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Solutia Inc.
702 Clydesdale Avenue
Anniston, Alabama 36201-5328
Tel 256-231-8400

January 29, 2007

Ms. Pamela J. Langston Scully, P.E.
Remedial Project Manager
United States Environmental Protection Agency, Region IV
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, GA 30303-3104

Re: Anniston PCB Site – Comments on Operable Unit 3 Pathways Analysis Report

Dear Ms. Langston Scully:

On behalf of Solutia Inc. and Pharmacia Corporation, as parties to the Partial Consent Decree (PCD) for the Anniston PCB Site, please find enclosed 18 hard copies of our comments on the *Final Pathways Analysis Report For The Baseline Risk Assessment For Anniston PCB Site Operable Unit 3, Anniston, Alabama* (CDM Federal Programs Corporation, October 2006).

Should you have any questions regarding this matter, please contact me at (256) 231-8404.

Sincerely,

Craig R. Branchfield
Manager, Remedial Projects

CRB/jrl

cc: Mr. Phillip Davis (ADEM)
Mr. G. Douglas Jones, Esq.
Mr. Thomas Dahl

PATHWAYS ANALYSIS REPORT FOR THE BASELINE RISK ASSESSMENT FOR ANNISTON PCB SITE OPERABLE UNIT 3, ANNISTON, ALABAMA

SOLUTIA INC. COMMENTS

Section 1, Introduction

1. *CDM Federal Programs Corporation (CDM) was tasked by the U.S. Environmental Protection Agency (EPA) to perform a baseline risk assessment for the Anniston Polychlorinated Biphenyl (PCB) Site (herein after referred to as "the Site"), through Task Order No. 023.*

   The term "Site" is subsequently used interchangeably throughout the document to refer to both the Anniston PCB Site and Operable Unit 3. Recommend the term "Site" be used consistent with its definition under the Partial Consent Decree (PCD; see Comment No. 5 below) and the term "Operable Unit 3" be used when referring to Solutia Inc.'s Anniston Plant Site, the former South Landfill and the former West End Landfill.

2. *This Pathways Analysis Report (PAR) was developed to characterize the exposure setting and receptor characteristics for Operable Unit (OU) 3.*

   Recommend OU 3 be defined in the Introduction, e.g. "...Operable Unit (OU) 3, the plant site itself and former landfills."

3. *Note that while state or federal Occupational Safety and Health Organizations (OSHA) are typically responsible for risks to workers at a site, these agencies are primarily concerned with air exposures. OSHA does not have a validated method for assessing risk resulting from dermal exposure for PCBs. Thus the HHRA is a useful tool to estimate risk based on soil as the primary medium of exposure and provides an adjunct method of assessing total risk.*

   The Federal Occupational Safety and Health Act requires employers to "furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees." In order to accomplish this requirement, the Occupational Safety and Health Administration (OSHA) has established Permissible Exposure Limits (PELs) for a variety of chemicals, including two polychlorinated biphenyl (PCB) mixtures (42% and 54% chlorine). The PELs for these mixtures, 1.0 milligrams per cubic meter (mg/ m^3) for 42% and 0.5 mg/m^3 for 54%, have both been assigned a "Skin" designation which indicates that a cutaneous route of exposure contributes to overall exposure. The Solutia Inc. facility has established personal protective equipment requirements to protect against such dermal exposures, as stipulated in 29 CFR 1910.132 (Personal Protective Equipment, General Requirements). In addition, please note that vapor/particle partitioning studies

conducted in conjunction with air monitoring performed at the site failed to detect any particulate-associated PCBs and indicated that PCBs measured were present only in the vapor phase (*RFI/CS Air Monitoring Report, ENSR International, July 2004*). Thus, the assumption that soil is "the primary medium of exposure" for inhalation exposures is not supported by empirical monitoring data collected in OU 3. The inclusion of language in the Pathways Analysis Report (PAR) implying that OSHA standards do not adequately address potential worker exposures to PCBs is incorrect.

Solutia Inc. recognizes that risk assessment methods used by the United States Environmental Protection Agency (USEPA) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) differ from methods used by the OSHA to determine PELs and that PELs are not considered Applicable or Relevant and Appropriate Requirements (ARARs) under CERCLA statute or regulation; however, the differences largely reflect the fact that CERCLA is primarily designed to address abandoned sites, not actively managed plant operating sites. OSHA PELs should be maintained for use as a toxicity screening value for the air inhalation exposure route for plant workers.

