US Army Corps of Engineers

Proposed Plan
Tongue Point Landfill
Astoria, Oregon

Introduction

The United States Army Corps of Engineers (USACE) invites you to comment on our proposed plan for the Tongue Point Landfill (Landfill) in Astoria, Oregon. The proposed plan summarizes the extensive information collected during our investigation and contained in the Project Administrative Record for the Tongue Point Landfill and adjacent aquatic areas. We conducted an investigation for the project to assess contaminants potentially resulting from past U.S. Department of Defense (DoD) activities at the Landfill that meet the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) definition of a hazardous substance. The USACE and the Oregon Department of Environmental Quality (ODEQ), the lead regulatory agency, have worked together to select the proposed remedy. The remedy may be modified based on public input or additional information brought forward during the public comment period. The project is being conducted as part of the Formerly Used Defense Sites (FUDS) program.

Public Comment Period

Your comments are important to us. The final decision for the project will be made after reviewing and considering all information submitted during the comment period from March 27, 2018 through April 27, 2018.

Public Meeting

You are invited to attend a public meeting on April 11, 2018 to hear more about the proposed plan. This is an opportunity to learn more about the project, ask questions, and share relevant concerns. Please see the "Opportunities for Public Involvement" section of this plan for additional information about the meeting.

Submitting Comments

Comments may be submitted during the public meeting or by mail or email until April 27, 2018. Following the public comment period, the USACE will summarize and respond to public comments in a responsiveness summary, which will become part of the official decision documents.

Project Background

The Tongue Point Landfill is located at the former Tongue Point Naval Air Station (NAS) in Astoria, Oregon. The Landfill is in a rural area on the tidelands near the mouth of the Columbia River where Mill Creek enters Cathlamet Bay. The Landfill is located near Old Highway 30 approximately 3 miles east of Astoria, Oregon (**Figure 1**).

The DoD acquired the property from Clatsop County by deed and condemnation in 1921. To support ongoing military activities, the Navy operated the Landfill from 1941 until 1962 when the NAS was deactivated. NAS operations included operation of a Naval Seaplane Base from 1941 through 1946. In 1946, naval air operations ceased, and the base became a fleet facility for the Columbia River Group of the Pacific Reserve Fleet. In 1962, the facility was deactivated, and the property was transferred to General Services Administration. Because of the diversity of industrial activities that occurred at the NAS, an assortment of solid and liquid wastes was disposed at the Landfill. Wastes included construction debris and other solid wastes generated at the NAS. The waste materials were associated with ship maintenance, repair, and mothballing, e.g., waste oil, diesel fuel; machine shop wastes; building and landscape demolition debris; various oils/paints/solvents; metals; wood waste; buried drums; car engines and frames; large appliances; crockery; wire; glass; and bricks.

The Landfill was subject to a series of investigations and limited remedial investigations (LRI) leading to a non-time critical removal action (NTCRA), followed by development of a focused feasibility study (FFS). The investigations and studies were conducted per requirements of the Defense Environmental Restoration Program (DERP) and CERCLA. The process followed includes the CERCLA steps listed below.

- Remedial investigations related to the Landfill 1992 to 2002
- Baseline risk assessment and engineering evaluation and cost analysis (EE/CA) 1999
- Action Memorandum March 2003
- NTCRA design and construction 2006
- NTCRA operation, monitoring, and maintenance 2007 and ongoing in 2017
- Post-NTCRA investigation of Landfill aquatic area and risk assessment 2008
- Feasibility study for the Landfill 2014 to 2016

The USACE implemented the NTCRA in 2007 to address ecological risks related to the Landfill. The NTCRA included contaminated soil and sediment removal, construction of a barrier wall that encompasses the Landfill, construction of a landfill cover and associated

landfill gas collection system and stormwater controls, and installation and operation of a light non-aqueous phase liquid (LNAPL) recovery and separation system. The USACE completed a detailed investigation in 2008 and evaluated residual risk to human and ecology receptors after completion of the Landfill NTCRA. A protectiveness evaluation was completed as part of the FFS to evaluate the effectiveness of the Landfill removal action components to provide containment of contaminants.

Based on the USACE's investigations at the Landfill and the accompanying health and environmental risk assessments, the Landfill removal action has been determined to be protective of human health and the environment in the short term. Maintenance and monitoring of the removal action components will ensure protectiveness to human and ecological receptors in the future.

This proposed plan summarizes USACE's findings and remedy selection process. The FFS and supporting technical documents related to the Landfill are available in the Administrative Record file at the Astoria Public Library.

Previous Investigations Leading up to the Removal Action

Specific investigations and evaluations conducted at the Landfill by the Seattle District of the USACE are summarized below:

Tongue Point Landfill LRI – 1992 to 1993

- Eight sediment grab samples were collected in the intertidal region of the Landfill.
- Nine groundwater monitoring wells and seven seeps near the Landfill were sampled and analyzed.

Finger Piers Sediments LRI – 1995

- Thirty-two sediment cores and surface grab samples were collected from around the finger piers.
- Twenty surface sediment grab samples were collected at background locations in Cathlamet Bay.

