ecology, EPA designated Ecology the lead agency for the tank farms because petroleum is the primary contamination for Operable Unit 1. Petroleum is excluded from the CERCLA statute but is regulated under the State MTCA as a hazardous substance.

The ARCO property consists of two separate bulk storage plants, Plants 1 and 2. Plant 1 consists of approximately 12 acres located along the west waterway of the Duwamish River, and Plant 2 consists of 6 acres located in the north-central part of Harbor Island. Both plants were constructed in the 1930s and have been operated as bulk fuel storage and transfer facilities since

that time under a variety of owners. ARCO assumed operation of Plant 1 in the 1940s and Plant 2 in the 1950s.

ARCO's soil and groundwater are contaminated due to spills and leaks from the above ground storage tanks, underground storage tanks, product piping, oil/water separator and chemical storage areas (which contain small volumes of lubricants, paints and solvent used for on-site activity). An adjacent smelter has also contributed to the contamination. A Remedial Investigation (RI) was completed in 1994; a Feasibility Study (FS) was completed in 1997. Both documents were available for public review and comment in 1997. Results of the RI/FS indicate the following areas of concern:

Primary Areas of Concern:

Include areas beneath the shoreline warehouse (inaccessible) adjacent to the West Waterway and in the inland (accessible) areas of Plant 1. Weathered diesel and gasoline of approximately 14,000 gallons (including approximately 11,700 gallons recovered to date) have been trapped behind the subsurface shoreline warehouse bulkhead-seawall structures that form a partial barrier to ground water flow to the West Waterway. An interim remediation system has been installed to remove floating product and associated dissolved hydrocarbons in this area. The soils beneath the warehouse and inland portions of Plant 1 are contaminated with total petroleum hydrocarbons (TPH) and are potential sources of groundwater contamination.

Secondary Areas of Concern:

Include TPH contamination at the inland subsurface soils (accessible areas) in Plant 2, located at the middle of the Island.

Summary Of The Proposed Cleanup

****KEY REVISIONS TO THIS FINAL CAP ARE DENOTED BY THIS SYMBOL: ♠**

The proposed actions for cleaning up both the accessible and inaccessible TPH-contaminated soils include:

- ♠ Excavate the accessible TPH-contaminated soil hot spots located inland of Plant 1 that are above 10,000 mg/kg. This remedial action level will address the primary areas of concern impacted by TPH and it is based on EPA ROD for the industrial Harbor Island.
- ♠ Excavate accessible TPH-contaminated soil hot spots located inland of Plant 2 that are above 20,000 mg/kg. This remedial action level will address the secondary areas of concern impacted by TPH and it is based on EPA Guidance for natural attenuation.
- Treat inaccessible TPH-contaminated soil hot spots beneath the shoreline warehouse in the vadose zone with vapor extraction technology;
- Treat remaining residual TPH-contaminated soil with bioremediation/monitoring.
- Place a restrictive covenant on the property deed for "industrial use" only.
- ♠ Implement Contingency Plan, if needed.

The proposed actions for cleaning up the TPH-contaminated ground water include:

- ❑ Treat in-accessible TPH-contaminated soil hot spots beneath the shoreline warehouse in the smear and saturated zones with air sparging technology to strip residual hydrocarbons below the water table.
- ❑ Implement dual phase extraction wells for product removal and dissolved petroleum hydrocarbons in the groundwater.
- ❑ Treat groundwater before disposal.
- ❑ Conduct long-term ground water monitoring.
- ♠ Remove free-product from the water table, wherever present.
- ♠ Implement Contingency Plan, if needed.
- ❑ Place a restrictive covenant on the property deed for “industrial use” only.
- ♠ Remove free-product beneath the warehouse after 18 months of implementing this CAP
- ♠ Restore site groundwater to state standards after 5 years of implementing this CAP

Comments Received and Responses

A.1 EPA Region 10 - Natural Attenuation & Source Control (*public comment - PC*)

#1.1PC

“Source control measures are a fundamental component of any monitored natural attenuation remedy. At petroleum fuel spill sites “Following degradation of a dissolved BTEX plume, a residue consisting of heavier petroleum hydrocarbons of relatively low solubility and volatility will typically be left behind in the original source (spill) area. Although this residual contamination may have relatively low potential for further migration, it still may pose a threat to human health and the environment either from direct contact with soils in the source area or by continuing to slowly leach contaminants to groundwater. For these reasons, monitoring natural attenuation alone is generally not sufficient to remediate even a petroleum release site.”

A.1 RESPONSE

#R1.1PC

Ecology concurs that natural attenuation alone will not be sufficient to remediate the high concentrations of petroleum contaminated soils detected on site. In the Final CAP, accessible TPH hot spots will be excavated without undermining the integrity of the aboveground storage tanks. Monitored natural attenuation of the residual TPH and long term groundwater monitoring will be implemented.

