Legacy Site Services LLC

March 27, 2007

Mr. Sean Sheldrake
U.S. Environmental Protection Agency
1200 Sixth Avenue, ECL-111
Seattle, Washington 98101

Subject: Response to February 15 Meeting Discussion and Materials Provided
Arkema Portland Facility
U.S. EPA Region 10 Docket No. CERCLA 10-2005-0191

Dear Mr. Sheldrake:

This letter presents the response of Legacy Site Services LLC (LSS), agent for Arkema Inc., to written materials provided by the U.S. Environmental Protection Agency (EPA) on February 5 and 15, 2007 and the subsequent presentation of those materials during our meeting on February 15 in Seattle, Washington regarding the status of EPA's proposed analysis/definition of the "principal threat" and "removal action area" (RAA) boundary for the Arkema Portland draft EE/CA Work Plan. LSS would like to express its appreciation for your time to meet with us on February 15 and provide us with an overview of EPA's progress towards revisions of the draft EE/CA Work Plan. However, LSS believes that the materials provided by EPA in advance of and at the meeting did not meet the requirements stipulated in Dan Opalski's November 29, 2006 letter. Mr. Opalski's letter called for EPA to provide EE/CA Work Plan language that addressed, at a minimum, the definition of principal threat(s) at the site and the methodology for determining the RAA in redline/strike-out format. (Opalski letter p 6). EPA's materials included only talking points and four figures, which lacked both the kriging and the contouring that EPA required of LSS in the more than 330 figures LSS provided in its draft EE/CA Work Plan. The methodology for determining the RAA was not provided. Nonetheless, it was agreed at the February 15 meeting that LSS will be given adequate opportunity and time to make further comments on EPA's additional work at such time as EPA produces the information specified in Mr. Opalski's November 29 letter. LSS looks forward to the opportunity and time to make further comments on additional text, figures, contouring, and related materials as this output and any other proposed changes to the draft EE/CA Work Plan become available. Since our meeting, LSS has received the LWG, Portland Harbor RI/FS Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report (LWG 2007) and has performed an expedited evaluation of pertinent sections for inclusion in this letter.

LSS's general comments on each of the topics presented at the meeting are provided below. In addition to these general comments, LSS is providing an analysis of the application of EPA's proposed principal threat and RAA boundary definitions to the Arkema site. At this time, we have limited our analysis of EPA's proposed principal threat and RAA approach in order to

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provide timely feedback to EPA for consideration into the overall EE/CA work plan revision process. The purpose of this feedback is to provide EPA with what we believe is the fundamental regulatory context for resolving the problem of defining a principal threat and RAA boundary, and to focus ongoing efforts on practical and meaningful technical approaches, as EPA continues to contemplate these issues in the draft EE/CA work plan.

To those ends, in order to provide some meaningful perspective and relevance, LSS has completed the following:

1) evaluated EPA's proposed use of arbitrary multipliers of conservative SLVs to develop a principal threat definition versus using site specific (yet still very conservative) LWG initial preliminary remedial goal (iPRG) data along with EPA-established guidance to aid in the definition of the principal threat;

2) revisited EPA's principal threat and non-time-critical removal action definitions and guidance;

3) analyzed background, baseline, and ongoing loading of DDx[1] in the Willamette River system; and

4) Compared and contrasted EPA's proposed principal threat levels with DDx final clean up levels cited in EPA records of decision (RODs) at other sites.

The results of our review, research and analyses is that LSS believes we should follow the Non Time Critical Removal Action (NTCRA) Guidance and focus our efforts on substantial risk reduction based on a targeted mass remediation approach at this site. We hope that we can present in this letter a rationale means to obtain some consensus and clarity by presenting EPA with an alternative methodology for identifying, defining, and achieving meaningful risk reduction which should be a primary objective of this NTCRA. The targeted mass remediation conceptual evaluation presented herein is based strictly on achieving meaningful DDx remediation (i.e., substantial risk reduction) in advance of the LWG's harbor-wide remedial action and, therefore, is focused primarily on targeting percentage of DDx mass remediated.