Phase II Tongue Point Landfill LRI – 1995 to 1998

- Twenty surface sediment grab samples were collected from the shoreline at the toe of the Landfill.
- Sixty surface sediment grab samples were collected from the nearshore, mudflats, and offshore areas adjacent to the Landfill.
- Geophysical survey.
- Soil gas survey.
- Groundwater screening surveys.
- Drilling program, including soil borings and installation of shallow and deep monitoring wells.
- Soil, groundwater, seep, and LNAPL sampling and analysis.

EE/CA 1999

- Human health and ecological risk assessments
- EE/CA for removal action alternatives

Supplemental Studies to the Landfill LRI – 2000 to 2002

- Wetlands delineation
- Biological assessment
- Geotechnical exploration
- Pilot pumping test
- LNAPL evaluation

USACE evaluated the data collected during these investigations and completed a baseline risk evaluation for the Landfill. The primary sources of chemicals released at the Landfill are buried refuse and petroleum products. Metals, polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pesticides, polychlorinated biphenyls (PCBs), and dioxins/furans were identified as chemicals to be evaluated further based on the conservative risk-based toxicity screening performed. An EE/CA with risk assessments was prepared and evaluated alternatives to perform a NTCRA to address risks posed by the Landfill. Estimated human health risk for combined exposures was 7 in 1,000,000, which is within the U. S. Environmental Protection Agency (EPA) established acceptable excess cancer risk range of 1 in 10,000 to 1 in 1,000,000 over a person's lifetime. The ecological risk assessment identified a potential threat to aquatic receptors adjacent to the Landfill from chemicals, such as PCBs and pesticides, in seep water and sediment.

Landfill Removal Action

The risk assessments completed as part of the EE/CA identified potential adverse ecologic effects to aquatic biota adjacent to the Landfill from the chemicals in sediment and groundwater/seep water. In 2006, a NTCRA was implemented to address the ecological effects of PCBs and pesticides in sediment and seep water adjacent to the Landfill. The NTCRA consisted of constructing a soil-bentonite barrier wall along the perimeter of the Landfill; emplacing a landfill cover; and installing an upgradient groundwater interceptor trench and drain, a landfill gas collection system, and an LNAPL recovery and separation system. The barrier wall was designed to extend from above the seasonal high-water table to tie into the low-permeability bedrock of the Astoria Formation siltstone, which underlies the Landfill. Other actions involved excavation of approximately 19,600 cubic yards of contaminated sediment/soil, placement of the material inside the containment area, and installation of groundwater monitoring wells.

The operation and maintenance (O&M) period of the Landfill removal action began in June 2007 and has continued through 2017. O&M activities have included

removal of LNAPL, erosion repair along the shoreline, regular inspections, and maintenance of the cover, and groundwater and landfill gas monitoring.

Assessment of Post-Removal Action Risk

Once the NTCRA was complete, it was necessary to determine if the Landfill removal action components had addressed the ecological risk that had been identified in the baseline risk assessment. Several investigation activities were completed to evaluate the effectiveness of the NTCRA. The focus of the post-NTCRA investigations was to demonstrate containment of LNAPL, contaminated groundwater, and soil at the Landfill and determine post-NTCRA concentrations of the chemicals of concern in sediment, groundwater, and landfill gas. The post-NTCRA data were used to support the FFS for the final remedy for the Landfill. Assessments to evaluate the effectiveness of the NTCRA include:

Exploratory Drilling along the Barrier Wall – 2006

- Seven boreholes were drilled along the barrier wall alignment to confirm hydrogeologic conditions below the barrier wall.
- Soil samples were collected for permeability testing to determine the hydraulic conductivity of soil underlying the barrier wall.
- Slug tests were conducted at Landfill monitoring wells to determine hydraulic conductivity of the water bearing strata within and underlying the Landfill.

Groundwater Monitoring – 2008 to 2014

- Two pressure transducer studies were conducted at Landfill monitoring wells in 2008 and 2014 to evaluate hydraulic containment of the barrier wall and landfill cover system.
- Four monitoring events were conducted in 2008, 2010, 2011, and 2013 to determine chemical concentrations in groundwater within and outside the Landfill.

Post-removal Action Sediment Sampling at the Landfill Aquatic Unit – 2008

- Incremental surface sediment sampling (seven analyses) and discrete sediment sampling (three analyses) were completed over the aquatic area adjacent to the Landfill.
- Clams and fish were collected for analysis of tissue samples.
- Incremental surface sediment samples were collected from an upstream reference location.
- Sediment and clam tissue samples were analyzed for selected chemicals.

Landfill Gas Monitoring – 2015 to 2016

- Landfill gas sampling at six landfill gas vents in September 2015 and April 2016 and analysis for volatile organic compounds (VOCs)
- Landfill gas measurements of methane, carbon dioxide, and oxygen at the six gas vents in February and September 2015 and April 2016

The USACE evaluated the post-NTCRA data in a Landfill protectiveness evaluation that was included as an appendix to the Tongue Point Landfill FFS. The purpose of the protectiveness evaluation was to evaluate the effectiveness of the NTCRA to achieve containment of contaminants within the Landfill and determine if post-NTCRA chemical concentrations presented a risk to human health or the environment. The evaluation included:

- Evaluation of the effectiveness of the Landfill components to provide containment of contaminants at the Landfill
- An evaluation of risks to human and ecological receptors due to residual chemical concentrations in soil, sediment, groundwater, and landfill gas at the Landfill and adjacent areas