A.2 Public Hearing (PH) Audience (Ms. Kathy Fletcher – People for Puget Sound) - Source Control and Interim TPH Policy

#1.2PH

“... It seems like a lot of the effort in all the studies and in the Interim Rule and how that Interim Rule is being applied is to minimize the amount of expenditure and effort that ARCO has to put into the cleanup; whereas a simpler approach, probably more expensive initially, but something that would actually give a long-term assurance that the site was clean would be to go in as I believe. One of the gentlemen who asked a question earlier said remove the contaminated soil and remove the sources so that there... we'd like this site cleaned up and the Duwamish River and Elliot Bay estuary protected as much as possible from petroleum contamination.”

A.2 RESPONSE

#R1.2PH

In the Final CAP, accessible TPH hot spots will be excavated and treated. Inaccessible TPH-contaminated soil hot spots beneath the shoreline warehouse in the vadose zone will be treated with vapor extraction technology. These inaccessible TPH-contaminated soil hot spots beneath the shoreline warehouse in the smear and saturated zones will also be treated with air sparging technology to strip residual hydrocarbons below the water table. Remaining residual TPH-contaminated soil will be treated with bioremediation/monitoring. A restrictive covenant will be placed on the property deed for “industrial use” only. The Contingency Plan will be implemented, if needed. A dual phase extraction-well system for product removal and dissolved petroleum hydrocarbons in the groundwater will be implemented. Groundwater will be treated before disposal. Long-term ground water monitoring will be conducted and free-product will be removed from the water table, wherever present.

Ecology believes that these cleanup actions will protect the Duwamish River and Elliot Bay estuary, human health and the public. For additional comments on source control please see Response Items E.1, #R5.1PC and E.2, #R5.2PH below. See Response Item A.5, #R1.5PH for comments on Interim TPH Policy.

A.3 Public Hearing (PH) Audience (Ms. Dawn Abrams – WashPIRG) and Public Comment (Eric Espenhorst – Friends of the Earth) -Source Control & Restoration Time Frame

#1.3PH

“... And it just seems like ARCO is getting a great big bailout, and I think that the Department of Ecology should be taking a really strong stand to make sure that ARCO is being held responsible while we have the chance to hold them responsible for all the pollution that they have created and not allow this to continue on for 23 years and years to come.”

#1.3PC

“Ecology’s multi-year delay in solving the polluted mess at Harbor Island does not inspire our confidence in the consent decree, which allows ARCO to leave the pollution in the ground indefinitely. A genuine cleanup program would do just that: remove the pollutants from the site, dispose of them properly, and restore the site to being safe”

A.3 RESPONSE

#R1.3PH/PC

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots, and a restoration time frame of 18 months to remove about 14, 000 gallons of product trapped next to the seawall-bulkhead. Also, time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. For additional comments, please see Response Items, A.2, #R1.2PH of the above for comments on source control and E.1, #R5.1PC and E.2, #R5.2PH below for comments on restoration time frame.

A.4 Public Hearing (PH) Audience (Mr. Andrew Stanbridge) and Public Comment (Carol Dansereau – Washington Toxics Coalition) -Source Control

#1.4PH

“...There is, however, oil in the bay that we all see. Whether it's ARCO or not, probably is at least some of it. Ecology is not doing their job because they are not putting restriction on rules for those companies. There is oil in the bay. These companies need to take action. They need to start thinking about their community not about their wealth as does Ecology. There's one definition of clean and that is no dirt and no oil.”

#1.4PC

“...We strongly oppose the proposal to let ARCO leave in place most of the massive contamination it perpetrated on Harbor Island”

A.4 RESPONSE

#R1.4PH/PC

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots and a restoration time frame of 18 months to remove about 14,000 gallons of product trapped next to the seawall-bulkhead. Time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. For additional comments, please see Response Items, A.2, #R1.2PH of the above and A.7, #R1.7PH/PC, E.1, #R5.1PC and E.2, #R5.2PH below for the preferred remedial action in the Final CAP.

A.5 Public Hearing (PH) Audience (Mr. Greg Wingard) -Source Control, Public Involvement , Restoration Time Frame & Interim TPH Policy

#1.5PH

“.... The Interim Policy, was implemented with little or no public input, no rule making. They are dancing around the issue. They're saying it's not really a rule change. It's just kind of a policy. We're actually using the MTCA law.... Well, you know, it's a lot of dancing around, but all I can tell you is I have seen cleanups that happen not using this Interim Policy; and I am seeing cleanups using the Interim Policy. One, you got aggressive, you optimized the pumping of the free product, you optimized the removal of the smeared soils, and then you looked at what to do about what was left. This plan shows no optimization of the removal of free product in the least available time. It shows no method of getting rid of the smeared soils other than removal by turning oil into carbon dioxide.... I understand that's a mechanism that probably happens, but it's not suitable and a fall back of if it gets worse some day, we'll do it then, it's not cost effective. The most cost most effective thing to do is go in, do the job, do it once, do it right, get out clean. And what we have here is a good deal for big oil and a bad deal for everything else. The policy really violates the principle of environmental justice as well because basically it sets up a situation where people who can afford to do six years of very complicated studies and have millions of bucks can do the studies and get a better deal. People that don't have the money to hang around for six years to do complicated studies get a much worse deal... They need to optimize the pumping of free oil and get it out of there now. They need to remove the seriously contaminated smeared soils. They need to do it now, and then we can talk about the rest of it. But get to the bad stuff now and get it out of there.”