EPA's Principal Threat Definition and Selection of Screening Level Values

The materials provided by EPA at the February 15 meeting used screening level values[2] to gauge whether individual samples could be classified as principal threat material. EPA proposed that the PEC or "1,000 times any specific sediment SLV" for solids would be used to identify the

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[1] Normally defined herein as the sum of all DDT isomers, DDD isomers, and DDE isomers.

[2] EPA Region 9 preliminary remediation goals (PRGs), Ingersoll et al. (2000) sediment quality values, and DEQ (2001, 2006a,b) bioaccumulation guidelines. See Appendix 1 for comments on EPA's proposed values and methods

principal threat. LSS indicated that these concentrations were not consistent with the principal threat definition that has been established by EPA at other sites and in EPA guidance (see review of EPA guidance below).

During the meeting, LSS expressed concern over the technical accuracy and merits of some of the bioaccumulation SLVs (See Appendix 1). As stated during the meeting, LSS encourages EPA to revisit SLVs that may be out of date or have been replaced by more current guidance.

At the meeting, LSS also expressed interest in the iPRGs developed for Portland Harbor by the LWG in its recently completed Round 2 Comprehensive Site Characterization Summary and Data Gaps Analysis Report (LWG 2007). In this context, LSS would re-iterate the importance of making best use of the LWG data, including iPRG values. The iPRGs are based on information developed specifically for Portland Harbor, range over several orders of magnitude depending on the receptor and DDx compound, but are nonetheless conservatively based and if used in the proper context, could be appropriate for aiding in the initial identification of principal threat material in the vicinity of the Arkema site.

LSS also recommends that EPA include U.S. Food and Drug Administration (FDA) action levels for DDT compounds as an additional benchmark for judging principal threats. FDA's action level for DDT in the edible portion of fish is 5,000 μg/kg ww. The FDA action level for DDT in fish is cited in many RODs as an ARAR (discussed below) and, therefore, is relevant in characterizing principal threat material.

Principal Threat and Non-Time Critical Removal Action Definition

Based on LSS's assessment, the concentrations of chemicals provided by EPA on February 5 and 15 to define a principal threat at the Arkema site not only do not meet the EPA definition of a principal threat based on well-established guidance, but EPA's concentrations define an area that is well beyond a principal threat based on an evaluation of site data. Recall that EPA guidance on conducting a non-time-critical removal action (NTCRA) under CERCLA states:

> "At one end [of a continuum] are sites where the non-time-critical removal action is the first and only action expected at a site and where no other data are available. In this case, the EE/CA should provide definitive information on the source, nature and extent of contamination, and risks presented by the site. At the other end of the continuum are sites where the non-time critical removal action is one of a series of response actions, where a completed RI is or will be available, and where the nature and extent of contamination and the risk presented by the site have been or will be determined. In this case, the EE/CA would be similar to a focused FS, concentrating on the analysis of perhaps two or three appropriate alternatives and providing reference to existing information on the nature and extent of contamination and risks" (USEPA 1993).

LSS believes the record for the Arkema site is clear; i.e., it is not at the end of the spectrum where the NTCRA is the first and only action at the site and where no other data are available. The Arkema site is well within the Portland Harbor Superfund Site Assessment Area where more than $50 million dollars have been spent to date to conduct perhaps the most comprehensive remedial investigation and feasibility study undertaken in EPA's Region 10. Moreover, the Arkema NTCRA is only one of a series of removal actions that are taking place in Portland Harbor. EPA's proposed approach using extremely low concentrations of chemicals is requiring LSS to produce an EE/CA that would be expected if the NTCRA were the first and only action at the site and also assuming that no risk assessment was being considered for the site.

Again, recall that the foundation of a NTCRA is to implement a removal action on the principal threat area of a site to address priority risks. It is therefore an important means of moving a site more quickly through the Superfund process.

> "Thus, conducting non-time-critical removal actions advances the goals of the Superfund Accelerated Cleanup Model (SACM) to include substantial, prioritized risk reduction in shorter time frames and to communicate program accomplishments to the public more effectively" (USEPA 1993).

