October 10, 2008

Mr. Sean Sheldrake
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Seattle, Washington 98101

Subject: Response to EPA's August 21, 2008 and September 16, 2008 comment letters
U.S. EPA Region 10 Docket No. CERCLA 10-2005-0191

Dear Mr. Sheldrake:

This letter presents a response to EPA's letters dated August 21, 2008 (received on August 22, 2008) and September 16, 2008, that together provide a complete set of review comments on Legacy Site Service's (LSS') Arkema Early Action EE/CA Work Plan Addendum dated July 22, 2008. To facilitate review of LSS' responses, EPA's comments are provided below in bold text followed by the LSS response.

EPA August 22nd Letter General Comments

A. Sediment Screening Level Values (SLV) - (see Comments 10, 11, 12, 13, and 14, pages 5-1 to 5-4), In the EPA (Parametrix) EE/CA Work Plan (EPA WP) and in subsequent discussions with Legacy Site Services, Inc. (LSS), EPA agreed to use the Oregon Department of Environmental Quality (ODEQ) *Guidance for Assessing Bioaccumulatives of Concern in Sediment* (ODEQ 2007) for bioaccumulation SLVs. For direct contact for human health receptors, the EPA Region 9 Preliminary Remediation Goals (PRG) were to be used. For direct contact for ecological receptors, the McDonald PECs and TECs or other Sediment Quality Values (Portland Harbor [PH] Joint Source Control Strategy and others) were to be used. The following issues will impact these SLVs:

(1) EPA and the Lower Willamette Group (LWG) have agreed on a process for the LWG to develop draft early sediment PRGs by October, 2008. It includes an agreed to list of chemicals for which PRGs will be developed for eco and human health. Many of these PRGs will be different than those in the EPA WP both in the values used and the chemicals selected.

For the EE/CA Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) that LSS will be submitting, the SLVs agreed to by EPA and LSS should be used to make decisions (e.g., select sampling locations and detection limits). However, once the Arkema EE/CA data are available, the PH RI/FS early PRGs should be used if EPA has agreed to them.

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LSS Response: LSS has agreed to include early sediment PRGs for data comparisons that have been agreed upon by EPA and the Lower Willamette Group (LWG) into the EE/CA report assuming they are available in a timely manner that will allow for incorporation into the EE/CA report. In the meantime, as is pointed out in the comment, LSS and EPA have agreed to use SLVs from DEQ guidance and other sources (see listed sources in EPA comment). LSS used those values in the Work Plan Addendum. LSS agrees that the early sediment PRGs being developed for the Portland Harbor RI should be used when available and approved by EPA. However, the early PRGs are intended as an interim first iteration to advance the schedule of the Portland Harbor FS prior to completion of the Portland Harbor RI and baseline risk assessments (BLRAs). Consequently, LSS believes that final PRGs that are developed pursuant to completion of the draft Portland Harbor RI/BLRA and approved by EPA should be used if and when they are available.

(2) EPA Region 10 no longer uses the Region 9 PRGs. The Region 9 PRGs have been superseded by national EPA *Regional Screening Levels for Chemical Contaminants at Superfund Sites (*attached to these comments). These EPA Regional PRGs should be used instead of those from Region 9 until the early RI sediment PRGs are available. In addition, EPA Region 10's Human Health Screening Memo (April 17, 2007, attached to these comments) has language that is Region-specific and shall complement or supersede the EPA *Regional Screening Levels for Chemical Contaminants at Superfund Sites.*

LSS Response: LSS is aware of EPA national screening level guidance and Region 10's memorandum and will refer to these documents as needed in the future.

(3) The following statement should be modified: "TEC and PEC values represent a range of available chronic and acute exposure data available from laboratory and field studies" (see Comment 22, Page 6-2, and Comment 28, page 6-4). It should be replaced with the following language"

"TECs represent concentrations below which adverse effects on biota are not expected, while PECs represent concentrations above which adverse effects on biota are expected to be frequent. Both values are based on an array of laboratory and field studies."

LSS Response: LSS agrees to this change as modified by LSS to reflect the wording from the original source document and presented below.

"TECs represent concentrations below which adverse effects on biota are not expected to occur, while PECs represent concentrations above which adverse effects on biota are expected to occur more often than not (MacDonald et al. 2000). Both values are based on an array of laboratory and field studies."

B. <u>Definitions of Boundaries and Media</u>- Several boundaries are discussed in the draft Addendum (medium low water, medium high water, ordinary high water and top of bank) and the following areas are defined based on these boundaries (see comments 76 and 77, page 3-3):

Upland groundwater (GW) and sediment GW
Upland site, riverbank soil, beach sediment, and Willamette River sediment

LSS should add discussion of how the various boundaries will be used in the EE/CA.

LSS Response: The terms medium low water and medium high water are not used in the EE/CA Work Plan Addendum. If EPA is referring to the terms mean high and mean low water, those boundaries are presented and used in the EE/CA work plan. The other boundaries described are not used to define elements of the EE/CA removal action other than to assist the reader in understanding the different areas and elevations that have been introduced as part of the EE/CA and broader RI/FS process. Many of the boundaries are shown on Figure 2-1 from the EE/CA work plan prepared by LSS and submitted in July 2006 as well as in the 2007 EPA/Parametrix Work Plan (attached).

Important issues for the EE/CA might include recontamination potential and perhaps evaluation of the need to control migration of contaminants subsequent to completion of the removal action. Other uses for these designations could include evaluation of health risks to trespassers that might use beach areas, and evaluation of ecological risks within the riparian zone. It could be reasonable to combine two or more areas included in the boundary definitions for purposes of evaluating recontamination. For example, definitions of riverbank (TOB or containment boundary riverward) and river sediment could be sufficient for EE/CA purposes. It should also be noted that all definitions other than "top of bank" are problematic for riverbank cleanup implementation, as the riverbank cannot be practicably divided up for construction purposes.

Note that some boundary definitions may need to be subject to change in the future as RI/FS investigations and evaluations are completed so as to be consistent with the final Portland Harbor Superfund Site remedy. Uses of boundary definitions in the EE/CA should not be requisite on boundary definitions remaining as defined for the work plan.

LSS Response: Comment noted.

Further, LSS should develop a figure (vertical definitions) and map (horizontal extent) with all of these boundaries shown for purposes of the Arkema EE/CA including the datum used (e.g. OHW, top of bank, etc.). A cross-reference should be prepared showing elevations for the Mean Sea Level, City of Portland Datum, National Geodetic Vertical Datum, Ordinary High Water, Ordinary Low Water, and any other datum for the river mile at the Arkema site that may be used for the remedial work. If possible, the upland containment boundary should also be shown.