A.5 RESPONSE

#R1.5PH

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots, a restoration time frame of 18 months to remove from the water table about 14, 000 gallons of product trapped next to the seawall-bulkhead. Time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. For additional responses, please see Response Item, A.2, #R1.2PH of the above and Response Items, E.1, #R5.1PC, E.2, #R5.2PH below for source control and restoration time frame, F.1, #R6.1PH below for public involvement.

The Interim TPH Policy provides people who are cleaning up a site with another means to evaluate the toxicity and mobility of different types of petroleum products.

Framework:

There are, and have always been, two primary approaches to cleaning up contaminated sites:

- ◆ The first approach is a one-size-fits-all cleanup (Method A). Those cleaning up a site could look up the cleanup level for TPH or other contaminant and use that number to clean up their site. The number is conservative because it is designed to be protective at any site.
- ◆ The second approach: "Method B, is site-specific." That is, it is a cleanup level that is set using data specific to that site.

Before the Interim TPH Policy, people cleaning up petroleum contaminated sites often did not use the second approach because more detailed scientific information about the nature of petroleum compounds was not available.

During the study of the Model Toxics Control Act by the PAC, the petroleum industry and others asked Ecology to make it easier for people cleaning up petroleum contaminated sites to use the second approach.

Scientists from Ecology, working with all others interested in participating, used new scientific information to develop a method that people cleaning up petroleum contaminated sites could use when applying the second, site specific approach. The method allows for evaluation of the toxicity and mobility of different petroleum products. This method is described in the Interim TPH Policy.

The guidance in the Interim Policy provides only limited evaluation of the ways that people or the environment can be exposed to contamination:

- Human exposure through ingestion of contaminated soil, and
- Contamination dissolving out of soil and being carried into groundwater.

Other potential exposures such as vapors, direct contact with contaminated soil, soil cleanup levels protective of groundwater and contamination in surface water must be addressed through other methods.

The Policy does not require one cleanup approach over the other. Those conducting a cleanup can decide to use either approach to clean up their site. For example:

If someone has a small or less complex site with soil contaminated with petroleum, they may want to use the first, more conservative approach because the cost savings would not be there to use the second approach. However, if someone has a site with a lot of petroleum contaminated soil, it would probably be more effective to use the second approach and spend more money characterizing the soil and less money on soil removal, treatment or cleanup.

Ecology is in the process of revising the regulations that support the Model Toxics Control Act. In the revision, Ecology plans to provide ways to address other types of TPH exposure - for example, inhalation of vapors in buildings or basements, and toxicity of petroleum to organisms on land and in water. In addition, Ecology believes that there is enough information to provide a more refined evaluation of the toxicity of different petroleum products.

Ecology will solicit and consider public comment, then issue the revised regulations later this year. The Interim Policy provides an interpretation of the regulations as they exist now. When the revised regulations are issued, the Interim Policy will no longer be in effect.

A.6 Public Hearing (PH) Audience (Mr. Dan Caldwell) -Source Control & Disposal Options

#1.6PH

“... ARCO is typical, and they should also remove all of the contaminated dirt. We don't want that dirt brought to SEATAC to fill as a landfill or the landfill, but they must remove the contaminated dirt. All ARCO all the rest of the piece of property and up, they must remove that dirt and sterilize it and replace it with fresh.”

A.6 RESPONSE

#R1.6PH

Remedial actions on site addressing TPH hot spots will be consistent with MTCA that require the use of permanent solutions to the maximum extent practicable WAC 173-340-360 (3) (a). For additional comments on source control please see Response Item, A.2, #R1.2PH of the above.

A.7 Public Hearing (PH) Audience (Ms. Carol Dansereau – Washington Toxic Coalition) and Public Comment (Richard A. Smith) -Source Control, Cleanup Standards, Adjacent Ecosystem & Interim TPH Policy

#1.7PH

“...Steve Robb said that the Interim policy quote doesn't create new ways to avoid regulations, but I think that as a practical matter we can all see that that is exactly what it does. Basically we're allowing with Ecology's assistance ARCO to avoid a Method A standard... The system is set up under the Interim Policy to favor ARCO and other deep pocket polluters. It's very hard for the public to participate in meetings in the way of these risk calculations... But most importantly what we are talking about is a situation where you are going to leave pollution there for our kids, and this is just a terrible precedent... The other thing that's mind boggling about the use of this policy here with this outcome is that we are talking about it being right in the middle of a globally significant natural resource. This area that the bay, the river is so critical in many ways, not the least of which is this habitat for salmon and other species, and we actually have study after study showing that these particular sorts of pollutants are already a major problem for salmon and other species... I think there are some real legal questions raised here in terms of

using this policy without having full rule making that happens under the Administrative Procedure Act, and I think those legal questions need to be investigated, if not by Ecology then by our citizens groups, so thank you.”

