RESPONSE TO COMMENTS
&
FINAL DECISION

on the

REMEDIAL ACTION DECISION DOCUMENT (RADD)

Former Cedar Chemical Facility

Intersection of U.S. Highway 49 & Highway 242
Helena-West Helena
Philips County
Arkansas

AFIN: 72-00174

A. INTRODUCTION.

On February 24, 2010, the Arkansas Department of Environmental Quality – Hazardous Waste Division (ADEQ) proposed a Remedial Action Decision Document (RADD) for the Former Cedar Chemical Facility site located at the intersection of U.S. Hwy 49 and Hwy 242, Helena-West Helena, in Philips County, Arkansas. This RADD outlines the remedy for the property.

This Response to Comments and Final Decision addresses and documents, for the public record, the comments and issues raised concerning the notice of the RADD, provides ADEQ's response to the issues raised during the public participation process; and sets forth the final decision and approval of the RADD attached herein.

B. SELECTED REMEDY.

The selected remedies for the Former Cedar Chemical Facility site is set forth in the attached final Remedial Action Decision Document (RADD).

Within thirty (30) days of completing all activities outlined in the RADD, Potentially Responsible Parties (PRPs) shall submit to ADEQ for review and approval a completion report. The completion report shall include information to document that no unacceptable risks, as described in A.C.A. § 8-7-502, remain on-site as a result of the release of hazardous substances, and the site has been remediated in accordance with the provisions set forth in the RADD. The completion report shall be reviewed by ADEQ and, upon written approval by ADEQ, a letter of No Further Action will be issued.

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C. PUBLIC PARTICIPATION ACTIVITIES.

The ADEQ issued a public notice of the RADD on February 24, 2010. Notice was published in the Helena Daily World, and comments were accepted for a 30-day period. The public comment period closed on March 25, 2010. A public hearing was also held on March 16, 2010 at the UAMS Area Health Education Center in Helena-West Helena. Written and verbal comments were received prior to the end of the comment period.

D. PUBLIC COMMENTS AND THE DEPARTMENT'S RESPONSE.

The thirty (30) day public comment period to make comments on the RADD ended March 25, 2010. Comments were received in the following letters:

- AECOM letter dated March 18, 2010
- Ann Faitz letter dated March 18, 2010
- Letter by concerned local citizen dated March 22, 2010
- Letter on behalf of Exxon/Helena Chemical dated March 25, 2010
- Letter on behalf of Harcros/Quapaw dated March 24, 2010
- Allen Gates' public hearing transcription which took place March 25, 2010 on behalf of Council Representing Helena Chemical Company.

ADEQ's responses follow each comment listed below. In addition, a copy of the comments received is included as an attachment.

Comments received from AECOM letter dated March 18, 2010:

Comment No. 1) Section 2, page 4, last paragraph. The statement "Due to lack of participation by Ansul. . ." is incorrect, as stated and should be deleted. Wormald fully participated in and complied with the Consent Administrative Order LIS No. 07-027 (CAO) by executing a Separate Agreement with the ADEQ on January 9, 2009. Wormald was never requested by ADEQ or required by the terms of the CAO to conduct a full site investigation for all contaminants at the site. With the full knowledge and approval of ADEQ, the requirements of the CAO and the Separate Agreement were satisfied through the completion of the following:

- *Wormald Site Investigation Work Plan* (AECOM, January 22, 2009),
- Wormald Site Investigation field work – completed March 4 and 5, 2009,
- *Wormald Site Investigation Report* (AECOM, originally submitted March 30, 2009; revised June 2, 2009), and
- *Focused Feasibility Study Report – Site 3* (AECOM, June 29, 2009).

> ***Response:*** *ADEQ will alter the statement as follows: "Due to lack of participation by Ansul. .." will be replaced with "Due to negotiations between the 3 PRP's ... "*

Comment No. 2) Section 3, page 6. ADEQ should reference the author, title and date of the report which is the source of Table 1.

> ***Response:*** *The author and title are listed in the title of Table 1. No change was made in the RADD*

Comment No. 3) Section 4, pages 17 through 19 and Tables 2A and 2B. The first sentence on page 17 states that "The [Facility Investigation] FI findings were used to identify Constituents of Concern (COCs) in on-site soil and in on-site and off-site groundwater." Based on the previous section, which discusses the findings of the 2009 FI (AMEC Geomatrix, February 2009), it appears this section is also referencing the 2008 FI.

The *Feasibility Study (FS) Report* (AMEC Geomatrix, December 2009) was generated based on the FI findings and includes the Center for Toxicology and Environmental Health (CTEH) *Derivation of Human Health (HH) Risk-Based Concentrations (RBCs)*, which is listed as being prepared for the ADEQ, in Appendix A. The *Derivation of HH RBCs* (CTEH, December 2009) provides a description of the methodology used to select COCs for each media and provides a list of COCs for each media in Tables1, 2, 3A, and 3B for soil, on-site perched zone groundwater on –site alluvial groundwater and off-site alluvial groundwater respectively. However there are discrepancies between the COCs listed in RADD Table 2A for soils and 2B for groundwater and those listed in the *Derivation of HH RBCs* (CTEH, December 2009). For example, in the *Derivation of HH RBCs*, dinoseb was selected as a COC based on the direct-contact pathway and for on-site soils only, but is included as a COC in the RADD for on-site perched zone groundwater and on-site alluvial groundwater (Table 2B). Other chemicals, such as bis(2-

ethylhexl)phthalate, heptachlor, and methoxychlor, are also selected as COCs for perched zone groundwater in Table 2B of the RADD, although they were not retained as COCs in the *Derivation of HH RBCs*. Furthermore, chemicals, such as chloroethane and 1,3-dichlorobenzene, were selected as COCs for on-site alluvial aquifer groundwater in the *Derivation of HH RBCs* but were not included as COCs in Table 2B of the RADD. The rationale for these changes and/or variations in COCs between these documents is not provided and leads to confusion.

AECOM recommends that the COCs presented in tables 1, 2, 3A, and 3B of the *Derivation of HH RBCs* (CTEH, December 2009) be adopted for the purpose of the RADD and that corrections be made to ensure COCs are approximately matched to media at the Site. Alternately, ADEQ should (a) provide detailed scientific and technical rationale supporting the decision to include the COCs identified in Tables 2A and 2B of the RADD rather than those identified in the *Derivation of HH RBCs* (CTEH, December 2009); (b) provide reference(s), with document name and page number, for the investigative document(s) or report(s) which are the source(s) for Tables 2A and 2B; and (c) provide references for all scientific literature, investigative reports, and findings upon which ADEQ relied to identify the COCs in Tables 2A and 2B in the RADD.

> ***Response:*** *For clarification, findings from the February 2009 FI and the December 2009 FS, which includes Derivation of Human Health Risk-Based Concentrations, were used to identify COCs in the RADD. The Derivation of HH RBCs in the December 2009 FS did not include chemicals in subsurface soil that exceed the protection of soil to groundwater screening levels. Since there are chemicals in site subsurface soils that exceed the protection of soil to groundwater screening levels (DAF 20), ADEQ included these as COCs in Table 2A of the RADD, in addition to chemicals in soil that exceed health-protective screening levels. The COCs in subsurface soil were selected from the findings presented in the February 2009 FI. The Derivation of HH RBCs in the December 2009 FS only included COCs in perched zone groundwater via the vapor intrusion pathway. However, ADEQ considers all groundwater a source of potable water and these chemicals in on-site perched zone groundwater serve as a potable source of contamination to the alluvial aquifer. Therefore, chemicals in on-site perched zone groundwater with concentrations that exceed MCLs or Tap Water Screening Levels (based at 1E-05) are listed as COCs on Table 2B of the RADD. Dinoseb was included as a COC on Table 2B of the RADD for on-site alluvial groundwater because concentrations in the February 2009 FI exceed the MCL.*
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> *Based to this comment, Chloroethane and 1,3-dichlorobenzene have been added to the list of COCs in the on-site alluvial aquifer on Table 2B in the RADD. These two chemicals have been included on Table 2B (Constituents of Concern in Groundwater) and Table 5D (Remedial Action Levels for Chemicals of Concern in On-Site Alluvial Groundwater) of the final RADD. Additionally, the Industrial Tap Water RBCs for On-Site Alluvial Groundwater and On-Site Perched Groundwater have been revised to reflect more appropriate industrial conditions*

in the final RADD. Based on this comment, ADEQ went back and evaluated all the COCs listed in these tables. As a result, Dinoseb has been added to tables 2A and 5B as a COC for subsurface soils. Dinoseb does not have a soil to groundwater screening value in the USEPA Soil Screening Guidance: User's Guide and Technical Background Document, 1996. Dinoseb was included in these tables in the final RADD based upon the MCL- based soil to groundwater protection value (DAF 1).

Comment No. 4)
Section 6, page 20, Table 3A. The list of remedial alternatives considered for on-site soils lists "no further action" as the only remedy considered for Site 3 soils and appears to reference the *Focused FS Report - Site 3* (AECOM, June 2009). This phrase is incorrect and should be deleted. As a point of clarification, the referenced report addressed residual concentrations of dinoseb in Site 3 soils exclusively, with the acknowledgement and approval of ADEQ, and the remedies discussed there in were only considered with respect to dinoseb concentrations - they did not consider other COCs that may potentially be present in soil at Site 3 or anywhere else on or on-site or in groundwater. As such, application of the findings of the *Focused FS Report - Site 3* (AECOM, June 2009) to other COCs or media in the RADD is inappropriate. Moreover, the *Focused FS Report – Site 3* evaluated multiple remedies, including no further action, institutional controls (exposure controls), institutional controls with down-gradient groundwater monitoring, and an engineered barrier with institutional controls and down-gradient groundwater monitoring, before recommending institutional controls as the preferred remedial alternative for residual dinoseb concentrations in subsurface soil at Site 3.

As a standalone entity in Table 3A of the RADD, this table should be corrected to accurately reflect the three alternatives that were considered for residual dinoseb in soil at Site 3. At a minimum, the table should be corrected to accurately reflect the alternative that was presented in the conclusion of the *Focused FS Report – Site 3* for residual dinoseb in soil – Institutional Controls.

Response: *Table 3A has been revised to include alternatives listed in the AECOM Focused FS Report. Other places throughout the RADD have been revised as well. Please note ADEQ does not view Institutional Controls as a remedial activity and therefore are not considered a stand alone remedy.*

Comment No. 5)
Section 7, page 22, first paragraph. This statement "no action" inaccurately reflects the recommendation made in the conclusions of the *Focused FS Report – Site 3* (AECOM, June 2009). Please see previous comment for additional information regarding the findings of the Site 3 FS. This statement should be revised to reflect the recommendation of "Institutional Controls" as the preferred remedy for residual dinoseb concentrations in soil at Site 3. Furthermore, the statement should specify that the AECOM recommendations are applicable to residual concentrations of dinoseb in subsurface soil only, and do not consider other constituents that may be present in soil at Site 3 or in other areas of the Site.

> ***Response:*** *ADEQ acknowledges that AECOM proposed recommendations other than "no action" to address Site 3. The text has been revised in Section 7 to reflect the exposure controls recommended by AECOM in the June 2009 Focused FS Report. However, please note ADEQ does not view Institutional Controls as a remedial activity and therefore are not considered a stand alone remedy.*

Comment No. 6)
Section 8, page 25, last paragraph, first bullet and Section 10, page 34, paragraph 3. It is unclear why the remediation area identified for soil stabilization in Figure 8B has been expanded by ADEQ in the RADD from the *FS Report* (AMEC Geomatrix, December 2009) and why dinoseb has been identified as the reason for expanding the remediation area for the remedies described in the RADD. Dinoseb was selected as a COC for on-site soils in the *FS Report* (AMEC Geomatrix, December 2009) and in the RADD based solely on the direct contact exposure pathway. Exposure controls, such as deed restrictions to secure the facility area, to limit future land use to the industrial scenario, and to restrict intrusive activities and/or to require the use of personal protective equipment (PPE) during intrusive activities, should be sufficient to control exposure to dinoseb and the identified direct contract risk. There does not appear to be any justification provided for expansion of the area identified for soil stabilization or an explanation for why dinoseb is the reason for the expansion.

AECOM requests that this point be clarified by ADEQ to explain in detail the scientific and technical justification and rationale behind this decision to expand the remediation area due to dinoseb, and provide the appropriate scientific literature, investigative documents, and/or reports relied upon by ADEQ for this decision. AECOM recommends that the expansion of the area and/or the reference to dinoseb as the reason for expanding the area for soil stabilization be removed from the RADD.

Response: *Dinoseb was retained as a COC for on-site perched groundwater (Table 5C of the RADD). Therefore it was warranted to address dinoseb in the sub-surface soil to limit the infiltration to the groundwater. The area outlined for stabilization in the RADD has been expanded because significant dinoseb concentrations were found in the areas adjacent to the area outlined by AMEC.*

In addition, the area outlined for stabilization in the RADD located in the northern portion of the facility was expanded to encompass SWMUs directly north of the production units. No change to the final RADD is warranted in the final RADD.

Comment No. 7)

Section 8, page 25 and Section 10, page 34. Soil remedy alternatives address on-site soils as a whole and do not differentiate between remedies designed to address a particular exposure pathway (i.e., direct exposure pathway vs. vapor intrusion pathway). The COCs identified for each pathway exhibit very different physical properties and, as such, the selected remedies are not necessarily applicable or appropriate for all contaminants/pathways. For instance, soil vapor extraction may address the vapor intrusion pathway for 1,2-DCA, but would not be necessary to implement to address those constituents, such as dinoseb, which are only identified for potential exposure via the direct contact pathway. Institutional controls (i.e., land use controls, deed restrictions, and site security measures) should be sufficient on their own to control direct contact exposure to dinoseb in on-site soils. AECOM requests that the ADEQ amend the RADD to include a list of COCs and exposure pathways addressed by each proposed remedy.

Response: *The nature of each remedy demonstrates what pathway a particular remedy addresses. Soil Vapor Extraction will not remediate dinoseb. However, in-situ stabilization should prevent further migration of dinoseb and volatile organic compounds into the alluvial aquifer. Due to the continual sourcing of dinoseb and other COCs to groundwater, institutional controls alone are not adequate remedial actions. The data used to chose the areal extent of each remedy can be found in the AMEC FI. ADEQ feels the RADD's intent regarding remedial alternatives is clear and therefore, no changes are warranted.*

Comment No. 8)
Section 8, page 28, Table 4D. The basis for the recommendation to remove all above-ground structures is unclear. The recommendation does not appear to be based on controlling exposure risk, since no COCs or exposure pathways are identified for the remaining structures. Furthermore, all columns of the table are blank except for "capital cost", so the remedy does not appear to have been evaluated with respect to the criteria outlined on page 25, paragraph 1. The January 2003 USEPA Region 6 removal action addressed "chemicals left at the Facility in tanks and containers" as discussed on page 3, paragraphs 6 and 7 of the RADD.

Based on this information, we do not believe there is enough information to justify razing all aboveground structures. ADEQ should consider that if particular above-ground structures need to be razed to implement selected remedies, as discussed on page 36, paragraph 2 of the RADD, the demolition could be implemented on a case-by-case basis for a lower cost. ADEQ should provide its scientific reasons and rationale for the necessity to remove all above ground structures when there is at least one viable buyer for the facility, Harcros Chemical, who has need to use at least some of the on-site structures, and removing the structures will eliminate the purchase or lease of the facility to any potential industry who may make use of the facility, redevelop the facility, and offer jobs to the community.

> ***Response: : ADEQ has signed a lease agreement with Quapaw LLC (Quapaw). Quapaw will utilize portions of site for a wood processing operation. Based on the lease agreement,*** *one building and two production units that were targeted for demolition in the RADD will remain on site. The old lab building and the former production units identified on figure 7 of the RADD as the Laboratory, the Permetherin and Propane Unit # 1 and Unit # 5. The structures that remain on site will have little if any impact on implementing the remedial alternatives selected in the RADD. The foundation and covers of the structure will continue to serve as exposure controls. Section 7, bullet #4(Recommendations for Removal of Site Structures and Figure #4 in the RADD will be changed to reflect the buildings remaining on site based on the signed lease agreement and associated with this comment. Updates were made to Section 2 of the RADD to reflect the lease agreement.*

Comment No. 9)
Section 9, pages 30 through 33, Tables 5A through 5E. The RADD does not reference the source of the Remedial Action Levels (RALs) for the COCs for Site media presented in Tables 5A through 5E. The RALs for COCs in on-site soils appear to be in agreement with those presented in Table 4 of the *Derivation of HH RBCs* (CTEH, December 2009) for most COCs; however, the Direct Contact RBC for 1,2-DCA presented in Table 5A of the RADD (22 mg/kg) is double the value presented in Table 4 of the *Derivation of HH RBCs* (CTEH, December 2009). With the exception of the Vapor Intrusion RBCs presented in Table 5C of the RADD, which appear to correspond with the values presented in Table 5 of the *Derivation of HH RBCs* (CTEH, December 2009), and the Maximum Contaminant Levels presented in Tables 5C through 5E, there is no explanation as to the methodologies or references used to determine the remaining RALs in Tables 5A through 5E. Furthermore, it is unclear if the RBCs presented in these tables are site-specific calculated values or regional screening levels. AECOM requests that the ADEQ amend the RADD to add (a) an explanation of the rationale for selection of the RALs in Tables 5A through 5E; (b) the methodologies used for calculation site-specific RALs (if applicable); and (c) references to technical guidance, standards, or reports used to generate the RALs.

> ***Response:*** *RALs in Table 5A for the RADD were taken from Table 4 of Derivation of HH RBCs (CTEH, December 2009). With the exception of 1,2-DCA (which is discussed below), the Direct Contact RBCs in Table 5A were based on equations (at 1E-05) from USEPA Guidance using default inputs for the on-site long-term worker and appropriate inputs for the construction worker. RALS in Table 5B were taken from USEPA Soil Screening Guidance: User's Guide and Technical Background Document, 1996. Residential and Industrial Tap Water RALs in Tables 5C-5E were based on default exposure parameters and factors that represent Reasonable Maximum Exposure (RME) conditions for long-term/chronic exposures and are based on methods outlined in EPA's Risk Assessment Guidance for Superfund, Part B Manual (1991).*
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> *In Table 5A of the RADD, ADEQ used default assumptions for the RAL of 22 mg/kg for 1,2-DCA. Because 1,2-DCA is sensitive to geographic location and size of the area affected, site-specific RBCs were calculated in the Derivation of HH RBCs (CTEH, December 2009). Therefore, the final RADD has been changed using the more protective and site-specific Direct Contact RBC of 10.9 mg/kg for 1,2-DCA. RBCs for direct contact were calculated for the industrial worker and the construction worker. The more protective RBC from these two receptors was used in the final RADD.*

Comment No. 10)
Section 9, page 31, last paragraph and page 32, Table 5C. It is unclear why maximum contaminant levels (MCLs), residential tap water RBCs, and industrial tap water RBCs are included in Table 5C as RALs for COCs in on-site perched zone groundwater. As stated in the correspondence from AMEC Geomatrix to ADEQ on October 14, 2009 entitled *Response to Comments on the FS Report for Cedar Chemical Corporation* (Email Date of September 10, 2009), "the Perched Zone yields insufficient water to be used as a potable or industrial water supply" (page 2, first paragraph). As such, drinking water standards and tap water risk-based criteria are not applicable to the intermittent perched zone groundwater in this area.

Considerations for current land use and groundwater use designation are included in the *Ground Water Remediation Level Interim Policy and Technical Guidance* (ADEQ, July 12, 2009), available via a link from the ADEQ Hazardous Waste Division website (http://www.adeq.state.ar.us/hazwaste/default.htm), and the USEPA Region 6 Corrective Action Strategy (CAS; November, 2008), available via a link from the ADEQ Hazardous Waste Division- Arkansas Corrective Action Strategy website (http://www.adeq.state.ar.us/hazwaste/branch_tech/cas.htm).Page 2, paragraph 4 and page 4, Section III (c) of the *Ground Water Remediation Level Interim Policy and Technical Guidance* (ADEQ, July 12, 2005) state that "Consideration will be given to the current and reasonably anticipated future land use (including ground water usage)" when establishing goals for groundwater remediation. Page 6, paragraph 2 of the guidance states that "in cases where the designated use differs from the actual or reasonably anticipated use; the remediation standard may be based on an acceptable risk range. The acceptable risk range shall be based on protection of human health and the environment." The USEPA Region 6 CAS (November 2008) states that "current land use conditions should be emphasized when evaluating exposures at commercial/industrial facilities because for most of these facilities, current land use is assumed to continue into the foreseeable future" (page 51). The use of MCLs as the RALs for on-site perched zone groundwater does not appear to take these considerations into account. Current land use is industrial and no perched zone or alluvial aquifer drinking water wells exist within the Site. Institutional controls is a reasonable remedy to be put in place within the Facility boundaries to limit certain land-use scenarios, to restrict perched zone groundwater use within the Facility boundary, and/or to require PPE for intrusive activities, thus mitigating the risk of incidental exposure through the direct-contact scenario.

AECOM recommends that (a) institutional controls (e.g., deed restrictions) be put in place within the Facility boundary to prohibit the installation of groundwater wells in the perched zone; and (b) remedial actions levels for non-volatile compounds in perched zone groundwater should be based on the risk of incidental exposure to potential future construction workers through the direct-contact exposure pathway. Furthermore, institutional controls and long-term monitoring should be sufficient to mitigate risks for chemicals, such as dinoseb, identified as COCs for the perched zone that (a) have not been identified as COCs in off-site groundwater and (b) exhibit declining concentration trends. For perched zone and on-site alluvial aquifer COCs that meet these criteria, a limited remedy, which couples institutional controls to restrict groundwater use and to

limit exposure and long-term monitoring to verify that concentration trends continue to decline and migration does not occur, should be included in the RADD.

ADEQ should provide its rationale for not accepting these recommendations and consider this information before the RADD is finalized.

> ***Response:*** *The Cedar site is not participating in the Corrective Action Strategy (CAS) program; therefore the strategies outlined in the CAS are not necessarily applicable to the site. However, the June 26, 2009 OSWER Directive 92831-33 does apply to this site. Institutional controls on the property cannot prevent the further contamination of the deeper aquifer and cannot protect future workers from exposure to contaminated media. Institutional controls alone are not considered remedial actions. Therefore, no change to the final RADD is warranted.*

Comment No. 11)
Section 10, page 34: ADEQ should provide its scientific and technical rationale and reference to the appropriate scientific literature and/or reports as to (a) why it did not adopt the conclusions and remedies presented in the *Comprehensive Site Assessment* (ADEQ, April 2004) for SWMUS 63-73 and AOC 1 rather than the remedies provided in the RADD (ADEQ, February 2010) for those areas; and (b) why it did not adopt the conclusions and remedies proposed in the *FS Report* (AMEC Geomatrix, December 2009) and the *Focused FS Report - Site 3* (AECOM, June 2009) for SWMUs 63-73 and AOC 1 rather than those provided in the RADD.

> ***Response:*** *ADEQ provided the rational for choosing the remedial options in Tables 4A through 4E. All remedial alternatives were carefully considered and compared to the criteria outlined in the National Contingency Plan. 40 CFR §300.430(a)(ii)(F) states "EPA expects to return usable ground waters to their beneficial uses whenever practicable, within a timeframe that is reasonable given the particular circumstances of the Site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction." At this point, ADEQ feels restoration of the groundwater is practicable. Therefore, no change to the final RADD is warranted.*

Comment No. 12)
Section 10, page 34 through 36. The RADD does not specify a schedule for implementation or specify whether or not a phased approach has been considered for the Site. For chemicals that have been identified as COCs due to potential risk via the direct-contact pathway for on-site soils, institutional controls (e.g., deed restrictions, land use restriction, PPE-requirements for intrusive activities) and exposure controls (i.e., low-permeability cover) should be sufficient to mitigate the risk. Hot spots could be treated with in-situ stabilization and/or soil vapor extraction (SVE), as applicable for the specific COC, to reduce residual source material for COCs identified for the soil-groundwater exposure pathway. For COCs identified in on-site media, a phased approach using these components could be implemented and long-term groundwater monitoring/monitored natural attenuation (MNA) could be used to monitor the remedies for their effectiveness in reducing on-site groundwater concentrations. If these low-cost remedies were sufficient in reducing concentrations, a more aggressive and more expensive approach would not be needed. Furthermore, additional monitoring data collected during the initial phase could be useful in the design phase if a more aggressive approach was needed.

AECOM requests that the ADEQ include a schedule for how the remedies will be implemented in the final RADD. Furthermore, AECOM requests that ADEQ consider a phased approach for COCs in on-site media when developing the final RADD.