LSS Response: The riverbank boundaries described above were presented in a conceptual figure in LSS' 2006 EE/CA work plan, Figure 2-1, that shows the vertical definitions of the elements described above. Figure 2-1 was also included in the 2007 EPA/Parametrix EE/CA work plan. Horizontal extent of these boundaries, including the top of bank, ordinary high water, and mean high water are shown in most of the figures of the Arkema site. The reference to two datums

used on the site, NAVD88 and CRD, are included on Figure 2-1.

C. <u>Asbestos</u> – In Figure 2-4 that LSS submitted as part of its package, former asbestos ponds are located on Lot 3 and asbestos trenches on Lot 1. These disposal areas may or may not have released asbestos to the Removal Action Area (RAA); data are not currently available to address the issue. It may be wise to either include some asbestos analysis as part of the EE/CA site characterization, or at least indicate that asbestos analysis will be required for waste characterization prior to disposal. Ruling out asbestos as a factor as early as possible in the process could be useful.

LSS Response: LSS agrees with this comment and asbestos was added for waste characterization analysis in the EE/CA FSP and QAPP which was submitted to EPA prior to receiving this comment letter.

<u>EPA August 22nd Letter Specific Comments</u>

1. Preface to the Work Plan Addendum, Page *vii* - The following text should be added to the text describing the removal of "PTM" from the Work Plan: "The intended use and purpose of SLVs for the Arkema removal action is further presented in the Opalski Decision (USEPA 2008)."

LSS Response: The suggested revision is inconsistent with the language that was agreed upon by EPA and LSS during informal dispute resolution and as documented in a final email from Todd Slater to Sean Sheldrake dated October 23, 2007, and in the November 7, 2007 letter from EPA to LSS confirming the agreement (copies attached).

2. Comment 76, Page 3-3 – Comment 98 is also applicable to this text.

LSS Response: Comment noted; however, comment 98 was originally provided on Figure 4-2 of the EPA/Parametrix EE/CA work plan not on the text. See Figure 2-1 (from LSS 2006 EE/CA Work Plan and EPA/Parametrix' 2007 EE/CA Work Plan) for a visual representation of these descriptions.

3. Comment 104, Page 4-1 – Correct typo in last sentence: "provided" should be "provide".

LSS Response: Comment noted.

4. Comment 108, Page 4-2 – The following comments on Tables 2-2 and 4-5 were developed as part of EPA's review of the July 2008 *Stormwater Interim Measures Sampling and Data Report*.

Table 2-2 – There is an error in the discharge calculation for Drainage to Outfall 004 (including from Lot 2). The area for this drainage is listed as 528,000 sf (12.1 acres), and represents a sum of 376,000 sf and 152,000 sf (8.6 and 3.5 acres) from Table 2-1 of the July

2008 report. The error is in the listing of pervious and impervious percentages. Listed percentages are for the 376,000 sf (8.6 acres) listing in Table 2-1 and do not reflect the proportional percentages of the 152,000 sf (3.5 acres) listing. The percentages should be 91.5% pervious and 8.5% impervious given the combined areas. The resulting discharge should be 1,350,000 gal/year from Outfall 004. The total discharge should be changed to reflect this. Subsequent tables in the July 2008 report that use these discharge values (especially Table 4-5) need to incorporate the change.

LSS Response: LSS agrees with the comment and the percentages for the Drainage to Outfall 004 (including from Lot 2) in Table 2-2 has been changed to 91% pervious and 9% impervious. Discharge volumes have also been changed in the table in accordance with additional comments below.

Note "c" is missing the rainfall depth of 36in/year in the equation. Notes "e" and "f" are not referenced in the table.

LSS Response: LSS has added the normal rainfall depth, the minimum annual rainfall depth (22.48 inches), and the maximum annual rainfall depth (63.20 inches) to Note "c" and to the calculations. The average value was also modified to reflect the average (or "normal") rainfall depth of 37.07 inches for the 1971 to 2000 period. Notes "e" and "f" have been removed.

Table 4-5 – Indicate in a note that the source of this data is presented in Table 7 of Appendix A of the July 2008 report.

LSS Response: LSS agrees with the comment, and a note has been added.

Only a small sample size is used for these important loading calculations (4 sample points for each parameter at each outfall). Typically, more than 10 representative stormwater samples would be appropriate to estimate an annual load. What's more is that sampling only took place from mid-February through early June, and the resulting loads only capture a four month period of stormwater flow. If sampling were to incorporate late-year flows (November and December rainfall is on average 6.39 inch and 6.75 inch, respectively—source: http://www.oregon.com/weather/history_pdx.cfm) the average DDx concentrations may increase and the resulting DDx loads from the site may also increase. Consideration should also be given to the effect of estimated Site discharges on the calculated DDx load. If the rainfall depth of 36 in/year were instead used to represent a "wet year" instead of an average, the DDx load would also increase. A "worst-case" scenario calculation using the wettest year on record (63 inches in 1996 – source: http://www.wrh.noaa.gov/pqr/paststorms/PDX2007.txt) would produce a DDx load of 2.02oz. This value was determined by changing the discharge values in the table below to account for 63"/year rainfall.

LSS Response: LSS disagrees that 10 stormwater samples are required to accurately estimate an annual load. Sampling was conducted in accordance with the approved *Stormwater Interim Remedial Measures Work Plan* (Integral 2006). Further, Appendix D of the Joint Source Control Strategy states "It is recommended that at least four separate storm events per year be sampled

for screening purposes. Because storm water quality varies considerably with rainfall intensity and duration, two of the four sampling events should be representative of "first flush" conditions (i.e. within the first 30 minutes of storm water discharge). For the remaining two events, samples should be collected within the first three hours of storm water discharge, to the extent practicable." The 2007 sampling was conducted within these guidelines.

Regarding EPA's statement that DDx concentrations would be expected to be higher during late year flows, LSS disagrees. The sampling conducted in 2007 included both "first flush" and longer-term discharge events. These events should be representative of the range of flows and DDx concentrations that would be expected to occur during a typical year. The volume of discharge is already accounted for in the annual stormwater flow and DDx flux calculations so the statement that "the average DDx concentrations would increase" in November and December is erroneous and unsupported. Therefore, DDx concentrations would be within the range of the 2007 sampling events.