The FFS identified multiple lines of evidence that the Landfill barrier wall and cover provide effective containment of LNAPL and contaminated groundwater. The primary lines of evidence identified in the FFS are as follows:

- Permeability testing conducted on samples collected from the soil-bentonite barrier wall indicate very low permeability material that serves as an effective hydraulic barrier to lateral flow of LNAPL and groundwater from the Landfill.
- Permeability testing of soil samples collected below the bottom of the barrier wall and slug testing at monitoring wells completed below the bottom of the barrier wall indicate very low permeability soils, which minimize vertical groundwater flow beneath the barrier wall.
- Groundwater levels at wells completed inside the barrier wall show little to no response to tidal or seasonal effects in contrast to the significant tidal and seasonal response at wells located outside of the barrier wall.
- Landfill chemical concentrations in groundwater within and outside of the barrier wall indicate that no horizontal or vertical migration of contaminants in groundwater is occurring.
- Pre-removal action seeps, observed at the toe of the Landfill, have been eliminated since the barrier wall was constructed.

The purpose of the post removal action risk evaluations was to determine whether chemicals at and adjacent to the Landfill posed risks that warrant action or potentially trigger additional cleanup action. The post removal action risk evaluations completed in the FFS are consistent with EPA guidance and generally followed State of Oregon guidance.

CERCLA provides a range of acceptable risk values to assess whether federal cleanup is necessary based on potential threats to people's health. The EPA established an acceptable excess cancer risk range, from 1 in 10,000 (or 10^{-4}) to 1 in 1,000,000 (or 10^{-6}) over a person's lifetime. An excess lifetime cancer risk of 1 in 10,000 indicates that an individual experiencing the reasonable maximum exposure estimate for current and future land use has a 1 in 10,000 chance of developing cancer because of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun.

Noncancer health effects for people are evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose that represents a level an individual may be exposed to but that is not expected to cause adverse effects. The EPA (and ODEQ) established a noncancer threshold of 1 to indicate that adverse noncancer effects are unlikely.

The following summarizes the conclusions of the FFS regarding post-NTCRA risk at the Landfill. The summary is organized by media.

Soil and landfill waste

- Direct contact with soil and/or landfill waste is prevented by the landfill cover and barrier wall (human and ecological receptors).
- Existing conditions are protective of current and future human and ecological receptors provided the landfill containment components are maintained.

Groundwater

- Exposure to contaminated groundwater within the Landfill is prevented by the landfill cover and barrier wall (human receptors).
- Exposure to contaminated groundwater discharging to surface water is prevented by groundwater control provided by the landfill cover and barrier wall (human and ecological receptors).
- Exposure to LNAPL is prevented by groundwater control provided by the landfill cover and barrier wall (human and ecological receptors).
- Analytical results from the USACE Landfill groundwater monitoring program outside of the barrier wall indicate chemicals detected were less than concentrations that would indicate potential adverse effect to humans.
- Post-NTCRA conditions are protective of current and future human and ecological receptors.

Landfill Gas

- The landfill gas collection system controls the migration of landfill gas and discharges it through riser vents 7.5 feet above the ground, thereby minimizing potential exposure to human receptors.
- Access to the Landfill is controlled by a locked fence and only site workers have access to the Landfill for activities of limited duration such as mowing and landfill cover inspections.
- A risk evaluation of site worker exposure to landfill gas indicates that VOC concentrations in the landfill gas are below site-specific screening levels and present no unacceptable risk (less than 1 in 1,000,000 for cancer risk and a hazard index (HI) of 1 for noncancer risk).

Sediment, surface water, aquatic biota

- The post-NTCRA risk assessment determined that residual risks are at acceptable risk levels from exposure to DoD-related chemicals in sediment and surface water.
- The calculated upper-bound excess cancer risks for recreational users exposed to sediment and surface water (1 in 1,000,000 for adolescent and 4 in 10,000,000 for adult) were below or at the lower limit of the EPA acceptable cancer risk of 1 in 1,000,000. The noncancer HIs (0.03 for adolescent and 0.002 for adult) were below the EPA target threshold of 1.
- Concentrations of chemicals in surface water and sediment are similar to concentrations throughout the Lower Columbia River area. Therefore, risk estimates are consistent with surface water and sediment reference locations.
- The total upper-bound excess cancer risk associated with ingestion of fish caught in areas near the Landfill is estimated to be 1 in 10,000, which is at the upper bound of the EPA target cancer risk range of 1 in 1,000,000 to 1 in 10,000. The total noncancer HI is estimated to be 1 and is a value equal to the EPA noncancer target threshold of 1.
- Concentrations of contaminants in fish caught near the Landfill are comparable to concentrations in fish caught from reference areas, which indicate the estimated cancer risk and noncancer hazards for exposure to contaminants in fish is related to background rather than to past DoD activity.
- Exposure to landfill-related contaminants in near surface sediment was mitigated by the contaminated sediment/soil excavation during the 2007 removal action. Recontamination of sediment is prevented by the landfill cover and barrier wall.

- Exposure to landfill-related contaminants in surface water is prevented by the landfill cover and barrier wall (human and ecological receptors).
- Ecological risks identified in the aquatic area near the Landfill were found to be minor, unlikely to be related to past DoD activity, and do not appear to be different from risks associated with chemicals in surface sediments in other parts of Cathlamet Bay or other locations in the Lower Columbia River.