#1.7PC

“I am concerned about the contamination targets set in Ecology’s plan and believe this to be a matter of some significance to Elliott Bay”

A.7 RESPONSE

#R1.7PH/PC

MTCA Method A Residential Soil Cleanup Level for TPH is not appropriate and not applicable to Harbor Island because it is zoned an “Industrial Site” and will remain so for the foreseeable future. Method C Soil Cleanup Level is appropriate and applicable to the Harbor Island Industrial Site. Method B Soil Cleanup Level is appropriate and applicable to all sites based on site-specific considerations. In this Final CAP, all pathways of concern for the site were addressed and they include; soil to groundwater, soil and dissolved product to air, soil to groundwater to surface water and marine sediment pathways, and free product to surface water and marine sediment pathways. The preferred remedy in this Final CAP is adequate to protect human health and the environment including the West Waterway ecosystem. The preferred remedy include source control in the soil, remove free product, and dissolved petroleum hydrocarbons in the groundwater; periodic sediment sampling; periodic biota (species) sampling; contingency plans; long term groundwater monitoring; and deed restrictions. Ecology is currently going through rule changes to update MTCA as the cleanup industry evolves.

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots, and a restoration time frame of 18 months to remove about 14, 000 gallons of product trapped next to the seawall-bulkhead. Time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. For additional responses on source control and restoration time frame, please see Response Items A.2, #R1.2PH above and E.1, #R5.1PC, E.2, #R5.2PH below. See comments on Interim TPH Policy in Response Item A.5, #R1.5PH of the above.

A.8 Public Hearing (PH) Audience (Mr. John Beal – President, Green Duwamish Watershed Alliance) and Public Comment (Greg Nickels – Council Member, King CO, Tom C. Knoblauch, Alexandra Pye, J Grahame Bell -Source Control & Adjacent Ecosystem)

#1.8PH

“...But to look at human health I think you need to look at the fact the specific islanders and many other people take fish from the bay, from upriver and at that location, and in fact those salmon and salmonoids are being fouled by that oil.”

#1.8PC

“Please hold ARCO responsible to a thorough cleanup plan that protects the environment form contaminated surface water runoff and groundwater from continued pollutants”

“Also the site should be cleaned up completely, safely for environmental concerns, public health, and wildlife protection”

“I certainly concur with the People of Puget Sound that ARCO should cleanup its site and pay for the pollutant that ARCO has caused”

“While I might be able to understand a contention that petroleum based contaminants are not as potentially harmful as creosote, which is found in the Port of Olympia and other locations, for DOE to contend, or to attempt to “find”, that petroleum contamination presents little or more ridiculously no risk to the public health and the marine environment around Harbor Island, would be unforgivable and inexcusable”

A.8 RESPONSE

#R1.8PH/PC

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots, and a restoration time frame of 18 months to remove about 14, 000 gallons of product trapped next to the seawall-bulkhead. Time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. For additional responses please see Response Items A.2, #R1.2PH and A.7, #R1.7PH above and E.1, #R5.1PC, E.2, #R5.2PH, for source control, restoration time frame and protection of human health and the environment.

B.1 EPA Region 10 - Natural Attenuation – Performance Monitoring (PC)

#2.1PC

“Performance monitoring is another fundamental component of any monitored natural attenuation remedy. Monitoring programs should be designed to, among other accomplishments, demonstrate that natural attenuation is occurring according to expectations. Performance monitoring should continue as long as contamination remains above required cleanup levels. Contamination is not and will not re-contaminate the adjacent property prior to reaching the surface water.”

B.1 RESPONSE

#R2.1PC

Ecology concurs. In the Final CAP, the attached Groundwater Compliance Monitoring and Contingency Plans, Exhibit F, of the Consent Decree contains Performance Monitoring and Standards and Response Contingency Action Plan to be implemented as necessary. This is to ensure that remedial action objectives are met, and that human health and the environment are protected (adjacent properties included).

C.1 EPA Region 10 and David T. Johnson – Soil as a Source of Groundwater Contamination & Interim TPH Policy (PC)

#3.1PC

“The draft CAP and the draft selected remedy does not appear to give sufficient attention and consideration to the upland soils as a source of groundwater contamination, particularly considering EPA's experience and policy on the importance of removing the source of contamination wherever practicable before accepting monitored natural attenuation as an acceptable remedy. In addition, the draft CAP's method of addressing contaminated soils as a source of groundwater contamination appears to be inconsistent with the intent of both the interim policy and the MTCA regulations.

The MTCA regulations require that soil cleanup levels be established that will not cause contamination of ground water to concentrations that will exceed ground water cleanup levels.

The interim policy incorporates the following logic:

If measured ground water contaminant concentrations exceed standards, then remedial action of the source area is required.