Rainfall depths for the minimum year, maximum year, and the "normal" year were used to calculate a range of loading values and loading during a "normal" precipitation year. Also, it should be noted that during periods with higher precipitation that DDx flux in the river would be higher as a result of higher particulate loads and DDx flux in the river. Thus, the proportional contribution from the site to the river would not be expected to change substantially.

Values presented in the table are inconsistent with source data results in Table 7 of Appendix A of the July 2008 report (the values were correctly reported from Table 7 of Appendix A in Table 3-3 of the July 2008 report). Also the average concentration of DDD from Outfall 001 was incorrectly calculated. Changes to this table should also reflect the new calculated discharge from Outfall 004 (see Table 2-2 comment above). See below for an updated Table 4-5 that reflects these changes, which are highlighted in yellow to call attention.

<u>Proposed Revision to Table 4-5:</u>

COPC	Outfall 001 (mg/L)		Outfall 002 (mg/L)		Outfall 003 (mg/L)		Outfall 004 (mg/L)	
4,4'-DDD								
2/15/2007	3.74E-05		4.29E-05		3.04E-05		6.34E-05	
3/2/2007	4.48E-05	J	5.40E-05	J	2.44E-05	J	5.45E-05	J
3/19/2007	5.92E-05	U	2.26E-04	U	2.78E-05	U	4.09E-05	U
6/5/2007	3.33E-05	J	1.33E-04		NS		NS	
Average Concentration	3.63E-05		8.57E-05		2.29E-05		4.61E-05	
Annual Discharge Quantity (gal)	10,900,000		1,400,000		4,000,000		1,350,000	
Average Annual Mass (lb)	3.30E-03		1.00E-03		7.64E-04		5.20E-04	
Total Loading (lbs):	0.0056							

4,4'-DDE								
2/15/2007	**1.48E-04**		**2.29E-04**		**1.08E-04**	**U**	**8.43E-05**	**U**
3/2/2007	**2.16E-04**		**2.49E-04**		**2.75E-04**		**1.34E-04**	
3/19/2007	**2.28E-04**		**2.00E-03**		**2.40E-04**	**J**	**1.57E-04**	
6/5/2007	**9.28E-05**	**J**	**1.47E-04**	**J**	**NS**		**NS**	
Average Concentration	**1.71E-04**		**6.56E-04**		**1.90E-04**		**1.11E-04**	
Annual Discharge Quantity (gal)	**10,900,000**		**1,400,000**		**4,000,000**		**1,350,000**	
Average Annual Mass (lb)	**1.56E-02**		**7.67E-03**		**6.33E-03**		**1.25E-03**	
Total Loading (lbs):	**0.0308**							
4,4'-DDT								
2/15/2007	**1.32E-04**	**J**	**3.73E-04**		**1.88E-04**	**J**	**8.43E-05**	
3/2/2007	**1.61E-04**	**J**	**4.78E-04**		**2.02E-04**	**J**	**1.22E-04**	**J**
3/19/2007	**1.57E-04**		**2.48E-03**		**2.14E-04**	**J**	**1.27E-04**	
6/5/2007	**1.80E-04**	**J**	**1.11E-03**		**NS**		**NS**	
Average Concentration	**1.58E-04**		**1.11E-03**		**2.01E-04**		**1.11E-04**	
Annual Discharge Quantity (gal)	**10,900,000**		**1,400,000**		**4,000,000**		**1,350,000**	
Average Annual Mass (lb)	**1.43E-02**		**1.30E-02**		**6.72E-03**		**1.25E-03**	
Total Loading (lbs):	**0.0353**							
TOTAL DDx Loading (lbs):	**0.0717**	**=**	**1.15**	**oz**				

NOTE: Averages were calculated using 1/2 the detection limit for undetected values (denoted with a U).
The value reported where a U is noted is the assumed detection limit.

LSS Response: LSS agrees with the comment, and DDT, DDD, and DDE concentrations have been changed to reflect concentrations in Table 7 of Appendix A of the July 2008 report.

5. Comment 5, Page 4-2 – See No. 4 above for comment on Table 4-5.

LSS Response: See LSS responses to comment 4 above.

6. Comment 7, Page 4-3 - This statement needs to be modified:

"MCLs and Region 9 tapwater PRGs are not relevant to on-site worker exposure limits, because Willamette River surface water in the vicinity of the site has not been and is not expected to be used as a washing and/or drinking source for on-site workers."

The following language shall be substituted:

"MCLs and EPA Regional tapwater PRGs are relevant to on-site worker exposure limits since the river is designated as a drinking water source. Such hypothetical use of water will be addressed, however, under a future residential exposure scenario."

PRG is an acronym for "preliminary remediation goal", not "primary remediation goal".

LSS Response: Regarding the acronym PRG, the comment is noted. With respect to MCL and on-site worker exposure, LSS recognizes EPA's desire to adopt a standard of comparison as a benchmark for making judgments about a site. Nevertheless, LSS maintains that MCLs are not relevant to on-site worker exposure for the following reasons:

- EPA guidance requires that the chosen remedy must protect against unreasonable risks, which requires an assessment of whether the exposure scenarios that are evaluated will actually occur.

- A future drinking water scenario is not likely because residential water supply is not a likely potential future scenario for the Willamette River.

- Even if the Portland Harbor section of the Willamette River were to be used for residential water supply, this would have to be after adequate pretreatment that meets Safe Drinking Water Act (SWDA) standards and Oregon Rules. The State's beneficial use designations for the Willamette River Basin indicate that any use for drinking water would be after such pretreatment.

- State beneficial use designation does not mean that MCLs need to be met in-stream, but that in-stream waters are of sufficient quality so that it is possible to use conventional treatment methods to meet drinking water standards.

- The SWDA itself clearly states that surface water MCLs are applied at the tap after treatment.

The most likely on-site worker scenario would involve the use of treated tap water for drinking and washing. Consequently, direct comparisons of MCLs to untreated in-stream-water are neither realistic nor appropriate to the standard.

7. Comment 13, Page 5-1 – The referenced Work Plan page number should be 5-<u>3</u> not 5-4.

LSS Response: Comment noted.

8. Comment 18, Page 6-1 – Directed Comment: The word "horizontal" shall be inserted into the last sentence as follows: "The Opalski Decision determined that the removal action alternative evaluation should consider a range of options within the 5 mg/kg focused RAA <u>horizontal</u> boundary." (Per page 2, paragraph 4 of the Opalski decision

letter)

LSS Response: LSS acknowledges this comment.