Section 2, Site Background and Setting

2.1 Site Location and Description

4. *The Anniston PCB Site (the "Site") is located in Calhoun County in the north-central part of Alabama (Figure 2-1).*

   The figure reference should be Figure 1-1.

5. *The Site consists of the entire geographic area in Anniston and its environs where PCBs have come to be located.*

   The Anniston PCB Site is defined in the PCD as "...the area where hazardous substances, including PCBs associated with releases or discharges as a result of the operations, including waste disposal, of the Anniston Plant by Solutia Inc., Monsanto Company, and their predecessors have come to be located." Please modify the definition in the PAR to accurately reflect the PCD language.

6. *EPA believes that the vast majority of the PCBs in the Anniston area were released from the operations of the former Monsanto Company's Anniston PCB manufacturing plant.*

   This statement is premature, misleading, and unnecessary for the purposes of this document. A Remedial Investigation is currently being conducted to evaluate the nature and extent of PCBs in the Anniston area and determine the contribution of releases from the former Monsanto manufacturing plant as well as other sources including foundry operations.

7. *Solutia currently produces para nitrophenol and polyphenyl compounds at the Anniston plant.*

   During 2004, Solutia Inc. discontinued the manufacture of paranitrophenol. The Solutia Inc. Anniston Plant currently manufactures polyphenyl compounds, and blends and packages phosphate-ester based, non-flammable hydraulic fluids.

8. *To better manage the cleanup and study of PCBs in the Anniston area, site management activities have been divided into four Operable Units (OUs): OU-1, Anniston residential properties; OU-2, Anniston non-residential properties: OU-3, the former Monsanto PCB plant and landfills; and OU-4, Choccolocco Creek and its flood plains."*

   Please note that Operable Units 1 and 2 were subsequently combined given their geographic similarity, with land use differentiated based on residential and non-residential exposures. In addition, Operable Unit 4 includes the lower end of Snow Creek and its floodplain downstream of Highway 78 to the confluence of Snow and Choccolocco Creeks. A complete description of the Operable Units currently established for the Site is provided in the *Remedial Investigation/Feasibility Study Work Plan, Revision 2* (BB&L, December 2004).

9. *The "On-Site area is geographically similar to the OU-3 area, which includes the manufacturing plant and the two landfills.*

   Please change to read: "The 'On-Site' area is geographically similar to the OU-3 area, which includes the manufacturing plant and two *former* landfills, *the West End Landfill and the South Landfill.*"

10. *The borders of OU-3 depicted in Figure 2-2, are the railway to the north, the South Landfill to the south. Clydesdale Avenue to the east, and First Avenue to the west.*

    The figure reference should be Figure 2-1. In addition, the period after the word "south" should be replaced with a comma.

2.2 Site History

11. *The plant currently manufactures polyphenyl compounds (utilized in a variety of heat transfer fluid, plasticizer, and lubricant applications). These compounds have been produced for many years using the same raw materials and intermediates, even though there have been several expansions and process modifications. A summary description of the various manufacturing and associated support processes is provided below.*

    - *Polyphenyl Production...*

    Please modify to read "...These compounds have been produced for many years using the same raw materials and intermediates, even though there have been several expansions and process modifications. *The plant also blends and packages*

phosphate-ester based, non-flammable hydraulic fluids primarily used in the aviation industry.

- *Phosphate Ester-Based Hydraulic Fluids (2006 to present) – Phosphate esters (e.g. tributyl phosphate) are blended to produce non-flammable hydraulic fluids.*
- Polyphenyl Production…

2.3 Land Use

12. *...Land use reflects the urbanized nature of the area surrounding the chemical manufacturing plant and includes heavy industry, manufacturing, residences, and light commercial.*

    Please clarify that this is land use information for areas surrounding Operable Unit 3, and not land use information for Operable Unit 3 itself.