If measured ground water contaminant concentrations do not exceed standards, then one -of four options should be used to establish vadose soil concentrations protective of the groundwater. ”

“The proposed remedy clearly points out the ramifications of the RBCA policy as adopted by Ecology: many such sites containing large amounts of contamination will remain as they are long-term monitoring being the only action taken”

C.1 RESPONSE

#R3.1PC

Key revisions in the Final CAP require excavation of accessible soil TPH hot spots in Plant 1 and Plant 2 without undermining the integrity of the aboveground storage tanks next to the soil hot spots. A restoration time frame of 18 months is required to remove about 14, 000 gallons of product trapped next to the seawall-bulkhead. Time required to restore the site groundwater to meet state standards is 5 years after implementation of this Final CAP. After which monitored natural attenuation of the residual TPH, Contingency Response Actions and long term groundwater monitoring will be implemented. For additional comments on the Interim TPH Policy, please refer to Response Item A.5, #R1.5PH of the above.

D.1 EPA Region 10 and Parker Blackman – Groundwater Contamination and Points of Compliance (PC)

#4.1PC

“The assumed point of compliance of groundwater may not be consistent with MTCA. WAC 173-340-720(6) requires that even when a conditional point of compliance is approved, the conditional point of compliance shall be as close as practicable to the source of the hazardous substance, not to exceed the property boundary. In addition, the same section of the MTCA regulations requires that a request for a conditional point of compliance include a demonstration that all practicable methods of treatment (AKART) are utilized in the site cleanup, which also does not appear to be addressed in the draft CAP. We also recommend that Ecology consider adding a requirement that all free phase or NAPL be removed whenever it is found anywhere on the ARCO property.”

“I believe that there may be problems with the current proposal that does not adequately address the issues of groundwater contamination and human health risks”

D.1 RESPONSE

#R4.1PC

Ecology concurs. In the Final CAP, point of compliance of groundwater for the inland portions of the site in Plant 1 and Plant 2 is as close as practicable to the source of the hazardous substance, and does not exceed the property boundary. Also, Ecology considers excavation of accessible TPH hot spots, a key revision in this Final CAP as a condition that meets AKART

under the MTCA WAC 173-340-720(6). Free phase or NAPL will be removed whenever it is found anywhere on the ARCO property. Contingency response actions outlined in the attached Exhibit F, Groundwater Compliance and Contingency Plans is added protection to ensure that groundwater meets state standard with a restoration time frame of 5 years after implementation of this Final CAP.

E.1 EPA Region 10 – West Waterway: Pilot Study, Restoration Time, Performance Standards and Contingency Plans (PC)

#5.1PC

“The monitoring system should probably include some way to evaluate whether the extraction system has effectively established hydraulic control. In our experience, establishing hydraulic control is a critical issue, especially at a tidally influenced site. If this evaluation shows that hydraulic control has not been established throughout the entire area of concern, the CAP and consent decree should require modification or expansion of the active remediation system until hydraulic control is demonstrated and maintained.

The draft CAP identifies groundwater cleanup standards, but it does not clearly state whether or not the active remediation system (including hydraulic control) must continue operation until these standards are achieved.

EPA's preference would be for the CAP to articulate the criteria for shutting off the system. These criteria should probably include a requirement that the active remediation system be kept operating until all NAPL is removed, all contaminated soil in and above the smear zone that could contribute in the future to water quality problems has been treated, and it has been demonstrated that there is no groundwater above the cleanup standards migrating past the active remediation system.”

E.1 RESPONSE

#R5.1PC

Since the Draft CAP was completed in November 1997, a Pilot Study for the shoreline area was completed in January 1999. The Pilot Study showed appropriate well locations to optimize the extraction system for effective hydraulic control of free phase and dissolve petroleum hydrocarbons in groundwater, collection of vapor from the vadose zone and stripping of hydrocarbons from the smear and saturated zones located below the ground water table. The final configuration of the extraction system will be outlined in detail in the Engineering Remedial Design Report to be submitted to Ecology under this Consent Decree.

Criteria for shutting off the extraction systems is outlined in the attached Groundwater Compliance Monitoring and Contingency Plans for the site, Exhibit F, of the Consent Decree. The Monitoring Plan includes attaining performance standards for NAPL, soil to groundwater pathways, soil and groundwater to vapor pathways, and groundwater to surface water pathways. Performance standards are built to trigger contingency response action plans to address all these pathways of concern. Removal of NAPL from the water table is projected at 18 months after extraction system startup, and restoration time frame for the site groundwater is projected at 5 years after implementing this final draft CAP.

E.2 Public Hearing (PH) Audience (Mr. Herbert Curl) – West Waterway: Quantity of NAPL, Restoration Time, Groundwater Compliance Monitoring Requirements & Interim TPH Policy

#5.2PH

“Apparently, the Interim Rule only addresses the pathways of product to ground water not into the Duwamish and not into receptors such as marine organisms. And one of the things that's not addressed is the total quantity of free product that's currently there, and if one assumes based on the implied model, which is not presented, it looks like there is an infinitely long period of time over which product is going to be delivered to the Duwamish waterway, and we already know that there's sheen there, so something is coming in there. The question is how long is this process going to go on? The five quarters of monitoring data that are eluded to are totally inadequate. This needs to be done for at least two years quarterly in order to get cycles that go over the wet and dry periods, summer and winter, and I would say a minimum of two years of quarterly data. Another issue is whether the solvent extraction system which is going to be discharging Class A carcinogens including benzene into the atmosphere is protective of human health, but also whether it contributes to smog formation in the Duwamish Valley because of summer time inversions there”