9. Comment 115, Page 6-2 – The process used to develop the 50 ft by 50 ft square grid cells is outlined in Section 6.1.3.1, page 6-3 of the EPA/Parametrix Work Plan. LSS did not dispute this process, thus, it is in the Work Plan without revision.

LSS Response: As documented under comment 115 in Comment Resolution Table B, LSS has requested justification for the 50x50 ft. grid size selection. LSS does not agree that the dredge units will be in 50x50 ft grids given that analysis of possible future dredging at the site has not been completed. EPA has not provided justification for the use of the 50x50 ft grid area, particularly in the context of the 2-dimensional gridding and Kriging analysis that was conducted in the EPA/Parametrix EE/CA work plan (see also LSS comments 54 through 57 documented in Comment Resolution Table A). The comment resolution states that this can be resolved in the Work Plan Addendum and future EE/CA documents. LSS suggests that grid size be discussed once the EE/CA Remedy has been selected and during the design phase of that selected remedy.

10. Comment 21, Page 6-2 – The referenced footnote should be 16, not 34.

LSS Response: Comment noted.

11. Comment 22, Page 6-2 – From an editorial standpoint, it's not necessary to define TEC in the last sentence, or both TEC and PEC should be defined in the first sentence.

LSS Response: Comment noted.

12. Comment 117, page 6-3 – No revision to the work plan text is necessary. The work plan goes into detail on distributions of contaminants later in the section, and the methodology using mass removal is now specifically included.

LSS Response: LSS believes that the clarification is appropriate and consistent with prior agreement with EPA to provide clarification to the text as needed. Nevertheless, LSS proposes to replace the last sentence in the paragraph with the following: "Table 6-1 presents appropriately scaled comparisons that show the magnitude of maximum detection concentrations relative to their respective SLVs."

13. Comment 24, page 6-3 –EPA Region 10 no longer uses the Region 9 PRGs. The Region 9 PRGs have been superseded by national EPA *Regional Screening Levels for Chemical Contaminants at Superfund Sites (*attached to these comments). These EPA Regional PRGs should be used instead of those from Region 9 until the early RI sediment PRGs are available. In addition, EPA Region 10's Human Health Screening Memo (April 17, 2007, attached to these comments) has language that is Region-specific and shall complement or supersede the EPA *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* No revision to the work plan is necessary.

LSS Response: See response to General comment 1A. LSS is aware of EPA national screening level guidance and Region 10's memorandum and will refer to these documents as needed in the future.

14. Comment 25, page 6-3 – Aqueous media are included in the EE/CA analysis "because of the potential threat of recontamination of sediments" as well as contamination of GW, transition-zone water (TZW) and surface water. The text should also recognize possible recontamination includes chemical migration through in-water sediment as well as TZW/GW.

LSS Response: LSS would like clarification of this comment. "Possible recontamination … through in-water sediment" would have to occur by means of migration of the chemicals via water (either TZW or groundwater).

15. Comment 32, Page 6-4 – Analyte tables with detection limits that are included in the FSP/QAPP should include the appropriate SLVs in the same tables for each chemical/media so that it can be determined if the detection limits meet risk-based values.

LSS Response: Analyte tables with ACGs based on SLVs are included in the QAPP that was submitted to EPA prior to receiving this comment on August 21, 2008 (see Tables 6-2 and 6-3 in the QAPP).

16. Comment 34, page 6-4 - GW and TZW collected should include analysis of both total and dissolved phase DDX and other COIs. The work plan currently appears to indicate that only the dissolved phase will be measured.

LSS Response: Comment noted.

17. Section 7, Page 6-6, first paragraph – LSS revised the text previously agreed to with EPA. Please use the agreed to text, which reads as follows: "EPA and LSS agree that a range of removal action technologies may be reviewed to include dredging (mechanical and hydraulic dredging) with hydraulic containment, capping, and on-site (upland and confined disposal facility [CDF]) and off-site disposal." (Deleting the words "and without" from that sentence.)

LSS Response: LSS proposes the following clarifying statement which is consistent with language presented in the EPA/Parametrix work plan.

"EPA and LSS agree that a range of removal action technologies may be reviewed to include hydraulic dredging, mechanical dredging with provisions for proper management and containment of dredging residuals, capping, and on-site (upland and confined disposal facility [CDF]) and off-site disposal."

As discussed in the November 13, 2007 meeting, hydraulic dredging or mechanical dredging with hydraulic containment are viable technology options that will be considered in the EE/CA. LSS believes other equally effective methods for controlling resuspension residuals may be

available and will be evaluated in the EE/CA (e.g., a combination of dredging controls, environmental bucket and/or silt curtain with sheet pile deflection wall). It is anticipated that a range or combination of environmental dredging controls could be appropriate, depending on such factors as seasonal river levels, proximity to the shoreline, and the physical and chemical characteristics of the area to be dredged.

18. Comment 37, Page 6-6 – EPA agrees that a clamshell bucket may be used within a sheet piled or coffer dam area which does not communicate with the Willamette River. It is unclear what other technologies might be evaluated as part of "hydraulic containment".

LSS Response: As stated above in the response to Comment 17, LSS believes other equally, and potentially more effective and cost efficient means for controlling resuspension residuals may be available and will be evaluated in the EE/CA process.

19. Comment 38, Page 6-7 – EPA does not concur with the statement referencing the May 23, 2008 dispute decision "the use of an on-site CDF can be evaluated and presented as a disposal option in the EE/CA". The dispute decision only determined that it was premature to screen a CDF disposal option out at the work plan stage. However, the decision clearly indicated that there were significant obstacles and issues to overcome through the EE/CA process, and the dispute decision did not determine that the CDF could not be screened out through the EE/CA or RI/FS processes.

LSS Response: LSS disagrees with this comment. The Opalski Decision clearly states, "I find that it is appropriate to allow LSS the opportunity to include a CDF evaluation in the EE/CA."

20. Comment 36, Page 6-7 –The following sentence should be modified: "Based on the location of the DDx mass and the chemical sorption propertied of DDx, localized isolation capping is a viable option that can be considered in the EE/CA" with the addition of "once dredging has been implemented".

LSS Response: LSS disagrees with this comment. This comment implies that areas of isolation capping must be dredged first, which defeats the purpose of an isolation cap being used in conjunction with a dredging project (i.e., an isolation cap placed over sediment that generally cannot or will not be dredged in the removal action area). The Statement of Work (Appendix B) to the Administrative Order on Consent (AOC) also requires under Work to be Performed by Respondent, LSS to evaluate: "Technologies for sediment remediation including capping, dredging, treatment, including any necessary treatability testing, and disposal (on-site and off-site)."