> ***Response:*** *ADEQ will operate on the presumption that remedies outlined in the RADD will be pursued. Therefore, there is no need to look at a phased approach where remedies are put in place prior to implementing a more aggressive remedy. A schedule is not included in the RADD. A schedule will be included in the legal document requiring implementation of the RADD. Therefore, no change to the final RADD is warranted.*

Comment No. 13)
General comment. It is our understanding that there is a potential buyer for the Site, Harcros, who intends to use the Site for industrial use and ADEQ is currently negotiating with Harcros for it to acquire the Site. The USEPA Region 6 CAS (November 2008), which is available via a link from the ADEQ Hazardous Waste Division - Arkansas Corrective Action Strategy website (http://www.adeq.state.ar.us/hazwaste/branch_tech/cas.htm), states that "under the CAS screening process, the receptors for the commercial/industrial scenario are limited to generic on-site worker (indoor worker and outdoor worker). There is no requirement under this land use category to evaluate exposure to members of the public" (page 52). Page 53 of the CAS states that the "EPA prefers to rely on states to develop ground water use designations and will generally defer to a state's designation of groundwater classification and use when developing cleanup objectives". Page 54 of the CAS states that "if an aquifer is not a drinking water resource, does not have any other beneficial resource attributes, does not impact indoor air, does not contaminate surface water, or does not contaminate a drinking water aquifer, then the level of protection (e.g., MCL or alternate concentration limit (ACL)) to be met at, within, or beyond the facility boundary will be determined in consultation with the administrative authority." Finally, page 11 and Appendix A, page 9 of the CAS state that "For instances where groundwater is not a drinking water source, is not a beneficial resource, or in instances in which restoration is not practical, the expectation is that human health and the environment must be protected at the point of exposure (POE). If a state does not consider groundwater beneath a facility to be a beneficial resource, the POE may be placed at the facility boundary." The CAS provides scenarios for placing the POE at the facility boundary and beyond the facility boundary (Appendix A, page 11): "In Figure A-4 the POE is determined to be at the facility boundary (where land use is industrial), offsite land use beyond the boundary is residential" and "Figure A-6 describes the case where groundwater is not a beneficial resource and both onsite and offsite properties are classified as industrial."

Based on the information provided in the USEPA Region 6 CAS (November 2008), AECOM respectfully requests that either the ADEQ (a) amends the RALs to RBCs for on-site perched zone and on-site alluvial aquifer groundwater in the final RADD and shifts the POE (and applicability of MCLs) to the Site boundary or beyond, or (b) provides a detailed rationale and technical explanation for using MCLs as the RALs for on-site groundwater in the final RADD.

> ***Response:*** *Please note that there is no Memorandum of Agreement for the Cedar Chemical Site to utilize the Corrective Action Strategy. ADEQ does consider the groundwater beneath the facility to be a beneficial resource as it is used to irrigate agricultural fields near the facility. Also, all waters of the State are considered potable unless otherwise designated. Therefore, ADEQ set the clean-up levels outlined in the RADD to be consistent with Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) policy. The document, OSWER Directive 9283.1-33, June 26, 2009 documents the authorities, for the policies outlined herein. Note that although OSWER Directive 9283.1-33 was published recently, it is only a summary of the policies promulgated in CERCLA, as implemented by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). Therefore, no change to the final RADD is warranted.*

Comments received from Ann Faitz letter dated March 18, 2010:

Comment No. 1)
FactSheet: Wormald has many times in the past advised ADEQ as to the status of Ansul's involvement at the Cedar Site, however some of the information remains incorrect in the RADD. The historical evidence and documentation located in ADEQ's files, at the Cedar Site, and in previous litigation involving the Cedar Site (referred to as "historical documents") show that Par. 4 of the Fact Sheet should be revised as follows:

Par. 4 of the Fact Sheet should be revised as follows:

The Facility was constructed and initially owned and operated by Helena Chemical Company in 1970 for the production of propanil. The Facility was purchased by Jerry Williams, president of Helena Chemical Company, who, formed Eagle River Chemical Company, which owned and operated the Facility beginning in September 1971. Ansul states on its website that it acquired Eagle River in 1971. From September 15, 1971 to November 15, 1972, Ansul was a majority shareholder in Eagle River and Jerry Williams was a minority shareholder, during which time dinoseb was produced on the site. Jerry Williams became sole shareholder on November 15, 1972 when Ansul sold its shares back to him. Helena Chemical Company had various plant managers at the Facility from November 1972 to 1976, during which time methoxychlor, lannate and 1,2 - dichloroethane, in addition to other chemicals, were produced on the Site for various toll manufacturers. 1, 2 -dichloroethane was produced at the Site beginning in 1975 pursuant to a contract with Mobil Oil. The Facility from 1970 to 2002 manufactured ...

If ADEQ does not agree with the above summary and the dates provided, it should reference and produce all of its documented evidence and justification for the dates and description of ownership/operation that it has provided in the Fact Sheet.

> ***Response:*** *The purpose of the Fact Sheet is to provide the public and interested parties with a brief overview of the facility description and anticipated remedial activities during the public comment period. Thus a Fact Sheet is not redeveloped when a final RADD is published. Therefore, the Fact Sheet will not be revised. However, ADEQ acknowledges that the ownership and operational control history of the facility is under dispute.*

Comment No. 2)
Introduction, page 1, par. 3: Exxon, HCC and Ansul voluntarily entered into a consent order, CAO LIS 07-027 with ADEQ - the CAO was not issued to them. Wormald admits that currently it is the successor to Ansul as referenced in the Introduction. Par. 3 should be revised as follows:

"On March 22, 2007, ADEQ.... entered into Consent Administrative Order (CAO) LIS 070927 with Tyco Safety Products LP, formerly known as Ansul, Incorporated, formerly known as Wormald U.S., Inc. (Ansul) ... "

See also Site Background, page 4, par. 2, which should be revised to state that ADEQ entered into a CAO with the other Parties and delete the word "issued."

> ***Response:*** *Agreed. Changes to the final RADD have been made.*

Comment No. 3)
Site Background, page 2, par. 3: Certain dates and ownership references in par. 3 do not correlate with documentation in historic files and should be revised as follows:

"After Ansul left the Site, beginning in November 1972 to about 1976, Helena had its own plant managers at the Site, during which time the Facility was known as Eagle River Chemical and during which time Helena Chemical built and began using three unlined surface impoundments ..."

If ADEQ does not agree with the above, it should reference and produce all of its documented evidence and justification to show that Vertac, rather than Helena Chemical, operated the Site from 1972 to 1973.

> ***Response:*** *The operation of the facility in the 1970's has been disputed. The paragraph regarding Vertac's operation during the 1970's has been deleted from the RADD.*

Comment No. 4)
Site Background, page 5, par. 1: Similar to the description for Exxon and HCC regarding its Separate Agreement, par. 1 should be revised and clarified as follows:

"Pursuant to Par. V. 20 of the CAO, Ansul entered into a Separate Agreement with ADEQ on January 9, 2009 to conduct a further investigation of Site 3."

> ***Response:*** *The changes have been made as requested in the final RADD.*

Comment No. 5)
Summary of Remedial Approach, page 5, par. 1: Both AMEC Geomatrix and . AECOM FIs and Feasibility Studies were submitted pursuant to the CAO and both should be referenced. Par. 1 should be revised as follows:

"There was extensive investigative work performed at the Facility prior to the 2008 FI (AMEC Geomatrix, February 2009), the FS Report (AMEC Geomatrix, December 2009), the Wormald Site Investigation (AECOM, June 2009) and the Focused FS Report (AECOM, June 2009). The FIs were necessary to obtain information to fill data gaps. . . "

Response: *The changes have been made as requested in the final RADD.*

Comment No. 6)
Summary of Remedial Approach, p. 6, par. 2: ADEQ references "previous investigations" for its Table 1. ADEQ should provide the title and date of the investigation reports that it is relying upon for the information provided in Table 1 and Figure 3.

Response: *The source of information is located in the title of Table 1 and in the title block of Figure 3. Therefore, no change to the final RADD is warranted.*

Comment No. 7)
Table 1, page 16: While the description for AOC 1 is apparently correctly cited, some of the information in the conclusions is not consistent with historic documentation. As stated previously, Ansul's involvement was only from Sept. 15, 1971 to November 15, 1972 when dinoseb was produced at the Site.

Response: *As noted in Table 1, the response is EPA's conclusion reached for each SWMU. The information provides justification for including the area of concern in future facility investigations. It is stated in Table 1 that the information came from a facility representative. ADEQ has other documentation showing that the Ansul owned two-thirds of the stock of Eagle River Chemical Corporation from about September 1971 until November 1973. (Cedar Chemical Corporation V. Wormald U.S., Inc. No. E-91-349, Phillips County Chancery Court). Therefore, no change to the final RADD is warranted.*

Comment No. 8)
Tables 2A and 2B, pp 17-18: ADEQ should provide the title and date of the investigation reports that it is relying for the information provided in Tables 2A and 2B.

Response: *A footnote has been included at the bottom of Tables 2A and 2B that cites the AMEC Geomatrix Facility Investigation (February 2009).*

Comment No. 9)
Recommended Remedy for Drum Vault, page 23: The COCs which are proposed to be remediated and referenced in the RADD for the drum vault as those "identified at concentrations that exceeded a regulatory level" should be specifically identified by ADEQ.

> ***Response:*** *Although sampling has been conducted at the drum vault, the amount of sampling did not fully characterize the waste. The characterization sampling preformed during disposal will identify the potential COCs associated with the drum vault. If additional COCs are identified that are not included in the final RADD, the levels will be established at that time. Therefore, no change to the final RADD is warranted.*

Comment No. 10)
Sec II Schedule of Implementation, page 36: It is unclear as to identity and scope of persons or entities ADEQ is referring to by the term "known PRPs" since they are not named nor identified. In any event, it does not appear that any person or entity has been found to be a potentially responsible party (PRP) for the contamination or remedial action identified in the RADD either by ADEQ or by a court, nor has any person or entity admitted to such liability. Further any persons that may be found liable are not jointly and severally liable under the Arkansas Remedial Action Trust Fund Act (RATFA), under which this RADD is issued. Rather, it is the clear purpose and intent of RATFA to allocate responsibility equitably among liable parties for their allocated share pursuant to statute. As such, ADEQ has no authority to make a general requirement in the RADD to all "known PRPs" to submit plans and/or take action under the RADD and Wormald objects to this requirement. ADEQ should identify all the persons or entities to which it is addressing this directive, and provide a detailed legal justification to support its authority to impose this .requirement in the RADD to "known PRPs."

> ***Response:*** *ADEQ has not determined the Potential Responsible Parties at this time that will be responsible for carrying out the terms of the RADD. The term "known PRPs" has been changed to "PRP's" in the final RADD. Once ADEQ has an agreement with a party(ies) to implement the final RADD, it will be ADEQ's intent to have such partiy(ies) submit an implementation schedule within 60 days of said agreement.*

Comment No. 11)
Administrative Record (AR), page 37: Since the RADD includes facts regarding ownership and/or operation of the Site; all documents upon which ADEQ relies evidencing that history should be made part of the AR. All documents listed as part of the AR should include the official title, author, and date of each document to avoid confusion. Further, all of the investigations which have been undertaken at the Site since 1990 and all related correspondence of such investigations, including, but not limited to, correspondence between ADEQ and Cedar, should be included in the AR.

> ***Response:*** *The administrative record listed in the RADD includes documents used to develop remedial decisions. The RADD is not intended to resolve any ownership or operational disputes. Therefore, no change to the final RADD is warranted.*

Comment No. 12)
General Comment regarding Site Redevelopment and Section 8, p. 28: Harcros Chemical is a potential buyer for the Site and has been actively negotiating with ADEQ to redevelop the Site for industrial use for various purposes, including reuse of equipment and buildings on site for chemical production and other activities. This redevelopment will create new, much needed jobs for the community, It is our understanding that Harcros does not desire the buildings to be razed as set out in the RADD (at a proposed cost of over $4M), but desires many of the building to remain for its reuse. Doing so would enable Harcros to redevelop the Site and create jobs, which would in turn lower the cost of proposed cleanup, and all which could be accomplished without adversely affecting public health and the environment. Wormald supports Harcros' redevelopment of the Site and strongly urges ADEQ to work with Harcros and finalize the plan for redevelopment prior to finalizing the RADD. The RADD should be modified in keeping with redevelopment of the Site.

We request that ADEQ provide a detailed explanation as to the reasons why razing of the buildings as proposed in the RADD is necessary to protect human health and the environment; and, if this is a stumbling block to approving Harcros' proposal, the reasons why ADEQ refuses to allow Harcros to keep certain buildings to redevelop the Site.

> ***Response: ADEQ has signed a lease agreement with Quapaw LLC (Quapaw). Quapaw will utilize portions of site for a wood processing operation. Based on the lease agreement,*** *one building and two production units that were targeted for demolition in the RADD will remain on site. The old lab building and the former production units identified on figure 7 of the RADD as the Laboratory, the Permetherin and Propane Unit # 1 and Unit # 5. The structures that remain on site will have little if any impact on implementing the remedial alternatives selected in the RADD. The foundation and covers of the structure will continue to serve as exposure controls. Section 7, bullet #4(Recommendations for Removal of Site Structures and Figure #4 in the RADD will be changed to reflect the buildings remaining on site based on the signed lease agreement and associated with this comment. Updates were made to Section 2 of the RADD to reflect the lease agreement.*

Comments received from Letter by Charles M. Tappan dated March 22, 2010:

After attending the recently held public meeting on the above mentioned, I feel that more needs to be done to save some of the manufacturing capabilities of the existing plant. The plant is comprised of several manufacturing units. I understand that several of the units exist above sources or significantly contaminated earth that requires their removal. However, some of the units could be left in place and worked around. This approach would allow the site to be re-mediated without destroying all units and would leave some marketable value with the site.

When Cedar was in operation, it employed well over 100 people with an average annual salary of @ $54,000. With a drive thru our community, one can visibly see the void the loss of these jobs has created. These types of jobs will be lost forever, if all units are demolished and the site is left as a large asphalt pad.

Please visit with -the companies previously interested in redevelopment of the site and discuss which units bring marketable value to the site. Discuss the assets of the site with ADED for their input on what would bring the best value to the site. This information could be used to modify the RADD for inclusion to provide the best outcome for the State of Arkansas and Phillips County.

One company was at the meeting that has a current proposal for the sites re-development. I urge ADEO to work with this company to modify the RADD and move forward on their plan for redevelopment. If the RADD goes without modification, the chances for getting a viable company to re-develop the site are very slim. There are many sites in our state that have fewer issues and many sites in our state that have fewer issues and many more assets that are attractive to the businesses our state needs.

Please seriously consider my comments, as the future economic health of our community could be dependent on this important decision.

Response: *ADEQ greatly appreciates your concern for Phillips County and your community as well as the desire to see the Cedar Chemical Company Site cleaned up and redeveloped. ADEQ looks forward to the day the Cedar Chemical Company Site is clean and restored. Again, thank you very much for taking the time to share your concerns and support.* ***: ADEQ has signed a lease agreement with Quapaw LLC (Quapaw). Quapaw will utilize portions of site for a wood processing operation. Based on the lease agreement,*** *one building and two production units that were targeted for demolition in the RADD will remain on site. The old lab building and the former production units identified on figure 7 of the RADD as the Laboratory, the Permetherin and Propane Unit # 1 and Unit # 5. The structures that remain on site will have little if any impact on implementing the remedial alternatives selected in the RADD. The foundation and covers of the structure will continue to serve as exposure controls. Section 7, bullet #4 (Recommendations for Removal of Site Structures) and Figure #4 in the RADD will be changed to reflect the buildings remaining on site based on the signed lease agreement and associated with this comment. Updates were made to Section 2 of the RADD to reflect the lease agreement.*

Comments received from Letter on behalf of Exxon/Helena Chemical dated March 25, 2010:

Comment No. 1)
ExxonMobil and Helena Chemical Company Agree with the Draft RADD insofar as it follows the Analysis and Remedial Recommendations of the Feasibility Study Prepared by AMEC Geomatrix.

ExxonMobil and Helena Chemical Company believe that the Current Conditions Report ("CCR") and Facility Investigation Report ("FIR") submitted to ADEQ by AMEC Geomatrix represent an accurate analysis of environmental conditions related to the Cedar Chemical Corporation Site. ADEQ approved the CCR and the FIR in their final form; and the Draft RADD appears to reaffirm that approval. *See* Draft RADD at p. 4.

The Feasibility Study submitted by AMEC Geomatrix assessed a comprehensive list of remedial alternatives that might be considered to address the environmental conditions identified in the CCR and FIR. ExxonMobil and Helena Chemical Company believe that the assessment of these remedial alternatives contained in the Feasibility Study is correct. The Draft RADD published by ADEQ proposes to adopt most of the remedial analysis and recommendations contained in the Feasibility Study. ExxonMobil and Helena Chemical Company agree with the Draft RADD insofar as it follows the analysis and adopts the remedial recommendations contained in the Feasibility Study. The Draft RADD published by ADEQ, however, departs in certain respects from the analysis and recommendations of the Feasibility Study. ExxonMobil and Helena Chemical Company disagree with the Draft RADD insofar as it departs from the analysis and recommendations of the Feasibility Study. In particular, the companies believe that the RADD failed to properly evaluate and apply the Risk Assessment analysis presented in the Feasibility Study.

> ***Response:*** *The Draft RADD does incorporate a significant portion of the remedies that were recommended in the AMEC Geomatrix (December 2009) FS Report.*
>
> *The most significant deviation from the FS Report is that the stabilization area has been expanded in the vicinity of the former dinoseb disposal ponds. This is because Dinoseb is retained as a COC in sub-surface soil in the RADD. Dinoseb in the sub-surface soil is above the "soil to groundwater protection concentration" (see table 5B of RADD) which makes it a potential pathway to groundwater. To address these elevated concentrations, the area has been extended further to address dinoseb in greater concentrations than in the area originally outlined in the AMEC Geomatrix FS Report.*
>
> *ADEQ considered the risk assessment analysis presented in the AMEC FS. However, ADEQ must also consider all applicable pathways for remedial alternatives. In doing so, it is determined no changes to the final RADD are warranted at this time.*

Comment No. 2)
The Provisions of Section 11 of the Draft RADD are not relevant to remedy selection and should be deleted.

The Draft RADD focuses almost entirely on a discussion of remedial alternatives. This focus on assessing remedial alternatives as the subject matter of the Draft RADD is entirely appropriate. One section of the RADD, however, strays from the subject of assessing remedial alternatives and purports to direct certain parties to begin taking steps to implement a remedy. Specifically, Section 11 of the Draft RADD directs undefined entities referred to as the "known PRPs" to develop a schedule for implementing the remedy:

> **11. Schedule of Implementation**
> **To help aide [sic] in the procession of remedial activities, the known PRPs are to submit to ADEQ a schedule within sixty (60) days of finalization of the ADEQ RADD regarding this facility.** The schedule should give highest priority to implementation of the Drum Vault Removal (Remedial Alternative D1) and alluvial aquifer enhanced biodegradation (Remedial Alternative A3). Each remedy should be scheduled in a way to expedite implementation of all remedies.
> **The known PRPs must submit a plan annually to evaluate monitoring data from the SVE and selected groundwater remedies.** An evaluation of the overall effectiveness of contaminant removal in soils and groundwater and review of the site risks must be conducted at 5-year intervals. (Emphasis supplied.)

ExxonMobil and Helena Chemical Company believe that Section 11 should be deleted in its entirety from the RADD for several reasons. First, questions regarding who should prepare an implementation schedule and when it should be prepared have no relevance to the purpose of the RADD. Second, if Section 11 is intended as a legitimate and meaningful command to take action, it fails to comply with any of the administrative, statutory, or constitutional prerequisites for the issuance of a lawful administrative order. Third, even if it followed the procedural requirements for an administrative order, Section 11 would be impermissibly vague. It is impossible to know who ADEQ has in mind when it uses the term "known PRPs." Although a RADD is not an appropriate place to attempt to address questions of legal liability, it is important to note that the Draft RADD does not even mention most of the parties who appear to have potential liability for at least some aspect of the remedial costs contemplated by the RADD. Nor does the Draft RADD acknowledge that the Remedial Action Trust Fund itself likely has a large and perhaps majority share of the liability for the remedial costs under Ark. Code Ann. § 8-7- 513. Finally, there is nothing about the "command" contained in Section 11 that would allow a liable party to limit its efforts at implementation to the specific elements of the remedy for which the party has liability.

Stated simply, Section 11 of the Draft RADD should be deleted because it is irrelevant to the purposes of the RADD and the requirements stated in the section are impermissibly vague and unenforceable.

Response: *ADEQ is aware that there is currently no agreement in place to prompt implementation of the RADD. The Schedule of Implementation is vague because the legal document which will enforce the final RADD is not in place at this time. The limits of liability will be established through a separate legal action. The final RADD has been changed to state* "..the Responsible Parties (RPs) are to submit to ADEQ a schedule within sixty (60) days of issuance of an order or other binding legal document that determines their liability for remedial activities."

Comment No. 3)
The Draft RADD should be revised to make it clear that ADEQ's publication of the "Final RADD" and any related response to public comments do not constitute an administrative decision that is subject to immediate appeal.

The Notice and Fact Sheet that ADEQ published with the Draft RADD announces a 30 day period for the submission of public comments, sets a date for a formal public hearing, and identifies a set of documents that "comprise the administrative record" for the RADD. The Fact Sheet also states that:

> Submitting written comments to ADEQ or making oral statements on the record at any formal public hearing on the RADD provides individuals with legal standing to appeal a final Department decision. Only parties with legal standing may appeal a decision.

ExxonMobil and Helena Chemical Company agree that publishing the Draft RADD, establishing a publicly available "administrative record" of relevant documents, holding a public hearing, and inviting public comments are all appropriate steps to take in order to encourage and facilitate public participation in the remedy selection process. These steps are good public policy; and they help assure continued consistency with the public participation provisions of the National Contingency Plan. Taking steps to encourage public participation, however, does not make ADEQ's decision on the RADD an appealable administrative action. ExxonMobil and Helena Chemical Company are not aware of any instance in which a RADD issued by ADEQ has been appealed; and the companies are not aware of any statutory provision or administrative rule that would allow or require interested parties to pursue an immediate appeal from a Department decision to issue a "final RADD."

The language quoted above from the Notice and Fact Sheet published with the draft RADD contains language about standing to appeal a RADD, but that language appears to have been copied from standard form language used in the notices that the Department publishes when it issues draft permits for public comment. Indeed, the legal limitation on standing to appeal that is discussed in the language quoted above applies only to third party appeals of permitting decisions. *See* Ark. Code Ann. § 8-4-205(b); APCEC Regulation No. 8, Reg. 8.214. It is clear that the final RADD will not constitute a permit, and its issuance will not constitute a permitting decision. *See* APCEC Regulation No. 8, Reg. 8.103 (AA) & (BB) (definitions of "permit" and "permitting decision").

ExxonMobil and Helena Chemical respectfully submit that the "final RADD" and the response to comments that accompanies the "final RADD" should state clearly whether ADEQ views the issuance of the final RADD as an appealable administrative action. Unless this question is clarified in unequivocal terms, parties with interest in the matter may feel that they have no choice but to appeal the issuance of the "final RADD" in order to preserve their opportunity to resolve any potential differences with the Department regarding the RADD. ExxonMobil and Helena Chemical believe that those differences are more appropriately resolved when ADEQ seeks to order a party to implement an element of the remedy selected in the RADD, or at the time ADEQ seeks to recover costs that the Department has expended from the Remedial Action Trust Fund to implement some element of the remedy selected at the RADD. At that time a party's concerns about the relevant provisions of the RADD would be concrete rather than hypothetical, and ripe for either negotiation or adjudication.

> ***Response:*** *ADEQ does believe that a RADD is a decision of the Director that may be reviewed by the Arkansas Pollution Control & Ecology Commission pursuant to APC & E Commission Regulation 8.601 (H), 8.603(B)(9) and 8.603(C)(1)(f). The regulation provides standing to individuals who the Commission determines are injured in his or her person, business, or property. Absent such a determination by the Commission a party would lack standing to request a review of the RADD.*

Comments received from Letter on behalf of Harcros/Quapaw dated March 24, 2010

Please accept these comments to the Cedar Chemical Corporation draft Remedial Action Decision Document ("RADD") submitted today on behalf of Harcros Chemicals Inc. ("Harcros") and its wholly owned subsidiary, Quapaw Products, LLC ("Quapaw"). As you know, Harcros, through Quapaw desires to redevelop the Cedar Chemical Corporation Helena-West Helena facility ("the Facility").

Harcros believes that redevelopment of the facility is the highest and best use of the Facility. As the State of Arkansas has recognized, through Arkansas' Five-Year Delta Development Plan, the Arkansas Economic Development Commission's designation of Phillips County as a Tier 4 location of economic development, the need for development in Phillips County is among the highest in all of Arkansas. To promote local overall development, the citizens of Phillips County created the Delta Bridge Project. Part of the Delta Bridge Project includes an economic development component whose mission is to:

> Create new quality jobs and career opportunities for Phillips County citizens by working with elected officials, business leaders, Port and Airport representatives, State economic development representatives, the State Highway commission, and tourist industry representatives to improve the business development infrastructure, strengthen and expand existing businesses, attract new businesses, promote local entrepreneurship, and identify local and regional needs that can be converted into business opportunities.

The redevelopment of the Facility meets the goals of the State and local community. The Facility has historically produced agrichemicals, while Quapaw doesn't intend to redevelop the Facility in this fashion; the workforce that produced agrichemicals can produce the chemicals that Quapaw may manufacture there. Additionally, Quapaw, through its strategic partner, Delta Specialty Wood Products, will utilize bio-based waxes in its fuel log production. These projects can be accommodated at the Facility and benefit from the existing transportation services in Phillips County. This opportunity will take advantage of the Port of Helena, the third largest port on the Mississippi River.

Harcros would point out that the RADD decision making process is all based upon no reuse of the Facility. While ADEQ directed AMEC, the environmental consultant to come of the known PRPs, to leave certain buildings for potential reuse, that reuse would only involve the Large Warehouse and office buildings. The ADEQ imposed requirement is not scientific or technical in nature. In fact, the removal of the laboratory building to the north edge of the Facility, is not required by the state reason for the demolition in the RADD. The demolition is not considered protective of human health and the environment by ADEQ in the RADD. Beyond demolition, the RADD is also based upon not having specific controls in place to eliminate, limit or control exposures to industrial workers. The RADD makes assumptions related to ingestion of soils and groundwater which are clearly not applicable in an industrial setting.