Section 3, Human Exposure Pathways

3.1 Identification of Exposure Pathways

13. *In this risk assessment, pathways are identified for the No Action alternative, assuming no site remediation occurs. This assessment also assumes that no additional restrictions to site access or use exist. The goal of this discussion is to establish whether it is feasible for individuals to engage in activities resulting in exposure to site-related contaminants.*

    Extensive remediation activities have previously been performed in Operable Unit 3, as described in the *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia, 2005). These remediation activities, including the imposition of a legal deed restriction precluding residential land use or use of ground water for industrial, potable or irrigation purposes, serve as a baseline condition for current exposure conditions and should be included in the No Action alternative evaluation.

14. *There are three general routes through which individuals could potentially be exposed to chemical contamination: ingestion, inhalation, and dermal contact.*

    The text description in Section 3.1 and referenced Site Conceptual Exposure Model, Figure 3-1, indicate an air pathway involving the inhalation of fugitive dust for all receptor categories. As indicated in Comment No. 3, site-specific air monitoring data collected in OU 3 indicate that PCBs are detected only in the vapor phase, as opposed to being particle bound. The Site Conceptual Exposure Model and description of exposure pathways should be modified to reflect these findings.

3.2 Characterization of Potentially Exposed Populations

15. *During the remedial investigation (RI), 11 parcels occupied by commercial enterprises were found to have wells.*

    As presented in the referenced *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005), the 11 parcels house four commercial enterprises,

and all of the wells found were monitoring/observation wells with the exception of one well located at Union Foundry which is used for process water. The Union Foundry property is located well outside of any ground-water impact areas associated with Operable Unit 3. There are no known "potentially exposed populations" to ground water located at or emanating from Operable Unit 3.

3.2.1 Current/Future Receptors

Operations Area Site Workers

16. *Site workers may come into contact with contaminants in surface soil through incidental ingestion, dermal contact, and inhalation of fugitive dust. Workers will be examined using default parameters recommended by EPA (1989, 1991, 1997a, 2002a) as described in Section 4.*

    a. As discussed in Section 4.2 (Exposure Pathway Variables) of the PAR, the USEPA has elected to consider two classifications of Operations Area Workers: current site workers using site-specific exposure parameters, and a hypothetical future worker using default parameters. Both receptors should be introduced and defined in this section. The current site worker should be described as an Operations Area Site Worker, and the hypothetical future worker should be described as a "Generic Site Worker." The intent of establishing these two different receptor groups is to account for the effects of existing institutional and engineering controls employed by Solutia Inc. on limiting exposures for the current site worker. It is assumed that such controls may not exist for the hypothetical future worker. Similar differentiations should be made, where applicable, for the trespasser (see Comment No. 17 below), O&M worker and construction worker.
    b. As indicated in Comment Nos. 3 and 14, the air pathway for the Operations Area Site Workers, as well as that for the trespasser (where applicable, see Comment No. 17 below), O&M worker and construction worker, should be modified to reflect a vapor, as opposed to particulate, inhalation pathway.

Trespassers

17. *Trespassers who cross the fence at the site may be exposed to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of windblown soil (i.e., fugitive dust). Trespassers will be examined using default parameters recommended by EPA (1989, 1997a, 2001b, 2004a) as described in Section 4.*

    a. Given the existence of a routinely maintained and inspected security fence surrounding all of the impacted property located within Operable Unit 3, the existence of appropriate signage warning against unauthorized entry, the presence of security personnel on site on a daily basis, the lack of attractiveness of the site to a potential receptor, and the fact that the facility is manned and monitored on a continuous 24-hour per day basis, there is no sound technical justification to include a trespasser as a potentially exposed receptor for current conditions. There have been no known trespasser entries at the site, and none are expected given the increasingly stringent security procedures established following "9/11."

b. If a trespasser receptor is maintained for "policy" purposes, either for current or future conditions, it is recommended that the exposure frequency and duration be reduced from 50 days/year and 10 years, respectively, to 5 days/year and two years. It is highly unlikely that the same individual would trespass on the site 50 times a year for 10 years given the absence of any "attractive nuisances" located on the property.