The USACE found no unacceptable risk in post-removal action conditions for soil, groundwater, landfill gas, sediment, surface water, or aquatic biota during post-removal risk assessment attributable to past DoD practices. Assuring the integrity and conditions of the Landfill containment components of cover and barrier wall and implementation of landfill security measures will assure the protectiveness of human and ecological receptors in the future.

Landfills and EPA's Presumptive Remedy Approach

The EPA's guidance for CERCLA municipal landfills establishes containment as the presumptive remedy and highlights the importance of streamlining the RI/FS. EPA's guidance for military landfills provides an approach for identifying landfill characteristics appropriate for the presumptive remedy. Both documents are used for identifying the presumptive remedy described in the FFS for the Tongue Point Landfill.

The technical evaluations in those documents provide the basis for applying the presumptive remedy at the Landfill; therefore, containment was evaluated as a component of the remedial alternatives in the FFS. No other technologies or treatments were subjected to detailed evaluations because the technical evaluations in the presumptive remedy guidance documented that other technologies were not feasible as a remedy or a component in a remedial alternative.

Feasibility Study

Based on information obtained from investigations and the 2007 removal action discussed in this proposed plan, an FFS for the Landfill was conducted and finalized in 2016. The purpose of the FFS was to identify, screen, evaluate, and compare potential remedial alternatives for the Landfill and provide decision makers with relevant information for selecting an appropriate remedy. The comparative analyses and cost estimates presented in Table 1 and Table 2 of this Landfill Proposed Plan are directly from the Landfill FFS. The FFS focused on containment as the presumptive remedial alternative and followed the guidance for presumptive remedies for landfill sites as discussed above.

Remedial Action Objectives

Based on the exposure pathways identified in the presumptive remedy guidance and applicable or relevant and appropriate requirements, which are referred to collectively as ARARs, the following preliminary remedial action objectives (RAOs) were identified for the Tongue Point Landfill to provide protection of human health and the environment:

- Preventing direct contact with landfill contents
- Minimizing infiltration and resulting contaminant-leaching to groundwater
- Containing the contaminated groundwater, LNAPL, and leachate to prevent migration from the source area
- Controlling surface water runoff and erosion

The FFS used preliminary RAOs to identify, screen, evaluate, and compare potential remedial alternatives for the Landfill. The RAOs presented in this Proposed Plan are a refinement of the preliminary RAOs based upon evaluations presented the Final FFS.

Identification and Screening of General Response Actions and Remedial Technologies

Application of the presumptive remedy approach eliminates the need for the initial identification and screening of remedial technologies and process options during the FFS. Based on the exposure pathways for the Tongue Point Landfill, remedial components can be limited to the following:

- Landfill cover system
- Source area groundwater control to contain plume
- Leachate collection and treatment
- Landfill gas collection and treatment
- Institutional controls to supplement engineering controls

Removal and/or treatment of landfill contents would be required to meet unlimited use/unrestricted exposure conditions at the Tongue Point Landfill. However, given the limited information on disposal history and the volume of industrial/hazardous waste co-mingled with other wastes within the Landfill, removal and/or treatment to achieve unlimited use/unrestricted exposure conditions is not practicable and could result in additional harm to sensitive environments surrounding the Landfill. EPA's presumptive remedy guidance supports approaches to contain Landfill contents and prevent migration of contaminants rather than excavate and/or treat a landfill's contents. Thus, following the presumptive remedy approach, the FFS determined, based on site-specific factors, to exclude excavation and/or

treatment approaches for the Tongue Point Landfill and use a proven approach for containment. With this approach contained wastes remain inplace and would not achieve unrestricted use/unlimited exposure conditions.

Only those remedial technologies that are included in the presumptive remedy, based on site-specific conditions, were retained for alternative development. The general response actions, remedial technologies, and process options considered for remediation of the Landfill are presented in **Table 1**.

As part of the 2007 removal action, most of the retained process options presented in Table 1 are already in place at the Landfill, including fencing and/or posted warnings, landfill cover system, barrier wall, landfill gas collection system, and LNAPL recovery and separation system. Institutional control is the only retained process option identified in **Table 1** that is not implemented as part of removal action at the Landfill.

Development of Alternatives

Three remedial alternatives were assembled by combining the retained remedial technologies and process options listed in **Table 1** as follows. The assembled alternatives were retained for detailed analysis.

- Alternative 1 – No Further Action
- Alternative 2 – Containment, Maintenance, Monitoring, Institutional Controls, and Access Controls
- Alternative 3 – Containment, LNAPL Recovery and Separation with Disposal, Maintenance, Monitoring, Institutional Controls, and Access Controls

Alternative 1 is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to provide an environmental baseline against which impacts of various other remedial alternatives can be compared. For Alternative 1, no new removal and/or remedial activities would be initiated at the Tongue Point Landfill to further address contaminated media or otherwise mitigate the associated risks to human health from exposure to contaminated media. The LNAPL removal and separation system would be shut off, and the landfill containment components would no longer be maintained.