21. Comment 123, page 8-1 – It should be clarified here that analysis of chlorinated dioxins and furans will be required in some samples.

LSS Response: Comment noted. LSS included dioxin and furan analysis for some sediment samples in the FSP and QAPP that were submitted to EPA prior to receiving this comment.

22. Comment 125, page 8-1 – Post-removal sampling for chemicals such as DDX in

biota will help establish the effectiveness of removal in terms of impacts to upper trophic level species. However, sediment bioassays may be needed to assess direct toxicity to benthic macroinvertebrates which might be caused by either chemicals other than those that bioaccumulate, or by the mixture of chemicals residual in sediment. These assays can be designed to take advantage of and be complementary to assays work completed by LWG based on procedures adopted by the final Harborwide RI.

LSS Response: The first sentence of this comment pertains to post-removal monitoring effectiveness, which is addressed in Section 8.2.2 (Biological Sampling) of the Work Plan and on page 8-2 of the Addendum not in Section 8.2.1 (Nature and Extent). Sediment toxicity testing, to the extent necessary, will be included to complement the data already available through the Portland Harbor RI and to meet COE/EPA requirements for dredged material evaluation, which may be relevant to a capping strategy.

23. Comment 48, Page 8-2 – LSS revised the text previously agreed to with EPA. Please use the agreed to text, which reads as follows: "EPA and LSS agree that the current surface water data set is adequate for the EE/CA evaluation. No sampling will be specified in the EE/CA work plan. However, additional baseline surface water sampling will need to be proposed as a part of the removal action/design and completed before removal actions begin."

LSS Response: LSS will insert the agreed upon text under comment 48.

24. Comments 49, 51, 52, 53, Page 8-2 – In previous discussions with LSS, we indicated jointly (LSS and EPA) that sampling of aquatic biota should take advantage of and complement sampling being completed by LWG as much as possible, while still meeting the needs of the EE/CA. The first suggested text revision starting with "Section 8.2.2.1 provides …" should reflect these discussions.

LSS Response: LSS recalls that the discussions focused on SLVs not on indicators of bioaccumulation, which is the subject of the Section 8.2.2 and the cited comments. Nevertheless, LSS will add a phrase that acknowledges the LWG data as requested.

25. Comments 54-60, Attachment B, Pages 8-3 through 8-5 – The document proposes to characterize existing data, and establish future sampling points based on C Tech Development Corporation's Environmental Visualization System (EVS). As part of the Environmental Technology Verification Program, EPA (working together with Oak Ridge National Laboratories) has evaluated this tool[1]. Although this evaluation was based on an older version of the software, the general conclusions from this are valid and summarized as: (1) the software efficiently, accurately, and consistently provided 3-D visualization of the data, geologic structures, and concentration contours; and (2) EVS is a mature software program which can perform complex data analyses.

[1] U.S. EPA EPA/600/R-00/047, March 2000

LSS Response: According to C-Tech Software Support the version of the software reviewed for the Environmental Technology Verification Program Report (EPA, 2000) is significantly antiquated and not comparable to the enhanced current version of EVS-Pro.

However, as with any tool, the accuracy and utility of the application is dependent on the data available, and the operator's judgment in defining the geostatistical methods and boundaries.

LSS Response: The utility, data and judgment is of critical importance for three-dimensional modeling in EVS. For this very reason, a considerable amount of detailed information was provided in the three-dimensional Kriging Methodology section in the work plan addendum. EPA has not commented specifically on the information provided.

For example, as part of the verification of this tool, EPA provided C Tech with a baseline set of data. EPA found that while use of the calculated default values makes it easier for the analyst, the values were not always optimal for the sample optimization or cost-benefit analysis. For one of the baseline sites reviewed, approximately a third of the site remained unsampled due to the approach used in EVS-PRO and the limit on the number of samples. For the cost-benefit problems, the estimates of contaminated volumes were often a poor match to the baseline analysis. This was especially true in estimates of volume above the threshold concentration with a low probability of exceeding the threshold. In these situations, the default parameters selected by EVS-PRO often caused predictions of contamination in regions upgradient from the main plume that did not contain data. Operator intervention to optimize model parameters would have led to better, more accurate analyses.

LSS Response: This comment which references the EPA Environmental Technology Verification Program Report (EPA 2000) lacks specific page references to the report. LSS has concluded that the majority of the EPA report cited in this comment primarily pertains to "Site N" from the Technology Evaluation Report.

Site N contained data for only 16.6 % of the site (<10 acres of a 125 site) and has little to no relevancy to the DDx modeling performed for the Arkema site. The disparity in the spatial data coverage alone does not allow for a valid comparison between sites. The Arkema site does not contain a disproportionally large poorly characterized area like Site N, which was the underlying source of the poor sample optimization and cost-benefit analysis results. These conclusions are from an antiquated version of the software and from a site with an inadequate baseline data set and are therefore not applicable to the EVS modeling conducted for the Arkema EE/CA.

Thus, while EVS is a recognized tool for data visualization, it is not acceptable to use the geostatistical or optimizing assumptions in "default mode" to justify sampling recommendations, or identify volumes of material for removal.

LSS Response: There is no mention of using a "default mode" in the EE/CA work plan addendum. Information was provided in the work plan addendum that addresses the treatment of the data, EVS methodology, and the kriging settings. EPA has not provided any specific comments on the information provided.

If LSS chooses to use EVS for these latter purposes, the mathematical and statistical assumptions used by the program as modified by the operator should be discussed relative to the specific-site. Furthermore, all data input files, and simulation outputs should be

provided peer-review of operator judgment. This information was not provided for review in the current submittals and thus the suggested sampling design has not been reviewed.

While such tools can be useful on complex sites, the use of this tool for compliance decisions requires the assumptions behind the geostatistics and Kriging be peer reviewed. This peer review can create a time consuming and often expensive burden on the site. This site's size, relatively uniform substrate, and the need for this process to be performed in a timely manner, may not warrant this level of evaluation.

LSS Response: LSS has agreed to provide the .V file, .gmf, .gwc, and miscellaneous shapefiles for review in response to subsequent comments on the FSP.

The two proposed target concentrations of 5 mg/kg and 10 mg/kg are insufficient to determine optimal locations for additional sediment sampling and are not consistent with EPA's position on the use of risk-based SLVs for removal actions at the site[2]. Target levels used in the Drill Guide statistical function within the EVS model should include the SLVs as well as values between the SLVs and 5 mg/kg , since SLVs are intended to be a significant consideration in designing the vertical extent of dredging[2]. The additional target concentrations used in the Drill Guide should represent multiples of the SLVs.