Despite the apparent technical issues not considered in the RADD, the industrial reuse of the Facility provides numerous benefits, both economic and environmental. The most readily apparent benefit directly to the State is the assumption by Quapaw of site security. Currently ADEQ, through funding provided by certain PRPs, provides for 24-hour guard service. Quapaw, upon assumption of the Facility, would provide the same site security.

In addition to the guard service, Quapaw would also conduct operations at the site and have vested interested in protecting its property. Quapaw will also conduct maintenance activities that will ensure the existing plant facility doesn't degrade. The mere presence of employees will control, if not eliminate, the attractive nuisance factor the Facility currently poses.
The industrial reuse of the facility changes the technical evaluation as well. In particular, the risk evaluation changes significantly. Plus an industrial reuse will also impose institutional and engineering controls that are not considered by the RADD.

Harcros/Quapaw would appreciate additional discussion of the RADD and its proposed redevelopment of the Facility. The redevelopment is clearly needed in Helena-West Helena. The proposed redevelopment can be accomplished without adverse impact to the environment. The RADD, as proposed, will not be accomplished in a timely fashion. By ADEQ's own estimates, several years are likely to pass before <u>any</u> effort required under the RADD will be undertaken. ADEQ itself, under the terms of the Remedial Action Trust Fund Act, cannot undertake the remediation because of the funding requirements. Similarly, if the Facility was referred to the U.S. Environmental Protection Agency the remediation is very unlikely to occur any sooner. The Quapaw redevelopment will <u>immediately</u> bring about certain changes at the Facility that will control environmental risk.

As Harcros and ADEQ continue to work together to redevelop the Facility, Harcros believes it is appropriate to make decisions based upon the highest and best use of the Facility and in consideration of the technical and economic benefits that redevelopment brings. The highest and best use, i.e. full redevelopment, can be accomplished.

Harcros appreciate the opportunity to comment upon the proposed RADD. The public comment process is clearly valuable to address the issues apparent to interested parties that may not be known or well understood by ADEQ. Harcros hopes that its comments help to formulate a RADD that is best for the Facility and the community. Of course, Harcros is always available to meet and discuss these issues with ADEQ.

Response: Response: ADEQ has signed a lease agreement with Quapaw LLC (Quapaw). Quapaw will utilize portions of site for a wood processing operation. Based on the lease agreement, *one building and two production units that were targeted for demolition in the RADD will remain on site. The old lab building and the former production units identified on figure 7 of the RADD as the Laboratory, the Permetherin and Propane Unit # 1 and Unit # 5. The structures that remain on site will have little if any impact on implementing the remedial alternatives selected in the RADD. The foundation and covers of the structure will continue to serve as exposure controls. Section 7, bullet #4(Recommendations for Removal of Site Structures and Figure #4 in the RADD will be changed to reflect the buildings remaining on site based on the signed lease agreement and associated with this comment. Updates were made to Section 2 of the RADD to reflect the lease agreement.*

Allen Gates' public hearing transcription (verbal comment) on behalf of Council Representing Helena Chemical Company which took place March 25, 2010:

"Thank you Clyde, and I want to thank the Director and Deputy Director and Tammie for coming and making the presentation; they've done a lot of work on this site.. and um..we appreciate it
I'm here tonight on behalf of Helena Chemical Company, Helena is one of two companies that prepared all these studies at quite a bit of an extent." And we will be submitting some comments, written comments, on the substance of the RADD, but the thing I wanted to address tonight, is just one kinda rightful shot.....to the idea of the reuse of the site and the idea that proposals are around. Um.. there has been some suggestion that either the companies who have done the work to date the studies for other companies opposed that the plans to reuse the site, and that's just not the case." Specifically, we had a meeting with the representatives of Harcoss/Quapaw last week, the first time we had heard of the renewed activities, and they described the concept they have currently for reuse and we number 1 strongly support getting reuse of the site as soon as possible; and number 2 we support the proposal as we understand it, that was described to us and is currently on the table and being discussed if the Department or anyone else is thinking that somehow a proposal will stumble because of opposition from the companies who have done the studies or who might be looked to about doing additional work I can tell ya on behalf of Helena Chemical we support the idea of reuse and we support what is on the table and I'd like to make clear that we support that because it will save money, it will save money for the state, it will save money for those other companies that now have a turn to step up to the plate, it'll save money to the state RATFA. As we understand it, the proposal will be consistent with the RADD but the bigger concern I have what's good for the environment not only will save money having an operator on site, providing site security, storm water, the usual business facilities of an operating site that is maintained is better for the environment and so we hope that will be looked at, and finally the thing I would like to express a concern about tonight specifically and Teresa, Ryan, Tammie, and Clyde I'd like you guys to take home and think about, is if you can change the RADD after the fact to accommodate a plan let me strongly suggest supporting that you think about the plan that is before you from Harcross right now... because as I understand it that business opportunity is time sensitive, all business opportunities are and we would hate to have you leave tonight well we'll get the RADD adopted and then we'll go back and talk to them if in fact that might lose the opportunity we hope that you will continue to work hard and seeing whether there is ground to meet that you can with Harcross/Quapaw and if you can to do it and do it if necessary before the RADD or at least find the commitments and principle that will work less this opportunity slip away. And again I can't speak to the discussions I've not been a party to any of them but I listened last week the presentation, I got very concerned that the engine in getting this site back in use might be lost if the RADD gets in front of it and becomes the object I know that's the principle job you guys have at the Department to review and approve right now but I hope you don't lose site of the fact that maybe the first priority to see if there is closure you can reach with an existing business opportunity. And again I can't speak for the specifics of that but I hope you won't let anything get lost in the shuffle."

.....public hearing over

Response: ADEQ has signed a lease agreement with Quapaw LLC (Quapaw). ***Quapaw will utilize portions of site for a wood processing operation. Based on the lease agreement,*** *one building and two production units that were targeted for demolition in the RADD will remain on site. The old lab building and the former production units identified on figure 7 of the RADD as the Laboratory, the Permetherin and Propane Unit # 1 and Unit # 5. The structures that remain on site will have little if any impact on implementing the remedial alternatives selected in the RADD. The foundation and covers of the structure will continue to serve as exposure controls. Section 7, bullet #4(Recommendations for Removal of Site Structures and Figure #4 in the RADD will be changed to reflect the buildings remaining on site based on the signed lease agreement and associated with this comment. Updates were made to Section 2 of the RADD to reflect the lease agreement.*

E. FUTURE ACTIONS.

Effective with this Decision, the final Remedial Action Decision Document is incorporated into and will become a condition of a Consent Administrative Order between PRPs and the Department, as though set forth therein line for line and word for word.

F. DECLARATIONS.

ADEQ believes that the remedies proposed in this RADD, which were primarily based on remedies proposed in the Feasibility Study Report submitted by AMEC Geomatrix, are appropriate, technically feasible, reliable, and cost effective. With respect to risk management decisions made by ADEQ, this remedy is deemed acceptable, and to be protective of human health and the environment. This RADD is a decision of the Director that may be reviewed by the Arkansas Pollution Control & Ecology Commission pursuant to APC & E Commission Regulation 8.601 (H), 8.603(B)(9) and 8.603(C)(1)(f). The regulation provides standing to individuals who the Commission determines are injured in his or her person, business, or property. Absent such a determination by the Commission a party would lack standing to request a review of the RADD.

Clyde Rhodes Jr 06/03/10

Clyde E. Rhodes, Jr. (Date)
Chief
Hazardous Waste Division
Arkansas Department of Environmental Quality

Enclosure: Final RADD

AECOM

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SENT VIA FAX AND U.S. MAIL

March 18, 2010

Mr. Clyde Rhodes
Chief of Hazardous Waste Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Subject: **Comments to the Remedial Action Decision Document (Dated February 2010)**
Former Cedar Chemical Facility (the "Site")
Helena – West Helena, Arkansas
EPA ID No. ARD990660649

Dear Mr. Rhodes:

AECOM has reviewed the *Remedial Action Decision Document* (RADD; dated February 2010) for the former Cedar Chemical Company Site. On behalf of Tyco Fire Products LP, formerly Ansul, Incorporated, formerly Wormald U.S., Inc. ("Wormald"), AECOM submits this letter as a matter of record to document general comments compiled as a result of the RADD review.

AECOM respectfully requests that the Arkansas Department of Environmental Quality (ADEQ) provide clarifications, technical rationale, and references to appropriate technical documents and/or reports of investigations conducted at the Cedar Chemicals Site as justification for certain portions of the RADD as provided in each comment below and/or make corrections as necessary to address the comments identified herein.

Comments:

1. Section 2, page 4, last paragraph. The statement "Due to lack of participation by Ansul..." is incorrect, as stated and should be deleted. Wormald fully participated in and complied with the Consent Administrative Order LIS No. 07-027 (CAO) by executing a Separate Agreement with the ADEQ on January 9, 2009. Wormald was never requested by ADEQ or required by the terms of the CAO to conduct a full site investigation for all contaminants at the Site. With the full knowledge and approval of ADEQ, the requirements of the CAO and the Separate Agreement were satisfied through the completion of the following:

    - *Wormald Site Investigation Work Plan* (AECOM, January 22, 2009),
    - Wormald Site Investigation field work – completed March 4 and 5, 2009,
    - *Wormald Site Investigation Report* (AECOM, originally submitted March 30, 2009; revised June 2, 2009), and
    - *Focused Feasibility Study Report – Site 3* (AECOM, June 29, 2009).

2. Section 3, page 6. ADEQ should reference the author, title and date of the report which is the source of Table 1.

3. Section 4, pages 17 through 19 and Tables 2A and 2B. The first sentence on page 17 states that "The [Facility Investigation] FI findings were used to identify Constituents of Concern (COC) in on-site soil and in on-site and off-site groundwater." Based on the previous section, which discusses the findings of the 2008 FI (AMEC Geomatrix, February 2009), it appears this section is also referencing the 2008 FI.

   The *Feasibility Study (FS) Report* (AMEC Geomatrix, December 2009) was generated based on the FI findings and includes the Center for Toxicology and Environmental Health (CTEH) *Derivation of Human Health (HH) Risk-Based Concentrations (RBCs)*, which is listed as being prepared for the ADEQ, in Appendix A. The *Derivation of HH RBCs* (CTEH, December 2009) provides a description of the methodology used to select COCs for each media and provides a list of COCs for each media in Tables 1, 2, 3A, and 3B for soil, on-site perched zone groundwater, on-site alluvial groundwater, and off-site alluvial groundwater, respectively. However, there are discrepancies between the COCs listed in RADD Table 2A for soils and 2B for groundwater and those listed in the *Derivation of HH RBCs* (CTEH, December 2009). For example, in the *Derivation of HH RBCs*, dinoseb was selected as a COC based on the direct-contact pathway and for on-site soils only, but is included as a COC in the RADD for on-site perched zone groundwater and on-site alluvial groundwater (Table 2B). Other chemicals, such as bis(2-ethylhexl)phthalate, heptachlor, and methoxychlor, are also selected as COCs for perched zone groundwater in Table 2B of the RADD, although they were not retained as COCs in the *Derivation of HH RBCs*. Furthermore, chemicals, such as chloroethane and 1,3-dichlorobenze, were selected as COCs for on-site alluvial aquifer groundwater in the *Derivation of HH RBCs* but were not included as COCs in Table 2B of the RADD. The rationale for these changes and/or variations in COCs between these documents is not provided and leads to confusion.

   AECOM recommends that the COCs presented in tables 1, 2, 3A, and 3B of the *Derivation of HH RBCs* (CTEH, December 2009) be adopted for the purpose of the RADD and that corrections be made to ensure COCs are appropriately matched to media at the Site. Alternately, ADEQ should (a) provide detailed scientific and technical rationale supporting the decision to include the COCs identified in Tables 2A and 2B of the RADD rather than those identified in the *Derivation of HH RBCs* (CTEH, December 2009); (b) provide reference(s), with document name and page number, for the investigative document(s) or report(s) which are the source(s) for Tables 2A and 2B; and (c) provide references for all scientific literature, investigative reports, and findings upon which ADEQ relied to identify the COCs in Tables 2A and 2B in the RADD.

4. Section 6, page 20, Table 3A. The list of remedial alternatives considered for on-site soils lists "no further action" as the only remedy considered for Site 3 soils and appears to reference the *Focused FS Report - Site 3* (AECOM, June 2009). This phrase is incorrect and should be deleted. As a point of clarification, the referenced report addressed residual concentrations of dinoseb in Site 3 soils exclusively, with the acknowledgement and approval of ADEQ, and the remedies discussed therein were only considered with respect to dinoseb concentrations – they did not consider other COCs that may potentially be present in soil at Site 3 or anywhere else on or on-site or in groundwater. As such, application of the findings of the *Focused FS Report - Site 3* (AECOM, June 2009) to other COCs or media in the RADD is inappropriate. Moreover, the *Focused FS Report - Site 3* evaluated multiple remedies, including no further action, institutional controls (exposure controls), institutional

controls with down-gradient groundwater monitoring, and an engineered barrier with institutional controls and down-gradient groundwater monitoring, before recommending institutional controls as the preferred remedial alternative for residual dinoseb concentrations in subsurface soil at Site 3.

As a standalone entity in Table 3A of the RADD, this table should be corrected to accurately reflect the three alternatives that were considered for residual dinoseb in soil at Site 3. At a minimum, the table should be corrected to accurately reflect the alternative that was presented in the conclusion of the *Focused FS Report - Site 3* for residual dinoseb in soil - Institutional Controls.

5. Section 7, page 22, first paragraph. This statement "no action" inaccurately reflects the recommendation made in the conclusions of the *Focused FS Report – Site 3* (AECOM, June 2009). Please see previous comment for additional information regarding the findings of the Site 3 FS. This statement should be revised to reflect the recommendation of "Institutional Controls" as the preferred remedy for residual dinoseb concentrations in soil at Site 3. Furthermore, the statement should specify that the AECOM recommendations are applicable to residual concentrations of dinoseb in subsurface soils <u>only</u>, and do not consider other constituents that may be present in soil at Site 3 or in other areas of the Site.

6. Section 8, page 25, last paragraph, first bullet and Section 10, page 34, paragraph 3. It is unclear why the remediation area identified for soil stabilization in Figure 8B has been expanded by ADEQ in the RADD from the *FS Report* (AMEC Geomatrix, December 2009) and why dinoseb has been identified as the reason for expanding the remediation area for the remedies described in the RADD. Dinoseb was selected as a COC for on-site soils in the *FS Report* (AMEC Geomatrix, December 2009) and in the RADD based solely on the direct contact exposure pathway. Exposure controls, such as deed restrictions to secure the facility area, to limit future land use to the industrial scenario, and to restrict intrusive activities and/or to require the use of personal protective equipment (PPE) during intrusive activities, should be sufficient to control exposure to dinoseb and the identified direct contact risk. There does not appear to be any justification provided for expansion of the area identified for soil stabilization or an explanation for why dinoseb is the reason for the expansion.

   AECOM requests that this point be clarified by ADEQ to explain in detail the scientific and technical justification and rationale behind this decision to expand the remediation area due to dinoseb, and provide the appropriate scientific literature, investigative documents, and/or reports relied upon by ADEQ for this decision. AECOM recommends that the expansion of the area and/or the reference to dinoseb as the reason for expanding the area for soil stabilization be removed from the RADD.

7. Section 8, page 25 and Section 10, page 34. Soil remedy alternatives address on-site soils as a whole and do not differentiate between remedies designed to address a particular exposure pathway (i.e., direct exposure pathway vs. vapor intrusion pathway). The COCs identified for each pathway exhibit very different physical properties and, as such, the selected remedies are not necessarily applicable or appropriate for all contaminants/pathways. For instance, soil vapor extraction may address the vapor intrusion pathway for 1,2-DCA, but would not be necessary to implement to address those constituents, such as dinoseb, which are only identified for potential exposure via the direct contact pathway. Institutional controls (i.e., land use controls, deed restrictions, and site security measures) should be sufficient on their own to control direct contact exposure to dinoseb in on-site soils.

AECOM requests that the ADEQ amend the RADD to include a list of COCs and exposure pathways addressed by each proposed remedy.

8. Section 8, page 28, Table 4D. The basis for the recommendation to remove all above-ground structures is unclear. The recommendation does not appear to be based on controlling exposure risk, since no COCs or exposure pathways are identified for the remaining structures. Furthermore, all columns of the table are blank except for "capital cost", so the remedy does not appear to have been evaluated with respect to the criteria outlined on page 25, paragraph 1. The January 2003 USEPA Region 6 removal action addressed "chemicals left at the Facility in tanks and containers" as discussed on page 3, paragraphs 6 and 7 of the RADD.

   Based on this information, we do not believe there is enough information to justify razing all above-ground structures. ADEQ should consider that if particular above-ground structures need to be razed to implement selected remedies, as discussed on page 36, paragraph 2 of the RADD, the demolition could be implemented on a case-by-case basis for a lower cost. ADEQ should provide its scientific reasons and rationale for the necessity to remove all above ground structures when there is at least one viable buyer for the facility, Harcros Chemical, who has need to use at least some of the on-site structures, and removing the structures will eliminate the purchase or lease of the facility to any potential industry who may make use of the facility, redevelop the facility, and offer jobs to the community.

9. Section 9, pages 30 through 33, Tables 5A through 5E. The RADD does not reference the source of the Remedial Action Levels (RALs) for the COCs for Site media presented in Tables 5A through 5E. The RALs for COCs in on-site soils appear to be in agreement with those presented in Table 4 of the *Derivation of HH RBCs* (CTEH, December 2009) for most COCs; however, the Direct Contact RBC for 1,2-DCA presented in Table 5A of the RADD (22 mg/kg) is double the value presented in Table 4 of the *Derivation of HH RBCs* (CTEH, December 2009). With the exception of the Vapor Intrusion RBCs presented in Table 5C of the RADD, which appear to correspond with the values presented in Table 5 of the *Derivation of HH RBCs* (CTEH, December 2009), and the Maximum Contaminant Levels presented in Tables 5C through 5E, there is no explanation as to the methodologies or references used to determine the remaining RALs in Tables 5A through 5E. Furthermore, it is unclear if the RBCs presented in these tables are site-specific calculated values or regional screening levels. AECOM requests that the ADEQ amend the RADD to add (a) an explanation of the rationale for selection of the RALs in Tables 5A through 5E; (b) the methodologies used for calculation site-specific RALs (if applicable); and (c) references to technical guidance, standards, or reports used to generate the RALs.

10. Section 9, page 31, last paragraph and page 32, Table 5C. It is unclear why maximum contaminant levels (MCLs), residential tap water RBCs, and industrial tap water RBCs are included in Table 5C as RALs for COCs in on-site perched zone groundwater. As stated in the correspondence from AMEC Geomatrix to ADEQ on October 14, 2009 entitled *Response to Comments on the FS Report for Cedar Chemical Corporation* (Email Date of September 10, 2009), "the Perched Zone yields insufficient water to be used as a potable or industrial water supply" (page 2, first paragraph). As such, drinking water standards and tap water risk-based criteria are not applicable to the intermittent perched zone groundwater in this area.

    Considerations for current land use and groundwater use designation are included in the *Ground Water Remediation Level Interim Policy and Technical Guidance* (ADEQ, July 12, 2005), available

via a link from the ADEQ Hazardous Waste Division website (http://www.adeq.state.ar.us /hazwaste/default.htm), and the USEPA Region 6 Corrective Action Strategy (CAS; November, 2008), available via a link from the ADEQ Hazardous Waste Division- Arkansas Corrective Action Strategy website (http://www.adeq.state.ar.us/hazwaste/branch_tech/cas.htm). Page 2, paragraph 4 and page 4, Section III (c) of the *Ground Water Remediation Level Interim Policy and Technical Guidance* (ADEQ, July 12, 2005) state that "Consideration will be given to the current and reasonably anticipated future land use (including ground water usage)" when establishing goals for groundwater remediation. Page 6, paragraph 2 of the guidance states that "in cases where the designated use differs from the actual or reasonably anticipated use; the remediation standard may be based on an acceptable risk range. The acceptable risk range shall be based on protection of human health and the environment." The USEPA Region 6 CAS (November 2008) states that "current land use conditions should be emphasized when evaluating exposures at commercial/industrial facilities because for most of these facilities, current land use is assumed to continue into the foreseeable future" (page 51). The use of MCLs as the RALs for on-site perched zone groundwater does not appear to take these considerations into account. Current land use is industrial and no perched zone or alluvial aquifer drinking water wells exist within the Site. Institutional controls is a reasonable remedy to be put in place within the Facility boundaries to limit certain land-use scenarios, to restrict perched zone groundwater use within the Facility boundary, and/or to require PPE for intrusive activities, thus mitigating the risk of incidental exposure through the direct-contact scenario.

AECOM recommends that (a) institutional controls (e.g., deed restrictions) be put in place within the Facility boundary to prohibit the installation of groundwater wells in the perched zone; and (b) remedial actions levels for non-volatile compounds in perched zone groundwater should be based on the risk of incidental exposure to potential future construction workers through the direct-contact exposure pathway. Furthermore, institutional controls and long-term monitoring should be sufficient to mitigate risks for chemicals, such as dinoseb, identified as COCs for the perched zone that (a) have not been identified as COCs in off-site groundwater and (b) exhibit declining concentration trends. For perched zone and on-site alluvial aquifer COCs that meet these criteria, a limited remedy, which couples institutional controls to restrict groundwater use and to limit exposure and long-term monitoring to verify that concentration trends continue to decline and migration does not occur, should be included in the RADD.

ADEQ should provide its rationale for not accepting these recommendations and consider this information before the RADD is finalized.

11. Section 10, page 34: ADEQ should provide its scientific and technical rationale and reference to the appropriate scientific literature and/or reports as to (a) why it did not adopt the conclusions and remedies presented in the *Comprehensive Site Assessment* (ADEQ, April 2004) for SWMUS 63-73 and AOC 1 rather than the remedies provided in the RADD (ADEQ, February 2010) for those areas ; and (b) why it did not adopt the conclusions and remedies proposed in the *FS Report* (AMEC Geomatrix, December 2009) and the *Focused FS Report – Site 3* (AECOM, June 2009) for SWMUs 63-73 and AOC 1 rather than those provided in the RADD.

12. Section 10, page 34 through 36. The RADD does not specify a schedule for implementation or specify whether or not a phased approach has been considered for the Site. For chemicals that have been identified as COCs due to potential risk via the direct-contact pathway for on-site soils, institutional controls (e.g., deed restrictions, land use restriction, PPE-requirements for intrusive activities) and exposure controls (i.e., low-permeability cover) should be sufficient to mitigate the

risk. Hot spots could be treated with in-situ stabilization and/or soil vapor extraction (SVE), as applicable for the specific COC, to reduce residual source material for COCs identified for the soil-groundwater exposure pathway. For COCs identified in on-site media, a phased approach using these components could be implemented and long-term groundwater monitoring/monitored natural attenuation (MNA) could be used to monitor the remedies for their effectiveness in reducing on-site groundwater concentrations. If these low-cost remedies were sufficient in reducing concentrations, a more aggressive and more expensive approach would not be needed. Furthermore, additional monitoring data collected during the initial phase could be useful in the design phase if a more aggressive approach was needed.

AECOM requests that the ADEQ include a schedule for how the remedies will be implemented in the final RADD. Furthermore, AECOM requests that ADEQ consider a phased approach for COCs in on-site media when developing the final RADD.

13. General comment. It is our understanding that there is a potential buyer for the Site, Harcros, who intends to use the Site for industrial use and ADEQ is currently negotiating with Harcros for it to acquire the Site. The USEPA Region 6 CAS (November 2008), which is available via a link from the ADEQ Hazardous Waste Division- Arkansas Corrective Action Strategy website (http://www.adeq.state.ar.us/hazwaste/branch_tech/cas.htm), states that "under the CAS screening process, the receptors for the commercial/industrial scenario are limited to generic on-site worker (indoor worker and outdoor worker). There is no requirement under this land use category to evaluate exposure to members of the public" (page 52). Page 53 of the CAS states that the "EPA prefers to rely on states to develop ground water use designations and will generally defer to a state's designation of groundwater classification and use when developing cleanup objectives". Page 54 of the CAS states that "if an aquifer is not a drinking water resource, does not have any other beneficial resource attributes, does not impact indoor air, does not contaminate surface water, or does not contaminate a drinking water aquifer, then the level of protection (e.g., MCL or alternate concentration limit (ACL)) to be met at, within, or beyond the facility boundary will be determined in consultation with the administrative authority." Finally, page 11 and Appendix A, page 9 of the CAS state that "For instances where groundwater is not a drinking water source, is not a beneficial resource, or in instances in which restoration is not practical, the expectation is that human health and the environment must be protected at the point of exposure (POE). If a state does not consider groundwater beneath a facility to be a beneficial resource, the POE may be placed at the facility boundary." The CAS provides scenarios for placing the POE at the facility boundary and beyond the facility boundary (Appendix A, page 11): "In Figure A-4 the POE is determined to be at the facility boundary (where land use is industrial), offsite land use beyond the boundary is residential" and "Figure A-6 describes the case where groundwater is not a beneficial resource and both onsite and offsite properties are classified as industrial."