3.2.2 Future Receptors

On-site Residents

18. *For this risk assessment, exposure to adults and young children (0 to 6 years) will be examined as the most conservative potential exposure pathways. They will be examined as a future use scenario using default parameters recommended by EPA (1989, 1991, 1997a, 2001b, 2001c, 2002a, 2004a) as described in Section 4. Future on-site residents may come into contact with contaminants in surface soil via dermal contact, incidental ingestion, and inhalation of fugitive dust.*

    Although development of groundwater resources at the Site is unlikely and the deed for the Site restricts future residential development, it is EPA region 4's policy to evaluate future consumption of groundwater for residential purposes if the groundwater is considered to be potable. Thus, the risk assessment will evaluate a scenario where wells are installed in the future that draw from the contaminated part off the aquifer. In such an eventuality, future residents [lifetime residents and young children (0-6 years old)] may come into contact with contaminants in on-site groundwater through ingestion, dermal contact and by inhalation of VOCs from groundwater during washing, bathing, showering, laundering, and cooking. Future residents will be examined using default parameters recommended by EPA (1989, 1991, 1997a, 2002a, 2002b, 2004a) as described in Section 4.

    Unlike most abandoned sites typically addressed under CERCLA, Operable Unit 3 is an active operating facility that traditionally would be regulated under provisions of the Resource Conservation and Recovery Act (RCRA). The USEPA has recognized for some time that RCRA facilities are typically actively managed and that non-residential land use is the most appropriate use for consideration when conducting risk evaluations. As recognized by the USEPA, the property contained within Operable Unit 3 is presently occupied by two managed former landfills and an operating plant that is expected to remain in operation for the foreseeable future. Under provisions of the National Contingency Plan (NCP) and applicable CERCLA guidance, the baseline human health risk assessment is intended to address current and reasonably anticipated future land uses. Given the existence of a deed restriction encumbering Operable Unit 3 that prevents any future residential land use or use of ground water for industrial, potable or irrigation purposes, there is no justifiable basis for including a future residential exposure scenario for this operable unit for any impacted media or exposure pathways. In addition, ground-water yields in impacted areas of the site are insufficient to support potable supply or use. The residuum underlying OU 3 consists of low permeability silts and clays with characteristic hydraulic conductivities averaging approximately 10E-05 centimeters per second

(*Preliminary Site Characterization Summary Report on Operable Unit 3*, Solutia, 2005).

As indicated in the USEPA's *Fact Sheet – Summary of Pathways Analysis Report Operable Unit 03* dated December 2006, the "residential scenario for soil exposure has not been presented in this fact sheet due to the likelihood that it will be eliminated from future consideration in OU3." Consistent with this statement, if a hypothetical future residential receptor cannot exist at the facility then that same receptor cannot be exposed to ground water underlying OU 3.

Solutia Inc. recognizes that ground-water impacts in Operable Unit 3 will require remediation under CERCLA. In fact, such remediation has already been initiated as RCRA Corrective Measures under Solutia Inc.'s RCRA Post-Closure Permit including semi-annual monitoring of ground water and continuously operated ground-water recovery systems to contain and treat impact ground water within the perimeter of the facility. Given that restoration of ground water to meet Federal and State ground-water quality standards will serve as an Applicable or Relevant and Appropriate Requirement (ARAR) in developing remedial action objectives (RAOs) for OU 3, there is no need or basis to conduct a human health risk assessment for a hypothetical residential receptor that will never exist. The USEPA can compel that a remedy be implemented to achieve ARARs without conducting a human health risk assessment. For example, at the Barceloneta Landfill National Priority List Site in Puerto Rico, the USEPA chose to compel a remedy based on an exceedance of drinking water Maximum Contaminant Levels (MCLs) in ground water. As documented in the 1996 Record of Decision (ROD) for the Barceloneta Site (USEPA Site Number PRD 980509129), "EPA conducted a streamlined risk assessment by comparing levels of contaminants in groundwater to MCLs."

Section 4, Exposure Assessment

4.1 Data Evaluation and Selection of Chemicals of Potential Concern

19. *Consultants to Solutia conducted field investigations at the site that are evaluated in this PAR.*

Given that Solutia Inc. was responsible for all work conducted at the site, this sentence should read: "Solutia Inc. conducted field investigations at the site that are evaluated in the PAR."