LSS Response: Drill Guide focuses the optimization of sample location by selecting locations of the greatest uncertainty with the highest predicted concentrations near a target concentration value. LSS provided a Drill Guide analysis using 50 samples at the 0.04 ppm SLV target concentration level within the 5 ppm contour in a letter responding to FSP and QAPP comments that LSS submitted to EPA on October 3, 2008.

26. PROJECT SCHEDULE, Page 9-1 –The proposed schedules for the biological assessment and 404 memorandum require modification per the Statement of Work. The draft BA and 404 are needed as part of the EE/CA in order to begin consultation and for EPA to make a cleanup decision. The schedule for these items should be revised to allow for draft BA and 404 development, time for Agency and other stakeholder review, and revised draft into the final EE/CA.

LSS Response: Note that the schedule shown in Figure 9-1 was a summary of the eight subtasks shown under the biological assessment and 404 memorandum task. The revised schedule (attached) shows the individual deliverable dates for the Draft, Revised Draft, and Draft Final or Final BA and 404 Memorandum. Note that these deliverable dates coincide with the deliverable dates for the First Draft, Second Draft, and Final EE/CA report. LSS realizes that the final BA is subject to ESA agencies review and information requests. For example in Table 1-Schedule of Project Deliverables to the AOC SOW, for the Draft Final BA the schedule states "If the ESA agencies determine that additional design information is necessary for a final BA, then a draft

[2] The use of SLVs in evaluating remedial actions is described in the Final Decision On Disputes of February 19, 2008 and March 27, 2008 by Legacy Site Services LLC (LSS) Regarding U.S. EPA Region 10 Docket No. CERCLA 10-2005-0191.

final BA shall be due as determined by the ESA agencies."

27. Appendix D – LSS Comment Number 5: Under Work Plan Addendum Modification, Table 1 should be changed to read Table 4.5

LSS Response: Comment noted.

28. Appendix D – LSS Comment Number 13: Under EPA Work Plan Page/Section No., 54/5.2.1 should be changed to read 5-3/5.2.1

LSS Response: Comment noted.

29. Appendix D – LSS Comment Number 21: Under EPA Comment/Problem Statement, the referenced footnote is shown as 16 on page 6-3 of the Work Plan; should change 34 to 16.

LSS Response: Comment noted.

30. Appendix D – LSS Comment Number 97: Text was added to section 4.1 of the Work Plan Addendum and should be noted as such.

LSS Response: Comment noted.

31. Appendix D - LSS Comment Number 98: Under Work Plan Addendum Modification, section 4.1 should be changed to read 3.1

LSS Response: Comment noted.

32. Appendix D – LSS Comment Number 118: Text was added to section 6.4 of the Work Plan Addendum and should be noted as such.

LSS Response: Comment noted.

33. Appendix D – LSS Comment Number 123: Text was added to section 8.2 of the Work Plan Addendum and should be noted as such.

LSS Response: Text was added to section 8.1 of the Work Plan Addendum and will be noted as such in future drafts.

34. Appendix D – For both the Appendix A and Appendix B comment sets EPA requested in its March 25, 2008 dispute statement response letter that the preface text accompanying both comment sets be changed as shown below (this text is for the "A" comment set). The requested change was not made. The requested change shall be made.

ATTACHMENT TO FEBRUARY 19, 2008 LETTER RESOLUTION OF 'A' COMMENTS ON THE DRAFT ARKEMA EARLY ACTION EE/CA WORK PLAN PREPARED BY PARAMETRIX FOR US EPA

This document contains a complete set of Legacy Site Services (LSS) comments on the Draft Arkema Early Action EE/CA Work Plan prepared by Parametrix for US Environmental Protection Agency (EPA Work Plan).

Explanation of table column headings:

LSS Comment Number:	**A sequential number applied by LSS to identify each individual comment in the table.**
Comment Priority:	**A hierarchical designation provided for each comment to indicate the level of priority placed on the comment by LSS. The "A" designation is a comment that required technical discussion and resolution to EPA's and LSS' satisfaction. LSS subsequently requested formal dispute on "A" comment No. 38. LSS chose to not dispute the "B" designated comments once the "A" designated comments were satisfactorily resolved.**
EPA Work Plan Page/Section Number	**Identifies the Page and Section number of the EPA work plan to which the comment is directed.**
Comment/Problem Statement	**Provides LSS' comment and/or problem statement that requires resolution. Solution Provides LSS' proposed solution for resolution of the comment/problem.**
Comment Resolution	**Provides the resolution of the comment.**
EPA comment number	**Provides a cross-reference to the original comment number provided by EPA on the September 26, 2005 work plan, where applicable.**

LSS Response: LSS feels the record clearly demonstrates that EPA was non-responsive to at least 46 of its own comments in its own version of the EE/CA Work Plan. However, LSS will make the change requested. Also, note that LSS had previously made a change to this preface requested by EPA in their November 29, 2007 letter. EPA requested that LSS add the statement "EPA does not necessarily endorse or agree with the statements made in this forward section" to

the header of the front page of each comment table. On February 19, 2008, LSS complied with EPA's November 29 request and submitted, along with the dispute position statement, the "final" A and B tables documenting EPA-LSS agreements including the EPA requested change. In EPA's March 25, 2008 response to LSS' dispute statement, EPA then altered its previous position and stated that "EPA believes that the preface language to the tables should be deleted as shown in Attachment B." There was no further discussion or agreement after March 2008.

<u>EPA September 15th Letter Supplemental Specific Comments</u>

35. Figure 9-1, Project Schedule

The following deliverables related to the CDF evaluation should be added to the project schedule to be started and completed prior to the draft EE/CA Report. The results of the floodway analysis and treatability studies likely will affect the alternatives that will be evaluated in the EE/CA Report. Likewise, Arkema needs to provide its schedule for performing these analysis (sic) to ascertain that they will be completed within the original EE/CA Report timeframe as directed by Dan Opalski's May 23, 2008 decision.