E.2 RESPONSE

#R5.2PH

Results of the Supplemental RI marine sediment sampling conducted in the Duwamish River adjacent to the site did not indicate that impacts due to ARCO operations exceeded the Marine Sediment Cleanup Standards to require active remediation. However, due to the on-going discharges to the bay of petroleum hydrocarbon sheen next to the Arco site, performance standards will require periodic evaluation of the sediment, biota, and the surface water next to the site as part of the attached Groundwater Compliance Monitoring Program, Exhibit F, of the Consent Decree for the site. This is to ensure that the preferred remedy for the site will provide continued protection to the bay as proposed in this final draft CAP.

The result of the Pilot Study shows that approximately, 14, 000 gallons of free product (including approximately 11,700 gallons recovered to date) has been trapped along the shoreline beneath the warehouse. The projected time to complete removal of the free product is 18 months after full extraction system startup. The projected time to restore the site groundwater is 5 years after implementation of the preferred remedial action alternative contained in the Final CAP. The Groundwater Compliance Monitoring Program requires quarterly monitoring over a 5-year period with annual trend analysis and contingency plan reviews.

The vapor extraction system will meet all substantive ARAR requirements for such technology and use under the Puget Sound Air Quality Standards to ensure that human health and the environment are protected.

For comments on the Interim TPH Policy, please refer to Response Item, A.5, #R1.5PH of the above.

E.3 Public Hearing (PH) Audience (Mr. David Johnson) Schedule, Pilot Study, Infiltration and Storm Water, Waste Handling, Direct Contact, Tank Maintenance & Adjacent Ecosystem

#5.3PH

“...Ecology should not enter into a consent decree when pilot testing is still required to determine the effectiveness of the proposed method of remediation... On the warehouse structure it appears to be unsuitable CAP to prevent infiltration. There appears to be inadequate protection of contaminated soil throughout the entire site against infiltration. The ground water to marine sediments pathway does not appear to consider the effects on pre-swimming quality life including salmon. Of course, as other people have mentioned the location here is right at the mouth of the Duwamish River. That also applies to the inland ground water to surface water pathway, and the soil to ground water pathway. There's no evaluation of a soil to surface water pathway even though the site's adjacent and in close proximity to marine waters.

There's no consideration anywhere that I could see of storm water runoff from the site for either now or the future. What's going to happen with the existing storm water collection system? Is that storm water going to be collected and treated? The storm water pipes themselves might provide a conduit for carrying some of this pre-phase oil off the site. There is no mention of storm water permit requirements in the areas of the Cleanup Action Plan.

There also appear to be insufficient consideration of the application of the Washington State Dangerous Waste Regulations. Are there any RCRA waste management units here? Was this site a generator of dangerous wastes by exposure? Are there any Washington State dangerous wastes or anything on the site? For instance, tank cleaning sludge, what happened to those? Are the tanks going to be cleaned up or are they still full of sludge?

And then finally the schedule. Other people have mentioned that too, but the schedule has no milestones. It has no objectives. It has no targets. It appears all ARCO has to do here is complete this monitoring and perform this limited free product removal and they're done. And this consent decree permits you from coming back to them for any further action. There's no deadline for when they have to accomplish this other than just subject to final approval. So there's no schedule here that will hold them to finish this job, even the limited amount that is described here.

And then the soil cleanup levels appear to be set on this really high direct pathway, direct contact pathway, 150,000 milligrams. That's 15 percent. That's not soil; that's oil. Even with that high of level they're saying they don't have to do anything to the highest soils. The soil that have been found on the site is 90 some thousand for TPH diesel. The thing to consider here is a lot of the samples were collected between these tanks and a lot of the leaks happen under the tanks. The water collects in these tanks, corrodes holes through the bottoms of the tank and the product goes directly beneath the tank. And they haven't removed these tanks and they haven't sampled under those. Some of the highest soil levels could be under the tanks that haven't been investigated.”

E.3 RESPONSE

#R5.3PH

The Pilot Study for the extraction system was completed in January 1999. Please see Response Item E.1, #R5.1PC for additional comments on the pilot study results. Harbor Island is a Superfund Site. EPA Region 10, is the regulating agency overseeing requirements concerning infiltration and dike containment and integrity around the above storage tanks.

ARCO has completed replacement of the tank bottoms with double containment and leak detection to ensure protection of the human health and the environment. In addition, all active piping has been raised above ground.

This Final CAP addressed all the environmental pathways of concern identified for the site that relates to the protection of human health and the environment including the adjacent properties and the West Waterway ecosystem. Please see Response Items A.2, #R1.2PH, A.7, #R1.7PH and E.1, #R5.1PC of the above for additional comments on source control, restoration time frame and the site environmental pathways of concern.

ARCO maintains an active storm-water collection system at sensitive areas on the site (loading rack area). Collected contact water is treated by a carbon infiltration system and is disposed of through the sanitary sewer system.