LSS believes that the Arkema NTCRA has been bogged down in disagreements over technical details, in particular, in the minutia of arguing over EPA's extremely conservative screening values that are unquestionably at or near the minimum threshold level of site risks and not at the "principal threat" level that is the presumed end goal of this analysis. Having the focus on and expending energy on EPA's conservative screening values distracts from the primary purpose of the action; i.e., substantially reducing prioritized risks in shorter timeframes than would otherwise be observed in a large, complex Superfund site like the Portland Harbor. LSS believes it is extremely important at this juncture to remind ourselves that one important point of the strongly held agreement between EPA and LSS, from the beginning of this NTCRA process, is that the principal threat area should include the area "between the docks", that is to say from in or around the Salt Dock on the upstream end to in or around Dock 2 on the downstream end of the Arkema site. This area has been previously described by EPA as the "hotspot" area, and it is unquestionably the area where most of the residual mass of DDx resides at the Arkema site.

According to EPA guidance, the prioritized risk arises from the principle threat wastes at a NTCRA site. EPA's *A Guide to Principal Threat and Low Level Threat Wastes* (USEPA 1991) provides the following definition for principal threat wastes:

> Principal threat wastes are those source materials considered to be 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. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. No "threshold level" of toxicity/risk has been established to equate to "principal threat." However, where toxicity and mobility of source material combine to pose a potential risk of 10^{-3} or greater generally treatment alternatives should be evaluated."

Recall, however, deciding whether particular source materials are principal threats is not based solely on site risks. EPA's Principal Threat Guidance further states:

> "Determinations as to whether a source material is a principal or low level threat waste should be based on the inherent toxicity as well as a consideration of the physical state of the material (e.g., liquid), the potential mobility of the wastes in the particular environmental setting, and the lability and degradation products of the material. However, this concept of principal and low level threat waste should not necessarily be equated with the risks posed by site contaminants via various exposure pathways. *Although the characterization of some material as a principal or low level threat takes into account toxicity (and is thus related to degree of risk posed assuming exposure occurs); characterizing a waste as a principal threat does not mean that the waste poses the primary risk at the site.*" (Emphasis added)

The buried DDx mass in sediments at the Arkema site, the highest concentration material, is located immediately offshore of the former discharge pipe that was located between the docks when DDT operations started in the late 1940s. This DDx material, which is buried under approximately 10 ft of sediments, has the highest concentration of DDx in sediments at the Arkema site and would be a "source" of DDx to the river if it were uncovered. However, the DDT mass that is buried 10 ft below the sediment mudline does not represent the current primary site risk because it is separated from potential receptors in a direct exposure scenario by approximately 10 ft of sediment with substantially lower DDx concentrations. Again, LSS believes that EPA's proposed methodology to use conservative screening values to define the removal action area boundary does not focus on the source of the principal threat, or even the actual risk of the principal threat, but rather diffuses the NTCRA into an open-ended investigation of the nature and extent of any and all contamination that may be associated with the Arkema site while simultaneously neglecting to take into consideration contamination from other known sources.

Recall for purposes of context, that the objectives of the NTCRA for the Arkema site are set forth in the Arkema Administrative Order on Consent (AOC)[3] as follows: "The removal action will address, at a minimum, the principal threat contamination extending from the top of the riverbank on the Arkema site into the Willamette River…." (Paragraph 21 of Section VIII of the AOC). "The primary purposes of the Statement of Work (SOW) are: . . . (3) to expedite the characterization, feasibility study, cleanup alternatives analysis, and performance of cleanup on the principal threat in the intertidal area and submerged lands on and adjacent to the Arkema site." (SOW, I. Purpose).

In order to address the principal threat material and expedite the characterization and cleanup of the principal threat material in the intertidal area and submerged lands on and adjacent to the Arkema site, LSS believes that EPA's approach cannot be successful. EPA's proposed use of screening level numbers and arbitrary multipliers is so overly conservative that it fails to take

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[3] Administrative Order on Consent for Removal Action, U.S. EPA Region 10, CERCLA Docket No. 10-2005-0191.

into account the existing baseline conditions for DDx at the Arkema site or in the Willamette River, fails to use relevant and appropriate site specific risk information, and is disconnected from remedial actions performed at other DDx sites.