LSS Response: As of August 2008, LSS initiated the preliminary CDF screening evaluation. To date, this effort has included the preliminary development of the CDF design concept for consideration during the recent dispute resolution process with EPA, initial informal Section 7 consultation, and other preliminary analyses in response to EPA's subsequent letters (dated July 21, 2008, September 16, 2008 and October 3, 2008) regarding the CDF evaluation. LSS has committed to completing the preliminary CDF screening evaluation. Collectively, the comments received from EPA in the letters cited above advance technical and regulatory considerations, including possible requirements for pretreatment of sediments prior to disposal into the CDF, treatability study requirements, and floodway impacts, that will be addressed during the preliminary screening evaluation. LSS observes, however, that if sediment treatability information is deemed necessary and existing treatability data are deemed insufficient (Note that LSS does not concur with this assumption at this stage of the EE/CA), then sediment treatability studies would be needed to evaluate a range of alternatives to include dredging with upland or offsite disposal, not solely a CDF. LSS will address the needs for treatability testing in the preliminary CDF evaluation and in the EE/CA evaluation.

In response to this comment, LSS has updated the Final EE/CA Work Plan Schedule to reflect the timeline for completing the preliminary CDF screening evaluation. As indicated in the revised schedule, it is LSS' intent to complete the preliminary screening following completion of the upcoming site characterization activities and prior to initiating the EE/CA. This will allow the design team to incorporate critical site data into its evaluation, and to establish a basis for further development and evaluation of the CDF concept during the EE/CA process, if warranted. Dependent on the timing of EPA approval of the EE/CA Addendum and issuance of any further EPA comment, a draft technical memorandum summarizing the results of the evaluation could be submitted to EPA by August 13, 2009.

Item	**Deliverable**
Floodway Analysis	**Floodway and Flood Storage Technical Analysis Memorandum**
	Letter of Map Revision/Physical Map Revision
Treatability Study Ex-Situ Treatment Using Thermal Desorption	
	Work Plan
	Sampling and Analysis Plan
	Draft Evaluation Report Final Evaluation Report
Treatability Study In-Situ Biological Treatment	
	Work Plan
	Sampling and Analysis Plan
	Draft Evaluation Report
	Final Evaluation Report
Treatability Study In-Situ Chemical Treatment	
	Work Plan
	Sampling and Analysis Plan
	Draft Evaluation Report
	Final Evaluation Report

Note that Sampling and Analysis Plans for treatability studies includes the Field Sampling Plan and the Quality Assurance Project Plan. EPA treatability study guidance documents, EPA cost and performance reports, and Interstate Technology and Regulatory Council (ITRC) case studies were researched to get a sense for the likely timeframes for the treatability study timelines. We estimate that the floodway analysis and map revision likely would take no less than 12 months based on information found on the Federal Emergency Management Agency's (FEMA) web site (http://www.fema.gov/business/nfip/fhamr.shtm#89 and http://www.fema.gov/plan/prevent/fhm/fmc_fmrp.shtm). From our research it appears that ex-situ treatment studies would take a minimum of 12 months to complete. In-situ biological and chemical treatment studies would likely take no less than 24 months. In-situ

treatability timeframes would extend the EE/CA Report submittal significantly beyond the current workplan schedule. Arkema should provide an explanation of how the schedule could be shorter if it proposes it can undertake such studies and stay on the original work plan schedule.

The information we reviewed is summarized below.

- **Ex-situ Treatment Using Thermal Desorption: The EPA Guide for Conducting Treatability Studies under CERCLA: Thermal Desorption Remedy Selection was used to develop the estimated schedule for conducting an ex-situ thermal desorption treatability study. An example of a typical project schedule including preparation of deliverables (work plan, sampling and analysis plan, and final evaluation report) and bench and pilot scale testing for a thermal desorption treatability study program is included as Attachment 1 (EPA 1992a). A thermal desorption treatability study can take up to 12 months or more to complete; however, this timeframe could increase in relation to the amount of sediment pre-treatment (i.e. dewatering) required. It should be noted that this schedule does not include time incurred as a result of administrative delays (i.e. review delays, etc.) and could change depending on the goals of the treatability test (i.e. determining if treatment is feasible versus determining design-specific parameters to optimize treatment and related costs).**

- **In-situ Biological Treatment: The EPA Guide for Conducting Treatability Studies under CERCLA: Biodegradation Remedy Selection, the EPA Use of Bioremediation at Superfund Sites, and two EPA cost and performance report case studies were used to develop the estimated schedule for conducting an in-situ biological treatment treatability study. An example of a typical project schedule including preparation of deliverables and laboratory and field-scale treatability testing for in-situ biological degradation treatability study program is included as Attachment 2 (EPA 1993). The schedule presented in Attachment 2 is based on a 30-day analytical turnaround time. Based on the EPA guidance document for conducting biodegradation treatability studies, an in-situ biological degradation treatability study can take up to 2 years or more to complete (EPA 1993). It should be noted that this schedule does not include time incurred as a result of administrative delays (i.e. review delays, etc.) and could change depending on the goals of the treatability test. The schedule for the treatability test can vary depending on whether a small- or large-scale study is performed. Small laboratory-scale studies typically take from 3 to 6 months, whereas large field-scale studies usually take from 6 to 9 months. Sufficient time must be built into the schedule to reach specified cleanup concentrations. The treatability study must continue until either the removal goals have been achieved or the contaminant removal has reached a distinct concentration at which contaminant reductions cease to occur at a reasonable rate (EPA 1993). Additionally, two case studies were found for field demonstrations of in-situ biological remediation (EPA 2000a, EPA 2000b, and EPA 2001). The first was a field demonstration for treatment of sediment and groundwater contaminated with trichloroethene (TCE) and tetrachloroethene (PCE) (EPA 2000a). The operational period for this field demonstration was approximately 14 months. The second case study was a field-scale demonstration conducted over a period of 19 months for**

treatment of soil contaminated with TCE, 1,1,1-trichloroethane (TCA), and cis-1,2-dichloroethane (DCE) (EPA 2000b, EPA 2001). However, it is not known for either of these field demonstrations whether the operational periods cited accounted for project planning (work plans and sampling plans) or project closeout (issuance of the final report). In addition, it should be noted that the case studies reviewed were for different contaminants (volatile organic compounds) than those found at the Arkema site (DDx-constituents) and for different media in one case (soil). Professional papers by Renner and Frazar were also reviewed regarding the applicability of biodegradation for the treatment of DDx-constituents (Renner 1998 and Frazar 2000). One paper concluded that although there have been numerous laboratory investigations to identify beneficial microbial processes, demonstrations of their effectiveness in the field have been few, especially for the difficult problem of contaminated sediments in freshwater and marine environments (Renner 1998). Renner also went on to state that whether reductive dechlorination proves to be a natural process that is making a significant impact on DDT contamination remains to be seen (Renner 1998). Frazar stated that although bioremediation appears to be a promising alternative for the remediation of pesticide-contaminated sites, it is still in the developmental phase and that many bench-scale projects are being conducted to optimize bioremediation protocols and to expand the number of compounds for which bioremediation is feasible (Frazar 2000). Frazar further states that bioremediation treatment takes longer than thermal treatment, is a research intensive technology, and that treatability studies must be conducted prior to any full-scale implementation of bioremediation. In light of the differences between the case studies cited and conditions at the Arkema site, and the fact that biological treatment of DDx-constituents is still in the developmental phase, additional time may be required for an in-situ biological treatability study beyond the minimum stated above.