Investigation derived “Dangerous Waste” from drill cuttings were addressed during the RI/FS Public Comment Process. These wastes were properly drummed on site and disposed according to the dangerous waste regulation. TPH hot spot excavation/treatment/disposal will include appropriate quality control screening and designation for proper waste handling. Tank bottom cleanup is a routine above storage tank maintenance task required for the longevity of those tanks. Bottom sludge disposal, also, require appropriate quality control screening and designation for proper waste handling.

The Final CAP contains implementation Schedule and Milestones as Exhibit E, of the Consent Decree. Exhibit E contains milestones to begin hot spot removal, milestones for free product removal, the time to submit the Engineering Design Report, restoration of the site groundwater, Contingency Plan Implementation. For specific timelines and dates, please refer to the attached Exhibit E.

Please see Response Item G.1, #R7.1PC below for comments on “Direct Contact Pathway.”

F.1 Public Hearing (PH) Audience (Ms. Minnie Brasher) – Public Participation Process
#6.1PH

“Most of these things with the Department of Ecology are finally complete by the time the public really gets to talk like this tonight. We don't get in on the initial projects, per se. We hear about it when it's completed, and I think that the main objective of the Department of Ecology and the EPA is to protect the public, not make it easier for commerce. These places need to be cleaned up.”

F.1 RESPONSE
#R6.1PH

The RI/FS and the CAP for the ARCO Harbor Island are subjected to the Public Comment Process as required by MTCA WAC 173-360-600. Notice was published in the Seattle PI and Ecology's Site Register. Also, public notification fact sheets were mailed to those citizens who had expressed interest for additional notification during each successive completion of the cleanup milestones.

For additional comments on the preferred remedial action contained in the final draft CAP to protect human health and the environment, please refer to Response Items, A.2, #R1.2PH, B.1, #R2.1PC, C.1, #R3.1PC and E.1, #R5.1PC, of the above.

F.2 Public Hearing (PH) Audience (Mr. Mike Sato – People for Puget Sound) and Public Comment (Velma R. Veloria – State Representative 11th District) – Public Participation Process

#6.2PH

“...I thought the decision had already been made from the presentation and the real close sense of partnership between ARCO and the Department of Ecology and working this all out. I would hope that after hearing some of the questions and also having some of these comments that it would lead you to consider or reconsider what the wisdom of this approach is...”

#6.2PC

“Any solution sought by ARCO and the Department of Ecology to cleanup the mess must put the people and their concerns in the forefront of their decision making process”

F.2 RESPONSE

#6.2PH/PC

The Final CAP contains key revisions as a result of the public hearing and comment period. Some of the key revisions include requirement for soil TPH hot spot removal, restoration time frame for free product and petroleum dissolved in site groundwater and contingency response actions. For additional comments on the preferred remedial action contained in the Final CAP to protect human health and the environment, please refer to Response Items, A.2, #R1.2PH, B.1, #R2.1PC, C.1, #R3.1PC, E.1, #R5.1PC and F.1, #R6.1PH of the above.

G.1 EPA Region 10 – Direct Contact TPH Contaminated Soils & Interim TPH Policy (PC)

#7.1PC

“The Method C cleanup levels calculated using the surrogate method only address direct contact threats through soil ingestion. Because these cleanup levels are quite high, it may also be worthwhile to consider whether protection of future workers through other direct exposure routes, such as dermal exposure, require more stringent cleanup levels.”

G.1 RESPONSE

#R7.1PC

The direct contact cleanup levels developed by ARCO as part of the FFS were calculated by retrofitting data from the old analytical method into Ecology’s Interim TPH Policy. The new analytical methods under the Ecology’s Interim TPH Policy require analysis of various petroleum hydrocarbon surrogates present at the site. Ecology does not have a policy concerning retrofitting of old analytical data. The average retrofitted data for the direct contact pathway is 140,000 mg/kg. MTCA regulates direct contact pathways from 0 to 15 feet below ground surface (bgs). Hot spot removal for the ARCO site outlined in the Final CAP will occur from 0 to 5 feet (maximum depth of vertical impact) bgs at Plant 1. This hot removal will use the EPA TPH hot spot action level of 10,000 mg/kg for Harbor Island. TPH hot spot action levels of 20,000 mg/kg will be used in Plant 2. This action level is the EPA Lower Threshold Guidance for natural attenuation.

The residual contamination that will be left behind in Plants 1 and 2, after the hot spot removal will be protective of human health and the environment. This is because of the added protection through institutional controls, proper worker training through health and safety work plans, biodegradation of the residual TPH in the subsurface soil, long-term groundwater monitoring and continued zoning of the Island as an Industrial site.

H.1 EPA Region 10 – Fate and Transport Modeling Groundwater Contamination (PC)

#8.1PC

“The draft CAP states (page 15) that: "Fate and transport modeling and site groundwater monitoring show that inland in-situ bioremediation will act to destroy soil contaminants which may act as an ongoing source of ground water contamination." This statement does not appear to be supported by the information in the RI, FS and FFS.”