    Based on the information provided in the USEPA Region 6 CAS (November 2008), AECOM respectfully requests that either the ADEQ (a) amends the RALs to RBCs for on-site perched zone and on-site alluvial aquifer groundwater in the final RADD and shifts the POE (and applicability of MCLs) to the Site boundary or beyond, or (b) provides a detailed rationale and technical explanation for using MCLs as the RALs for on-site groundwater in the final RADD.

If you have any questions or require additional information, please contact me at (864) 234-2282 or via email at leslee.alexander@aecom.com or Ms. Ann Faitz, Tyco Counsel, at (501) 831-5637. Please put the following Tyco contacts on the ADEQ mailing list for this RADD, including myself:

- Ms. Ann P. Faitz
  Attorney at Law
  585 Silverwood
  North Little Rock, AR 72116
  ann.faitz@gmail.com

- Mr. John Perkins
  Director, Environment, Health & Safety
  Tyco Safety Products
  6600 Congress Avenue
  Boca Raton, FL 33487
  johnperkins@tycoint.com

Sincerely,

AECOM

Leslee J. Alexander, P.G.
Project Manager

cc: Mr. John Perkins, Tyco Safety Products
Ms. Ann Faitz, Tyco Counsel
Project File 104336

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March 18, 2010

Mr. Clyde Rhodes, Jr.
Chief, Hazardous Waste Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: Comments to Remedial Action Decision Document (Dated February 2010)
Former Cedar Chemical Facility, Helena – West Helena, Arkansas
EPA ID No. ARD990660649 (the "Site")

Dear Mr. Rhodes:

Please consider these comments to the Cedar Chemical Remedial Action Decision Document (RADD) being submitted on behalf of Tyco Fire Products LP, formerly known as Ansul, Incorporated, formerly known as Wormald U.S., Inc. (Wormald). Also attached are comments submitted on behalf of Wormald by its consultant, AECOM.

We appreciate ADEQ considering these comments and providing a response to each one as set out below and as set out in AECOM's attached comments.

Fact Sheet: Wormald has many times in the past advised ADEQ as to the status of Ansul's involvement at the Cedar Site, however some of the information remains incorrect in the RADD. The historical evidence and documentation located in ADEQ's files, at the Cedar Site, and in previous litigation involving the Cedar Site (referred to as "historical documents") show that Par. 4 of the Fact Sheet should be revised as follows:

Par. 4 of the Fact Sheet should be revised as follows:

> The Facility was constructed and initially owned and operated by Helena Chemical Company in 1970 for the production of propanil. The Facility was purchased by Jerry Williams, president of Helena Chemical Company, who formed Eagle River Chemical Company, which owned and operated the Facility beginning in September 1971. Ansul states on its website that it acquired Eagle River in 1971. From September 15, 1971 to November 15, 1972, Ansul was a majority shareholder in Eagle River and Jerry Williams was a minority

shareholder, during which time dinoseb was produced on the site. Jerry Williams became sole shareholder on November 15, 1972 when Ansul sold its shares back to him. Helena Chemical Company had various plant managers at the Facility from November 1972 to 1976, during which time methoxychlor, lannate and 1,2 – dichloroethane, in addition to other chemicals, were produced on the Site for various toll manufacturers. 1, 2 –dichloroethane was produced at the Site beginning in 1975 pursuant to a contract with Mobil Oil. The Facility from 1970 to 2002 manufactured . . .

If ADEQ does not agree with the above summary and the dates provided, it should reference and produce all of its documented evidence and justification for the dates and description of ownership/operation that it has provided in the Fact Sheet.

Introduction, page 1, par. 3: Exxon, HCC and Ansul voluntarily entered into a consent order, CAO LIS 07-027 with ADEQ – the CAO was not issued to them. Wormald admits that currently it is the successor to Ansul as referenced in the Introduction. Par. 3 should be revised as follows:

"On March 22, 2007, ADEQ . . . entered into Consent Administrative Order (CAO) LIS 070927 with Tyco Safety Products LP, formerly known as Ansul, Incorporated, formerly known as Wormald U.S., Inc. (Ansul) . . . "

See also Site Background, page 4, par. 2, which should be revised to state that ADEQ entered into a CAO with the other Parties and delete the word "issued."

Site Background, page 2, par. 3: Certain dates and ownership references in par. 3 do not correlate with documentation in historic files and should be revised as follows:

"After Ansul left the Site, beginning in November 1972 to about 1976, Helena had its own plant managers at the Site, during which time the Facility was known as Eagle River Chemical and during which time Helena Chemical built and began using three unlined surface impoundments . . . "

If ADEQ does not agree with the above, it should reference and produce all of its documented evidence and justification to show that Vertac, rather than Helena Chemical, operated the Site from 1972 to 1973.

Site Background, page 5, par. 1: Similar to the description for Exxon and HCC regarding its Separate Agreement, par. 1 should be revised and clarified as follows:

"Pursuant to Par. V. 20 of the CAO, Ansul entered into a Separate Agreement with ADEQ on January 9, 2009 to conduct a further investigation of Site 3."

Summary of Remedial Approach, page 5, par. 1: Both AMEC Geomatrix and AECOM FIs and Feasibility Studies were submitted pursuant to the CAO and both should be referenced. Par. 1 should be revised as follows:

"There was extensive investigative work performed at the Facility prior to the 2008 FI (AMEC Geomatrix, February 2009), the FS Report (AMEC Geomatrix, December 2009), the Wormald Site Investigation (AECOM, June 2009) and the Focused FS Report (AECOM, June 2009).

The FIs were necessary to obtain information to fill data gaps . . . "

Summary of Remedial Approach, p. 6, par. 2: ADEQ references "previous investigations" for its Table 1. ADEQ should provide the title and date of the investigation reports that it is relying upon for the information provided in Table 1 and Figure 3.

Table 1, page 16: While the description for AOC 1 is apparently correctly cited, some of the information in the conclusions is not consistent with historic documentation. As stated previously, Ansul's involvement was only from Sept. 15, 1971 to November 15, 1972 when dinoseb was produced at the Site.

Tables 2A and 2B, pp 17-18: ADEQ should provide the title and date of the investigation reports that it is relying for the information provided in Tables 2A and 2B.

Recommended Remedy for Drum Vault, page 23: The COCs which are proposed to be remediated and referenced in the RADD for the drum vault as those "identified at concentrations that exceeded a regulatory level" should be specifically identified by ADEQ.

Sec II Schedule of Implementation, page 36: It is unclear as to identity and scope of persons or entities ADEQ is referring to by the term "known PRPs" since they are not named nor identified. In any event, it does not appear that any person or entity has been found to be a potentially responsible party (PRP) for the contamination or remedial action identified in the RADD either by ADEQ or by a court, nor has any person or entity admitted to such liability. Further any persons that may be found liable are not jointly and severally liable under the Arkansas Remedial Action Trust Fund Act (RATFA), under which this RADD is issued Rather, it is the clear purpose and intent of RATFA to allocate responsibility equitably among liable parties for their allocated share pursuant to statute. As such, ADEQ has no authority to make a general requirement in the RADD to all "known PRPs" to submit plans and/or take action under the RADD and Wormald objects to this requirement. ADEQ should identify all the persons or entities to which it is addressing this directive, and provide a detailed legal justification to support its authority to impose this requirement in the RADD to "known PRPs."

Administrative Record (AR), page 37: Since the RADD includes facts regarding ownership and/or operation of the Site, all documents upon which ADEQ relies evidencing that history should be made part of the AR. All documents listed as part of the AR should include the official title, author, and date of each document to avoid confusion. Further, all of the investigations which have been undertaken at the Site since 1990 and all related correspondence of such investigations, including, but not limited to, correspondence between ADEQ and Cedar, should be included in the AR.

General Comment regarding Site Redevelopment and Section 8, p. 28: Harcros Chemical is a potential buyer for the Site and has been actively negotiating with ADEQ to redevelop the Site for industrial use for various purposes, including reuse of equipment and buildings on site for chemical production and other activities. This redevelopment will create new, much needed jobs for the community. It is our understanding that Harcros does not desire the buildings to be razed as set out in the RADD (at a proposed cost of over $4M), but desires many of the building to remain for its reuse. Doing so would enable Harcros to redevelop the Site and create jobs, which would in turn lower the cost of proposed cleanup, and all which could be accomplished without adversely affecting public health and the environment. Wormald supports Harcros' redevelopment of the Site and strongly urges ADEQ to work with Harcros and finalize the plan for redevelopment prior to finalizing the RADD. The RADD should be modified in keeping with redevelopment of the Site.

We request that ADEQ provide a detailed explanation as to the reasons why razing of the buildings as proposed in the RADD is necessary to protect human health and the environment; and, if this is a stumbling block to approving Harcros' proposal, the reasons why ADEQ refuses to allow Harcros to keep certain buildings to redevelop the Site.

Contact Information:

Please put the following Wormald contacts on the ADEQ mailing list for this RADD:

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Thank you for consideration of these comments. Please give me a call if you have any questions.

Sincerely,

Ann P. Faitz

Ann P. Faitz

APF:fa
Encl.

cc: John Perkins, Tyco
Leslee Alexander, AECOM

3/22/2010

Charles M. Tappan
200 Ridgemont Road
Helena, AR 72342

Arkansas Department of Environmental Quality
Attn: Clyde E. Rhodes, Jr.
Chief, Hazardous Waste Division
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

Re: Cedar Chemical RADD

Dear Mr. Rhodes,

After attending the recently held public meeting on the above mentioned, I feel that more needs to be done to save some of the manufacturing capabilities of the existing plant. The plant is comprised of several manufacturing units. I understand that several of the units exist above sources or significantly contaminated earth that requires their removal. However, some of the units could be left in place and worked around. This approach would allow the site to be re-mediated without destroying all units and would leave some marketable value with the site.

When Cedar was in operation, it employed well over 100 people with an average annual salary of @ $54,000. With a drive thru our community, one can visibly see the void the loss of these jobs has created. These types of jobs will be lost forever, if all units are demolished and the site is left as a large asphalt pad.

Please visit with the companies previously interested in re-development of the site and discuss which units bring marketable value to the site. Discuss the assets of the site with ADED for their input on what would bring the best value to the site. This information could be used to modify the RADD for inclusion to

provide the best outcome for the State of Arkansas and Phillips County.

One company was at the meeting that has a current proposal for the sites re-development. I urge ADEQ to work with this company to modify the RADD and move forward on their plan for redevelopment. If the RADD goes without modification, the chances for getting a viable company to re-develop the site are very slim. There are many sites in our state that have fewer issues and many more assets that are attractive to the businesses our state needs.

Please seriously consider my comments, as the future economic health of our community could be dependent on this important decision.

Sincerely,

Charles M. Tappan

MITCHELL || WILLIAMS

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March 25, 2010

VIA HAND AND ELECTRONIC DELIVERY

Mr. Clyde E. Rhodes, Jr.
Chief, Hazardous Waste Division
5301 Northshore Drive
North Little Rock, AR 72118-5317

Re: Comments on ADEQ RADD for Cedar Chemical Corportion Site

Dear Clyde:

Enclosed please find the joint Comments of Exxon Mobil Corporation and Helena Chemical Company on ADEQ RADD for Cedar Chemical Corporation Site, which I am submitting on behalf of Helena Chemical Company.

If you have any questions, please do not hesitate to call. With best regards I am,

Very truly yours,

MITCHELL, WILLIAMS, SELIG,
GATES & WOODYARD, P.L.L.C.

By
Allan Gates

cc: Mr. Ed Brister (w/encl.)
Mr. Dave Backus (w/encl.)
Mr. Kim Burke (w/encl.)

COMMENTS OF EXXON MOBIL CORPORATION AND HELENA CHEMICAL COMPANY ON ADEQ RADD FOR CEDAR CHEMICAL CORPORATION SITE

1. **ExxonMobil and Helena Chemical Company Agree with the Draft RADD insofar as it follows the Analysis and Remedial Recommendations of the Feasibility Study Prepared by AMEC Geomatrix.**

ExxonMobil and Helena Chemical Company believe that the Current Conditions Report ("CCR") and Facility Investigation Report ("FIR") submitted to ADEQ by AMEC Geomatrix represent an accurate analysis of environmental conditions related to the Cedar Chemical Corporation Site. ADEQ approved the CCR and the FIR in their final form; and the Draft RADD appears to reaffirm that approval. *See* Draft RADD at p. 4.

The Feasibility Study submitted by AMEC Geomatrix assessed a comprehensive list of remedial alternatives that might be considered to address the environmental conditions identified in the CCR and FIR. ExxonMobil and Helena Chemical Company believe that the assessment of these remedial alternatives contained in the Feasibility Study is correct. The Draft RADD published by ADEQ proposes to adopt most of the remedial analysis and recommendations contained in the Feasibility Study. ExxonMobil and Helena Chemical Company agree with the Draft RADD insofar as it follows the analysis and adopts the remedial recommendations contained in the Feasibility Study. The Draft RADD published by ADEQ, however, departs in certain respects from the analysis and recommendations of the Feasibility Study. ExxonMobil and Helena Chemical Company disagree with the Draft RADD insofar as it departs from the analysis and recommendations of the Feasibility Study. In particular, the companies believe that the RADD failed to properly evaluate and apply the Risk Assessment analysis presented in the Feasibility Study.

2. **<u>The Provisions of Section 11 of the Draft RADD are not relevant to remedy selection and should be deleted.</u>**

The Draft RADD focuses almost entirely on a discussion of remedial alternatives. This focus on assessing remedial alternatives as the subject matter of the Draft RADD is entirely appropriate. One section of the RADD, however, strays from the subject of assessing remedial alternatives and purports to direct certain parties to begin taking steps to implement a remedy. Specifically, Section 11 of the Draft RADD directs undefined entities referred to as the "known PRPs" to develop a schedule for implementing the remedy:

> **11. Schedule of Implementation**
>
> **<u>To help aide [sic] in the procession of remedial activities, the known PRPs are to submit to ADEQ a schedule within sixty (60) days of finalization of the ADEQ RADD regarding this facility.</u>** The schedule should give highest priority to implementation of the Drum Vault Removal (Remedial Alternative D1) and alluvial aquifer enhanced biodegradation (Remedial Alternative A3). Each remedy should be scheduled in a way to expedite implementation of all remedies.
>
> **<u>The known PRPs must submit a plan annually to evaluate monitoring data from the SVE and selected groundwater remedies.</u>** An evaluation of the overall effectiveness of contaminant removal in soils and groundwater and review of the site risks must be conducted at 5-year intervals. (Emphasis supplied.)

ExxonMobil and Helena Chemical Company believe that Section 11 should be deleted in its entirety from the RADD for several reasons. First, questions regarding who should prepare an implementation schedule and when it should be prepared have no relevance to the purpose of the RADD. Second, if Section 11 is intended as a legitimate and meaningful command to take action, it fails to comply with any of the administrative, statutory, or constitutional prerequisites for the issuance of a lawful administrative order. Third, even if it followed the procedural requirements for an administrative order, Section 11 would be impermissibly vague. It is impossible to know who ADEQ has in mind when it uses the term "known PRPs." Although a

RADD is not an appropriate place to attempt to address questions of legal liability, it is important to note that the Draft RADD does not even mention most of the parties who appear to have potential liability for at least some aspect of the remedial costs contemplated by the RADD. Nor does the Draft RADD acknowledge that the Remedial Action Trust Fund itself likely has a large and perhaps majority share of the liability for the remedial costs under Ark. Code Ann. § 8-7-513. Finally, there is nothing about the "command" contained in Section 11 that would allow a liable party to limit its efforts at implementation to the specific elements of the remedy for which the party has liability.

Stated simply, Section 11 of the Draft RADD should be deleted because it is irrelevant to the purposes of the RADD and the requirements stated in the section are impermissibly vague and unenforceable.

3. **The Draft RADD should be revised to make it clear that ADEQ's publication of the "Final RADD" and any related response to public comments do not constitute an administrative decision that is subject to immediate appeal.**

The Notice and Fact Sheet that ADEQ published with the Draft RADD announces a 30 day period for the submission of public comments, sets a date for a formal public hearing, and identifies a set of documents that "comprise the administrative record" for the RADD. The Fact Sheet also states that:

> Submitting written comments to ADEQ or making oral statements on the record at any formal public hearing on the RADD provides individuals with legal standing to appeal a final Department decision. Only parties with legal standing may appeal a decision.

ExxonMobil and Helena Chemical Company agree that publishing the Draft RADD, establishing a publicly available "administrative record" of relevant documents, holding a public

hearing, and inviting public comments are all appropriate steps to take in order to encourage and facilitate public participation in the remedy selection process. These steps are good public policy; and they help assure continued consistency with the public participation provisions of the National Contingency Plan. Taking steps to encourage public participation, however, does not make ADEQ's decision on the RADD an appealable administrative action. ExxonMobil and Helena Chemical Company are not aware of any instance in which a RADD issued by ADEQ has been appealed; and the companies are not aware of any statutory provision or administrative rule that would allow or require interested parties to pursue an immediate appeal from a Department decision to issue a "final RADD."

The language quoted above from the Notice and Fact Sheet published with the draft RADD contains language about standing to appeal a RADD, but that language appears to have been copied from standard form language used in the notices that the Department publishes when it issues draft permits for public comment. Indeed, the legal limitation on standing to appeal that is discussed in the language quoted above applies only to third party appeals of permitting decisions. *See* Ark. Code Ann. § 8-4-205(b); APCEC Regulation No. 8, Reg. 8.214. It is clear that the final RADD will not constitute a permit, and its issuance will not constitute a permitting decision. *See* APCEC Regulation No. 8, Reg. 8.103(AA) & (BB) (definitions of "permit" and "permitting decision").

ExxonMobil and Helena Chemical respectfully submit that the "final RADD" and the response to comments that accompanies the "final RADD" should state clearly whether ADEQ views the issuance of the final RADD as an appealable administrative action. Unless this question is clarified in unequivocal terms, parties with interest in the matter may feel that they have no choice but to appeal the issuance of the "final RADD" in order to preserve their

opportunity to resolve any potential differences with the Department regarding the RADD. ExxonMobil and Helena Chemical believe that those differences are more appropriately resolved when ADEQ seeks to order a party to implement an element of the remedy selected in the RADD, or at the time ADEQ seeks to recover costs that the Department has expended from the Remedial Action Trust Fund to implement some element of the remedy selected at the RADD. At that time a party's concerns about the relevant provisions of the RADD would be concrete rather than hypothetical, and ripe for either negotiation or adjudication.

Rigg, Jim

From: Hynum, Tammie
Sent: Thursday, March 25, 2010 8:40 AM
To: Greenway, Cindy; McDaniel, Clay; Rich, Jay; Rigg, Jim; Cusher, Annette
Subject: FW: Harcros/Quapaw Comments
Importance: High

Please see Harcros/Quapaw comments below on the Cedar RADD. These will be officially submitted but wanted to go ahead and give you the e-copy so the team can continue to compile the Responsiveness Summary and draft responses.
Thanks,

Tammie

From: Rhodes, Clyde
Sent: Thursday, March 25, 2010 7:41 AM
To: Hynum, Tammie
Subject: FW: Harcros/Quapaw Comments

Good morning Tammie

See below draft RADD comments from Harcros/Quapaw...thanks

Clyde Rhodes
Chief, Hazardous Waste Division

ADEQ
ARKANSAS
Department of Environmental Quality

5301 Northshore Drive
North Little Rock, AR 72118-5317
(501) 682-0831

From: John Peiserich [mailto:jpeiserich@perkinstrotter.com]
Sent: Wednesday, March 24, 2010 9:58 PM
To: Rhodes, Clyde
Cc: John Miles; dgoode@harcroschem.com; John Peiserich
Subject: Harcros/Quapaw Comments

Dear Mr. Rhodes,

Please accept these comments to the Cedar Chemical Corporation draft Remedial Action Decision Document ("RADD") submitted today on behalf of Harcros Chemicals Inc. ("Harcros") and its wholly owned subsidiary, Quapaw Products, LLC ("Quapaw"). As you know, Harcros, through Quapaw desires to redevelop the Cedar Chemical Corporation Helena-West Helena facility ("the Facility").

Harcros believes that redevelopment of the facility is the highest and best use of the Facility. As the State of Arkansas has recognized, through Arkansas' Five-Year Delta

Development Plan, the Arkansas Economic Development Commission's designation of Phillips County as a Tier 4 location of economic development, the need for development in Phillips County is among the highest in all of Arkansas. To promote local overall development, the citizens of Phillips County created the Delta Bridge Project. Part of the Delta Bridge Project includes an economic development component whose mission is to:

> Create new quality jobs and career opportunities for Phillips County citizens by working with elected officials, business leaders, Port and Airport representatives, State economic development representatives, the State Highway commission, and tourist industry representatives to improve the business development infrastructure, strengthen and expand existing businesses, attract new businesses, promote local entrepreneurship, and identify local and regional needs that can be converted into business opportunities.

The redevelopment of the Facility meets the goals of the State and local community. The Facility has historically produced agrichemicals, while Quapaw doesn't intend to redevelop the Facility in this fashion; the workforce that produced agrichemicals can produce the chemicals that Quapaw may manufacture there. Additionally, Quapaw, through its strategic partner, Delta Specialty Wood Products, will utilize bio-based waxes in its fuel log production. These projects can be accommodated at the Facility and benefit from the existing transportation services in Phillips County. This opportunity will take advantage of the Port of Helena, the third largest port on the Mississippi River.

Harcros would point out that the RADD decision making process is all based upon no reuse of the Facility. While ADEQ directed AMEC, the environmental consultant to come of the known PRPs, to leave certain buildings for potential reuse, that reuse would only involve the Large Warehouse and office buildings. The ADEQ imposed requirement is not scientific or technical in nature. In fact, the removal of the laboratory building to the north edge of the Facility, is not required by the state reason for the demolition in the RADD. The demolition is not considered protective of human health and the environment by ADEQ in the RADD. Beyond demolition, the RADD is also based upon not having specific controls in place to eliminate, limit or control exposures to industrial workers. The RADD makes assumptions related to ingestion of soils and groundwater which are clearly not applicable in an industrial setting.

Despite the apparent technical issues not considered in the RADD, the industrial reuse of the Facility provides numerous benefits, both economic and environmental. The most readily apparent benefit directly to the State is the assumption by Quapaw of site security. Currently ADEQ, through funding provided by certain PRPs, provides for 24-hour guard service. Quapaw, upon assumption of the Facility, would provide the same site security.

In addition to the guard service, Quapaw would also conduct operations at the site and have vested interested in protecting its property. Quapaw will also conduct maintenance activities that will ensure the existing plant facility doesn't degrade. The mere presence of employees will control, if not eliminate, the attractive nuisance

factor the Facility currently poses.
The industrial reuse of the facility changes the technical evaluation as well. In particular, the risk evaluation changes significantly. Plus an industrial reuse will also impose institutional and engineering controls that are not considered by the RADD.

Harcros/Quapaw would appreciate additional discussion of the RADD and its proposed redevelopment of the Facility. The redevelopment is clearly needed in Helena-West Helena. The proposed redevelopment can be accomplished without adverse impact to the environment. The RADD, as proposed, will not be accomplished in a timely fashion. By ADEQ's own estimates, several years are likely to pass before any effort required under the RADD will be undertaken. ADEQ itself, under the terms of the Remedial Action Trust Fund Act, cannot undertake the remediation because of the funding requirements. Similarly, if the Facility was referred to the U.S. Environmental Protection Agency the remediation is very unlikely to occur any sooner. The Quapaw redevelopment will immediately bring about certain changes at the Facility that will control environmental risk.

As Harcros and ADEQ continue to work together to redevelop the Facility, Harcros believes it is appropriate to make decisions based upon the highest and best use of the Facility and in consideration of the technical and economic benefits that redevelopment brings. The highest and best use, i.e. full redevelopment, can be accomplished.

Harcros appreciate the opportunity to comment upon the proposed RADD. The public comment process is clearly valuable to address the issues apparent to interested parties that may not be known or well understood by ADEQ. Harcros hopes that its comments help to formulate a RADD that is best for the Facility and the community. Of course, Harcros is always available to meet and discuss these issues with ADEQ.

Please confirm that you have received this email.

Sincerely,

John Peiserich

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101 Morgan Keegan Drive, Suite A
Little Rock, AR 72202
jpeiserich@perkinstrotter.com

www.perkinstrotter.com

ADEQ

ARKANSAS
Department of Environmental Quality

Interoffice Memorandum

TO : Tammie Hynum, Technical Manager, HWD

THROUGH : Jim Rigg, Geology Supervisor, HWD

FROM : Cindy Greenway, Geologist, Technical Branch, HWD

DATE : March 16, 2010

SUBJECT : Cedar Chemical Public Hearing Comments

Allen Gates: Council Representing Helena Chemical Company

"Thank you Clyde, and I want to thank the Director and Deputy Director and Tammie for coming and making the presentation; they've done a lot of work on this site.. and um..we appreciate it I'm here tonight on behalf of Helena Chemical Company, Helena is one of two companies that prepared all these studies at quite a bit of an extent." And we will be submitting some comments, written comments, on the substance of the RADD, but the thing I wanted to address tonight, is just one kinda rightful shot.....to the idea of the reuse of the site and the idea that proposals are around. Um.. there has been some suggestion that either the companies who have done the work to date the studies for other companies opposed that the plans to reuse the site, and that's just not the case." Specifically, we had a meeting with the representatives of Harcoss/Quapaw last week, the first time we had heard of the renewed activities, and they described the concept they have currently for reuse and we no. 1 strongly support getting reuse of the site as soon as possible; and no. 2 we support the proposal as we understand it, that was described to us and is currently on the table and being discussed if the Department or anyone else is thinking that somehow a proposal will stumble because of opposition from the companies who have done the studies or who might be looked to about doing additional work I can tell ya on behalf of Helena Chemical we support the idea of reuse and we support what is on the table and I'd like to make clear that we support that b/c it will save money, it will save money for the state, it will save money for those other companies that now have a turn to step up to the plate, it'll save money to the state RATFA. As we understand it, the proposal will be consistent with the RADD but the bigger concern I have what's good for the environment not only will save money having an operator on site, providing site security, storm water, the usual business facilities of an operating site that is maintained is better for the environment and so we hope that will be looked at, and finally the thing I would like to express a concern about tonight specifically and Teresa, Ryan, Tammie, and Clyde I'd like you guys to take home and think about, is if you can change the RADD after the fact to accommodate a plan let me strongly suggest supporting that you think about the plan that is before you from Harcross right now... because as I understand it that business opportunity is time sensitive, all business opportunities are and we would hate to have you leave tonight well we'll get the RADD adopted and then we'll go back and talk to them if in fact that might lose the opportunity we hope that you will continue to work hard and seeing whether there is ground to meet that you can with Harcross/Quapaw and if you can to do it and do it if necessary

before the RADD or at least find the commitments and principle that will work less this opportunity slip away. And again I can't speak to the discussions I've not been a party to any of them but I listened last week the presentation, I got very concerned that the engine in getting this site back in use might be lost if the RADD gets in front of it and becomes the object I know that's the principle job you guys have at the Department to review and approve right now but I hope you don't lose site of the fact that maybe the first priority to see if there is closure you can reach with an existing business opportunity. And again I can't speak for the specifics of that but I hope you won't let anything get lost in the shuffle."