Background and Baseline DDx Levels

For purposes of understanding this project in its geographic context, it is necessary to take a broader look at the contemporary patterns and distribution of DDx in the environment generally, and in the Willamette River Basin in particular. The impact of DDx residues from the historical usage of DDx in Oregon and worldwide must be recognized, especially when screening levels are being considered by EPA to define a principal threat area that includes not only the recognized DDx "hot spot" at the Arkema site in Portland, but that also incorporates areas well upstream of any influence from Arkema or includes other known DDx sources within the industrial area of Portland Harbor.

In a recent report on pesticides in the nation's streams and groundwater, the USGS (2007) states that the geographic distributions of historically used insecticides follow their past agricultural uses and further indicate that use in urban areas probably was substantial. In particular, non-agricultural uses of DDx are believed to be historically significant to control insects, principally mosquitoes in urban areas.

In Oregon, more than 2 million kilograms (kg) of DDT were applied to forests between 1945 and 1974 and 1.3 million kg of that amount was sprayed along the crest of the Cascades between 1949 and 1953 (Moore and Loper, 1980). Moore and Loper's (1980) study of DDT residues showed average total DDx[4] concentrations of 319 μg/kg in organic forest floor material and 16 μg/kg in shallow mineral soils near these spray areas. In one area, residual concentrations 13 years after spraying were 1,405 μg/kg in the forest floor and 81 μg/kg in shallow mineral soils. More importantly, in the Coast Range forests where DDx spraying had not been conducted, total DDx residues were also detected, averaging 71 μg/kg (range from 37 μg/kg to 132 μg/kg) in the forest floor and 9 μg/kg (range from 4 μg/kg to 24 μg/kg) in the shallow mineral soil. The results of this study show that the influence from DDT application in silvacultural areas was widespread and the impact extended broadly outside of the areas where DDT was applied.

More recent studies of DDT isomers and metabolites in stream sediments within the Willamette Valley also show the presence and persistence of total DDx in the environment. Tanner (2002) reported DDx concentrations in 14 small streams in the Salem area that are all within the Willamette watershed with drainage to the Willamette River. Total DDx was detected in all of the sediment samples at concentrations up to 374 μg/kg (mean total DDx of 38 μg /kg). Harrison *et al.* (1995) include sediment data for urban streams in the Portland area that drain directly or indirectly to the Willamette River including samples from Johnson Creek in Gresham (total DDx of 311 μg/kg), Beaverton Creek in Beaverton (total DDT of 117 μg/kg) and Beaver Creek in Troutdale (total DDx of 54 μg/kg). These data represent the residual concentrations of total DDT

[4] Defined in this study as the sum of 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE.

for both urban and agricultural areas because most of these streams were located in areas that transitioned from primarily agricultural to urban uses during and after the period of DDT use.

Additional perspective on the degree to which historical uses of DDx can affect contemporary patterns of its distribution is provided by a USGS study (Henny et al. 2003) of DDx in fish and birds. Henny et al. (2003) measured levels of DDE in fish tissue throughout the Willamette River basin from the McKenzie River to Oregon City, with peak levels detected below the confluence with the Santiam River (318 μg/kg wet weight [ww]) and just above Newberg (259 μg/kg ww). This suggests that the past agricultural, forest, and urban uses have resulted in background levels of DDx compounds in biotic as well as abiotic media. More importantly, this contrasts with the sculpin data (the single highest observed fish tissue concentration and not considered a fish for human consumption) for DDE from the Willamette River at 3 μg/kg ww. This data suggests that there are upstream sources that are significantly more contaminated than existing levels adjacent to the Arkema site.