Surface Soil

20. *Surface soil samples from thirty-six locations have been collected during the RFI (Golder 2002), the supplemental RFI (Golder 2003), and the RI. Sample locations shown in Figure A-1. Surface soil samples were collected from varying depth intervals ranging from 0 to 3 inches below ground surface (bgs) to 0 to 2 feet. All surface soil samples were analyzed for PCBs. In addition to PCBs, two samples were analyzed for the COPC list extant at the time of the investigation (arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, methyl parathion, parathion, tetraethyldithiopyrophosphate, 1,2-dichlorobenzene,*

1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 4-nitrophenol, o,o,o-triethylphosphorothioate, pentachlorophenol, 1,1,2,2-tetrachloroethane, chlorobenzene, isopropylbenzene, and methlyene chloride). In addition to PCBs, three samples were analyzed for furans, dioxins, PCB congeners, Target Analyte List (TAL) metals, Target Compound List (TCL) volatile organics, semi-volatile organics, pesticides, and cyanide. In addition to PCBs, two samples were analyzed for mercury. Duplicate samples collected for quality assurance/quality control (QA/QC) purposes are not included in the risk assessment data set.

a. Surface soil sample SWMU-42A was not analyzed for PCBs.
b. The "...COPC list extant at the time of the investigation..." included phenol.
c. Based on evaluation of Tables B-2.1 and B-2.3, it appears that duplicate sample data were included in the risk assessment data set.
    i. Table B-2.1 (Surface Soil, Operations Area): During the RI investigation, samples for PCB analysis only were initially collected at sample locations SSRI-04, SSRI-07 and SSRI-11. Additional samples were subsequently collected at these same locations and analyzed for a broader suite of parameters, including PCBs. Since these samples were collected at the same locations, the samples should be evaluated as field duplicate samples and not listed as distinct samples. It is recommended that the PCB concentrations be averaged for these duplicate field samples.
    ii. Table B-2.3 (Subsurface Soil, Operations Area): The maximum concentration listed for sample SSR-18 appears to be incorrect. While it appears that the average of the original sample and field duplicate PCB concentrations at this location was used, the calculation appears to be incorrect. Total PCBs for SSR-18 original and duplicate samples measured 16,620(J) milligrams per kilogram (mg/kg) and 9,800(J) mg/kg, respectively, assuming Aroclors that were not detected or analyzed are assigned a zero value. The average of these two values is 13,210(J) mg/kg. The value reported in Table B-2.3 for sample SSR-18 is 12,745 mg/kg.

Subsurface Soil

21. *Twenty subsurface soil samples were analyzed for the COPC list extant at the time of the investigation (arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, methyl parathion, parathion, tetraethyldithiopyrophosphate, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 4-nitrophenol, o,o,o-triethylphosphorothioate, pentachlorophenol, 1,1,2,2-tetrachloroethane, chlorobenzene, isopropylbenzene, and methlyene chloride).*

a. Only 18 subsurface samples were analyzed for "...the COPC list extant at the time of the investigation..."
b. The "...COPC list extant at the time of the investigation..." included phenol.

Groundwater

22. *However, in keeping with Region 4 policy, only those wells in the highly concentrated area of the plume, defined as MW-07, MW-09A, MW-14, MW-15, MW-16, MW-20A, MW-21A, and T-4, were used to assess risk.*

    a. As indicated in Comment No. 18 above, Solutia Inc. does not believe the evaluation of ground water for a hypothetical future residential receptor is appropriate given the presence of an existing deed restriction prohibiting such use. In the event the USEPA elects to carry such an evaluation forward, Solutia Inc. requests that it select wells that would be more representative of an actual point of exposure for this receptor, specifically at the downgradient edge of the plume. Solutia Inc. believes that the existing deed restriction coupled with ARARs that will need to be considered for the former landfills and current RCRA Permit at the facility act as an effective plume management zone to prevent groundwater use within the plume. The area over which ARAR or risk-based cleanup levels are to be attained is defined in the NCP as follows:

    > "For ground water, remediation levels should generally be attained throughout the contaminated plume, or at and beyond the edge of the waste management area when waste is left in place" (NCP, *Federal Register*, 1990; Preamble at 8713).

    Thus, the edge of the waste management area, or plant perimeter, can be considered as the point of compliance, because ARAR or risk-based cleanup levels are not expected to be attained in ground water within this area. In general, the term ewaste left in place is used in the NCP to refer to wastes that, at the completion of the remedy, will be contained or otherwise controlled within a waste management area (USEPA, 1996a), as is the case for OU 3. The NCP Preamble also acknowledges that Aan alternative point of compliance may also be protective of public health and the environment under site-specific circumstancesp (NCP, *Federal Register*, 1990; at 8753).

    b. Please note that monitoring well MW-20A cited above should read eOW-21A as indicated in Table A-2.

