15.0 GLOSSARY OF TERMS

A

Absorption: The uptake of water, other fluids, or dissolved chemicals by a cell or an organism (as tree roots absorb dissolved nutrients in soil).

Acceptable Levels: Levels of chemicals in media that do not cause unacceptable adverse risk to either ecological or human health receptors.

Adsorption: The process of adhering a chemical on the surface of a solid material as a chemical transport mechanism.

Alluvial: Relating to sediment deposited by flowing water.

Anthropogenic: Natural and human-made substances present in the environment as a result of human activities.

Aqueous: Composed of liquid water medium.

Aquifer: An underground geological formation, or group of formations, containing usable and practicably extractible quantities of water. Aquifers are sources of groundwater for wells and springs.

Area of Potential Concern: An area of sediments that potentially contributes to unacceptable risks within a site.

Assessment Endpoint: In ecological risk assessments, an explicit expression of the environmental value to be protected. It includes both an ecological entity and specific attribute thereof. For example, osprey are a valued ecological entity; reproduction and population maintenance of osprey, the attribute, form an assessment endpoint.

Attenuation: The process by which a chemical is reduced in concentration over time, through absorption, adsorption, degradation, dilution, or transformation.

B

Background: Constituents or locations that are not influenced by the releases from a site, either naturally occurring or anthropogenic.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

Benthic Invertebrates: Organisms without vertebrae dwelling either in the sediment or on the sediment in streams and rivers.

Bioavailability: Degree of ability to be absorbed and ready to interact in organism metabolism.

Biota: The animal and plant life of a given region.

Biota-Sediment Accumulation Factor (BSAF): The relationships used to describe the accumulation of sediment-associated organic compounds or metals in tissues of ecological receptors. BSAFs are calculated from paired sets of chemical concentrations in sediment and tissue and can be calculated in two ways: 1) from the slope of the line that results from plotting paired sediment and tissue concentrations, or 2) as the average of BSAF values calculated for each paired data set (see Appendix E for details on the site-specific BSAFs developed for Portland Harbor).

Blowdown: Water discharged from boilers to control water quality and maintain boiler function. Boiler blowdown contains various concentrations of suspended and dissolved solids and, sometimes, sludge; it may also contain boiler treatment chemicals.

C

Carcinogen: Any substance that can cause or aggravate cancer.

Central Tendency: An estimate of the average exposure that may potentially be experienced by the population.

Characterization of Ecological Effects: A step in the ecological risk assessment process that evaluates the ability of a stressor to cause adverse effects under given circumstances.

Characterization of Exposure: A step in the ecological risk assessment process that evaluates the interaction of a stressor with one or more receptors.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, natural attenuation, or corrective action.

Columbia River Datum (CRD): A vertical datum established for the Columbia River from the lower river to the Bonneville Dam and on the Willamette from the Columbia up to Willamette Falls. At the Morrison Street bridge gauge, the CRD is 1.85 feet above NVGD29/47.

Combined Sewer Overflow: Discharge of a mixture of stormwater and domestic wastewater when the flow capacity of a sewer system is exceeded during rainstorms.

Community: In ecology, an assemblage of populations of different species within a specified location in space and time. Sometimes, a particular subgrouping may be specified, such as the benthic community in a river.

Confined Aquifer: An aquifer in which groundwater is confined under pressure that is significantly greater than atmospheric pressure.

Chemical(s) of Concern (COC): Chemicals identified through the baseline risk assessment that are judged to cause unacceptable adverse effects to human health and/or ecological receptors.

Chemical(s) of Interest (COI): Chemicals that have been detected at a site but have not been screened in the risk assessment process.

Chemical(s) of Potential Concern (COPC): Chemicals of interest that have been screened-in for evaluation in the Round 2 risk assessment process.

D

Data Quality Objectives (DQOs): Qualitative and quantitative statements of the overall level of uncertainty that a decision-maker will accept in results or decisions based on environmental data. They provide the framework for planning and managing environmental data operations consistent with user's needs.

Dermal Absorption: Process by which a chemical penetrates the skin and enters the body as an internal dose.

Dermal Contact: Contact between a chemical and the skin.

Detection Limit: The lowest concentration of a chemical that can reliably be distinguished, with a stated level of confidence, from a zero concentration.

Dredging: Removal of mud and sediment from the bottom of water bodies.

E

Early Action: A non-time critical removal action pursuant to 40 CFR 300.415(b)(4).

Ecological Exposure: Exposure of a non-human organism to a stressor.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial problem formulation, exposure and effects assessments, and risk characterization.

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Effluent: Wastewater--treated or untreated--that flows out of a treatment plant or industrial outfall. Generally refers to wastes discharged into surface waters.