Total DDx has been detected in more than three-quarters of the sediment samples collected by the LWG and other related studies in the lower Willamette River upstream of the Arkema site. In the area immediately upstream of the Arkema site to Willamette River mile 12, the mean detected total DDT sediment concentration is 30 μg/kg with a maximum DDx concentration of 4,010 μg/kg. These data suggest that the historical use of DDT in forest, agricultural and urban environments has impacted soils and sediment in the Willamette River. These baseline total DDT levels also fall within the range of the principal threat definition proposed by EPA in our February 15 meeting (i.e., 1000x DEQ 2006 Bioaccumulation SLVs is 3.8 μg/kg for DDE, 39 μg/kg for DDD, 62 μg/kg for DDT, and 62 μg/kg for total DDx). Therefore, using EPA's proposed definition implies that the principal threat for DDx in the Willamette River encompasses much of the lower Willamette Harbor (see maps 6.1-9a through 6.1-12b from LWG Round 2 Comprehensive Data Report attached).

EPA's proposed approach is not technically within the parameters of EPA guidance, and given the contemporary patterns of DDx distribution in the Willamette River system and the data from the LWG Remedial Investigation, this approach fails to account for background contaminant concentrations and continued loading from upstream sources. To continue this approach will result in an ill conceived and unsuccessful NTCRA.

Established DDx Sediment Cleanup Levels

A review of selected RODs from around the United States was conducted in an effort to identify DDx levels that would be considered a "principal threat" if possible; and if not, to determine the range of EPA–accepted, risk-based "final clean up" levels for DDx. If no principal threat levels were published in the ROD, then final clean up levels were used as the basis to compare to EPA's proposed principal threat level, which by definition should be several orders of magnitude higher than a final clean up level.

The review was conducted by searching EPA's national ROD database for cleanup sites with DDx cleanup values. Although not a fully comprehensive review, LSS suggests that this review captures a fair representation of the range of RODs with DDx cleanup values for comparative

purposes. Table 1 provides a summary of the key information from RODs that had DDx cleanup values.

The RODs reviewed included DDx cleanup values for various individual DDx metabolites or groupings and also for different endpoint receptors. Site cleanup values were derived for direct contact to humans, contaminated fish consumed by humans, and for ecological receptors of various types. It should be noted that all the RODs included final clean up values, not the higher range values set forth in the EPA guidance to define a "principal threat". As such, the values listed in the tables are considered to be several orders of magnitude lower (at a minimum) than would be appropriate and acceptable to define a principal threat.

In summary, this review suggests that the values currently proposed by EPA to define principal threats at the Arkema Portland site are well below any principal threat levels, and in many cases well below established final DDx cleanup levels, at many other sites. It appears to LSS, that EPA's proposed approach is not consistent with similar sites across the country. The most notable contrast is between EPA's proposed description of principal threat and RAA and the recent EE/CA performed by EPA Region 9 for the Palos Verdes Site. The Palos Verdes proposed plan, which was published pursuant to an EE/CA, called for the following three actions: (1) increased enforcement of the commercial fishing ban and recreational catch limit for white croaker off the Palos Verdes peninsula; (2) public outreach and education regarding the existing advisories on consumption of fish caught in this area; and (3) monitoring contaminant levels in commercially-sold fish to evaluate the effectiveness of the enforcement actions. The observed highest DDT in fish tissue and in surface sediments at the Palos Verdes site are an order of magnitude higher (59,600 μg/kg and 200,000 μg/kg respectively) than those directly off the Arkema dock area (3,000 μg/kg and 10,000 μg/kg respectively). In addition, DDT in surface sediment above 1,000 μg/kg at Palos Verdes extend 17 square miles. In contrast, total DDx surface sediment above 1,000 μg/kg in front of the Arkema site is less than 8 acres in size. This comparison illustrates that there is a major disconnect in the approaches between these two DDx sites.

An evaluation of DDx cleanup levels for other sites around the country included the following information (refer to Table 1):

- DDT cleanup values based on direct human contact with sediments ranged from 2 μg/kg to 60,000 μg/kg. The highest value at Camp Jejune Military Reservation was a cleanup goal based on cancer risk. The 2 μg/kg value was the Cordoba Chemical Company in Michigan and was based on Michigan soil standards.