.....public hearing over

State of Arkansas

Arkansas Department of Environmental Quality

Remedial Action Decision Document

Cedar Chemical Company
Helena-West Helena, Phillips County, Arkansas

June 2010

Table of Contents

1. Introduction 1
2. Site Background 2
3. Summary of Remedial Approach 5
4. Summary of Site Risks 17
5. Installed On-Site Interim Measures 20
6. Summary of Alternatives Considered In Feasibility Study 20
7. Proposed / Recommended Remedies 22
8. Evaluation of the Proposed Remedy and Alternatives 25
9. Remedial Action Levels 31
10. Selection of Remedy and Justification 35
11. Schedule of Implementation 37
12. Community Participation 38
13. Coordination with Other Divisions/Agencies 39

Tables

Table 1: Solid Waste Management Units (SWMUs) and Areas of Concern (AOCS) Identified by USEPA Region 6 During the RCRA Facility Assessment (RFA) Cedar Chemical Corporation Facility Helena-West Helena, Arkansas 7-16
Table 2A: Constituents of Concern in Soils 17
Table 2B: Constituents of Concern in Groundwater 18
Table 3A: Remedial Alternatives Considered for On-Site Soil 20
Table 3B: Remedial Alternatives Considered for Perched Zone Groundwater 20
Table 3C: Remedial Alternatives Considered for Alluvial Aquifer Groundwater 21
Table 3D: Remedial Alternatives Considered for Site Structures 21
Table 3E: Remedial Alternatives Considered for Drum Vault 21
Table 3F: Remedial Alternatives Considered for Wastewater Treatment Ponds 22
Table 4A: Evaluation of Soil Remedy Alternatives 26
Table 4B: Evaluation of Perched Zone Remedy Alternatives 27
Table 4C: Evaluation of Alluvial Aquifer Remedy Alternatives 28
Table 4D: Removal of Site Structures 29
Table 4E: Evaluation of Drum Vault Remedy Alternatives 29
Table 4F: Evaluation of Waste Water Treatment Pond Remedy Alternatives 30
Table 5A: Remedial Action Levels for Chemicals of Concern in Soils 31
Table 5B: Remedial Action Levels for Chemicals of Concern in Soils 31-32
Table 5C: Remedial Action Levels for Chemicals of Concern in On-Site Perched Groundwater.33
Table 5D: Remedial Action Levels for Chemicals of Concern in On-Site Alluvial Groundwater34
Table 5E: Remedial Action Levels for Chemicals of Concern in Off-Site Alluvial Groundwater34
Table 6A: Internal Coordination with ADEQ Divisions 39
Table 6B: Internal Coordination with ADEQ Divisions 39

Figures

Figure 1: Site Location Map .....
Figure 2: Facility Structure Locations .....
Figure 3: SWMUs and AOCs Identified by USEPA Region 6 PR/VSI .....
Figure 4: Demolition of On-Site Structures .....
Figure 5: Soil Remedy Alternatives S2b and S2c .....
Figure 6: Soil Remedy Alternatives S4b and S4c .....
Figure 7: Soil Remedy Alternative S1 .....

Appendices

Appendix A: Specific Chemicals and Their Manifest
Appendix B: Cost Estimates for ADEQ Remedial Alternatives S2c and S4c

Arkansas Department of Environmental Quality

REMEDIAL ACTION DECISION DOCUMENT

Cedar Chemical Corporation
EPA ID No.: ARD990660649
AFIN: 54-00068

1. INTRODUCTION

It is the Arkansas Department of Environmental Quality's (ADEQs) purpose by issuance of this Remedial Action Decision Document (RADD) to ensure that Cedar Chemical Corporation (hereinafter Cedar Chemical or the Facility) is remediated using the most protective remedies for on-site soils, groundwater, and the water supply. This RADD contains justification for ADEQs decision on all applicable remediation activities, including the rationale for preferred remedy and all additional remedies considered. This RADD includes the opportunity for the public to comment on the selected remedies, and serves as a companion to the documents found in the administrative record

The Facility is located just to the south of the city of Helena-West Helena, in Phillips County, Arkansas. The Facility consists of approximately 48 acres located within the Helena-West Helena Industrial Park, approximately 1.25 miles southwest of the intersection of U.S. Highway 49 and State Highway 242. A site location map is included as **Figure 1.** The Facility is bordered by farmland, State Highway 242, the Union-Pacific Railway, and industrial park properties. Of the 48 acres, approximately 40 acres comprise the abandoned manufacturing fenced area of the Facility. The current wastewater treatment ponds are located on an additional 8 acres of the property. An undeveloped, wooded area west of the wastewater treatment ponds and south of Industrial Park Road is part of the Facility property, but does not appear to have historically been part of the manufacturing Facility.

On March 22, 2007, ADEQ, pursuant to the authority of the Arkansas Remedial Action Trust Fund Act ("RATFA"), entered into Consent Administrative Order (CAO) LIS 07-027 with Tyco Safety Products LP, formerly known as Ansul, Incorporated, formerly known as Wormald U.S., Inc. (Ansul), Helena Chemical Company (Helena Chemical), and ExxonMobil Chemical Co., a division of ExxonMobil Corporation (ExxonMobil) regarding Cedar Chemical. The basic objective of the CAO was to "address environmental concerns at the Facility to ensure protection of human health and the environment."

Public involvement is an important process for ultimately selecting the final remedies to be employed at the Facility for remediating releases to the environment of hazardous constituents to the media of concern. The RADD is subject to public notice and comment to allow the public and interested parties to raise all ascertainable issues concerning the remedies proposed at the Facility, including options not addressed.

2. SITE BACKGROUND

Prior to 1970, the land where the Facility now exists was used for agriculture purposes (EnSafe, 1996). The plant was constructed and initially operated by Helena Chemical. The construction date of the Facility is not documented in available records; however, several reports state that operations began at the Facility around 1970 with the manufacture of methoxychlor. The following companies or individuals also owned, operated or had an ownership interests in the plant prior to its conveyance to the Cedar Chemical Corporation in 1986: Jerry Williams, Ansul Corporation, Eagle River Chemical and Vertac, Inc. In 1986, the plant was sold to Cedar Chemical (A.T. Kearney, Inc. 1988).

During its operational life, the Facility manufactured various agricultural chemicals, including insecticides, herbicides, polymers, and organic intermediates. Plant processes were batch operations, with seasonal production fluctuations and the frequent introduction of new products.

During operation, the Facility consisted of six (6) production units which are described below and are identified in **Figure 2**:

- Unit 1 was utilized for formulation of various custom chemicals such as permethrin and permethrin acid chloride, for other companies.
- Unit 2 was the propanil production unit.
- Unit 3 known as the Expansion Area was destroyed in a fire and explosion on September 26, 1989.
- Unit 4 was used for production of various custom products such as orfom D-8 and orfom CO300. Unit 4 was also contracted from time to time for the production of methyl 2-benzamide carbonate (MBC) and methyl ethyl sulfide (MES) and the mixing of Metam Sodium.
- Unit 5 primarily used to manufacture nitroparaffin derivatives.
- Unit 6 began producing dichloroaniline in 1991used in the production of Propanil Regulatory History.

The ADEQ, formally know as the Arkansas Department of Pollution, Control, and Ecology (ADPC&E), initially became involved with the Facility shortly after production began at the plant in the early 1970s. This involvement was in response to citizen complaints of discharges of water and odors. There were additional regulatory actions or directives regarding the Facility during its operational history; these are summarized below.

In 1980, Vertac submitted a RCRA Part A Permit application to ADPC&E for a hazardous waste storage tank (T-B112), a container storage area, and the surface impoundments described above. In August 1984, Vertac submitted the Part B Permit application. Soon after the Part B application was submitted, the ADPC&E concluded that the surface impoundments were not a hazardous waste unit, and dropped them from the permitting process in a letter dated November 1984.

On January 9, 1986, Vertac notified ADPC&E that Cedar Chemical had purchased the Facility. The Part A and Part B Applications were revised in March 1986 and November 1986 to reflect the new ownership.

On May 30, 1986, ADPC&E conducted a compliance evaluation inspection (CEI). This resulted in an issuance of a notice of violation (NOV) to Cedar Chemical on December 19, 1986, citing several violations. Subsequently, Consent Administrative Order (CAO) No. LIS 86-027 was issued to Cedar Chemical on July 16, 1987, required them to stop disposing of hazardous waste in the certain surface impoundments and to investigate potential release(s) to surrounding media.

While constructing a drainage ditch, buried drums were found near the newest production unit; Unit 6. Cedar Chemical has removed these buried drums in accordance with the approved removal workplan dated June 1990. Cedar Chemical officials obtained information from individuals who worked at the plant prior to Cedar's purchase concerning the existence and location of additional drums. A geophysical survey was conducted at the Facility and subsurface anomalies were identified in the areas where drums were suspected to have been buried. Immediate removal actions were conducted by Cedar Chemical for the additional buried drums.

In 1991, Cedar Chemical entered into CAO No. LIS 91-118 under RCRA corrective action, requiring the completion of a Facility Investigation (FI) at the Facility. Phases I, II, and III of the FI were performed by EnSafe in 1993 through 1995 to acquire information on the soil and groundwater conditions at the Facility. The EnSafe FI Report dated June 28, 1996 documents results for the FI. The FI results were then incorporated into a Human Health Risk Assessment (HHRA) which is documented in Ensafe Risk Assessment document dated March 21, 2001.

On March 8, 2002, Cedar Chemical filed for bankruptcy. Manufacturing and plant operations were shut down shortly thereafter. ADEQ assumed control of the Facility on October 12, 2002.

In January 2003, USEPA Region 6 issued a Request for Removal Action Memorandum to remove chemicals left at the Facility in tanks and containers. The removal action was conducted by EPA Emergency and Rapid Response Services (ERRS) contractor, Environmental Quality Management, Inc. (EQM) and subcontractor U.S. Environmental Services (USES), and the removal oversight was conducted by Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START-2).

The removal action included the following tasks: inventory the laboratory and other containerized chemicals on-site; conduct HazCat for the containers without labels and/or those with questionable labels; inventory the on-site containers and tanks; and separate laboratory chemicals and containers identified for off-site disposal by the ERRS contractor. START-2 was also tasked to document the removal activities; to maintain a site logbook; to contact former employees to assist in identification; to prepare a Health and Safety Plan (HASP); to prepare maps and sketches; to prepare a Quality Assurance Sampling Plan (QASP); and to disseminate EPA-approved information to the public. The Federal On-scene Coordinator (FOSC) for the Cedar Chemical Facility was Gary Moore. The removal action was completed during the summer of 2003 and is documented in EPA Removal Action Report dated November 15, 2003. The specific chemicals and their manifests are included in **Appendix A**.

As documented in the Comprehensive Site Assessment (CSA) Report prepared by ADEQ dated April 2004, the environmental issues associated with the Facility included abandoned chemicals, buried drums, groundwater contamination, surface and subsurface soil contamination, and an abandoned stormwater treatment system.

On July 20, 2006, ADEQ issued a Civil Complaint against Ansul, Helena Chemical, and ExxonMobil (the Parties). In March 2007, ADEQ voluntarily dismissed its civil complaint and also, pursuant to the authority of the Arkansas Remedial Action Trust Fund Act ("RATFA"), entered into Consent Administrative Order (CAO) LIS 07-027 regarding environmental conditions at the Facility with the Parties. The basic objective of the CAO was to "address environmental concerns at the Facility to ensure protection of human health and the environment."

On August 8, 2007, representatives of the Parties and ADEQ met and discussed the work that should be performed under the CAO. The Parties agreed to address the Facility by conducting a Facility Investigation (FI) and to propose remedies based on the FI findings. To accomplish this, the following reports/investigations were completed:

- Current Conditions Report (CCR)
  The CCR is dated November 16, 2007. The CCR compiled all available data regarding environmental conditions at the Facility and identified any critical data gaps. The CCR also includes information regarding the Facility's setting, past environmental conditions, historical ownership, and surroundings.
- Facility Investigation (FI) Work Plan
  The report is dated March 20, 2008. The FI Work Plan was designed to fill any critical data gaps identified in the CCR. The FI Work Plan included a description of proposed sample locations and sampling and analytical methods.

Due to negotionations between the 3 PRP's and pursuant to Paragraph V. 20 of the CAO, Helena and Exxon Mobil, acting jointly, entered into a Separate Agreement with ADEQ on March 25, 2008. Under this Separate Agreement the following investigations/reports were completed:

- Facility Investigation (FI)
  Field activities, including drilling, cone penetrometer studies, and well installation, were conducted predominantly between March and November 2008. Groundwater sampling events were performed during January, July, September and November, 2008.
- Facility Investigation (FI) Report
  The FI Report, dated February 2009, reports additional data collected during the FI and summarize findings regarding the character and extent of contamination. The FI Report includes an identification of all sample locations and analytical results.
- Feasibility Study (FS) Report
  The FS Report, dated December 15, 2009, evaluates remedial alternatives and identifies the proposed remedial measures for the Facility.

Pursuant to Par. V. 20 of the CAO, Ansul entered into a Separate Agreement with ADEQ on January 9, 2009 to conduct further investigation of Site 3. Ansul submitted documents as follows:

- Site Investigation (SI) Work Plan dated January 1, 2009
- Site Investigation conducted on March 5, 2009
- SI Report dated March 30, 2009
- Focused Feasibility Study Report- Site 3 dated June 2009

Presently, Quapaw LLC leases the Facility. Quapaw LLC provides 24 hour security within the fenced area. A licensed wastewater operator is employed to direct storm water from the Facility into the wastewater treatment system and before it is discharged to the Mississippi River.

3. SUMMARY OF REMEDIAL APPROACH

There was extensive investigative work performed at the Facility prior to the 2008 FI (AMEC Geomatrix, February 2009), the FS Report (AMEC Geomatrix, December 2009), the Wormald Site Investigation (AECOM, June 2009) and the Focused FS Report (AECOM, June 2009). The 2008 FI was necessary to obtain information to fill data gaps and to identify the available technologies to remediate the Facility.

The Facility Investigation (FI) conducted by AMEC-Geomatrix concluded that the following were the primary remedial action needs at the Facility:

- On-site soils in the former Process Areas are impacted by volatile organic constituents (VOCs), semivolatile organic constituents (SVOCs), pesticides and herbicides, and possibly low levels of certain metals.
- Advective groundwater flow within the shallower Perched Zone and related lateral transport of COCs in this zone's groundwater is limited by the low hydraulic conductivity of this zone.
- The deeper Alluvial Aquifer is highly transmissive, with groundwater flowing generally from the Facility toward the Industrial Park and agricultural properties to the south and southeast.
- Certain COCs are migrating vertically through leakage from the Perched Zone to the Alluvial Aquifer. Based on the contrast in COC concentrations between these two zones, most of the contaminant mass is likely being retained in the low permeability soils of the perched zone.
- The primary groundwater constituents observed above screening levels in Perched Zone groundwater were 1,2-dichloroethane (1,2-DCA), 1,2-dichlorobenzene (1,2-DCB), dinoseb, 4-chloroaniline, toluene, and acetone.
- In the Alluvial Aquifer, the primary groundwater constituents observed above screening levels were 1,2-DCA, 1,2-DCB, bis(2-chloroethyl) ether, and 4-chloroaniline.
- With the exception of on-site or nearby off-site areas within the Industrial Park, the primary Alluvial Aquifer groundwater COC that exceeds its screening level was 1,2-DCA. 1,2-DCA has been documented to be present at least 2,700 feet downgradient of the Facility boundary, beyond the southern end of the Industrial Park. Updated delineation of the boundary of 1,2-DCA beyond the Industrial Park was not undertaken during the FI because of litigation filed by the subject property owner.
- The most significant source areas for Perched Zone and Alluvial Aquifer COCs are Process Areas and waste disposal areas, especially the vicinity of the Former Dinoseb Disposal Ponds.
- The Drum Vault contains highly dilapidated drums of unknown products or wastes; the vault also contains sand backfill and water. The backfill and water exhibit elevated levels of various VOCs, SVOCs, pesticides, and herbicides.

- Agricultural supply wells have been identified downgradient of the property. No downgradient water supply wells have been identified near the Facility that would be used for drinking water or domestic supply.

The purpose of the FI was to expand upon information gathered from previous investigations in order to better characterize the site. Previous investigations identified certain areas that warranted examination and are listed in **Table 1** below (also see **Figure 3** for Solid Waste Management Unit (SWMU) locations):

Table 1: Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Identified by USEPA Region 6 During the RCRA Facility Assessment (RFA) Cedar Chemical Corporation Facility Helena-West Helena, Arkansas		
SWMU No. and AOC	**Name**	**Conclusions Reached by USEPA Region 6**
SWMU 1 & 2	Railroad Loading and Unloading Sumps	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the Visual Site Inspection (VSI). However, the integrity of the sumps could not be verified during the VSI. No further action is recommended.
SWMU 3	Railroad Loading and Unloading Sump	There is no documented release history for this unit. Despite severe deterioration of the unit, there was no visible sign of release from this unit observed during the VSI. An RFI appears warranted for this unit.
SWMU 4	Production Areas #1 and #2 Drainage System and Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 5	Production Area #3 Drainage System and Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 6	Production Area #4 Drainage System and Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 7	Production Area #5 Drainage System and Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 8	Boiler Blowdown Area Sump #1	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the Visual Site Inspection (VSI). However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 9	Boiler Blowdown Area Sump #2	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 10	Laboratory Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 11	Sump near main Tank Farm	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. Deterioration of the adjacent concrete pad was observed during the VSI. No further action is recommended.
SWMU 12	Maintenance Shop Drainage System and Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 13	Truck Scale Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 14	Packaging Building Sump	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 15-17	Air Emissions Scrubbers #01, #02 and #03	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 18	Air Emissions Scrubber #4	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 19	Sump in Main Tank Farm Diked Area #1 (North)	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 20	Sump in Main Tank Farm Diked Area #1 (South)	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 21	Sump in the Main Tank Farm Diked Area #2	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 22	Sump in the Main Tank Farm Diked Area #3	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 23	Waste Storage Tank PE-209 in Main Diked Area #4	There is no documented release history for this unit. However, the unit appeared stained and discolored liquid was observed in the secondary containment area. The integrity of the unit could not be verified during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 24	Waste Storage Tank 002 in Main Tank Farm Diked Area #5	There is no documented release history for this unit. Severe staining of the unit and associated piping was noted during the VSI. Standing discolored water was observed in the containment area for this unit, and additional staining of the outside of the containment unit was noted. These stains appeared to be located directly under the associated piping and could not be attributed to overtopping of the unit. No further action is recommended.
SWMU 25	Sump in Main Tank Farm Diked Area #6	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, there were visible signs of deteriorated concrete observed during the VSI. No further action is recommended.
SWMU 26	Sump in Main Tank Farm Diked Area #7	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, there were visible signs of deteriorated concrete observed during the VSI. No further action is recommended.
SWMU 27	Tank B-109 in main Tank Farm Diked Area #7	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 28	Waste Storage Tank B-112 in the Main Tank Farm Diked Area #8	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the unit appeared corroded and the concrete diked area showed signs of deterioration. No further action is recommended.
SWMU 29	Sump in Main Tank Farm Diked Area #9	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 30	Waste Water Storage Tank B-102 in the Main Tank Farm Diked Area #10	There is no documented release history for this unit. However, staining was noted on the tank during the VSI. No further action is recommended.
SWMU 31	Sump in Main Tank Farm Diked Area #11	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, there were visible signs of deteriorated concrete observed during the VSI. No further action is recommended.
SWMU 32	Sump in Main Tank Farm Diked Area #12	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 33	Tank N-204 in main Tank Farm Diked Area #13	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 34	Tank N-201 in Main Tank Farm Diked Area #14	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, there were visible signs of deteriorated concrete in the diked area observed during the VSI. No further action is recommended.
SWMU 35	Tank N-205 in Main Tank Farm Diked Area #15	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 36	Tank N-206 in Production Area #4	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 37	Sump in Main Tank Farm Diked Area #16	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 38	Sump in Main Tank Farm Diked Area #17	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 39	Tank M-105 in Main Tank Farm Diked Area #17	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 40	Sump in Main Tank Farm Diked Area #18	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 41	Sump in Main Tank Farm Diked Area #19	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 42	Sump in Second Tank Farm Diked Area #1	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, there were visible signs of deteriorated concrete observed during the VSI. No further action is recommended.
SWMU 43	Wastewater Tank 014 in Second Tank Farm Diked Area #3	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 44	Hazardous Waste Storage Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 45	Nonhazardous Waste Storage Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 46	Drum Storage Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 47	Drum Crushing Area	The history of releases at the unit could not be determined; however, staining was evident throughout the area. A RCRA Facility Investigation (RFI) appears warranted for this unit.
SWMU 48	Waste Drum Staging Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 49	Scrap Drum Storage Wagons	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 50	Waste Drum Staging Area in Main Tank Farm Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 51	Waste Oil Drum	Staining of the pad was evident during the VSI. No further action is recommended.
SWMU 52	Drums	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 53	Solvent Cleaner Tank	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 54	Miscellaneous Drum Storage	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 55	Dumpsters	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 56	Laboratory Waste Rack Area	There is no documented release history for this unit. There was some visible evidence of staining on the rack, but no evidence of staining on the concrete pad. No further action is recommended.
SWMU 57	Warehouse Drum Storage Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 58	Loading/Unloading Dock Area	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the unit could not be verified during the VSI. No further action is recommended.
SWMU 59—Site 3	Stormwater Drainage System	The unit periodically discharges off-site through the NPDES-permitted outfall during excessive rainfall events. During the VSI, an oily film was observed on the water near the control gate. A RCRA Facility Investigation (RFI) appears warranted for this unit.
SWMU 60—Site 3	Stormwater Sump	In periods of excessive rainfall this unit backs up the stormwater drainage system which is then discharged through the NPDES-permitted outfall. An RFI appears warranted for this unit.
SWMU 61	Wastewater Tank #1 Wastewater Treatment System	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 62—Site 1	API Separator	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 63	Wastewater Tank #2 Waste Water Treatment System	During the VSI, staining was noted on the soil from leaks from the sampling valve. An RFI appears warranted for this unit.
SWMU 64	Flow Equalization Basin	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the clay liner could not be verified during the VSI. An RFI appears warranted for this unit.
SWMU 65	Aeration Basin	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. However, the integrity of the clay liner could not be verified during the VSI. An RFI appears warranted for this unit.
SWMU 66	Clarifier #1	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 67	Clarifier #2	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. No further action is recommended.
SWMU 68	Polish Pond	Effluent from this unit is pumped 4.5 miles through an epoxy-lined pipe to an NPDES-permitted outfall to the Mississippi River. There is no other documented or visible sign of release from this unit. An RFI appears warranted for this unit.
SWMU 69	Inactive Pond #1	Releases from this unit have not been documented by sampling although surface and subsurface contamination at the location of the unit has been documented. An RFI appears warranted for this unit.
SWMU 70	Inactive Pond #2	Releases from this unit have not been documented by sampling although surface and subsurface contamination in the location of the unit has been documented. An RFI appears warranted for this unit.

SWMU No. and AOC	Name	Conclusions Reached by USEPA Region 6
SWMU 71	Inactive Pond #3	Releases from this unit have not been documented by sampling although surface and subsurface contamination in the location of the unit has been documented. An RFI appears warranted for this unit.
SWMU 72	Drum vault	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. An RFI appears warranted for this unit.
SWMU 73	Buried Drums	There is no documented release history for this unit. There was no visible sign of release from this unit observed during the VSI. An RFI appears warranted for this unit.
SWMU 74	Loading/Unloading Area (Railroad Spur)	There was visible evidence of staining along the entire length of the unit. An RFI appears warranted for this unit.
AOC 1	Yellow Stained Areas	A facility representative indicated that yellow stains on the ground surface are the facility may be caused by waste associated with the manufacturing of dinitrobutylphenol conducted by Ansel Corporation while it operated the plant from 1970 until 1973. An RFI appears warranted for this unit.
AOC 2	Wetland Area	None Reached
AOC 3	Ditch Near Wastewater Treatment Basins	None Reached

Inclusive of the EPA investigation, all SWMU's and AOC's that were identified remained the primary focus for the AMEC Geomatrix field investigation, 2007-2009. These areas are further referenced within the RADD as On-Site Soils, Perched Zone Groundwater, On and Off-Site Alluvial Aquifer Groundwater, Site Structures, Drum Vault, and Wastewater Treatment Ponds.