Selection of Chemicals of Potential Concern

23. *Standard Tables 2.1 through 2.7 in Appendix B summarize the analytical data (range of detected concentrations, the detection frequency, the range of detection limits, and the basis for selecting or excluding the chemical from the list of COPCs) for each medium, and identify COPCs for the risk assessment. The tables include only those chemicals that were detected at least once. The COPCs are summarized in Table 4.1.*

    Maximum detected concentrations were compared to risk-based screening levels to identify COPCs for each medium. The screening levels are based on the EPA Region 9 Preliminary Remediation Goals (PRGs) for residential soil and tap water (EPA 2004c), using a target cancer risk of 10^{-6} (one in one million) and a target hazard

quotient of 0.1. Chemicals were considered COPCs if the maximum detected concentration exceeds its respective screening level.

a. If the residential exposure scenario is excluded from further analysis, as previously recommended, USEPA Region 9 PRGs for Industrial Soil as opposed to Residential Soil should be used for screening purposes.
b. Tables B-2.4 through 2.6 present analytical data for PCBs in air with concentrations expressed in nanograms per kilogram, along with a screening toxicity value for total PCBs in air of 3.4 nanograms per kilogram derived from the USEPA Region 9 PRG table.
    i. The concentration units for the air monitoring data and screening value presented should be corrected to read nanograms per cubic meter.
    ii. The descriptions of exposure pathways provided in Section 3 of the PAR indicate the air pathway is based on inhalation of fugitive dust released from surface and/or subsurface soil. As indicated in Comments No. 3 and 14, site-specific air monitoring data collected in OU 3 indicate that PCBs are detected only in the vapor phase, as opposed to being particle bound. The appropriate screening toxicity value applied should be the OSHA PELs. The PELs are known to be protective of workers based on many years of empirical data from exposed worker populations.
    iii. The USEPA Region 9 PRGs for the air pathway assume 24-hour exposures and are not designed to address worker inhalation exposures. If the USEPA elects to use the Region 9 PRGs for the air pathway:
        - The PCB Region 9 air screening value used is for an "unspeciated," high risk mixture (e.g. Aroclor 1254). The screening value for an unspeciated, low risk mixture (e.g. Aroclor 1016) is 96 nanograms per cubic meter. Given that speciation (homolog) data are available for air sampling conducted at the site (*RFI/CS Air Monitoring Report, ENSR International, July 2004*), the screening value should be adjusted to reflect the actual expected exposure.
        - The screening value should be adjusted to account for an 8-hour per day, five day per week exposure period for the site worker, construction worker and O&M worker.
c. Tables B-2.1, 2.2, 2.3, and 2.7 indicate "*Total PCBs calculated using one-half the practical quantitation limit for non-detected Aroclors when at least one Aroclor detected.*"
    i. Above text implies that a value of zero is used when no Aroclors are detected in the sample. Please confirm.
    ii. Numerous studies, including *USEPA Guidance for Data Quality Assessment: Statistical Guide for Practitioners* (USEPA, 2006), have demonstrated the limitations in using simple substitution methods to represent non-detect values. Use of such proxy methods can result in a substantial bias in the estimate of the mean and variability. Use of other methods to address non-detects, such as those described in the March 2006 USEPA document titled "On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based on Data Sets with Below Detection Limit

Observations" (Singh, Maichle and Sanghee; USEPA Contract No. 68-W-04-005; March 2006) should be considered by the USEPA.

iii. In determining 95% Upper Confidence Limit (UCL) concentrations, it is recommended that the USEPA consider statistical methods applicable to all data sets (e.g. normal and non-parametric); identify any outliers (i.e. large concentration values far removed from the remainder of the data set) and consider as a distinct population; and maintain consistency in treatment of non-detects and field duplicate values.

24. *Risk-based screening levels were not available for the following chemicals: calcium, lead, magnesium, potassium, and sodium.*

Table B-2.1 in Appendix B of the PAR presents a screening value of 4.0E+01 milligrams per kilogram (mg/kg) for lead in surface soil reportedly derived from the Region 9 PRG table. Table B-2.3 in Appendix B of the PAR presents a screening value of 4.0E+02 mg/kg for lead in subsurface soil, again reportedly derived from the Region 9 PRG table. Please explain the statement in the text that no risk-based screening level is available for lead and the difference in the screening values used for surface and subsurface soil.