- Fish bioaccumulation cleanup values for Total DDT and DDTr[5] at freshwater sites ranged from 2,100 to 5,000 μg/kg in river and pond sediments. The 2,100 μg/kg Total DDT value was included in a 2006 ROD for areas of the Patuxent River Naval Air Station. The remediation goal also included an institutional control restricting the consumption of fish from the pond.

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[5] DDTr is usually defined as the sum of DDT and its metabolites, and is either the same as or similar to DDx depending on its specific usage.

- Ecological cleanup values for DDTr or DDx in freshwater systems ranged from 27 μg/kg to 15,000 μg/kg. For some sites, the ecological endpoint receptors included songbirds, mallard ducks, and great blue herons. For the Ciba-Geigy site in Alabama, the cleanup level (15,000 μg/kg) was based on a balance of the risk to ecological receptors and the impacts from remediation at the site.

Based on this review, it is apparent that there is a broad range of DDx concentrations that are considered acceptable as final clean up levels at freshwater sediment sites around the country. Based on this information, EPA's proposed principal threat levels of DDx for the Arkema site is currently at the low end of established "final clean up" levels for RODs that have been accepted by EPA at other sites. Based upon the guidance cited above, "principal threat level" should be several orders of magnitude higher than "final clean up levels" and therefore EPA's proposed principal threat definition is not consistent and appears disconnected from actions taken on other sites.

Also, LSS observes that if some of the higher risk-based final clean up levels from the ROD's listed on the table were adopted for the Arkema site, little if any, sediment remediation would be warranted. Again, this illustrates that there is a major disconnect with EPA in differentiating between final clean up level and principal threat levels.

DDx Mass Capping or Removal Approach

Another way to look at the principal threat is to evaluate the chemical mass in the Arkema reach of the Lower Willamette River with respect to background, or in the case of DDx, baseline concentrations that are present because of the historic use of DDT for mosquito and other pest control in forested, agricultural, and urban areas. LSS evaluated the sediment data collected at the Arkema site by Arkema, the LWG, and other related investigations in an effort to estimate the principal threat DDx mass associated with the Arkema site relative to upstream baseline concentrations (see discussion in Background and Baseline DDx Levels above).

LSS has developed five figures to show the distribution of DDx at the Arkema site. The concentration distribution of 204 individual sediment samples collected at the Arkema site are plotted in sequence from lowest to highest concentration. All data, both detected and non-detected values, are plotted on the figures.[6] More than 97 percent of the sediment samples (198 samples) had detected DDT isomers or metabolites. In Figure 1, the y-axis is the sum of 4,4'-isomer of DDD, DDE, and DDT (total DDx) plotted on an arithmetic scale. In Figures 2 through 5, the y-axis (total DDx) is plotted on a logarithmic scale.

Figure 1 shows the sediment samples with the five highest concentrations rising above the baseline level for the Arkema site. If it is assumed that each sediment sample represents an equivalent volume of sediment, then the five sediment samples, all collected between the docks at the Arkema site, represent most of the total DDx mass at the site.

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[6] Non-detected results are plotted at the detection limit value.

Figures 2 through 5 show the incremental differences in mass that is represented by different concentrations of DDx in sediments. These figures can be used to determine an appropriate sediment mass that should be addressed in the EE/CA for the Arkema site. Figure 2 shows that a DDx value of approximately 4,500,000 μg/kg and greater encompasses 50 percent of the DDx mass at the Arkema site. One sample at the site exceeds this concentration; it was collected from a depth of 8-10 ft below mudline at sediment sample station WB-9 near the former manufacturing process residue discharge pipe at the Arkema site.

Figure 3 shows that a total DDx value of approximately 2,500,000 µg/kg and greater encompasses 75 percent of the DDx mass at the Arkema site. Two sediment samples at WB-24 and WB-9, both buried in sediment between the docks at the Arkema site, exceed this value. Seventy-five percent of the DDx mass at the Arkema site would be addressed if the buried sediment in this area were capped or removed.