4. SUMMARY OF SITE RISKS

The FI findings were used to identify Constituents of Concern (COCs) in on-site soil and in on-site and off-site groundwater. Constituents consistently found in environmental media at the Facility include: volatile and semivolatile organic constituents, ketones, metals, pesticides, and herbicides. In addition, the FI further delineated the distribution and magnitude of predominant COCs in soil and groundwater; these data were used to identify likely source areas for COCs. COCs in soils ranging from surface to 17 feet below ground surface (bgs) were identified by comparing detected concentrations with industrial worker health-protective screening levels. Additionally, COCs in soil were identified based on groundwater protection-based soil screening levels. COCs in groundwater were identified by comparing detected concentrations with maximum contaminate levels or the tap water screening level for those chemicals without maximum contaminant levels.
The facility COCs are detailed in the following tables:

Table 2A: Constituents of Concern in Soils*

Chemicals of Concern in Soil (exceeding health-protective screening levels)	Chemicals in Soils (exceeding groundwater protection-based screening levels)
Aldrin	Acetone
Arsenic	Aldrin
Chlordane	Arsenic
Dichloroethane, 1,2	Benzene
Dieldrin	Carbon tetrachloride
Dinoseb	Chlordane
Hexachlorocyclohexane, beta	Chloroethane
Hexachlorocyclohexane, gamma	Chloroform
Propanil	Chromium
Toxaphene	Dichlorobenzene, 1,3
	Dichlorobenzene, 1,4
	Dichloroethane, 1,2
	Dieldrin
	Dinitrophenol, 2,4
	Dinoseb
	Endrin
	Ethylbenzene
	Hexachlorocyclohexane, alpha
	Hexachlorocyclohexane, beta
	Hexachlorocyclohexane, gamma
	Isophorone
	Methoxychlor
	Methylene chloride
	Selenium
	Silver
	Toluene
	Trichlorobenzene, 1,2,4

* Constituents derived from AMEC Geomatrix Facility Investigation (February 2009)

Table 2B: Constituents of Concern in Groundwater		
Chemicals of Concern in On-Site Perched Groundwater	**Chemicals of Concern in On-Site Alluvial Groundwater**	**Chemicals of Concern in Off-Site Alluvial Groundwater**
Acetaldehyde	Aldrin	bis(2-Chloroethyl) ether
Acetone	Aniline	bis(2-Ethylhexyl) phthalate
Acetonitrile	Arsenic	Chromium
Aldrin	Benzene	Dichloroethane, 1,2
Aluminum	bis(2-Chloroethyl) ether	
Aniline	Chloroaniline, 4	
Arsenic	Chlorobenzene	
Beryllium	Dichlorobenzene, 1,2	
bis(2-Ethylhexyl) phthalate	Dichloroethane, 1,2	
Butanone, 2- (MEK)	Dinoseb	
Cadmium	Hexachlorocyclohexane, beta	
Chloroaniline, 4	Vinyl Chloride	
Chlorobenzene		
Chloroform		
Chromium		
Dichlorobenzene, 1,2		
Dichloroethane, 1,2		
Dieldrin		
Dinitrophenol, 2,4		
Dinoseb		
Ethylbenzene		
Heptachlor		
Heptachlor epoxide		
Hexachlorocyclohexane, alpha		
Hexachlorocyclohexane, beta		
Hexachlorocyclohexane, gamma		
Iron		
Isophorone		
Lead		
Manganese		
Methoxychlor		
Methyl-2-pentanone, 4- (MIBK)		
Methylene chloride		
3 & 4-Methylphenol		
Nickel		
Nitrophenol, 4		
Propanil		
Selenium		
Thallium		
Toluene		
Trimethylbenzene, 1,3,5		
Vanadium		
Xylene, m & p		

* Constituents derived from AMEC Geomatrix Facility Investigation (February 2009)

A. HUMAN HEALTH RISKS

Soils

On-site workers may directly contact chemicals in soils ranging from surface to 17 feet bgs via incidental ingestion of soil, skin contact with soil, and inhalation of chemicals in soil particles or chemicals vaporizing from soil. In addition, future construction workers installing utilities or preparing the Facility for future use may experience soil exposure. These direct contact pathways are therefore considered potentially complete for the on-site industrial worker and construction worker. Volatile organic compounds in deeper vadose zone soils may migrate through soil and infiltrate an on-site building. Therefore, the vapor intrusion pathway from soil is also considered a potential complete indirect exposure pathway for workers inside on-site buildings.

On-site Perched Groundwater

Although direct contact with on-site perched zone groundwater is unlikely, currently there are no restrictions to prevent direct contact with perched zone groundwater. Construction workers may be exposed to perched zone groundwater during trenching or other digging activities. There are currently no restrictions to prevent well installation in the perched zone. Furthermore, the perched groundwater zone may overlay a discontinuous lithologic lense and is likely a contributing source to the underlying more transmissive zone. Therefore, future on-site workers and construction workers potentially may have direct contact with perched zone groundwater. Volatile organic compounds in perched zone groundwater may volatilize into indoor air of on-site buildings and enter indoor workers via inhalation pathways. Therefore, the vapor intrusion pathway from perched zone groundwater is also considered a potential complete indirect exposure pathway for workers inside on-site buildings.

On- and Off-Site Alluvial Groundwater

Given the productivity and water quality of the on and off-site alluvial groundwater, direct contact with groundwater for use as a potable water supply is considered a complete pathway for on-site workers and off-site residents.

B. ECOLOGICAL RISKS

On-site ditches that served as a storm water retention system, which is a component of the wastewater treatment system, were evaluated in the 1999 Ecological Risk Assessment. These open ditches are vegetated with various grasses and submergent plants are present in more frequently submerged portions. Arsenic, Aldrin, Dieldrin, 4,4'-dichlorodiphenyldichloroethylene (4,4'-DDE), 4,4'-dichlorodiphenyldichloroethane (4,4-DDD), 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT), Endrin, gamma-BHC, Methoxychlor, and Toxaphene were detected in sediment in these ditches above the EPA Region 4 sediment screening values. Two potential receptors (tadpoles and piscivorus birds) were identified. However, it was concluded potential risk in was considered acceptable because the ditches are used as an integral component of the facility's wastewater treatment system. Also, due to the

function of these ditches, standing water is frequently drained and, thus, any emerging aquatic habitat is considered opportunistic.

An ecological potential pathway identified in the 1999 Risk Assessment included receptors exposed to contaminated groundwater during irrigation activities. The risk assessment indicated that only small mammals and bird species are present in this area. The risk assessment indicated that during hot summer months when irrigation is frequent, wildlife species are likely dormant during the heat of the day and seek refuge in wooded areas. Thus, exposure to contaminated groundwater during irrigation events is not anticipated to be significant for potential ecological receptors.

5. INSTALLED ON-SITE INTERIM MEASURES

No interim measures are installed on or off-site.

6. SUMMARY OF ALTERNATIVES CONSIDERED IN FEASIBILITY STUDY

The specific alternatives considered under the Feasibility Study were as outlined in **Table 3A, 3B, 3C, 3D, 3E & 3E** below:

Table 3A: Remedial Alternatives Considered for On-Site Soils	
Exposure Control	Engineering and institutional controls Including demolishing and capping, geotextile membrane; deed notices, ordinances, restrictive covenants
In Situ Physical Treatment	Stabilization thru soil mixing ▪ Area-wide approach→ entire process area ▪ Focused approach→target specific areas
Excavation with Off-Site Disposal as Solid Waste	Soil Removal and waste classification ▪ Hazardous vs. Non-hazardous
Soil Vapor Extraction	Utilizing wells or trenches
No Further Action	No additional measures
Tyco-Site 3- No Further Action	No additional measures
Tyco-Site 3- Exposure Control	Institutional controls with down-gradient groundwater monitoring, & an engineered barrier

Table 3B: Remedial Alternatives Considered for Perched Zone Groundwater	
Exposure Control	Institutional controls Including deed notices, ordinances, restrictive covenants, passive venting systems, vapor barriers and VOC alarm/sensor systems
Monitored Natural Attenuation	Natural processes, without human intervention, involving physical, chemical, or biologic, and can include biodegradation, hydrolysis, dilution, sorption, and volatilization; annual/semi-annual routine monitoring

In Situ Physical/Chemical Treatment	Chemical oxidation ▪ Injecting a chemical oxidants i.e. hydrogen peroxide, sodium persulfate, or potassium permanganate via wells
In Situ Enhanced Biodegradation	Multiple carbohydrate injections to stimulate methanogenic microbes
Hydraulic Control	Pumping groundwater via wells or french drain type trenches utilizing sumps
Permeable Reactive Barriers	Utilizing a barrier constructed of a granular medium i.e. metallic iron that reacts geochemically with COCs.
No Further Action	No additional measures

Table 3C: Remedial Alternatives Considered for Alluvial Aquifer Groundwater	
Exposure Control	Deed notices, ordinances, restrictive covenants
Monitored Natural Attenuation	Natural processes, without human intervention, involving physical, chemical, or biologic, and can include biodegradation, hydrolysis, dilution, sorption, and volatilization
In Situ Biodegradation	Multiple carbohydrate injections to stimulate methanogenic microbes utilizing a treatability study
Hydraulic Control	Two fences of extraction wells oriented north and south to pump groundwater at a rate that exceeds natural flow. Treatment would be required prior to surface discharge
In Situ Physical/Chemical Treatment	Chemical oxidation ▪ Injecting chemical oxidants; i.e., hydrogen peroxide, sodium persulfate, or potassium permanganate via wells
No Further Action	No additional measures

Table 3D: Remedial Alternatives Considered for Site Structures	
Removal of Site Structures	Removal of buildings, process units, tank systems; i.e., demolished or deconstructed. Sealing of sumps, storm grates, drains, and piping permanently plugged.

Table 3E: Remedial Alternatives Considered for Drum Vault	
Removal and Off-site Disposal	Demolition, slab removal, dewatering and characterization for disposal, possible stabilization, residual cleaning, and backfilling
Waste Stabilization	Drums, drum contents, and backfill would be mixed/stabilized as one unit
No Further Action	No additional measures

Table 3F: Remedial Alternatives Considered for Wastewater Treatment Ponds	
Pond Closure	Free liquids, stabilize sediments/sludge, regarding and revegetating pond area. Ancillary structures decommissioned and removed
Continued Use	Remain operational, as is
No Further Action	No additional measures

7. PROPOSED/RECOMMENDED REMEDIES

Ansul identified and retained the following remedial alternatives for implementation at the Facility at Site 3:

- No Further Action
- **Exposure Controls – This would include include institutional controls (with or without down-gradient groundwater monitoring) or an engineered barrier with institutional controls and down-gradient groundwater monitoring.**

AMEC-Geomatrix recommends that the following suite of remedy alternatives be selected by ADEQ for implementation at the Facility:

- Recommended Soil Remedy Elements
  - Exposure Controls—this would consist of the combination of engineering controls, including the soil cover and soil/geotextile cover, and institutional controls. The institutional controls would apply to the entire Facility property;
  - Soil Vapor Extraction, Focused Approach—as an active source removal effort, SVE would be implemented at the two areas overlying the highest 1,2-DCA concentrations in underlying groundwater; and
  - In Situ Soil Stabilization—Focused Approach—as a second active source removal effort, ISS would be implemented across the area of the Former Dinoseb Disposal Ponds, to stabilize soils with elevated Dinoseb, 1,2-DCA, and other compounds.
- Recommended Perched Zone Groundwater Remedy
  - Exposure Controls—this would consist of institutional controls to mitigate the risk of vapor intrusion exposures in limited areas of the property. This would likely include the inclusion of vapor monitoring or control systems in any building construction in those areas; and
  - Monitored Natural Attenuation—If the two active soil remedy elements are successful, the COC levels in the Perched Zone will gradually decline. If this decline is not observed, however, it may be necessary to expand the scope of active remediation in the soils and Perched Zone groundwater.

- Recommended Alluvial Aquifer Groundwater Remedy
  - Exposure Controls—this would consist of institutional controls to preclude the use of Alluvial Aquifer groundwater for drinking water supply within the boundaries of the 1,2-DCA plume, including both on-site and off-site areas; and

  - Monitored Natural Attenuation—some decline in COC levels has been observed over the time since Facility operations terminated in 2002, with active soil remedy elements described above, this trend is expected to continue.

- Recommendations for Removal of Site Structures
  - With the exception of the Office buildings, the two lab buildings, Unit 1, Unit 5 and the large Warehouse building (requested by ADEQ to remain in place for potential future use), all other aboveground portions of buildings, process units, tank systems, and related site structures at the Facility will be demolished or deconstructed (see **Figure 4**). Unless their removal is required to implement a selected remedy element (for example, excavation, or stabilization), slab foundations or similar at-grade and below-grade portions of these structures could remain in place to be incorporated into the soil cover system. In this event, the foundations and related structures should be inspected prior to their reuse. If any of these foundations or similar structures contain sumps, major failures, or other related breaches in their integrity, these will be permanently sealed as a part of the demolition/deconstruction process. In addition, storm grates, drains, and piping running beneath the demolition and soil cover area will be permanently plugged. To the extent practicable, any portion of the structures that can be readily recycled will be salvaged.

- Recommended Remedy for Drum Vault
  - The Drum Vault is located in the central area of the Facility. Based on the FI evaluation, the Drum Vault contains both crushed drums and intact drums in poor condition, and approximately 4-6 feet of water-saturated sandy backfill. Although the contents of the drums were not identified, waste materials were visibly present in the drums. Analysis of the backfill and vault water identified several COCs at concentrations that exceeded a regulatory level.

    Based on the presence of water contained in the Drum Vault at an elevation above the normal water table, the structure currently provides some degree of containment, limiting the release of COCs from within the Drum Vault. When the containment currently provided by the Drum Vault ultimately fails, however, it could result in a new release of COCs to the environment. This would reduce the effectiveness of on-going remedy efforts, and possibly result in an unacceptable exposure scenario. Given this, the recommended remedy for the Drum Vault is the removal of its contents for off-site disposal.

    This remedy would consist of:

    1. Demolition and removal of the above-grade portion of the overlying warehouse building;

2. Removal of the concrete slab (i.e., the warehouse floor slab) that covers the Drum Vault;

3. Dewatering of the Drum Vault backfill. All water will be stored and characterized for appropriate disposal. If its quality permits, it may be placed into the POTW inlet at the Facility, subject to the concurrence of the POTW operator;

4. Transferring the drums or drum portions and backfill in bulk from the Drum Vault to lined transport trucks. Based on observed condition of the drums, individual drum removal is not anticipated to be feasible or necessary. If the Drum Vault contents are determined to be non-hazardous waste, they may be stabilized with flyash, Portand cement, or similar materials prior to removal;

5. Cleaning any residual drum, waste, or backfill material from the Drum Vault; and

6. Backfilling the Drum Vault with clean, low permeability fill.

The removal of the Drum Vault is considered a final remedy with good long term effectiveness, and is protective of human health and the environment.

- Recommended Remedy for Wastewater Treatment Ponds
  - The recommended remedy for the WWTP is removal of the free liquids, removal or stabilization of the sediments/sludge, regrading of the pond area to shed storm water to appropriate drainage ditches, and revegetating the regraded surface. All ancillary structures, piping, and equipment will be decommissioned and removed, unless needed for future storm water management, treated groundwater discharge, or other use.

    The decision on removal for off-site treatment and/or disposal vs. in place stabilization of the sediments/sludge will be made as a part of the Remedial Design process (Section 10.0 in the FS). This decision will be based on physical and chemical characterization of the pond sediments at the time of pond closure, as well as any bench or pilot scale testing needed to finalize design decisions. Contingent upon characterization of pond waters at the time of closure, and with the approval of the POTW operator, these waters may be placed into the inlet of the local POTW.

    The optimal timing for pond closure will depend upon the array of remedies selected for implementation at the Facility. Closure of these ponds should be performed at the conclusion of any actions taken to implement remedies, such as demolition/deconstruction, soil cover construction, and SVE system construction. While these activities are in progress, storm water from the Facility would continue to be managed in the WWTP.

8. EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

Remedial alternatives were evaluated based on the following criteria:

- Protectiveness of Human Health and the Environment
- Short-term effectiveness
- Long-term effectiveness
- Implementability
- Cost

Tables 4A – 4F below show the evaluation of the above selection criteria for each remedial alternative considered. Also included in these tables are modified alternatives added by ADEQ, which are summarized below and discussed further in **Section 10:**

- Soil Remedy Alternative S2c: In Situ Stabilization, Focused Approach, ADEQ RADD follows the same guidelines as Soil Remedy Alternative S2b: In Situ Stabilization, Focused Approach, FS Figure 8B found in the FS, but expands the remediation area to include significant dinoseb contamination that lies outside of the boundaries proposed in Figure 8B of the FS (see **Figure 5**).
- Soil Remedy Alternative S4c: Soil Vapor Extraction, Focused Approach, ADEQ RADD follows the same guidelines as Soil Remedy Alternative S4b: Soil Vapor Extraction, Focused Approach, FS Figure 10B, but does not include the area encompassing Units 2, 3, and 4 that will be addressed with soil stabilization (see **Figure 6**).
- Perched Zone Groundwater Remedy Alternative P8: Contaminant Mass Removal is a pilot study to test a contaminant mass removal technology for the perched zone groundwater hot spots.

Table 4A

Evaluation of Soil Remedy Alternatives

SWMU-59, SWMU-60, SWMU-69, SWMU-70, SWMU-71, SWMU-72, SWMU-73, AOC-1

Soil Remedy Alternatives	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Soil Remedy Alternative S1: Exposure Control	Excellent	Excellent	Excellent	Moderate	$3,009,573	$5,000	$15,000
Soil Remedy Alternative S2a: In Situ Stabilization, Area-Wide Approach	Good	Good	Good	Difficult	$8,725,091		
Soil Remedy Alternative S2b: In Situ Stabilization, Focused Approach, Feasibility Study	Fair	Good	Good	Moderate	$2,144,255		
Soil Remedy Alternative S2c: In Situ Stabilization, Focused Approach, ADEQ RADD	Good	Good	Good	Moderate	$3,343,491		
Soil Remedy Alternative S3a: Excavation with Off-Site Disposal as Solid Waste, Area-Wide Approach	Excellent	Excellent	Excellent	Difficult	$50,034,669		
Soil Remedy Alternative S3b: Excavation with Off-Site Disposal as Solid Waste, Focused Approach	Fair	Excellent	Excellent	Difficult	$11,891,182		
Soil Remedy Alternative S4a: Soil Vapor Extraction, Area-Wide Approach	Good	Good	Good	Difficult	$6,150,694	$1,412,553	$950,789
Soil Remedy Alternative S4b: Soil Vapor Extraction, Focused Approach, Feasibility Study	Good	Good	Good	Moderate	$1,431,684	$516,715	$374,499
Soil Remedy Alternative S4c: Soil Vapor Extraction, Focused Approach, ADEQ RADD	Good	Good	Good	Moderate	$852,920	$324,430	$232,444
Soil Remedy Alternative S5: No Further Action	Unacceptable	NA	NA	NA	NA		
Tyco Soil Remedy Alternative 1: No Further Action (Site 3- SWMU's 59 & 60)	Unacceptable	NA	NA	NA	NA		

Table 4B

Evaluation of Perched Zone Remedy Alternatives

SWMU-69, SWMU-70, SWMU-71, SWMU-72, SWMU-73

Perched Zone Remedy Alternatives	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Perched Zone Groundwater Remedy Alternative P1: Exposure Control	Good	Good	Good	Easy	$25,000		$5,000
Perched Zone Groundwater Remedy Alternative P2: Monitored Natural Attenuation	Fair	Poor	Fair	Easy		$159,509	$168,064
Perched Zone Groundwater Remedy Alternative P3: In Situ Chemical Oxidation	Poor	Fair	Poor	Difficult	$3,673,685	$3,277,173	$1,559,330
Perched Zone Groundwater Remedy Alternative P4: In Situ Enhanced Biodegradation	Good	Good	Good	Difficult	$3,214,656	$1,777,030	$1,651,333
Perched Zone Groundwater Remedy Alternative P5: Hydraulic Control	Poor	Poor	Poor	Difficult	$1,633,432	$166,150	$366,799
Perched Zone Groundwater Remedy Alternative P6: Permeable Reactive Barriers	Poor	Poor	Poor	Difficult	$1,167,568	$73,952	$209,297
Perched Zone Groundwater Remedy Alternative P7: No Further Action	Unacceptable	NA	NA	NA	NA		
Perched Zone Groundwater Remedy Alternative P8: Contaminant Mass Reduction	Good	Good	Good	Unknown	Unknown	Unknown	Unknown

Table 4C

Evaluation of Alluvial Aquifer Remedy Alternatives

SWMU-69, SWMU-70, SWMU-71, SWMU-72, SWMU-73

Alluvial Aquifer Remedy Alternatives	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Alluvial Aquifer Groundwater Remedy Alternative A1: Exposure Controls	Good	Fair	Good	Easy	$50,000		$5,000
Alluvial Aquifer Groundwater Remedy Alternative A2: Monitored Natural Attenuation	Fair	Poor	Fair	Easy	$165,286	$161,383	$144,713
Alluvial Aquifer Groundwater Remedy Alternative A3: In Situ Enhanced Biodegradation	Good	Good	Good	Moderate	$1,183,260	$908,850	$946,519
Alluvial Aquifer Groundwater Remedy Alternative A4: Hydraulic Control	Fair	Fair	Good	Difficult	$8,048,186	$810,201	$1,136,388
Alluvial Aquifer Groundwater Remedy Alternative A5: In Situ Chemical Oxidation	Fair	Fair	Poor	Difficult	$8,026,158	$3,493,653	$1,559,330
Alluvial Aquifer Groundwater Remedy A6: No Further Action	Unacceptable	NA	NA	NA	NA		

Table 4D

Removal of Site Structures

Removal of Site Structures	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Removal of Site Structures					$4,639,000		

Table 4E

Evaluation of Drum Vault Remedy Alternatives

SWMU-72

Drum Vault Remedy Alternatives	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Drum Vault Remedy Alternative D1: Drum Vault Removal	Excellent	Excellent	Excellent	Moderate	$743,000		
Drum Vault Remedy Alternative D2: No Further Action	Unacceptable	NA	NA	NA	NA		
Drum Vault Remedy Alternative D3: Waste Stabilization	Good	Excellent	Good	Not Feasible	NA		

Table 4F

Evaluation of Waste Water Treatment Pond Remedy Alternatives

SWMU-63, SWMU-64, SWMU-65, SWMU-66, SWMU-68

Waste Water Treatment Pond Remedy Alternatives	Protection of Human Health and the Environment	Short Term Effectiveness	Long Term Effectiveness	Implement-ability	Capital Cost	Annual Cost	Decom-missioning Costs
Waste Water Treatment Pond Remedy Alternative WWTP1: Pond Closure	Excellent	Excellent	Excellent	Moderate	$964,000		
Waste Water Treatment Pond Remedy Alternative WWTP2: No Further Action	Unacceptable	NA	NA	NA	NA		
Waste Water Treatment Pond Remedy Alternative WWTP3: Continued Use	Unknown	NA	NA	NA	NA		

9. REMEDIAL ACTION LEVELS

Soils

Chemicals in soils ranging from surface to 17 feet bgs that exceed the appropriate health protective risk-based concentrations (*note: for example, if the Facilities soils are paved over then only vapor intrusion RBC would apply*) will be addressed in the selected remedy for that particular area of the Facility.

Table 5A: Remedial Action Levels for Chemicals of Concern in Soils

Chemicals of Concern in Soil	[a] Direct Contact Risk-Based Concentration (mg/kg)	[a] Vapor Intrusion Risk-Based Concentration (mg/kg)
Aldrin	1.01	[b]>solubility limit (87.4)
Arsenic	16	NA
Chlordane	64.7	NA
Dichloroethane, 1,2	22	0.354
Dieldrin	1.08	[b]> solubility limit (9.16)
Dinoseb	238	NA
Hexachlorocyclohexane, beta	9.58	NA
Hexachlorocyclohexane, gamma	21	6.6
Propanil	4765	NA
Toxaphene	15.7	NA

a - RBC is based on 1E-05 for carcinogens
b – calculated risk-based concentration exceeds water solubility limit; water solubility in parenthesis
NA- Not Applicable

Chemicals in soils that exceed groundwater protection screening levels will be addressed in the selected remedy for that particular area of the Facility. (*The note above applies here too*)

Table 5B: Remedial Action Levels for Chemicals of Concern in Soils

Chemicals in Subsurface Soil	[a] Soil to Groundwater Protection Concentration (mg/kg)
Acetone	16
Aldrin	0.4
Arsenic	20
Benzene	0.04
Carbon tetrachloride	0.06
Chlordane	10
Chloroform	0.6
Chromium	40
Dichlorobenzene, 1,4	2
Dichloroethane, 1,2	0.02
Dieldrin	0.004
Dinitrophenol, 2,4	0.2
Dinoseb	[b]0.062
Endrin	0.2
Ethylbenzene	14
Hexachlorocyclohexane, alpha	0.0006
Hexachlorocyclohexane, beta	0.002
Hexachlorocyclohexane, gamma	0.01
Isophorone	0.6
Methoxychlor	160

Table 5B: Remedial Action Levels for Chemicals of Concern in Soils Cont.