- **In-situ Chemical Treatment: Two EPA cost and performance report case studies and one case study published by the ITRC were used to develop the estimated schedule for conducting an in-situ chemical treatment treatability study. Three case studies were found for field demonstrations of in-situ chemical remediation. The first was a pilot test for treatment of groundwater contaminated with TCE (EPA 2003). The operational period for this field demonstration was approximately 20 months. The second case study involved both bench-scale and pilot-scale testing for treatment of soil and groundwater contaminated with chromium (EPA 2005). The pilot test was conducted over a period of 6 months, but the time period for completion of the bench tests was not given. The third case study involved both bench-scale and field-scale testing for treatment of soil contaminated with pentachlorophenol (PCP) and creosote (i.e., polynuclear aromatic hydrocarbons [PAHs]) (ITRC 2005). The timeframe for the bench-scale testing was not provided, but the field-scale testing was completed in 12 months. However, it is not known whether the operational periods cited in these three case studies accounted for project planning (work plans and sampling plans) or project closeout (issuance of the final report). In addition, it should be noted that the case studies reviewed were for different contaminants (TCE, chromium, PCPs, and creosote/PAHs) than those found at the Arkema site (DDx-constituents) and for different media (soil and groundwater). A white paper by Golder Associates was also**

reviewed regarding the applicability of in-situ chemical oxidation using Limnofix for the treatment of DDx-constituents in sediment (Golder Associates 2003). The paper highlighted several successful bench-scale and pilot-scale tests using this technology for the treatment of PAHs, total petroleum hydrocarbons, sulfide, benzene, toluene, ethylbenzene, and xylenes; however, DDx constituents was not included in the list of contaminants successfully treated by Limnofix. Also, according to sediment treatment performance data included in the paper, full-scale implementation of this technology had only occurred at three sites with the majority of the projects listed still being at the bench-scale and pilot-scale level. Golder Associates also stated that bench-scale and pilot-scale testing must be conducted prior to full-scale implementation (Golder Associates 2003). In light of the differences between the case studies cited and conditions at the Arkema site, and the fact that chemical treatment of DDx-constituents is still in the developmental phase, additional time may be required for an in-situ chemical treatability study beyond the minimum stated above.

LSS Response: LSS disagrees with EPA's comments regarding the necessity for treatability studies related solely to the CDF evaluation. The construction of a CDF, as conceptually proposed by LSS (designed so as not to require handling of the highest concentration DDx sediment), and placement of the peripheral DDx contaminated sediment from within the RAA Boundary into the CDF (as has been conceptually presented to the Government Team), would not require any pre-treatment, and hence no treatability studies are necessary. Moreover, the sediments would not be characterized as either listed or characteristic hazardous wastes for DDx. It is important to note that DDx is very insoluble and is also tightly bound to the sediment particles. The CDF concept, as proposed by LSS, would be designed so that the sediment (containing the sorbed DDx), would not physically pass through the steel sheet pile CDF barrier wall. LSS also observes that EPA apparently agrees with this statement as noted above in EPA's Comment 18. As an added measure of safety, LSS has also proposed to maintain an inward hydraulic gradient within the CDF, thereby addressing the highly unlikely potential pathway of DDx partitioning into the dissolved phase and potentially being transported via the dissolved phase through the steel sheet pile (or its sealed joints) into the Willamette River. It should be noted that, once the sediment is contained in the CDF with the inward hydraulic gradient, treatment of any potentially mobile DDx would then be realized in the extracted water via the planned Upland Treatment system. Bench scale treatability studies have confirmed that the planned Upland treatment system is capable of treating DDx. Therefore, LSS does not see the necessity for performing any treatability studies specific to the evaluation of a CDF in advance of the EE/CA Report.

In addition, if treatment or pre-treatment of sediment (other than conventional dewatering) were to be considered in advance of the EE/CA Report, LSS believes that these treatment or pre-treatment steps would also apply to any upland (off site/onsite) disposal options and not just to the CDF option. Therefore, any additional timeframe required to perform these treatability studies would need to be built into the EE/CA schedule for any option (not just the CDF option) that requires removal/handling of the sediments. Notwithstanding the above, following placement of the sediment into the CDF (where it is in a highly secure, controlled and contained area), LSS will evaluate implementing innovative in situ technologies within the confines of the CDF to effect further treatment of these COIs.

Lastly, LSS has performed many successful bench scale, pilot scale, and full-scale treatments using innovative technologies to treat numerous pesticides including DDx. LSS is aware of the capabilities (and limitations) of these technologies cited by EPA. LSS has direct first hand knowledge of these and other associated technologies, and has experience developing and implementing them. In fact, some of the case studies cited in the articles by EPA were based on early works performed by Arkema (Elf Atochem N.A. at that time) and its consultants. For example, EPA cites Frazar 2000. Although Frazar 2000 was not subject to peer or technical review, it does reference the following report which was subject to such review :

> Showers, D.R., Norris, R.D., and A.N. Clarke. 1996. Treatability Studies for Pesticides Contaminated Soil from a Superfund Site: A Case Study of Six Technologies. Air & Waste Management Association, 89th Annual Meeting & Exhibition.

The site discussed in the paper by Dale Showers P. E., Robert Norris, Ph.D., and Ann Clarke of Eckenfelder, Inc. (now part of Brown and Caldwell) is an Arkema site located in Alabama (not Florida as cited by Frazar) on which I was the Project Coordinator. In that capacity, I commissioned the referenced paper. At the site, we successfully implemented enhanced bioremediation of DDx. I would be more than happy to discuss our first-hand experience at that site and other more current Arkema projects.

LSS is prepared to finalize the work plan addendum in accordance with these responses and the FSP, QAPP, and HASP once final EPA comments on the FSP, QAPP and HASP are received. Please contact me at (610) 594-4430 if you have any questions about or wish to discuss any of these responses.

Sincerely,

Legacy Site Services LLC

J. Todd Slater
Manager, Environmental Technologies
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