Environmental Exposure: The interaction of a stressor with a human or ecological receptor.

Erosion: The removal of soil or sediment by wind or water.

Exposure Assessment: Identifying the pathways by which chemicals may reach receptors and estimating how much of a chemical an individual is likely to be exposed to.

Exposure Pathway: The path from sources of chemicals through environmental media to human or ecological receptors.

Exposure Point Concentration (EPC): The conservative estimate of the concentration of a chemical in an environmental medium (e.g., sediment) to which a receptor may reasonably be exposed over the entire frequency and duration of exposure.

Exposure Route: The way a chemical enters an organism after contact (e.g., ingestion).

Exposure: The interaction of a stressor with a human or ecological receptor.

F

Flood Stage: A river stage established by the National Weather Service (NWS) above which flood damage may occur. The NWS defines flood stage for the Willamette River at Portland as 18.0 feet CRD.

Food Web Model (FWM): A model that describes interconnecting feeding relationships and simulates chemical bioaccumulation from environmental media (see Appendix E for description of the food web model developed for Portland Harbor).

G

Groundwater: Fresh water found beneath the earth's surface, usually in aquifers, that supplies wells and springs.

Groundwater Discharge: Groundwater entering surface water or exiting to the ground surface.

H

Habitat: The place where a population or community (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Hazard Index: An indication of the potential for cumulative noncancer effects that is derived by summing the individual chemical hazard quotients.

Hazard Quotient: An indication of the potential for noncancer effects from a given chemical that is derived by dividing the estimated dose of a chemical by the reference dose for that chemical.

Hazardous Substance: Any substance defined as a “hazardous substance” under CERCLA or ORS Chapter 465.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrogeology: The geology of groundwater, with particular emphasis on the chemistry and movement of water.

I

Initial Area of Potential Concern (iAOPC): An area of sediments that potentially contributes to unacceptable risks within the Study Area identified through preliminary evaluations prior to the remedial investigation report.

Initial Chemical of Concern (iCOC): Chemicals identified as part of the Comprehensive Round 2 Report that are judged to have the potential to cause unacceptable adverse effects to human health and/or ecological receptors.

Initial Preliminary Remediation Goal (iPRG): A numeric matrix-specific (e.g., sediments, water, air) chemical value that should achieve target risk levels and that can be used to help identify iAOPCs (see definition) developed prior the remedial investigation report.

Initial Study Area (ISA): The 5.7-mile stretch of the Willamette River from approximately the southern tip of Sauvie Island at river mile 3.5 to the southern end of Swan Island at river mile 9.2, and adjacent areas logically associated with an evaluation of the in-water portion of this stretch of the river. The ISA does not include upland sources of contamination being investigated or cleaned up pursuant to ORS 465 as implemented by the Oregon Department of Environmental Quality.

L

Light Non-Aqueous Phase Liquid (LNAPL): A non-aqueous phase liquid with a specific gravity less than 1.0. Because the specific gravity of water is 1.0, most LNAPLs float on top of the water table. Most common petroleum hydrocarbon fuels and lubricating oils are LNAPLs.

Line of Evidence (LOE): A specific measure, based on empirical data or a model prediction, that is used to assess potential risks to ecological receptors.

Lipid Solubility: The maximum concentration of a chemical that will dissolve in fatty substances. Lipid soluble substances are insoluble in water. They will very selectively disperse through the environment via uptake in living tissue.

Lower Willamette River (LWR): The stretch of the Willamette River from the confluence with the Columbia River (river mile 0) to Willamette Falls (approximately river mile 26).

Lowest Observed Adverse Effect Level (LOAEL): The lowest level of a stressor that causes statistically and biologically significant differences in test samples as compared to other samples subjected to no stressor.

M

Matrix: The sample material in which the chemicals of interest are found (e.g., water, sediment, tissue).

Mean High River Stage: The arithmetic mean of the maximum (e.g., highest daily measurement) observed river stage data in a given period (e.g., monthly mean high river stage).

Mean Sea Level (MSL): MSL is a tidal datum determined over a 19-year National Tidal Datum Epoch. It pertains to local mean sea level and should not be confused with the fixed datums of North American Vertical Datum of 1988 (NAVD88) or the National Geodetic Vertical Datum of 1929 (NGVD29). Data referencing MSL as the vertical datum in the Portland Harbor is technically on NGVD29/47.

Media: Specific environments such as air, water, and soil that are the subject of regulatory concern and activities.

Mean High Water (MHW*):* A tidal datum. The average of all the high water heights observed over the National Tidal Datum Epoch (19-year period).