Alternative 2 would continue to provide protection of human health and the environment through the maintenance and monitoring of the landfill containment components such as the landfill cover system and barrier wall. Alternative 2 includes implementation of institutional controls comprising governmental controls and proprietary controls for land use restrictions implemented through an equitable servitude agreement with the property owners; and informational devices such as a notice of environmental contamination. These institutional controls, are coupled with existing access controls of fencing and signage, to inform the community of risks and restrict access and use of the Landfill property. Maintenance of the landfill cover system, landfill gas collection system, and barrier wall, and hydraulic monitoring would continue for Alternative 2. However, operation of the LNAPL recovery and separation system and related offsite disposal of LNAPL would cease.

Alternative 3 is similar to Alternative 2, with the exception that the LNAPL recovery and separation system would continue to operate through its design life for Alternative 3. Disposal of recovered LNAPL would continue at a permitted offsite facility.

Comparison of Alternatives

Detailed analysis of the three remedial alternatives was completed in the FFS using the two threshold evaluation criteria and five balancing evaluation criteria as mandated by the NCP and listed in **Table 2**. The two modifying evaluation criteria, state acceptance and community acceptance, were not evaluated within the FFS but will be completed for the preferred alternative as part of the proposed plan and public comment period. **Table 2** summarizes the comparative analyses of each of the remedial alternatives against the two threshold criteria and five balancing criteria.

Results of Comparison

The following presents a summary of the FFS report results of the comparative analyses for Alternatives 1, 2, and 3.

Overall Protection of Human Health and the Environment

Alternatives 2 and 3 provide protection of human health and the environment by meeting the RAOs and providing remedial components and institutional controls that limit exposure to contaminated soil, landfill waste, and groundwater. While the landfill containment components that are already in place provide protectiveness for Alternative 1, the lack of institutional controls and future monitoring and maintenance of the landfill containment components indicates that Alternative 1 may not be protective of human health and the environment in the future.

Compliance with ARARs

Alternatives 2 and 3 are designed to achieve compliance with preliminary ARARs identified in the FFS. Alternative 1 is not compliant because no further remedial action is taken to address contaminated media; presence of unaddressed chemicals could cause exceedances of chemical-specific ARARs in groundwater and adjacent media in the future if existing remedy components are compromised since monitoring and maintenance would be discontinued. The FFS evaluated alternatives using preliminary ARARs presented in the FFS Appendix D.

Long-Term Effectiveness and Permanence

Alternative 1 includes no continued monitoring and maintenance of the landfill containment components. Because continued monitoring and maintenance is needed to ensure the integrity of the landfill containment

components, Alternative 1 ranks low against this criterion. While Alternatives 2 and 3 are both designed to maintain the landfill containment components, Alternative 3 ranks higher against this criterion because it will reduce the volume of LNAPL present at the Landfill.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 fail to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of the alternatives. Alternatives 1 and 2 were given a rating of "none" for reduction of toxicity, mobility, or volume through treatment. Alternative 3 does involve removal of LNAPL from the Landfill and incidental offsite treatment and thus was given a rating of "low" in the FFS. However, Alternative 3 does not have an onsite treatment component. Removed LNAPL is transported to an offsite facility where it is treated incidentally as necessary for disposal. Therefore, the rating was revised to "none," as indicated in **Table 2**.

Short-Term Effectiveness

Alternative 1 presents no short-term risks to workers, the community, and the environment because no further action is taken. Alternative 2 has low short-term risks to workers because the landfill containment components are already installed and discontinuing operation of the LNAPL recovery and separation system will further reduce short-term risks to workers. Alternative 3 has some short-term risk due to ongoing operation of the LNAPL recovery and separation system and potential short-term worker exposure to LNAPL and contaminated groundwater.

Implementability

Alternative 1 ranks highest for implementability because no further action will be taken. Alternative 2 includes shutdown and mothballing of the LNAPL recovery and separation system, implementation of institutional controls, and ongoing monitoring and maintenance. These are straightforward and easily implementable, so Alternative 2 rates moderate to high for this criterion. Alternative 3 includes the additional component of long-term operation and maintenance of the LNAPL recovery and separation system; therefore, it has a lower implementability than Alternative 2.

Cost

The present value costs for all alternatives listed in Table 2 were evaluated over a 30-year period of analysis and include monitoring and maintenance of remedy components as pertinent for the alternative.

In the FFS, Alternative 1 was represented as having the lowest present value cost of approximately $110,000, which included 5-year site reviews; however, as presented in Table 2, the cost for Alternative 2 was revised and represented as the lowest cost of $0. Alternative 2 had a higher present value cost of approximately $810,000, and Alternative 3 had the highest present value cost of approximately $3,450,000.

Preferred Alternative

The preferred alternative for addressing the potential risks at the Landfill is Alternative 2 – Containment, Maintenance, Monitoring, Institutional Controls, and Access Controls. The preferred alternative was selected over other alternatives because it is protective of current and future human and ecological receptors, complies with ARARs, and has lower short-term risks and costs than Alternative 3.

The USACE, in collaboration with the State of Oregon, has determined that the long-term maintenance, monitoring, and institutional controls that comprise the Landfill Preferred Alternative would be conducted in a manner consistent with 40 CFR Part 264.310(b)(1, 5, and 6) for closure and post-closure care for landfills. This regulation is an ARAR because the substantive requirements identified for post-closure care of landfills are relevant and appropriate to the preferred alternative which includes monitoring and maintenance of the landfill cover system at the Tongue Point Landfill.