Methylene chloride	0.02
Selenium	6
Silver	40
Toluene	12
Trichlorobenzene, 1,2,4	6

a – Concentrations are based on dilution attenuation factor of 20 (DAF 20), developed for the protection of groundwater

b – Concentration based on the MCL based soil to groundwater protection value (DAF 1)

On-Site Perched Groundwater

Chemicals in on-site perched groundwater that exceed appropriate health protective risk-based concentrations will be addressed in the selected remedy for that particular area of the Facility. The maximum contaminant level is the applicable remedial action level for those chemicals which a maximum contaminant level exists. For those chemicals without a maximum contaminant level, the industrial tap water risk-based concentration or the vapor intrusion risk-based concentration (for volatile organic compounds) will be applicable for on-site perched groundwater, according to the selected remedy. However, if any of these chemicals are detected in off-site groundwater, the residential risk-based concentration would apply. (*note: if the Facility is completely paved, and institutional controls are in place, then the vapor intrusion RBC would apply if an MCL is not available*)

Table 5C: Remedial Action Levels for Chemicals of Concern in On-Site Perched Groundwater

Chemicals of Concern in On-Site Perched Groundwater	Maximum Contaminant Level (ug/L)	[a] Residential Tap Water Risk-Based Concentration (ug/L)	[a] Industrial Tap Water Risk-Based Concentration (ug/L)	[a] Vapor Intrusion Risk-Based Concentration (ug/L)
Acetaldehyde	na	22	111	NA
Acetone	na	22,000	68,600	[b]>solubility limit
Acetonitrile	na	130	526	NA
Aldrin	na	0.004	307	[b]>solubility limit
Aluminum	na	37,000	102,000	NA
Aniline	na	120	715	NA
Arsenic	10	NA	NA	NA
Beryllium	4	NA	NA	NA
bis(2-Ethylhexyl) phthalate	6	NA	NA	NA
Butanone, 2- (MEK)	na	7,100	25,600	179,200,000
Cadmium	5	NA	NA	NA
Chloroaniline, 4	na	3.4	409	NA
Chlorobenzene	100	NA	NA	[b]>solubility limit
Chloroform	na	1.9	10.7	8,940
Chromium	100	NA	NA	NA
Dichlorobenzene, 1,2	600	NA	NA	[b]>solubility limit
Dichloroethane, 1,2	5	NA	NA	14,840
Dieldrin	na	0.042	5.11	[b]>solubility limit
Dinitrophenol, 2,4	na	73	204	NA
Dinoseb	7	NA	NA	NA
Ethylbenzene	700	NA	NA	72,000
Heptachlor	0.1	NA	NA	NA
Heptachlor epoxide	0.2	NA	NA	NA
Hexachlorocyclohexane, alpha	na	0.1	818	NA
Hexachlorocyclohexane, beta	na	0.37	1.59	NA
Hexachlorocyclohexane, gamma	0.2	NA	NA	[b]>solubility limit
Iron	na	26,000	71,500	NA
Isophorone	na	710	20,400	NA
Lead	15	NA	NA	NA
Manganese	na	880	2,450	NA
Methoxychlor	40	NA	NA	[b]>solubility limit
4-Methyl-2-pentanone (MIBK)	na	2,000	6,240	[b]>solubility limit
Methylene chloride	5	NA	NA	534,000
3 & 4-Methylphenol	na	180	180	NA
Nickel	na	730	2,040	NA
Nitrophenol, 4	na	290	290	NA
Propanil	na	180	511	NA
Selenium	50	NA	NA	NA
Thallium	2	NA	NA	NA
Toluene	1,000	NA	NA	[b]>solubility limit
Trimethylbenzene, 1,3,5	na	12	1,020	NA
Vanadium	na	180	515	NA
Xylene, m- & p	na	1,400	840	[b]>solubility limit

a - RBCs are based on 1E-05 for carcinogens
b - calculated risk-based concentration exceeds water solubility limit
NA – Not Applicable
na – not available

On-Site Alluvial Groundwater

Chemicals in on-site alluvial groundwater that exceed appropriate health protective risk-based concentrations will be addressed in the selected remedy for that particular area of the Facility. The maximum contaminant level is the applicable remedial action level for those chemicals which a maximum contaminant level exists. For those chemicals without a maximum contaminant level, the industrial tap water risk-based concentration will be applicable for on-site alluvial groundwater, according to the selected remedy. However, if any of these chemicals are detected in off-site groundwater, the MCL would apply if available. If not, then the residential risk-based concentration would apply.

Table 5D: Remedial Action Levels for Chemicals of Concern in On-Site Alluvial Groundwater

Chemicals of Concern in On-Site Alluvial Groundwater	Maximum Contaminant Level (ug/L)	[a] Residential Tap Water Risk-Based Concentration (ug/L)	[a] Industrial Tap Water Risk-Based Concentration (ug/L)
Aldrin	na	0.004	307
Aniline	na	120	715
Arsenic	10	NA	NA
Benzene	5	NA	NA
bis(2-Chloroethyl) ether	na	0.12	0.743
Chloroaniline, 4	na	3.4	409
Chlorobenzene	100	NA	NA
Dichlorobenzene, 1,2	600	NA	NA
Dichloroethane, 1,2	5	NA	NA
Dinoseb	7	NA	NA
Hexachlorocyclohexane, beta	na	0.37	NA
Vinyl Chloride	2	NA	NA
Chloroethane	NA	20,900	87,600
1,3-Dichlorobenzene	NA	NA	NA

a - RBCs are based on 1E-05 for carcinogens
NA – Not Applicable
na – not available

Off-Site Alluvial Groundwater

Chemicals in off-site alluvial groundwater that exceed appropriate health protective risk-based concentrations will be addressed in the selected remedy for that particular area of the Facility. The maximum contaminant level is the applicable remedial action level for those chemicals which a maximum contaminant level exists. For those chemicals without a maximum contaminant level, the residential tap water risk-based concentration will be applicable for off-site alluvial groundwater, according to the selected remedy.

Table 5E: Remedial Action Levels for Chemicals of Concern in Off-Site Alluvial Groundwater

Chemicals of Concern in Off-Site Alluvial Groundwater	Maximum Contaminant Level (ug/L)	[a] Residential Tap Water Risk-Based Concentration (ug/L)	[a] Industrial Tap Water Risk-Based Concentration (ug/L)
bis(2-Chloroethyl) ether	na	0.12	0.578
bis(2-Ethylhexyl) phthalate	6	NA	NA
Chromium	100	NA	NA
Dichloroethane, 1,2	5	NA	NA

a - RBCs are based 1E-05 for carcinogens
NA – Not Applicable
na – not available

10. SELECTION OF REMEDY AND JUSTIFICATION

After evaluating the alternatives based on the criteria found in Tables 4A thru 4F, the following remedies were selected:

Soil Remedy Alternative S1: Exposure Control

As seen in **Figure 7**, exposure controls will effectively encapsulate soil within the process area, which will prevent current and future direct exposure pathways from becoming complete. It would therefore be effective over both the short and long term, providing excellent protection of human health and the environment. This remedy will be used in concert with Soil Remedy Alternative S2c and Soil Remedy Alternative S4c, discussed below, to address the cross-media soil-to-groundwater pathway. This remedial alternative addresses AOC 1 (the yellow stained areas found in surface soil), SWMU-59 (the storm water runoff associated with the Stormwater Drainage System), SWMU-60 (the stormwater sump), Site 3 (from the Tyco FS Report) and the soil contamination associated with SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Soil Remedy Alternative S2c: In-Situ Stabilization, Focused Approach, ADEQ RADD

This alternative follows the same guidelines as alternative Soil Remedy Alternative S2b, In Situ Stabilization, Focused Approach, FS Figure 8B, but expands the remediation area to include significant dinoseb contamination that lies outside of the boundaries of Alternative S2b (see **Figure 5** for comparison of these areas). This alternative will address some of the highest concentrations of dinoseb found on-site and will incorporate SWMU-73 into the remedy, in addition to the areas included by Alternative S2b. Therefore, this alternative is more protective of human health and the environment and has good short-term and long-term effectiveness while costing significantly less than the excavation alternatives. This remedial alternative addresses the soil contamination associated with SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73. A cost estimate for this alternative is found in **Appendix B**.

Soil Remedy Alternative S4c: Soil Vapor Extraction, Focused Approach, ADEQ RADD

This alternative follows the same guidelines as Soil Remedy Alternative S4b: Soil Vapor Extraction, Focused Approach, FS Figure 10B, but does not include the area encompassing Units 2, 3 and 4 that will be addressed with soil stabilization (see **Figure 6** for comparison of these areas). SVE will permanently remove VOCs from soil as opposed to stabilization, which may release contaminants as the stabilized soil begins to break down over time. This alternative provides good short-term and long-term effectiveness along with providing good protection of human health and the environment. Finally, this alternative costs significantly less than the excavation alternatives. This remedial alternative addresses the soil contamination associated with SWMU-69, SWMU-70, SWMU-71, and SWMU-73. A cost estimate for this alternative is found in **Appendix B**.

Perched Zone Groundwater Alternative P1: Exposure Control

This alternative was selected because, in combination with the other alternatives selected, it provides protection from human exposures to contaminated perched zone groundwater while the other remedies are implemented and begin to take effect. This alternative will have good short-term and long-term effectiveness at a very low cost. This alternative is not sufficient, by itself, to prevent future expansion of contaminated areas. This remedial alternative addresses the perched zone groundwater contamination associated with AOC-1, SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Perched Zone Groundwater Alternative P2: Monitored Natural Attenuation

This alternative was only selected to assist with the evaluation of the effectiveness of other selected remedies in the perched zone groundwater and in the soils overlying the perched zone. Given the extremely high concentrations in some areas of the perched zone groundwater, it is not reasonable to expect either short-term or long-term effectiveness for this alternative. After other alternatives are completed, monitored natural attenuation can be continued at a moderate cost until continued protection of human health and the environment has been documented. This remedial alternative addresses the perched zone groundwater contamination associated with AOC-1, SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Perched Zone Groundwater Alternative P8: Contaminant Mass Reduction

The Feasibility Study repeatedly indicated that the mass of contaminants left untreated in the soil and/or perched zone groundwater would continue to be a source of contamination in the alluvial aquifer. The data indicates that a large percentage of this mass is concentrated in a few relatively small hot spots. Therefore, it is the conclusion of this evaluation that a pilot study of a remedial alternative which has proven to be successful in reducing the contaminant mass in perched zone groundwater at similar Facilities should be conducted in one or more of those hot spots. A groundwater monitoring sampling program and frequency schedule for implementation of the pilot study should be submitted. If this pilot study is proven effective, the remedy should be applied Facility wide. If this pilot study is deemed inadequate, another pilot study using an alternate technology should be proposed and implemented.

Alluvial Aquifer Groundwater Alternative A1: Exposure Control

This alternative was selected because, in combination with the other alternatives selected, it provides protection from human exposures to contaminated groundwater in the alluvial aquifer while the other remedies are implemented and begin to take effect. This alternative will have good long-term effectiveness at a reasonable cost. This alternative is not sufficient, by itself, to prevent future expansion of contaminated areas. This remedial alternative addresses the alluvial aquifer groundwater contamination associated with AOC-1, SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Alluvial Aquifer Groundwater Alternative A2: Monitored Natural Attenuation

This alternative was only selected to assist with the evaluation of the effectiveness of other selected remedies in the alluvial aquifer and in the perched zone groundwater and the soils overlying the aquifer. Given the high concentrations already present in some areas of the

alluvial aquifer and the fact that some concentrations have already been detected in off-site wells, it is not possible for this alternative to be effective in the short-term. After other alternatives are completed, monitored natural attenuation can be continued at a moderate cost until continued protection of human health and the environment has been documented. This remedial alternative addresses the alluvial aquifer groundwater contamination associated with AOC-1, SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Alluvial Aquifer Groundwater Alternative A3: In-Situ Enhanced Biodegradation

This alternative was selected to actively address the contaminants present in the alluvial aquifer because it has been shown to be a cost-effective treatment and because the effects of this treatment have been shown to continue down gradient of the treatment area. This alternative will have good short-term and long-term effectiveness at a reasonable cost. This alternative will, in time, prevent future expansion of contaminated areas. This remedial alternative addresses the alluvial aquifer groundwater contamination associated with AOC-1, SWMU-69, SWMU-70, SWMU-71, SWMU-72, and SWMU-73.

Removal of Site Structures:

This alternative will allow for the installation of other alternatives when an area outlined for remediation falls within an area where site structures are present.

Drum Vault Remedy Alternative D1 - Drum Vault Removal:

The removal of the Drum Vault is considered a final remedy with excellent short term and long term effectiveness, and is protective of human health and the environment. This remedial alternative addresses the source of all contamination associated with SWMU-72.

Waste Water Treatment Pond Remedy Alternative WWTP1 - Pond Closure:

Since Exposure Controls will be installed throughout the process area, movement of storm water run-off to temporary holding ponds will no longer be necessary. Therefore, closure of these ponds was selected. This alternative provides excellent short-term and long-term effectiveness and provides protection of human health and the environment. This remedy addresses SWMU's 63, 64, 65, & 68.

11. SCHEDULE OF IMPLEMENTATION

To help aide in the procession of remedial activities, the Responsible Parties (RPs) are to submit to ADEQ a schedule within sixty (60) days of issuance of an order or other binding legal document that determines their liability for remedial activities. The schedule should give highest priority to implementation of the Drum Vault Removal (Remedial Alternative D1) and alluvial aquifer enhanced biodegradation (Remedial Alternative A3). Each remedy should be scheduled in a way to expedite the implementation of all remedies.

The RPs must submit a plan to annually evaluate monitoring data from the SVE and selected groundwater remedies. An evaluation of the overall effectiveness of contaminant removal in soils and groundwater and review of site risks must be conducted at 5-year intervals.

12. COMMUNITY PARTICIPATION

Public involvement is an important process for ultimately selecting the final remedies to be employed at the Facility for remediating releases to the environment of hazardous constituents. Since the RADD is an important decision document, the RADD is subject to public notice and comment to allow the public and interested parties to raise all ascertainable issues concerning the remedies proposed at the facility, including options not potentially addressed.

The Notice of the RADD for Cedar Chemical was published in the *The Daily World* on February 24, 2010. Documents used in preparation of the RADD, along with the RADD, comprise the administrative record. The administrative record is available for review at the following locations:

Arkansas Department of Environmental Quality
Records Management Section
5301 Northshore Drive
North Little Rock, Arkansas, 72118

UAMS Area Health Education Centers Delta
1393 Highway 242 South
Helena-West Helena, AR 72342

Documents comprising the administrative record include:

1. Remedial Action Decision Document (RADD)
2. Public Notice/ Fact Sheet
3. EPA Region 6 Removal Action Report
4. ENSAFE Facility Investigation Report
5. ADEQ Comprehensive Site Assessment Report
6. AMEC-Geomatrix Feasibility Study Report dated December 2009
7. Well Assessment Report
8. ENSAFE Risk Assessment
9. Ansul Focused Feasibility Study Report- Site 3 dated June 2009
10. CAO LIS 07-027

13. COORDINATION WITH OTHER DIVISIONS/AGENCIES

It is important to involve/inform other divisions of ADEQ and other divisions of ADEQ and other agencies in the development of a RADD, as applicable. To keep EPA informed of all corrective action work, EPA Region 6 was provided a copy of the Public Notice and RADD for review and comment. **Tables 6A** and **6B** below provide a list of which divisions and agencies consulted or informed regarding the development of the RADD.

Table 6A:
Internal Coordination with ADEQ Divisions

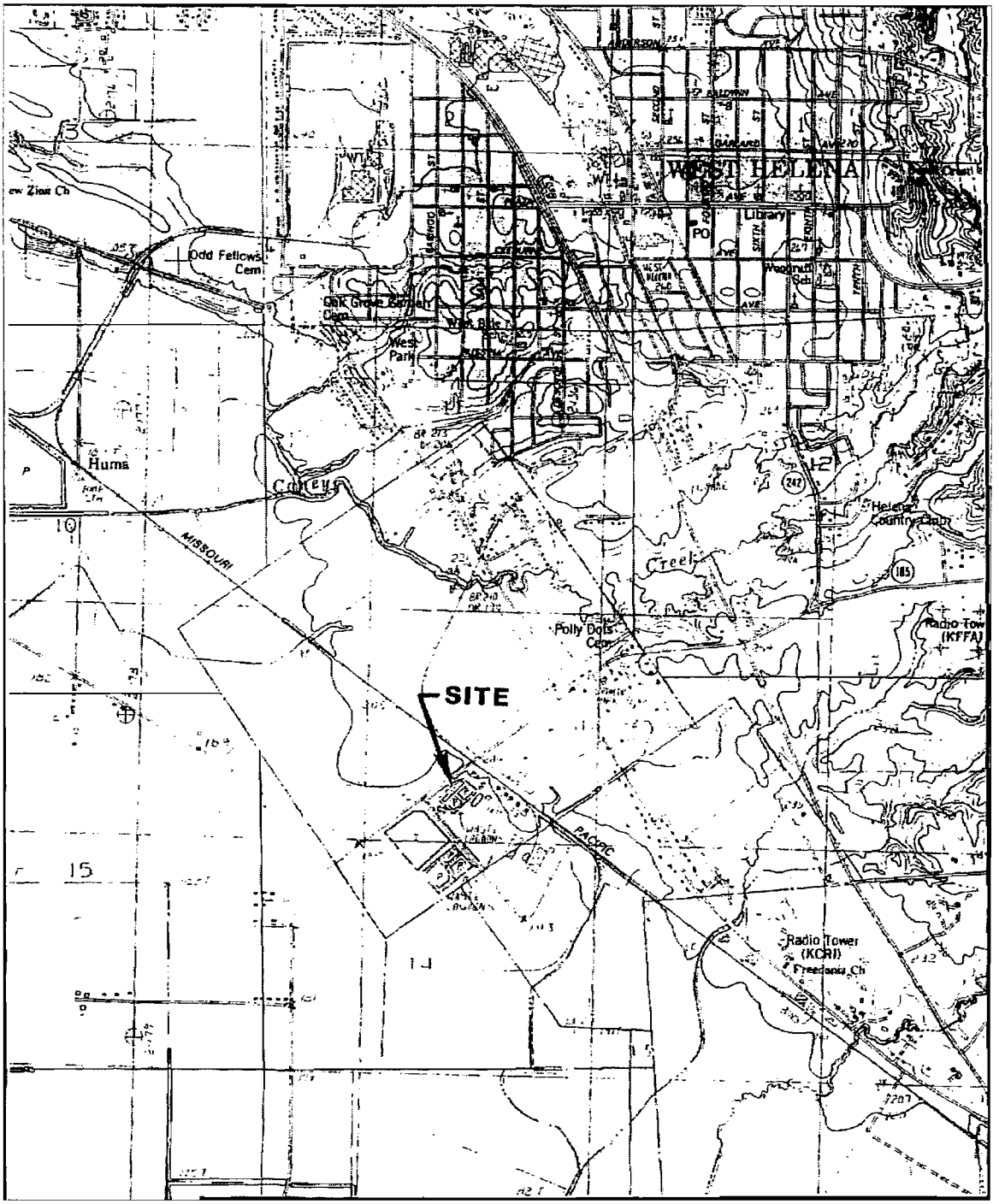
ADEQ Divisions	Consulted or Informed	Sent Notice of Decision
Water	**Yes**	**No**
NPDES	**Yes**	**No**
Air	**No**	**No**
Solid Waste	**No**	**No**
Regulated Storage Tanks	**No**	**No**
Technical Services and Environmental Preservation	**No**	**No**
Mining	**No**	**No**

Table 6B:
External Coordination with Outside Agencies

Other State and Federal Organizations	Consulted or Informed	Sent Notice of Decision
EPA, Region 6	**Yes**	**Yes**
Office of Emergency Services	**No**	**No**
AR. Dept. of Health & Human Services	**Yes**	**Yes**
AR. State Clearinghouse	**No**	**No**
AR. State Historic Preservation	**No**	**No**
AR. Natural Heritage Commission	**No**	**No**
AR. Game & Fish Commission	**No**	**No**
U.S. Army Corps of Engineers	**No**	**Yes**
AR. Soil and Water Conservation	**No**	**No**
AR. Geological Commission	**No**	**No**

The RADD was sent to all applicable branches of the Hazardous Waste Division, and to all divisions and agencies listed above.

Figures



SOURCE: EnSafe, Phase II Investigation Report, 1995

SITE LOCATION MAP

Cedar Chemical
Helena-West Helena, Arkansas

Figure 1

I:\13636 - Arkansas Helena-West Helena\2007 CCR\FINAL FIGURES\ FIG 1 Site Location Map\FIG 1.dwg

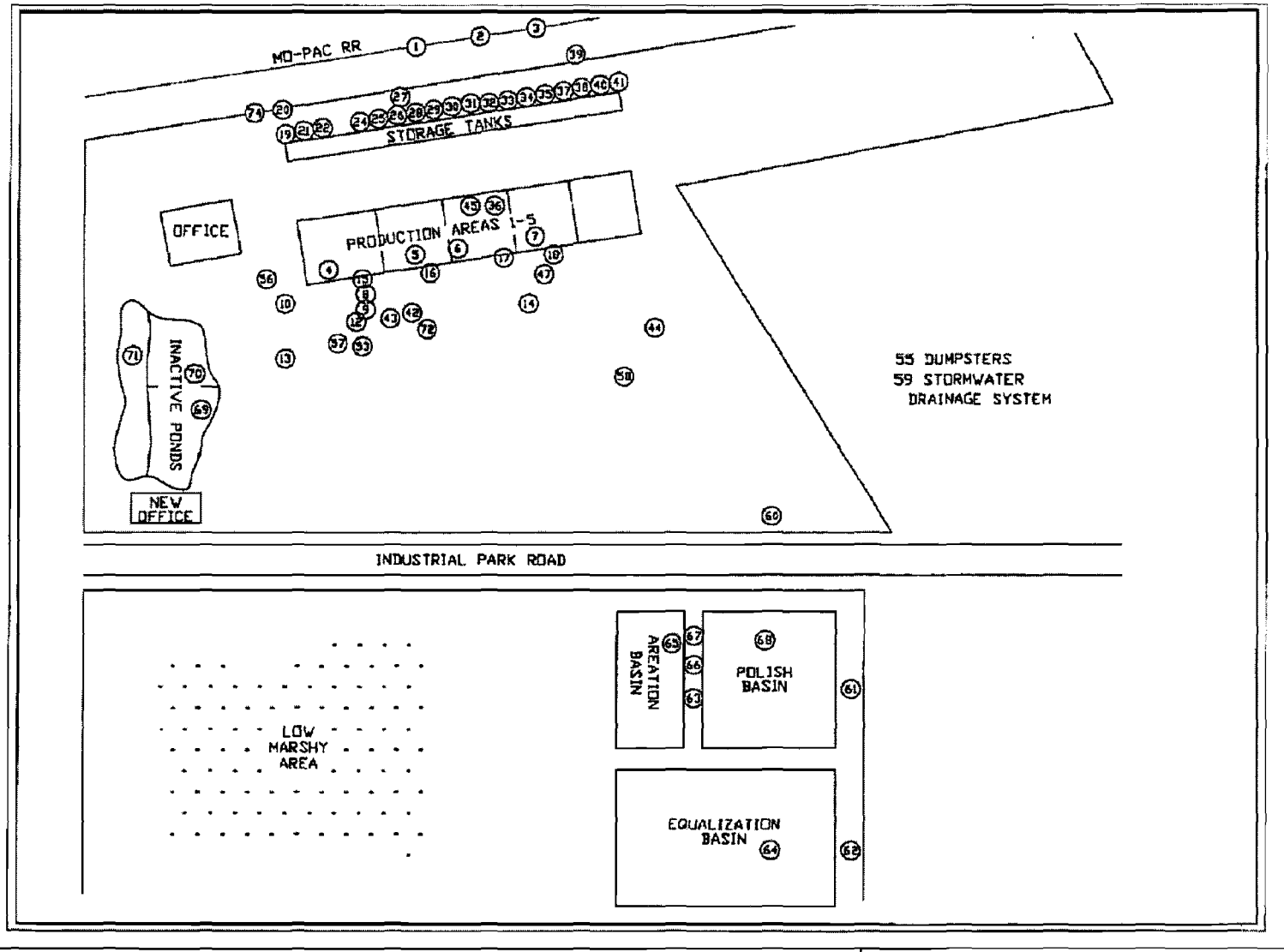
BASEMAP MODIFIED FROM:
Smith & Weiland/Cline-Frazier Survey, August 2008

0 80
APPROXIMATE SCALE IN FEET

Facility Structure Locations

Cedar Chemical
Helena-West Helena, Arkansas

Figure 2



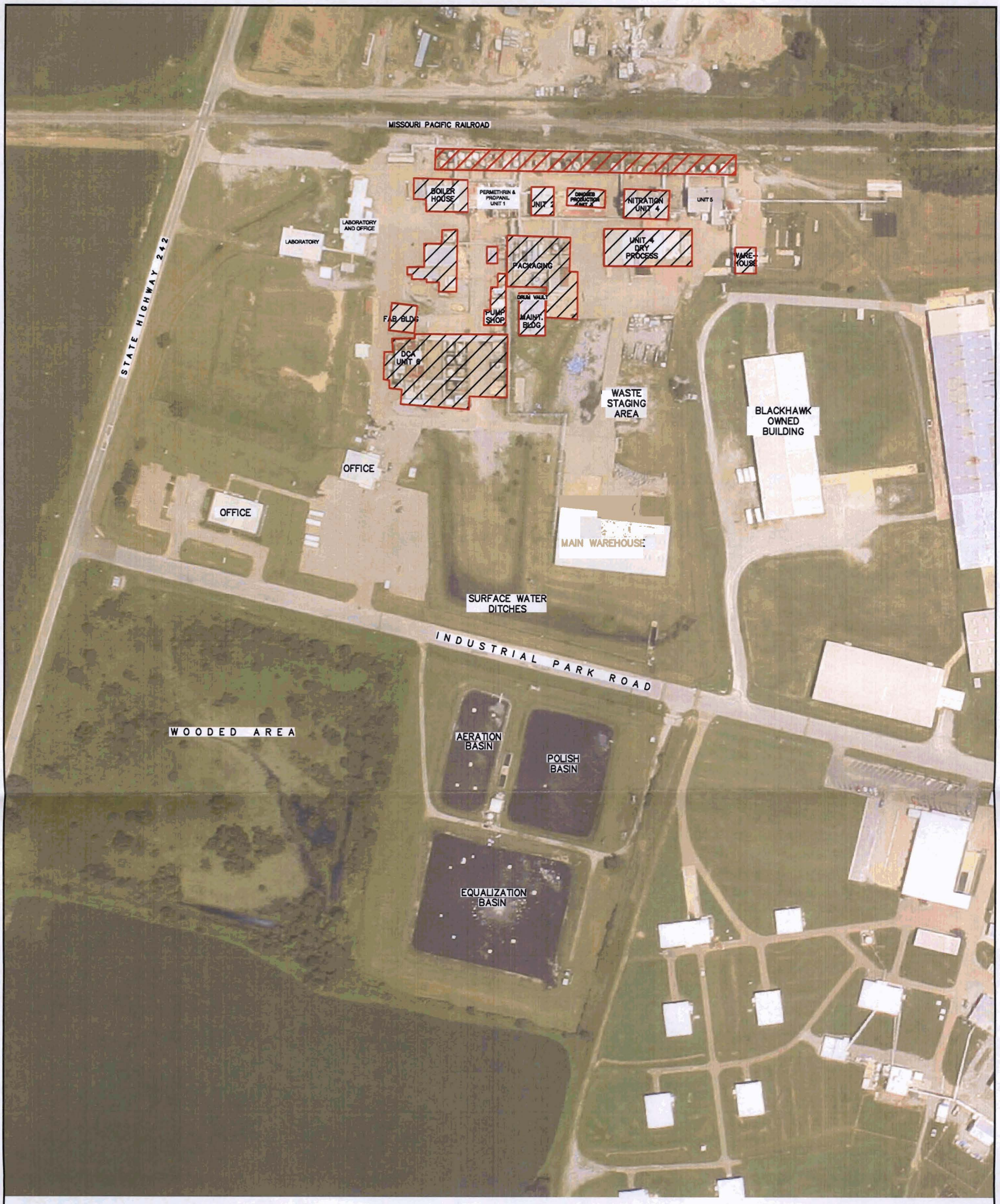
SOURCE: EnSafe 1993 FI Report

SWMUs and AOCs IDENTIFIED IN USEPA REGION 6 PR/VSI

Cedar Chemical
Helena-West Helena, Arkansas

Figure 3

I:\13636 - Arkansas Helena-West Helena\2007 CCR\FINAL FIGURES\ FIG 5 SWMUs and AOCs\FIG 5.dwg



EXPLANATION

BUILDINGS AND OTHER STRUCTURES TO BE REMOVED

NOTE: Boundaries, well locations, and remedy elements subject to change based on Remedial Design or other factors.