Figure 4 presents a total DDx value of approximately 750,000 µg/kg and greater which defines 90 percent of the DDx mass at the Arkema site. This value is only exceeded by four samples located in sediments buried between the docks at the Arkema site (WB-9, WB-24, WB-8, and WB-11). If the buried sediment from this area were capped or removed, 90 percent of the DDx mass from the Arkema site would be addressed.

Figure 5 shows that a total DDx value of approximately 50,000 ug/kg and above captures 95 percent of the DDx mass at the Arkema site. This concentration is exceeded in only 10 samples (Stations WB-9, WB-24, WB-8, WB-11, WB-10, OSS002, C348, WB-25, SD92, and C356). If the buried sediment from these areas were capped or removed, 95 percent of the DDx mass at the Arkema site would be addressed.

Alternative Principal Threat Proposal

It is the position of LSS that EPA's principal threat and RAA boundary definition are inconsistent with EPA guidance, with cleanup decisions made at other federal sites, and even with the baseline DDx that persist in the river as a result of historic uses of DDx in the Willamette River basin. Therefore, LSS proposes an alternative approach to define principal threats. LSS proposes to use a mass driven or targeted remediation approach for DDx to delineate the RAA boundary and principal threat for the Arkema NTCRA. This approach can achieve meaningful risk reductions in advance of the Harbor-wide remedial action. For this approach, LSS would more fully flesh out and build upon the initial analysis provided above and evaluate the relationship between mass of DDx in sediments to volume of sediments. A breakpoint in mass/volume/risk reduction could be used to delineate the RAA boundary at the Arkema site. This approach would clearly meet the EPA goal of "substantial, prioritized risk reduction in shorter time frames" for NTCRA sites. We would like to discuss this new approach with the EPA team at your earliest convenience.

Please contact me at (610) 594-4430 if you have any questions or comments pertaining to this letter.

Sincerely,

Legacy Site Services LLC

J. Todd Slater
Manager, Environmental Technologies
And Remedial Procurement

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References

DEQ. 2006a. Calculating Sediment Screening Levels for DDT. Unpublished Memorandum by M. Poulsen and J. Peterson. March 22, 2006. 11 pp.

DEQ. 2006b. Guidelines for Assessing Bioaccumulative Chemicals of Concern in Sediment. Public Review Draft. September 26, 2006. Oregon Department of Environmental Quality, Portland, OR. 17 pp. + appendices.

DEQ. 2007. Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment. January 31, 2007. Oregon Department of Environmental Quality, Portland, OR. 18 pp. + appendices.

Harrison, H.E., C.W. Anderson, F.A. Rinella, T.M. Gasser, and T.R. Pogue Jr. 1997. Analytical data from phases I and II of the Willamette river basin water quality study, Oregon, 1992-94. Open-File Report 95-373. U.S. Department of the Interior, U.S. Geological Survey, Washington, DC.

Ingersoll, C.G., D. MacDonald, N. Wang, J. Crane, L. Field, P. Haverland, N. Kemble, R. Lindskoog, C. Severn, and D. Smorong. 2006. Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines. EPA 905/R-00/007. U.S. Environmental Protection Agency, Great Lakes Program Office, Chicago, IL.

Lower Willamette Group. 2007. Portland Harbor RI/FS Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report. Prepared for the Lower Willamette Group, Portland, OR. Prepared by Integral Consulting, Windward Environmental, Kennedy/Jenks Consulting, and Anchor Environmental.

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus□based sediment quality guidelines for freshwater ecosystems. *Arch. Environ. Contam. Toxicol.* 39:20–31.

Moore, D.G., B.R. Loper. 1980. Soils, DDT residues in forest floors and soils of western Oregon, September–November 1966. *Pesticides Monitoring Journal.* 14(3):77-78.

Tanner, D.Q. 2002. Selected elements and organic chemicals in streambed sediment in the Salem area, Oregon, 1999. Water-Resources Investigations Report 02-4194. U.S. Department of the Interior, U.S. Geological Survey, Washington, DC.