The preferred alternative does not include continued operation of the LNAPL recovery and separation system. While continued operation of this system (as in Alternative 3) does reduce the volume of LNAPL contained within the Landfill, it is not necessary for the protectiveness of the remedy because the LNAPL is contained by the barrier wall and the landfill cover. For the preferred alternative, the protectiveness will be maintained by long-term maintenance of the barrier wall and cover, and hydraulic monitoring to ensure confinement of the LNAPL and all other wastes within the Landfill.

The NTCRA landfill containment components were constructed to contain contaminated media within the Landfill. Containment components include a barrier wall along the perimeter of the Landfill to prevent migration of contaminants outside the Landfill, an upgradient interceptor trench to mitigate groundwater mounding along the western alignment of the barrier wall, a landfill cover to minimize infiltration into the Landfill, and a gas collection system to minimize buildup of gas within the Landfill. For the preferred alternative, these landfill containment components would continue to be maintained and monitored to ensure integrity of the components and to remain protective of human health and the environment.

For the preferred alternative, the LNAPL recovery and separation system, also constructed as part of the NTCRA, would no longer be operated. The LNAPL recovery and separation system would be shut down, and the system would be mothballed.

Routine maintenance of the cover system would include controlling growth of trees and shrubs on the landfill cover, access road, and along the shoreline perimeter fence

through mowing and/or tree removal. Additional maintenance would be required if erosion, sloughing, slumping, or surface deformation is observed on the landfill surface or if settlement or seeps are observed along the perimeter of the barrier wall. Fencing and signage around the Landfill property would be repaired or replaced as necessary to maintain access controls and provide information to the public.

Hydraulic monitoring would be performed and evaluated to determine protectiveness of the remedy and routine inspections would be conducted to identify whether other remedy components (i.e., landfill cover, institutional controls, access controls) are functioning as designed. Monitoring components include continuous recording of water levels inside and outside the Landfill barrier wall (hydraulic monitoring) and regular inspections of landfill containment components and access controls. For the preferred alternative, routine monitoring would continue to ensure protectiveness of human health and the environment.

Institutional controls involve administrative and legal measures and/or informational measures such as community awareness activities, intended to inform of dangers and control activities or uses of contaminated media at the Landfill, which could pose a risk to human receptors and the environment if remedy components were to be compromised. These controls would be implemented to minimize or prevent disturbance of the landfill cover system and barrier wall containing wastes and leachate, restrict or prevent any activities or uses of the Landfill that could pose a risk to human receptors, and provide the public with community awareness tools to enhance awareness of potential hazards from wastes and leachate within the Landfill. Institutional controls for the preferred alternative include a proprietary control and an informational device. The specific proprietary control is an equitable servitude agreement that will be implemented by the property owner, Oregon Department of State Lands. The equitable servitude agreement is a permanent property record that establishes land use restrictions to prevent disturbance of the landfill cover and containment system. The informational device is another institutional control and is implemented by the ODEQ as the listing of the Landfill as a location of known release in the Oregon's Environmental Cleanup Site Information database site number 171. This listing provides ODEQ managers and the public with information on the landfill status as a contaminated site.

Access controls compromise physical measures, warning signs, fencing, and locked gates, which notify the public of the presence of the landfill and of the restricted access to areas within the Landfill. These controls minimize unauthorized activity, ensure integrity of the components, and prevent potential exposures to waste and other hazards at the Landfill.

Next Steps

The selection of a preferred alternative was based on comparison of how each of the alternatives fulfills the seven of the nine NCP criteria. The two modifying criteria of state acceptance and community acceptance is also evaluated for the preferred alternative. The ODEQ agrees with the selection of the preferred alternative while the community acceptance will be evaluated following the public comment period. The public will have the opportunity to provide comments on the proposed plan during the public comment period and at the public meeting. Responses to the public comments will be made in a responsiveness summary document, which will become part of the Landfill Decision Document. The USACE will document the selection of a preferred alternative, including any modifications made in review of the comments from the state and public, in the Landfill Decision Document.

Table 1 General Response Actions, Remedial Technologies, and Process Options

General Response Actions	Remedial Technology	Process Option
Monitoring	Inspection	Visual Inspections
	Sampling and Analysis	Sample Collection and Analysis
Institutional Controls	Institutional Controls	Governmental Controls, Proprietary Controls, and Informational Devices
Engineered Controls	Access Controls	Fencing and/or Posted Warnings
Containment	Source Controls	Landfill Cover System
		Barrier Wall
		Upgradient Interceptor Trench
Removal, Transport, Disposal	Removal	Landfill Gas Collection System
		LNAPL Recovery and Separation
	Transport	Mechanical Transport (Trucking)
	Disposal	Offsite LNAPL Disposal

Note: This table was modified from the FFS version to remove "no further action" as a general response action for consistency with USACE policy. This minor change does not affect the outcome of alternatives analysis.