4.2 Exposure Pathway Variables

25. *The Solutia RCRA Facility Investigation/Confirmatory Sampling (RFI/CS) report (Solutia October 2002) proposes modified exposure parameters for:*
    - *exposed skin surface area*
    - *dermal absorption factor*
    - *soil adherence factor*
    - *intestinal absorption factor*
    - *soil ingestion rate*
    - *exposure frequency*

EPA believes that these values are well defended and documented, and should be considered in the risk assessment. Solutia's modified exposure parameters may be found in Table B-4.4. Once risks are calculated, a range of risk will be presented with the parameter values found in Tables B-4.1.RME, B-4.2.RME, and B-4.3RME representing the upper bound and modified values, found in Table B-4.4, used to represent a lower bound. Title

a. The modified exposure parameters, with the exception of the exposed skin surface area and exposure frequency factors, are based on updated studies and can be equally applied to both current workers and hypothetical future workers. The exposed skin surface area factor differs for these receptor classes based on the existence of a Plant Safety and Health Procedure requiring workers, including third party contractors and construction workers, to wear a long-sleeved shirt, long pants, steel-toed boots and a hard hat. The shirt sleeves must be worn down and buttoned at all times. The exposure frequency factor may vary based on

professional judgment regarding anticipated days of exposure. Given that the USEPA has previously approved these modified exposure parameters in the RCRA Corrective Action Program and that it currently believes these values are "well defended and documented," the modified parameters, with the exception of exposed skin surface area and exposure frequency, should be considered for use to calculate risks for both current and future worker receptor classes. The USEPA default value for exposed skin surface area should be used to calculate the risk for the hypothetical future workers given that current institutional controls (Solutia Inc. Plant Safety and Health Procedure) may not be maintained in such a case. A consensus in professional judgment should be achieved to determine the exposure frequencies for current and future worker categories.

b. Although "EPA believes that these values are well defended and documented...," the dermal absorption factor presented in the referenced RFI/CS Report (6 percent) was not used in the risk calculation. Consistent with the USEPA's statement, Solutia Inc. recommends the dermal exposure factor proposed by Solutia Inc. be used in the risk calculations.

c. The use of the term "lower bound" to describe the risks determined using the modified exposure parameters described above is incorrect. The receptors characterized by current and future conditions represent two different receptor classes and should be evaluated as such. Both a Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) should be determined for each case in accordance with CERCLA guidance.

d. The word "Title" needs to be removed from the end of this section.

4.2.1 Operations Area Site Worker Exposure Assumptions

26. *The exposed skin surface area for workers is 3,300 cm^2, the average of the 50^{th} percentile for males and females greater than 18 years of age (EPA 1997a, 2002a, 2004a).*

A skin surface area of 3,300 cm^2 corresponds to exposed head, hands and forearms. Since the exposure is presumed to occur for the entire year, assuming exposed forearms for the entire exposure period overestimates the dermal exposure. An amortized skin surface area value of 2,705 cm^2, based on six months per year full exposure, is recommended to reflect seasonal variations in forearm exposures. This same comment applies as well to the Construction Worker and O&M Worker exposure assumptions.

27. *Inhalation of fugitive dusts generated by wind erosion may occur. An inhalation rate of 20 cubic meters (m^3)/day was assumed (EPA 1997a, 2002a). A particulate emission factor (PEF) of 1.36 x 10^9 m^3/kilogram (kg) was assumed (EPA 1995, 2002a), relating the concentration of a contaminant in soil to the concentration of dust particles in the air. This value assumes a vegetative cover of 50 percent and a mean annual wind speed of 4.69 meters per second (m/s).*

a. As discussed in Comment Nos. 3, 14 and 23, site-specific air monitoring data collected in OU 3 indicate that the PCB air pathway should be limited to potential

vapor inhalation exposures. In the event that the USEPA elects to maintain a particulate inhalation pathway:

i. The inhalation rate of 20 m^3/day is for a 24-hour period (USEPA, 1997a). The worker will only be on site for 8 hours, and an adjustment factor needs to be incorporated into the equations. This same comment applies as well to the Construction Worker, O&M Worker and Trespasser (if retained; see Comment No. 17) exposure assumptions. Note that this same comment would apply to the vapor inhalation pathway.

ii. Site-specific data should be used to determine the PEF. As indicated in Section 2.3 of the PAR, only 33 percent of the OU 3 area can be considered undeveloped. In addition, meteorological data provided in the *RFI/CS Air Monitoring Report* (ENSR International, 2004), indicate the annual wind speed is less than 4.69 m/s 89% of the time. This same comment applies as well to the Construction Worker, O&M Worker and Trespasser (if retained; see Comment No. 16) exposure assumptions.