Mean Low Water (MLW*):* A tidal datum. The average of all the low water heights observed over the National Tidal Datum Epoch (19-year period).

Method Detection Limit (MDL): See *Detection Limit.*

Municipal Discharge: Discharge of effluent from wastewater treatment plants that receive wastewater from households, commercial establishments, and industries in the coastal drainage basin. Combined sewer/separate storm overflows are included in this category.

N

North American Vertical Datum of 1988 (NAVD88): This vertical datum is the national standard geodetic reference for heights. NAVD88 is a fixed datum derived from local mean sea level observations at Father Point/Rimouski, Quebec, Canada. NAVD88 replaced NGVD29/47 as the national standard geodetic reference for heights.

National Geodetic Vertical Datum of 1929 and Supplemental Adjustment of 1947 (NGVD29/47): NGVD29/47 is a fixed datum adopted and adjusted in 1947 as a national standard geodetic reference for heights prior to June 24, 1993 and is now considered superseded by NAVD88. NGVD29 is sometimes referred to as Sea Level Datum of 1929 or as Mean Sea Level (MSL) on some early issues of U.S. Geological Survey topographic quads. NGVD29 was originally derived from a general adjustment of the first-order leveling networks of the U.S. and Canada after holding mean sea level observed at 26 long-term tide stations as fixed. Historical data referencing MSL as the vertical datum in Portland Harbor is technically on NGVD29/47.

Naturally Occurring: Substances present in the environment in forms that have not been influenced by human activity.

Nature and Extent: Characterization of chemical distribution within a site.

No Observable Adverse Effect Level (NOAEL): An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control. Some effects may be produced at this level, but they are not considered adverse or precursors to adverse effects.

No Observed Effect Concentration (NOEC): Exposure concentrations at which there are no statistically or biological significant differences in the frequency or severity of any effect in the exposed or control populations.

Non-Point Sources: Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet).

O

Operable Unit: A discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration or eliminates or mitigates a release, threat of release, or pathway of exposure.

Ordinary High Water or High Water: Defined as the vegetation line or the line the water impresses on the soil by covering it for sufficient periods to deprive it of vegetation. It is established by field observation of seasonally high river levels by the U.S. Army Corps of Engineers and designates the jurisdictional limits of the Corps regulatory program. From Willamette RM 0 to 16, the ordinary high-water level ranges from 14.7 to 15.2 feet CRD (USACE 1991). The Oregon Division of State Lands defines the ordinary high water line (OHWL) as a line on the bank or shore to which high water ordinarily rises annually in season. The OHWL excludes exceptionally high-water levels caused by large floods (e.g., 100-year events).

P

Pathway: The physical course a chemical or pollutant takes from its source to the exposed organism.

Perched Water: Zone of unpressurized water held above the water table by impermeable rock or sediment.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Plume: A visible or measurable discharge of a contaminant from a given point of origin.

Point Source: A stationary location or fixed facility from which pollutants are discharged.

Population: A group of interbreeding organisms (i.e., members of the species) occupying a particular space; the number of humans or other living creatures in a designated area.

Porewater: Water existing in the interstices of submerged sediments.

Portland River Datum (PRD): Datum of reference plane from which river stage is measured on the Willamette River at Portland at the Morrison Bridge gauge. PRD equals 1.55 feet above NGVD29/47 or MSL, and the PRD gauge reports water levels 0.30 foot above CRD levels at this location.

Potential Initial Chemical of Concern (Potential iCOC): Potential iCOCs are differentiated from iCOCs in that they were identified through less certain and/or less rigorous evaluations based on fewer lines of evidence.

Pre-AOC: Events including sampling and other studies that occurred prior to signing of the AOC for the Site.

Preliminary Background Concentrations: Concentrations of chemicals in bedded sediments from the upriver reach of the LWR (RM 15.3 to 26). The primary use of these preliminary

background concentrations in the Round 2 data evaluation is to support the definition of initial AOPCs.

Preliminary Remediation Goal (PRG): A numeric matrix-specific (e.g., sediments, water, air) chemical value that should achieve target risk levels, and that can be used to identify AOPCs (see definition) for a remedial investigation.

Principal Threat: Those source materials considered highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur.

Q

Quality Assurance/Quality Control (QA/QC): A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

R

Reasonable Maximum Exposure: An estimate of the highest exposure that is reasonably expected to occur for a given population.

Receptor: Human or ecological entity to be evaluated in a risk assessment.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration (e.g., where rainwater soaks through the earth to reach an aquifer).

Recharge: The process by which groundwater is added to a zone of saturation, usually by percolation from the soil surface (e.g., the recharge of an aquifer).