Table 2 Summary of Comparative Analysis for Remedial Alternatives

Remedial Alternative	Description	Threshold Criteria		Balancing Criteria					
		Overall Protection of Human Health and the Environment	Compliance with ARARs	Long Term Effectiveness and	Reduction of Toxicity, Mobility, or Volume through Treatment	Short Term Effectiveness	Implementability	Present Value Cost (Dollars)	
1	No Further Action	–	–	❷	❶	❺	❺	❶	$0
2	Containment, Maintenance, Monitoring, and Institutional Controls	+	+	❹	❶	❺	❹	$$	$810,000
3	Containment, LNAPL Recovery and Separation, Maintenance, Monitoring, and Institutional Controls	+	+	❹	❶	❹	❸	$$$$$	$3,450,000

Notes:

1. The numerical designations for the qualitative ratings system used in this table are not used to quantitatively assess remedial alternatives (for instance, individual rankings for an alternative are not additive).
2. The balancing criteria ratings for Alternative 1, costs, and Alternative 3, reduction of toxicity, mobility, or volume through treatment, were modified from the FFS version of this table for consistency with USACE policy. This minor change does not affect the outcome of alternatives analysis.

Legend for Qualitative Ratings System:

Threshold Criteria		Balancing Criteria (Excluding Cost)		Balancing Criteria (Present Value Cost in Dollars)	
–	Unacceptable	❶	None	❶	None
+	Acceptable	❶	Low	$	Low ($0 through $500,000)
		❷	Low to Moderate	$$	Low to Moderate ($500,000 through $1M)
		❸	Moderate	$$$	Moderate ($1M through $1.5M)
		❹	Moderate to High	$$$$	Moderate to High ($1.5M through $2M)
		❺	High	$$$$$	High (Greater than $2M)

Opportunities for Public Involvement

Public Meeting

USACE will hold a public meeting to explain the proposed plan. Because your input is important, we encourage you to attend. It's a great opportunity to learn more about the details.

Tongue Point Naval Air Station
Public Meeting

April 11, 2018
6:30 pm to 8:30 pm

Astoria Public Library, Flag Room
450 10th Street
Astoria, OR 97103
503.325.7323

Contacts
If you have questions or need additional information, please contact the following representatives:

Mirek Towster, Project Manager
USACE Kansas City District
601 E. 12th Street, Suite 0439
Kansas City, MO 64106-9861
816.389.3886
Mirek.S.Towster@usace.army.mil

May Carrell, Project Lead
USACE, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755
206.764.3418
May.G.Carrell@usace.army.mil

Mr. Robert Hood
Oregon DEQ
700 Lloyd Building
700 NE Multnomah Street
Portland, OR 97232
503.229.5263
robert.hood@state.or.us

Written Comments and Extensions

The public comment period is March 27, through April 27, 2018. During that time, you may submit a comment in writing (by mail, email, or at the public meeting). The mailing address for written comments is:

May Carrell, Project Lead
USACE, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755
206.764.3418
May.G.Carrell@usace.army.mil

USACE will respond in writing to all significant public comments in a responsiveness summary. The responsiveness summary will be included as part of the decision document for the Tongue Point Naval Air Station.

Administrative Record File

Documents from the Administrative Record file that provide the basis for selecting the final cleanup alternative will be available for viewing at:

Astoria Public Library *
450 10th Street
Astoria, OR 97103
503.325.7323

And

USACE Kansas City District
635 Federal Building
601 E 12th Street
Kansas City, MO 64106-2824

** Please call for current office hours.*

Glossary of Terms

ARARs: applicable or relevant and appropriate requirements**.** *Applicable requirements:* cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. *Relevant and appropriate requirements*: cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Bentonite: an absorbent clay formed by the breakdown of volcanic rocks, used often as a filler material

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act): provides Federal authority to respond to releases or threatened releases of hazardous substances that may endanger public health or the environment, and authorizes EPA to establish regulations for investigation and cleanups.

DERP (Defense Environmental Restoration Program): program that conducts environmental restoration activities at DoD sites in accordance with CERCLA. DERP was established when CERCLA was amended with the Superfund Amendments and Reauthorization Act (SARA) in 1986 requiring DoD to carry out environmental restoration in a manner consistent with Section 120 of CERCLA.

Dioxins/Furans: a family of toxic substances with a similar chemical structure that are created when other chemicals products are made, e.g., herbicides. 2, 3,7,8-tetrachlorodibenzo-p-dioxin is considered the most toxic. For the project, dioxins/furans were reported as 2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalents.

DoD (Department of Defense): an executive branch department of the federal government charged with coordinating and supervising all agencies and functions of the government concerned directly with national security and the U.S. Armed Forces

EE/CA (Engineering Evaluation/Cost Analysis): document that details different options for cleanup activities and their respective costs associated with a removal action.

EPA (United States Environmental Protection Agency): a federal agency that conducts actions in the United States to protect human health and the environment

FS (feasibility study): a required process at a Superfund site to develop, screen, and evaluate various alternatives being considered for selection of a remedial action

FUDS: properties that were formerly owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense before October 1986. Such properties are known as Formerly Used Defense Sites (FUDS). The U.S. Army is DoD's lead agent for the FUDS Program. The U.S. Army Corps of Engineers executes the FUDS Program to conduct environmental cleanup properties per CERCLA.

Groundwater: water located beneath the earth's surface in soil pore space and fractures

Hydraulic conductivity: a property of soil and rocks that describes the ability of water to move through pore spaces or fractures

Institutional controls: non-engineered legal methods that help maintain the integrity of a remedy, discourage human contact with contaminants, and/or encourage safe land uses. These may be governmental controls (e.g., zoning or permits), proprietary controls (e.g., covenants, conditions, and restrictions), and informational devices (e.g., deed notices).