H.1 RESPONSE

#R8.1PC

Statement has been stricken from the Final CAP. Ecology concurs that natural attenuation alone will not be sufficient to remediate the high concentrations of petroleum contaminated soils detected on site. In the Final CAP, accessible TPH hot spots will be excavated without undermining the integrity of the aboveground storage tanks. Monitored natural attenuation of the residual TPH and long term groundwater monitoring will be implemented.

H.2 EPA Region 10 – Fate and Transport Modeling Groundwater Contamination (PC)

#8.12C

“In addition, the fate and transport modeling and groundwater monitoring has not been sufficient to show that groundwater contamination is not leaving the ARCO property, particularly from the area between Tanks 1 and 9 on Plant 1.”

H.2 RESPONSE

#R8.2PC

Analysis of the fate and transport southeast of the site next to the above-ground storage tanks 1 and 9 in Plant 1 shows that groundwater contamination may exceed cleanup levels beyond the property boundary but may not exceed cleanup levels by the time it gets to the shoreline.

H.3 EPA Region 10 – Fate and Transport Modeling Groundwater Contamination (PC)

#8.3PC

“No fate and transport modeling has been done on the soils, nor of the contaminants found in the ground water closest to the hot spots. Only one groundwater contaminant was modeled and this at only one upland well, benzene in AR-03, which is approximately 150 to 200 feet down gradient of the soil hotspot area. While benzene is among the more mobile contaminants likely to be found in petroleum, it also has relatively short half-life. The potential for transport from the hot spot area of other contaminants found in TPH, less amenable to adsorption and breakdown, does not appear to have been addressed.”

H.3 RESPONSE

#R8.3PC

The fate and transport modeling relates only to contaminants in groundwater. Modeling was conducted on maximum contaminant concentration found in inland groundwater sampling results at the nearest soil hot spot. Analyses of groundwater sampling results show that the most problematic and soluble contaminant found in the groundwater beneath the ARCO facility is Benzene. Modeling was not conducted at the inland groundwater wells with free product.

H.4 EPA Region 10 – Fate and Transport Modeling Groundwater Contamination (PC)

#8.4PC

“No calibration of the transport model was performed. Calibration is important because it provides some level of assurance that the results predicted by the model approximate real world conditions. For example, the modeling shows that the concentration of benzene near tank 9 would be reduced from 1100 ug/l to less than 71ug/l (the cleanup level) in less than 5 years (FFS, figure 2-14), whereas the level of benzene in this off-site down-gradient well is equally high in both 1993 and 1996 (FFS, Table C-1.)”

H.4 RESPONSE

#R8.4PC

The process of refining model representation of the hydrologic framework, hydraulic properties, and boundary conditions to achieve a desired degree of correspondence between the model simulation and observations of the groundwater flow system (calibration) is usually associated with numerical groundwater flow models. Implementations of simple analytical solutions usually employ qualitative considerations for comparing simulation with site-specific information (reality check) and this was done for the site. The fate and transport model conducted applied a simple analytical model to a complex and dynamic coastal groundwater system. The model was used to conceptualize flow beneath the inland portion of the facility and to corroborate field observations and earlier EPA model predictions at the Island.

In the Final CAP, accessible TPH hot spots will be excavated without undermining the integrity of the aboveground storage tanks. Monitored natural attenuation of the residual TPH and long term groundwater monitoring will be implemented.

H.5 EPA Region 10, David T. Johnson, and Mike Sato – People for Puget Sound – Fate and Transport Modeling Groundwater Contamination (PC)

#8.5PC

“The modeling did not look at the cumulative impact of all TPH sources on all the tank farms on concentrations at the ground water/surface water interface. This could be a potential source of underestimation of the impact of these contaminated areas that probably should be addressed.”

“...The computer models may be failing to show future migration that might need to be addressed at a later date. If this occurs, what regulatory framework will then exist to compel removal of the contamination”

“...We have serious concerns that Ecology’s risk-based interim policy for petroleum contamination being solely based on modeling, may not adequately provide protections for public health and water quality in the Duwamish estuary.”

H.5 RESPONSE

#R8.5PC

The focus of the fate and transport modeling was on the migration of inland groundwater contaminants. Ecology independently looked at the various impacts from selected TPH Hot Spot sources on all the tank farms (ARCO, GATX (formerly SHELL), EQUILON (formerly TEXACO)) on concentrations at the ground water/surface water interface. The results are consistent. There appears to be no impact from the selected inland sources to the groundwater/surface water interface shorelines. However, there will be impacts at adjacent properties before the contaminated groundwater reaches the shoreline.

The cleanup decision in this Final CAP that include the following Key revisions: excavation of accessible soil TPH hot spots in Plant 1 and Plant 2 without undermining the integrity of the aboveground storage tanks next to the soil hot spots; a restoration time frame of 18 months to remove about 14, 000 gallons of product trapped next to the seawall-bulkhead; a restoration time frame of 5 years to restore the site groundwater to meet state standards and monitored natural attenuation of the residual TPH, Contingency Response Actions and long term groundwater monitoring is not based on the results of the fate and transport modeling.

NM:nm