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Riparian Zone: The portion of riverbank between approximately +13 feet to +22 feet NAVD88 vertical elevation.

Risk: A measure of the probability that an adverse effect to human health or ecological receptors will occur as a result of a release of a hazardous substance.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health or the environment by the actual or threatened release of specific chemical(s).

Risk Characterization: The last phase of the risk assessment process that estimates the potential for adverse human or ecological effects to occur from exposure to a stressor and evaluates the uncertainty associated with the estimate.

Risk Estimate: A description of the probability that organisms exposed to a specific dose of a chemical will develop an adverse effect (e.g., cancer).

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

Risk Reduction: Lessening the unacceptable risks from chemicals by lowering their concentrations, mobility, bioavailability, toxicity, or exposure to receptors.

River Stage: Height of a river measured relative to a datum or specific elevation.

Round 1: RI/FS field work performed during 2002. Initially termed Round 1A and Round 1 to denote separation of several months between sampling events.

Round 2: RI/FS field work conducted from July 2003 through December 2005, following EPA approval of the Programmatic Work Plan.

Round 3A: RI/FS field work conducted in 2006 and 2007 and that was scoped before completion of the Comprehensive Round 2 Report.

Round 3B: RI/FS field work proposed for 2007 that will be scoped and conducted following completion of the Comprehensive Round 2 Report.

S

Saturated Zone: The area below the water table where all open spaces are filled with water under pressure equal to or greater than that of the atmosphere.

Sediment Management Area (SMA): Areas and volumes of sediments contributing to unacceptable risks segregated into discrete units for the purposes of the identification and evaluation of remedial technologies in the feasibility study.

Sediment Quality Value (SQV): A sediment chemical concentration threshold that represents some documented correlation with effects on benthic invertebrates. SQVs are usually presented as a pair, with the lower concentration indicating a threshold below which adverse biological effects rarely occur and the upper concentration indicating a threshold above which adverse biological effects frequently occur.

Silt: Sedimentary materials composed of fine- or intermediate-sized mineral particles.

Site: The Portland Harbor NPL site.

Solubility: The amount of mass of a compound that will dissolve in a unit volume of solution. Aqueous solubility is the maximum concentration of a chemical that will dissolve in pure water at a reference temperature.

Sorption: The action of soaking up or attracting substances.

Spatially-Weighted Average Concentration (SWAC): A spatially weighted sediment chemical concentration calculated as the sum of the product (by sampling location) of normalized Thiessen polygon areas and sediment concentrations.**Storm Sewer:** A system of pipes (separate from sanitary sewers) that carries water runoff from buildings and land surfaces.

Stressors: Physical, chemical, or biological entities that can induce adverse effects on ecosystems or human health.

Study Area: The stretch of the Willamette River extending from approximately river mile 2 to river mile 11. Some samples as far downstream as river mile 1.9 were included in the risk assessments and delineation of iAOPCs.

Surface Runoff: Precipitation, snowmelt, or irrigation water in excess of what can infiltrate the soil surface and be stored in surface depressions.

Surface Water: All water naturally open to the atmosphere (e.g., rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries).

T

Threshold: The lowest dose or concentration of a chemical at which a specified measurable effect is observed and below which it is not observed.

Transition Zone: The interval where both groundwater and surface water comprise some percentage of the water occupying pore space in sediments.

Transition Zone Water (TZW): The groundwater/surface water transition zone (also known as the hyporheic zone) is the interval where a mixture of groundwater and surface water compose some percentage of the water occupying interstitial space in the sediments.

Trophic Levels: A functional classification of species that is based on feeding relationships.

Toxicity Reference Value:. A chemical concentration threshold that represents some level of documented effect on a particular organism from exposure to the chemical (i.e., the minimum concentration at which adverse effects have been observed, or the maximum concentration at which no adverse effects have been observed).

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicity: The concentration at which a substance or mixture of substances can cause adverse effects in humans or animals.

U

Unconfined Aquifer: An aquifer containing water that is not under pressure; and where the water level in a well is the same as the water table outside the well.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Urban Runoff: Stormwater from urban environments, including industrial, residential, commercial, vacant, and transportation land uses.

V

Vadose Zone: The zone between land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

Volatile: Any substance that evaporates readily.

W

Water Quality Criteria: Standards of water quality not to be exceeded under the Clean Water Act.

Weight of Scientific Evidence: Considerations in assessing the interpretation of published information about toxicity—such as quality of testing methods, size, and power of study design; consistency of results across studies; and biological plausibility of exposure-response relationships and statistical associations.

Willamette River Flood Stage: Defined as +18 feet CRD on the lower Willamette River.

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