4.2.5 Residential Exposure Assumptions

28. *The intake factor for soil will be based on a soil incidental ingestion rate of adult and child residents of 100 mg/day and 200 mg/day, respectively (EPA 1991). The resulting soil ingestion factor is 114 mg-yr/kg-day.*

As indicated in Comment No. 18 above, Solutia Inc. does not believe that evaluation of a residential use scenario is appropriate for OU 3. In the event that this scenario is maintained, the methodology used to calculate an amortized soil ingestion rate based on changing body mass and consumption over a 30 year period is incorrect. The amortizing of intake values for a receptor with a high intake rate, low body weight and short exposure duration time (child) with a low intake rate, high body weight and long exposure duration time (adult) results in a disproportionate percentage of the total intake accounted for by the child receptor, thus biasing the resulting soil ingestion factor. A time-weighted average soil ingestion rate should be used in conjunction with a lifetime average body weight. The time-weighted average soil ingestion rate using the incidental ingestion rates above for exposures starting at age zero is 120 mg/day ([100 mg/day x 24/30] + [200 mg/day x 6/30] = 120 mg/day). Using a lifetime average body weight body weight of 64.4 kg, derived from age-specific body weight data (1 to 75 years of age) provided in the USEPA's Exposure Factors Handbook, the age-adjusted average soil intake is calculated as 55.9 mg-yr/kg-day ([120 mg/day] / [64.4 kg] x [30 yr]) as opposed to the 114 mg-yr/kg-day value presented above.

5.3 Toxicological Assessment

29. *The RfD for Aroclor-1254 was used as a surrogate for total PCBs. The CSF for total PCBs is the upper-bound CSF intended for Aroclors having high risk and persistence.*

a. A single cancer slope factor (CSF) is used for "PCBs, Total." As previously indicated in Comment No. 25, a Central Tendency Exposure (CTE) should be determined for both current and future worker exposure scenarios. As indicated in

USEPA's Integrated Risk Information System (IRIS), "Depending on the specific application, either central estimates or upper bounds can be appropriate." The central estimate, as opposed to the upper bound estimate slope factor should be used in the CTE assessment.

b. As indicated in Comment No. 18 above, Solutia Inc. does not believe the evaluation of ground water for a hypothetical residential receptor is appropriate given the presence of an existing deed restriction prohibiting such use. In the event the USEPA elects to carry such an evaluation forward, Solutia Inc. requests the CSF value used be re-evaluated. Aroclor and homolog distribution data are available for ground water and indicate that PCBs, when detected, are present as lower chlorinated compounds. The USEPA's IRIS provides the following guidance on assessing PCB cancer risks: "The cancer potency of PCB mixtures is determined using a tiered approach that depends on the information available... For ingestion of water-soluble congeners, the middle-tier slope factor can be converted to a unit risk estimate and drinking water concentrations associated with specified risk levels."

30. *Table 3-1, Selection of Exposure Pathways: Entry for Current/Future, Subsurface Soil, Subsurface Soil, OU-3 Area, Construction Worker, Adult, Dermal, On-Site*

Entry for rationale for selection or exclusion of exposure pathway indicates "*Trespassers may have exposed skin surfaces come into contact with soil.*" Should read: "Workers may have exposed skin surfaces come into contact with soil."

31. *Table 4-2*

Referenced note (1) is not provided.

32. *Table B-2.2*

The location of maximum concentration and range of detection limits are incorrect for the samples evaluated.

33. *Tables B-4.1.RME, B-4.2.RME, B-4.3.RME, and B-4.4*

a. References to Tables B-3.1 to 3.5 for chemical concentrations need to be eliminated since exposure point concentrations are not included in the PAR.
b. The table references for Absorption Factor need to be corrected. Current references direct the reader to Table 4-1 or indicate "Chem. Spec."