Leachate: water that has percolated through a solid and leached out constituents of the material. In this case, the leachate is comprised of the landfill contaminants.

LRI: limited remedial investigation

LNAPL (light non-aqueous phase liquid): a group of groundwater contaminants that is only slightly soluble in water and has a lower density than water

NCP: National Oil and Hazardous Substances Pollution Contingency Plan is the federal government's comprehensive document of regulations for responding to both oil spills and hazardous substance releases.

ODEQ (Oregon Department of Environmental Quality): a regulatory agency whose job is to protect the quality of the State of Oregon's environment

PAHs (polycyclic aromatic hydrocarbons): neutral, nonpolar, organic compounds containing only carbon and hydrogen, which are found in fossil fuels and tar deposits. Carcinogenic PAHs: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

PCBs (polychlorinated biphenyls): toxic, synthetic organic chemical compounds of chlorine attached to biphenyls. These were widely used as dielectric and coolant fluids until banned in 1979. Total PCBs: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.

Pesticides: chlorinated hydrocarbon pesticides that often act as nerve toxins; they are readily stored in fatty tissue and resist metabolism so they can accumulate in increasing concentrations up the food chain.

Total DDT comprises p,p'-dichlorodiphenyldichloroethane, p,p'-dichlorodiphenyldichloroethylene, and p,p'-dichlorodiphenyltrichloroethane.

Present Value Cost: The present value cost represents the amount of money that, if invested in the initial year of the remedial action at a given interest rate, would provide the funds necessary to make future payments to cover all costs associated with the remedial action over its planned life.

RI/FS (remedial investigation/feasibility study): required data collection at contaminated sites used to characterize the nature and extent of contamination and assesses the risk to human health and the environment. The feasibility study focuses on the development of actions to address contamination at the site.

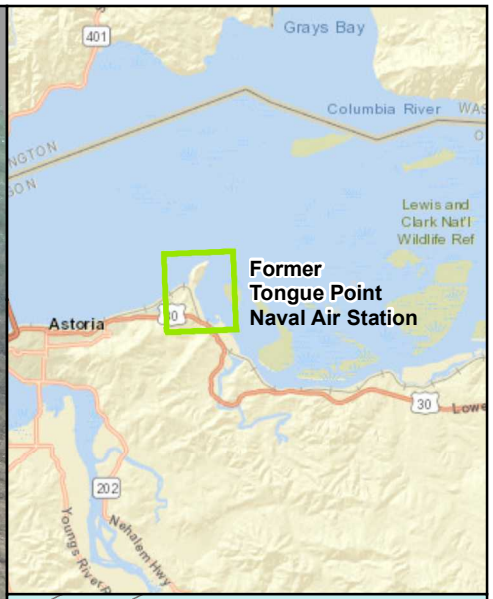
Riprap: loose stone used to form a foundation for a breakwater or other structure

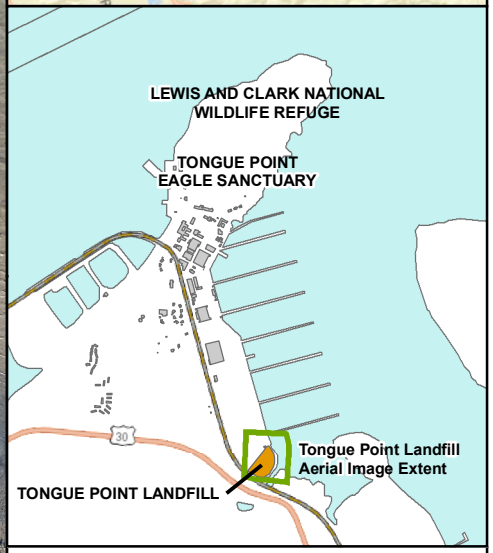
Slug test: aquifer test where water is quickly added or removed from a well in order to determine aquifer characteristics near the well

SVOCs (semi-volatile organic compounds): a group of organic compounds that have a boiling point higher than water and which may vaporize when exposed to temperatures above room temperature.

TPH (total petroleum hydrocarbons): a term used to describe a large family of several hundred chemical compounds that originally come from crude oil

VOCs (volatile organic compounds): organic chemicals that have a high vapor pressure at ordinary room temperature. The high vapor pressure results from a low boiling point.





U.S. ARMY
CORPS OF ENGINEERS
KANSAS CITY DISTRICT
KANSAS CITY, MISSOURI

Tongue Point Landfill

Tongue Point Landfill Proposed Plan
Former Tongue Point Naval Air Station
Astoria, Oregon

Figure 1

Document Path: S:\100185-TonguePtGIS\MXD\Figure-X_TonguePtLandfill_180315_NB_85x11L.mxd

COMMENT SHEET

The USACE encourages your written comments on the proposed plan for the Tongue Point Landfill. This form is provided for your convenience. Please mail this form to May Carrell, USACE Project Lead, or bring your comments to the public meeting. You may use additional sheets of written comments. Comments by mail must be postmarked no later than April 27, 2018, to the address shown below:

May Carrell, Project Lead
USACE, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

Comment Submitted by: _____

Address: _____

_____

_____

Return Address

affix postage here

May Carrell, Project Lead
USACE, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755