0 200

APPROXIMATE SCALE IN FEET

Demolition of On-Site Structures

Cedar Chemical
Helena-West Helena, Arkansas

Figure 4

Plot Date: 12/10/09 - 11:18am, Plotted by: mike.schofield
Drawing Path: I:\13636 - Arkansas Helena-West Helena\FIGURES\, Drawing Name: building_demo.dwg

EXPLANATION

Soil Remedy Alternative S2b Soil Stablization Area

Soil Remedy Alternative S2c Soil Stablization Area

Property Boundary

0 50 100
FEET

BASEMAP MODIFIED FROM:
Smith & Weiland/Cline-Fraizer Survey, August 2008

SOIL REMEDY ALTERNATIVES
S2b and S2c
Focused Approach
Cedar Chemical
Helena-West Helena, Arkansas

Figure 5

NOTE: Boundaries, well locations, and remedy elements subject to change based on Remedial Design or other factors.

EXPLANATION

PROPERTY BOUNDARY

PIPING

SOIL VAPOR EXTRACTION WELL

Soil Remedy Alternative S4b - Soil Vapor Extraction Treatment Areas

Soil Remedy Alternative S4c - Soil Vapor Extraction Treatment Area

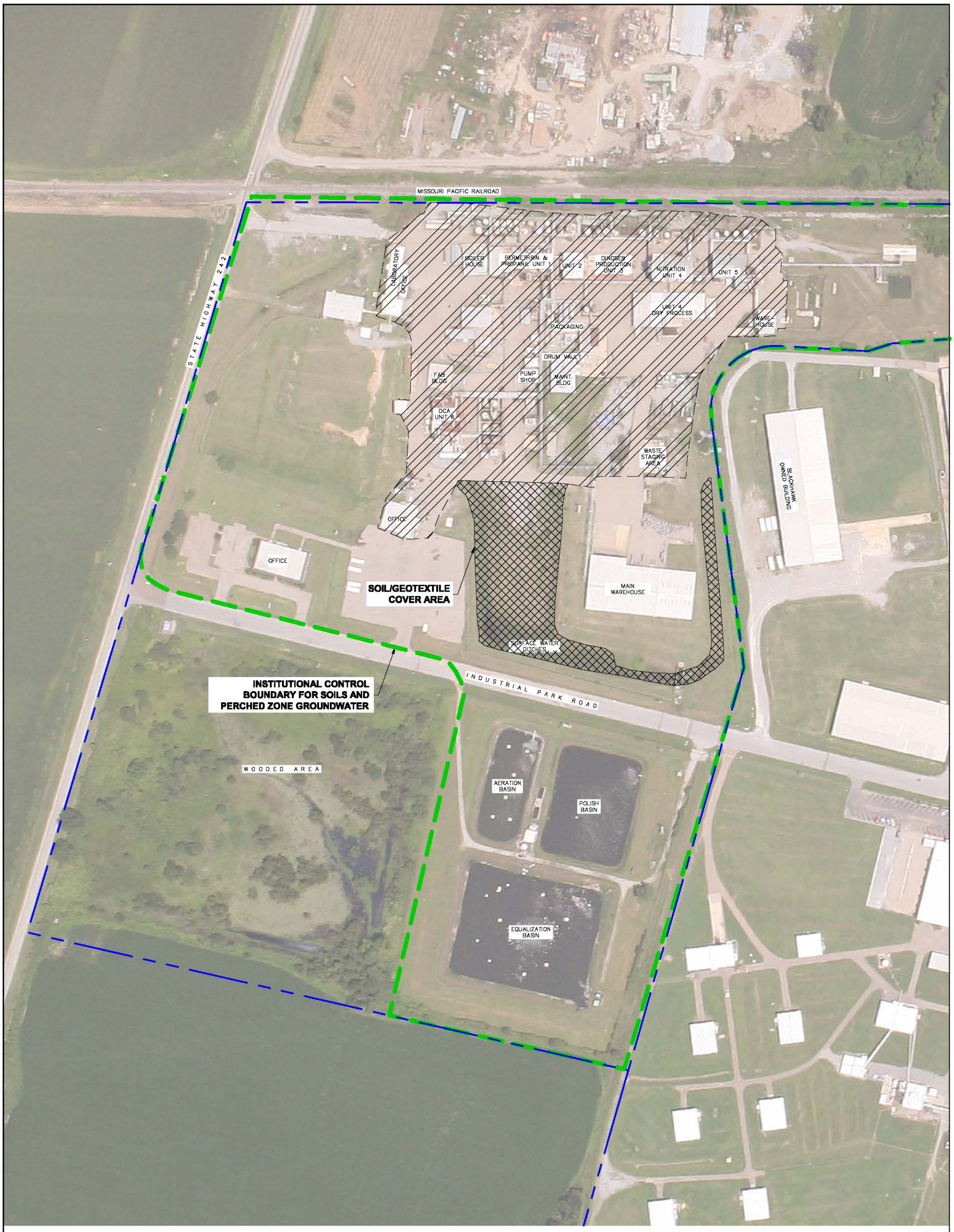
0 50 100
FEET

BASEMAP MODIFIED FROM:
Smith & Weiland/Cline-Fraizer Survey, August 2008

Soil Remedy Alternatives S4b & S4c
Soil Vapor Extraction
Focused Approach
Cedar Chemical
Helena-West Helena, Arkansas

Figure 6

NOTE: Boundaries, well locations, and remedy elements subject to change based on Remedial Design or other factors.



EXPLANATION

- SOIL COVER
- SOIL / GEOTEXTILE COVER AREA
- WASTEWATER TREATMENT POND CLOSURE AREA
- INSTITUTIONAL CONTROL
- PROPERTY BOUNDARY

N

0 50 100
FEET

BASEMAP MODIFIED FROM:
Smith & Weiland/Cline-Fraizer Survey, August 2008

SOIL REMEDY ALTERNATIVE S1
Exposure Control
Cedar Chemical
Helena-West Helena, Arkansas

Figure 7

NOTE: Boundaries, well locations, and remedy elements subject to change based on Remedial Design or other factors.

Appendix A

Specific Chemicals and Their Manifest

Appendix A Chemicals/Manifest Summary

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	Toxic solids, organic (potassium chloride, potassium fluoride)	80 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ waste, flammable liquids, n.o.s. (ethanol, petroleum distillates)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ Waste, corrosive liquids, flammable, n.o.s. (acetic anhydride, hydrochloric acid)	27 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, corrosive liquid, basic, organic, n.o.s. (sodium hydroxide, tetra butyl ammonium hydroxide)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, toxic liquids, organic, n.o.s. (chloroform, dichloroaniline)	51 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ waste, toxic liquids, organic, n.o.s. (o-dichlorobenzene, phenol)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (acifluorfen, cyclanilide)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (acifluorfen, diuron)	110 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ waste, toxic liquids, organic, n.o.s. (2,4-D, phenol))	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (propanil, tromethamine)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic solids, organic, n.o.s. (tromethamine)	300 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, toxic liquids, organic, n.o.s. (acifluorfen, tromethamine)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	Waste, toxic liquids, organic, n.o.s. (potassium carbonate, urea)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Hydrazine, anhydrous	2 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, hydrazine aqueous solutions	5 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, mercury compounds, liquid, n.o.s (mercuric nitrate)	6 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, cyanides, inorganic, n.o.s (potassium cyanide, sodium cyanide)	5 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, acetic acid, glacial	5 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, corrosive liquid, acidic, inorganic, n.o.s. (phosphoric acid, sulfuric acid (fuming))	60 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, corrosive liquid, acidic, organic, n.o.s. (carbon tetrachloride, dichloroaniline)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Methanesulfonyl choride	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Ethylene chlorohydrin	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Wastee, Dinmethyl sulfate	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Chloroacetyl chloride	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Trimethylacetyl chloride	1 lb	IL 10660014	Clean Harbors Environmental.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
					Services Inc.
08/14/03	Laboratories	Acetone cyanohydrin, stabilized	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Chloroacetyl chloride	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Ethylene chlorohydrin	1 lb	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Trimethylacetyl chloride	4 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Nitric acid, red fuming	5 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, Polyamines, flammable, corrosive, n.o.s.	20 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, corrosive liquids, flammable, n.o.s.	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable, liquid, toxic, corrosive, n.o.s. (diallyamine)	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Carbon disulfide	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Hydrogen peroxide	2 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, nitric acid	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Sodium dithionite	2 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, elf-heating solid, inorganic, n.o.s. (raney nickel)	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	Waste, water-reactive solid, self-heating, n.o.s (sodium borohydride, zinc powder)	3 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, oxidizing liquid, toxic, n.o.s. (silver nitrate, sodium nitrite)	56 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable solids, organic, n.o.s. (paraformaldehyde, sulfur)	82 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Acetic anhydride	10 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (diuron)	545 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, toxic liquids, organic, n.o.s. (molinate, tillam)	201 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, toxic liquids, organic, n.o.s. (carbaryl, chloroform)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (alachlor, propanil)	158 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (acetochlor)	192 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (glycerin)	272 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. chloroacetophenone)126 lbs	126 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (diuron)	134 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (propanil)	194 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, toxic liquids, organic, n.o.s. (butylate, tetrachloroethylene)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (chlorothalinil)	245 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable liquids, corrosive, n.o.s. (formaldehyde 37%, isopropylamine)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic solids, organic, n.o.s (4-(2,4-dichlorophenoxy) butyric acid)	40 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, toxic liquids, organic, n.o.s (2,6-dichlorobenzonitrie)	184 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable liquids, n.o.s. (kerosene, xylene)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, corrosive liquid, basic, organic, n.o.s. (modified amines)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (celite)	132 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic liquids, organic, n.o.s. (glycerol)	145 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable liquids, n.o.s. (paint, petroleum distillates)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Toxic solids, organic, n.o.s. (sodium chloride)	60 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, Paraformaldehyde	40 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	RQ, Waste, flammable liquids, n.o.s. (paint)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable liquids, n.o.s. (xylene, toluene)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	RQ, Waste, flammable liquids, n.o.s. (xylene, toluene)	150 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Corrosive solids, n.o.s. (2,4-dichlorophenoxy butyric acid)	100 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Potassium fluoride	250 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Pesticides, liquid, toxic, n.o.s. (dichloroaniline)	300 lbs	IL 10660014	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable liquids, n.o.s.	106 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, corrosive liquid, acidic, organic, n.o.s.	20 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, corrosive liquid, basic, organic, n.o.s.	10 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable solids, organic, n.o.s.	60 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable solids, corrosive, organic, n.o.s.	20 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable liquids, n.o.s.	80 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste oxidizing liquid, corrosive, n.o.s.	5 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
08/14/03	Laboratories	Waste Water-reactive liquid, n.o.s.	1 lb	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste, flammable solids, organic, n.o.s.	35 lbs	AR-1033810	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste Compressed gases, flammable, n.o.s.	3 lbs	S00682444	Clean Harbors Environmental. Services Inc.
08/14/03	Laboratories	Waste Ethylene oxide	12 lbs	S00682444	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Flammable liquids, n.o.s.	4400 lbs	3096553	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Hazardous waste, liquid, n.o.s. (trichloroethylene)	9600 lbs	3096553	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Non D.O.T. regulated	400 lbs	3096553	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Flammable liquids, n.o.s.	800 lbs	3096553	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Hazardous waste liquids, n.o.s.	3200 lbs	3096553	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Pesticieds, solid, toxic, n.o.s. (propanil, diuron)	4400 lbs	AR-1390047	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
10/03/03	Processing unit piping product and warehouse drums	Non D.O.T. regulated material	100 lbs	AR-1390047	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Dichloroanilines, solid	2000 lbs	AR-1390047	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Pesticides, solid, toxic, n.o.s.	4800 lbs	AR-1390047	Clean Harbors Environmental. Services Inc.
10/03/03	Processing unit piping product and warehouse drums	Dichloroanilines, solid	3200 lbs	AR-1390047	Clean Harbors Environmental. Services Inc.
10/05/03	Processing unit piping product and warehouse drums	Pesticides, solid, toxic, n.o.s. (Propanil, Diuron)	180 lbs	AR-1390060	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	RQ, Waste, mercury	3 lbs	IL10711292	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	Waste, organic peroxide type S, solid	1 lb	AR-969803	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	Waste, organic peroxide type C, solid, temperature controlled	1 lb	S00440690	Clean Harbors Environmental. Services Inc.

Appendix A Chemicals/Manifest Summary (Continued)

DATE	SOURCE	TYPE	QUANTITY	MANIFEST NUMBER	HAUL CONTRACTOR
10/06/03	Processing unit piping product and warehouse drums	Waste, flammable solids, organic, n.o.s.	1 lb	S00440691	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	Pesticides, solid, toxic, n.o.s. (propanil, diuron)	180 lbs	S00440691	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	Waste, hazardous waste, liquid, n.o.s. (trichloroethylene)	1350 lbs	S00440691	Clean Harbors Environmental. Services Inc.
10/06/03	Processing unit piping product and warehouse drums	Waste, hazardous waste, liquid, n.o.s. (trichloroethylene)	900 lbs	S00440691	Clean Harbors Environmental. Services Inc.

Appendix B

Cost Estimates for ADEQ Remedial Alternatives S2c and S4c

SOIL REMEDY ALTERNATIVE S2c: IN SITU STABILIZATION

				Total:	**$3,343,491**
treatment area:	2.19	acres			
1. Mobilization					$18,019
Assume	32	D6 Dozer (4)	$86.63	per hour	$2,772
Assume	32	compactors (4)	$86.63	per hour	$2,772
Assume	24	Water Truck (4)	$86.63	per hour	$2,079
Assume	24	Dump Truck (4)	$86.63	per hour	$2,079
Assume	32	924 Loader (4)	$86.63	per hour	$2,772
Assume	64	210 trackhoe (8)	$86.63	per hour	$5,544
2. Foundation and Pavement Removal					$190,793
Assume	95,396	sqft	$2.00	per hour	$190,793
3. Excavation (50 cubic yards per hour)					$527,925
Assume	2,004	trackhoes	$165.31	per hour	$331,229
Assume	502	contractor supervisor	$66.00	per hour	$33,115
Assume	2,004	dump truck	$81.64	per hour	$163,581
4. Stablization					$1,472,516
Assume	16,621	fly ash	$32.24	per ton deliver	$535,865
Assume	2,004	trackhoes	$165.31	per hour	$331,229
Assume	1,002	dozers	$127.89	per hour	$128,126
Assume	1,002	compactors	$87.65	per hour	$87,812
Assume	1,002	loader at stock pile	$101.63	per hour	$101,817
Assume	1,002	water wagon	$81.64	per hour	$81,790
Assume	1,002	dump truck	$102.72	per hour	$102,909
Assume	1,254	compaction tests	$45.00	per hour	$56,409
Assume	250	contractor supervisor	$66.00	per hour	$16,503
Assume	1,002	labor	$30.00	per hour	$30,055
5. Confirmation Sampling					$127,669
Assume	35	samples (16 samples per acre)			$0
Assume	35	SPLP confirmation sample	$845	per sample	$29,609
Assume	196	days rental equpment at	$500	per day	$98,060
6. AMEC Excavation Contractor Field Oversight					$164,208
Assume	6.5	months office trailer at	$500	per month	$3,269
Assume	144	days per diem/lodging/truck rental	$260	per day	$37,393
Assume	1,437	hours AMEC field supervisor at	$86	per hour	$123,545
7. Project Management & Reporting					$285,113
Assume	1	Report	$35,000	Lump Sum	$35,000
Assume	1	AMEC project management at 10% of all other cost			$250,113
8. Contingency					$557,248
Assume	1	Continegency	20%		$557,248

SOIL REMEDY ALTERNATIVE S4c: SOIL VAPOR EXTRACTION (Capitol Costs)

				Total:	**$806,866**
remedy area:	**0.8**	**acres**			
1. Power to Site					$25,000
Assume	1	to drop electrical conncection to system, including:			
		- Installation by a qualified electrician;			
		- Installation of main disconnect;			
		- Installation of an electrical meter face;			
2. SVE System Equipment					$112,500
Assume	1	Prewired skid mounted 10000 scfm SVE system, including:			
		1 X 500 Hp PD Blowers			
		1 X 500 gallon vapor/liquid separator with transfer pump			
		2,500 gallon holding tank			
		2 X 2500 lb carbon vessels			
		Control system w/ telemetry			
3. SVE System Installation					$357,328
Assume	70	SVE wells at	$3,366	per well	$235,171
Assume	2	truck loads of IDW	$385	per load	$821
Assume	3	tons of hazardous IDW	$132	per ton	$352
Assume	23	tons of non-hazardous IDW	$38	per ton	$892
Assume	13	IDW profile samples	$758	per sample	$9,702
Assume	787	feet of trenching at	$30	per linear foot	$23,616
Assume	787	feet of piping at	$30	per linear foot	$23,616
Assume	787	feet of resurfacing at	$12	per linear foot	$9,446
Assume	70	wellhead fittings at	$400	per well	$27,947
Assume	213	sqft concrete pad at	$11	per sqft	$2,347
Assume	1.0	fencing to enclose system	$2,244		$2,244
Assume	4	TO-14 Analysis at Start-up	$275	per sample	$1,173
Assume	1	Air Emissions Permit	$20,000	lump sum	$20,000
4. Installation Direction and Oversight					$76,435
Assume	349	Project Scientist I	$113	per ton delivered	$39,475
Assume	157	Senior Technician	$86	per hour	$13,531
Assume	41	hours of travel to/from the site	$105	per hour	$4,256
Assume	51	per diem/lodging/truck/fuel	$260	per hour	$13,173
Assume	5	airfare and parking costs of	$650	per hour	$3,467
Assume	10	field supplies cost of	$250	per hour	$2,533
5. Project Management & Reporting					$101,126
Assume	1	Installation Report & Drawings	$40,000	Lump Sum	$40,000
Assume	1	AMEC project management at 10% of all other cost			$61,126
8. Contingency					$134,478
Assume	1	Continegency			$134,478

SOIL REMEDY ALTERNATIVE S4c: SOIL VAPOR EXTRACTION (Annual Costs)

				Total:	**$278,013**
remedy area:	**0.8**	**acres**			
1. Utilities/Carbon					$137,649
Assume	400	Total SVE system horsepower			
Assume	4,380	System run-time (hours/year)			
Assume	0	per kilowatt hour		Electrical Total	$130,649
Assume	4	Carbon changes at		per change	$7,000
2. Fluid Profiling/Air Emissions Analytical Costs					$4,590
Assume	2	VOC in water analysis	$125	per sample	$250
Assume	2	SVOC in water analysis	$250	per sample	$500
Assume	2	RCRA metals in water analysis	$100	per sample	$200
Assume	2	TPH in water analysis	$60	per sample	$120
Assume	2	RCI in water analysis	$110	per sample	$220
Assume	12	TO-14 analysis	$275	per sample	$3,300
3. System Operation					$49,657
Assume	1	technician			
Assume	3	hours of travel to/from the site from Houston, TX	$86	per hour	$258
Assume	16	hours of system inspection, sampling, and maintenance	$88	per hour	$1,408
Assume	3	per diem/lodging/truck/fuel	$260	per day	$693
Assume	1	airfare and parking costs of	$650	round trip	$650
Assume	1	field supply cost of	$100	per inspection	$100
Assume	12	events at	$5,318	per event	$37,312
Assume	1	10% of wells to be replaced annually at 50% cost	$12,345	lump sum	$12,345
4. Fluid Disposal					$6,720
Assume	2,133	gallons of hazardous water disposal	$2.50	per gallon	$5,333
Assume	11	hours of vacuum truck (includes transport)	$95	per hour	$1,013
Assume	1	Truck washout	$350	each	$373
5. Project Management & Reporting					$33,062
Assume	4	System operation report	$3,000	Lump Sum	$12,000
Assume	1	AMEC project management at 10% of all other cost			$21,062
8. Contingency					$46,336
Assume	1	Continegency			$46,336

SOIL REMEDY ALTERNATIVE S4c: SOIL VAPOR EXTRACTION (Decommissioning Costs)

				Total:	**$232,444**
remedy area:	**0.8**	**acres**			
1. System Decommissioning					$84,331
Assume	1	Mob/Demob	$1,000	each	$1,000
Assume	16	Equipment Rental	$350	days	$5,600
Assume	16	Labor (4 man crew, 10 hrs/day)	$1,800	days	$28,800
Assume	16	Total days of contractor per diem (4 man crew)	$130	man/day	$2,080
Assume	7	truck loads of waste	$385	per load	$2,669
Assume	11	tons of hazardous IDW	$132	per ton	$1,408
Assume	96	tons of non-hazardous IDW	$38	per ton	$3,648
Assume	70	Wells plugged and abandoned (est. depth 20 ft)	$560	each	$39,125
2. AMEC Oversight					$13,109
Assume	11	per diem/lodging/truck/fuel	$260	per day	$2,773
Assume	105	hours Senior Technician at	$86	per hour	$9,036
Assume	2	airfare	$650	per trip	$1,300
3. Confirmation Sampling and Reporting					$28,654
Assume	22	samples (24 samples per acre)			
Assume	22	Confirmation sample	$640	per sample	$13,995
Assume	3	days of Geoprobe	$2,500	per day	$8,000
Assume	5	hours per technician/day for	6	days per event	
Assume	3	hours sample shipping at	1	per event	
Assume	6	hours mob for technician at	1	per event	
Assume	42	hours for technician at	$86	per hour	$3,578
Assume	3	per diem/lodging/truck/fuel	$260	per event	$832
Assume	1	airfare	$650	per trip	$650
Assume	3	days renatl equipment at	$500	per day	$1,600
5. Project Management & Reporting					$67,609
Assume	1	Annual Report	$50,000	per report	$50,000
Assume	1	AMEC project management at 10% of all other cost			$17,609
8. Contingency					$38,741
Assume	1	Continegency			$38,741

Capitol $	$852,920
Annual $	$324,430
Decommision $	$232,444
TOTAL $:	$1,409,794