U.S. EPA 1991. A Guide to Principal Threat and Low Level Threat Wastes, Superfund Publication:9380.3-06FS, Office of Emergency and Remedial Response, November 1991.

U.S. EPA 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, EPA/540-R-93-057, Publication 9360.0-32, Office of Emergency and Remedial Response, (August 1993)

USGS. 2007. Pesticides in the Nation's Streams and Ground Water, 1992-2001. Circular 1291. US. Department of the Interior, U.S. Geological Survey, Reston VA. 172 pp.

Van Derveer, W. and S. Canton. 1997. Selenium sediment toxicity thresholds and derivation of water quality criteria for freshwater biota of western streams. Environ. Toxicol. Chem. 16:1260-1268.

Appendix 1 – Comments on EPA PRGs

General Comments

Screening level values, like iPRGs, are also chemical concentrations in a specific medium (e.g., sediments) that represent some fixed level of risk for a particular receptor or exposure scenario. With the exception of the sediment PEC values, the SLVs presented by EPA were multiplied by 1,000 to be consistent with EPA's benchmarking procedure. In addition to this arbitrary weighting, the major difference between the SLVs and the iPRGs are that SLVs are generically derived and take into consideration few of the site-specific or receptor-specific factors developed for the iPRGs for Portland Harbor. For example, the soil PRGs developed by EPA Region 9 are very high and do not seem to contribute meaningfully to understanding of significant risk. LWG's analysis of human health risk via direct sediment exposure pathways resulted in deminimis exposure that precluded the need for either iPRGs or iAOPCs.

PEC/TEC values.

EPA provides a table of alternate SLVs/Sources. EPA cites Ingersoll et al. 2000 as an alternative source for PECs for DDT, DDD, and DDE. However, the PEC values are the same as those provided by Integral in the draft EE/CA work plan, which cites MacDonald et al. (2000). In fact Ingersoll et al. (2000) is an agency report that is the predecessor to the peer reviewed publication by MacDonald et al. (2000). LSS recommends that the most recent peer reviewed publication be given preference in such situations to assure quality and integrity of the final results generated by the research team performing the work. LSS also notes that the so-called alternative values do not include the PEC for total DDT, which appears in both the Ingersoll et al. (2000) and the MacDonald et al. (2000) versions of this research.

Also, the benthic community SLV (the probable effect concentration) does not include site-specific toxicity tests and should be replaced by harbor wide values that include toxicity data from the site (see iPRG discussion above).

Bioaccumulative Sediment SLVs.

EPA cites Oregon Department of Environmental Quality (DEQ 2006a,b) as sources of information for bioaccumulative SLVs. In fact, both are drafts of the same document and should be replaced entirely by ODEQ's (2007) final guidance document.

The bioaccumulative SLVs for tribal fish consumption and wildlife exposure to Osprey are based on draft guidance developed by the Oregon Department of Environmental Quality (DEQ). These values have since been revised pursuant to publication of the final guidance document in February 2007. For tribal fish consumption, the SLV is now expressed as a total DDT[7] concentration of 0.000035 mg/kg dw sediment, which results in 1000 X SLVs of 0.035 mg/kg dw total DDT. For wildlife exposure, the SLV is now expressed as a range of total DDT

[7] DEQ bases its calculations on DDE only, but expresses the result as a total-DDT value.

concentrations protective of individuals (0.000095 - 0.00043 mg/kg dw sediment) or populations (0.00034 - 0.0013 mg/kg dw), which results in 1000 X SLV values for total DDT of 0.095- 0.43 mg/kg dw for individuals and 0.34 - 1.3 mg/kg dw for populations.

Also, LSS has not had the opportunity to review the alternate SLV/Source for selenium (Derveer and Canton 1997) and therefore cannot determine whether it is an appropriate value at this time.

In summary, the bioaccumulative SLVs for both human and ecological exposure are out of date and lack site specificity. Values published in DEQs final guidance are more current, but still lack the site specificity that is found in the LWG Round 2 Report.