FINAL

WOOLFOLK CHEMICAL WORKS SITE, OU#4
RECORD OF DECISION

August 24, 2004

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DECLARATION FOR THE OU4 RECORD OF DECISION

DECLARATION FOR THE OU4 RECORD OF DECISION

SITE NAME AND ADDRESS

Woolfolk Chemical Works Site
Operable Unit 4, Surface Soil, Attic Dust Contamination
Fort Valley, Peach County, Georgia

STATEMENT OF PURPOSE

This Decision Document presents the selected remedial action for Operable Unit (OU) 4 of the Woolfolk Chemical Works Site (the Site or WCW Site), Fort Valley, Peach County, Georgia, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for the OU.

This remedial action is taken to protect human health and the environment from the threat posed by OU4 surface soils and attic dust contamination. The State of Georgia, as represented by the Georgia Environmental Protection Division (GAEPD), has been the support agency during the remedial investigation/feasibility study process for OU4. In accordance with 40 CFR§300.430, as the support agency, GAEPD has provided input during this process. That State of Georgia has concurred with the selected remedy.

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of contaminants from OU4 into the environment.

DESCRIPTION OF THE SELECTED REMEDY

This OU is the fourth of five (5) planned at the Woolfolk Site. OU1 addresses groundwater. OU2 addressed properties near the former WCW property that were designated for a redevelopment property in a ROD signed in September 1995. OU3 includes the former WCW property. The newly proposed remedy for OU3 will address four (4) primary areas of concern on or near the facility property, including: 1) the soil; 2) the capped area; 3) the manufacturing buildings; and, 4) the facility's storm water sewer system. The Selected Remedy for OU4 will include clean up activities that address: surface soils (approximately 40 parcels), attic dust in residential homes (approximately 60 residences), and the portion the ditch that drains away from the Site along Preston Street to Spillers Street. OU5 includes the portion of the drainage ditch that extends from the Spillers Street outfall or discharge pipe to the upper tributary of Big Indian

Creek. The ditch is contaminated with WCW Site-related constituents. The entire drainage ditch was originally planned to be addressed as part of OU4 but additional ecological sampling and evaluation is needed before ecological risk can be determined and cleanup alternatives developed for the portion of the drainage ditch that extends beyond the Spillers Street outfall This fifth OU was created to allow adequate time to sample the ditch without delaying cleanup activity in OU4.

The scope of this ROD is limited to OU4.

The major components of the selected remedy for this OU include

- excavation of contaminated surface soils from residential parcels and consolidation on OU3
- decontamination of drainage pipe running from the boundary of OU3 to Spillers Street
- decontamination of attics with attic dust contamination greater than 71 mg/kg arsenic
- use of OU4 soils as backfill in the paved areas of OU3 without testing. After testing to ensure that unpaved criteria have been achieved, the OU4 soils would be used as backfill in unpaved areas. If OU4 soil cannot be used as backfill, it will be disposed offsite.

The selected remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risk at OU4 through removal, treatment, engineering controls, and/or institutional controls such as land and/or groundwater use restrictions on a property deed.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate, and is cost-effective. Although this remedy does not satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element, available analytical data indicate that contaminant concentrations in OU4 soils would not require treatment prior to their final disposition as described in the Selected Remedy. Therefore, it is also determined that this remedy utilizes a permanent solution and alternative treatment technology to the maximum extent possible.

This remedy may result in the leaving of hazardous substances on the WCW Site, therefore, institutional controls and additional site reviews may be required.

DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record for this OU.

- Chemicals of concern and their respective concentrations
- Baseline risk represented by chemicals of concern
- Cleanup levels established for chemicals of concern and the basis for those levels
- How source materials constituting principal threats are addressed
- Current and reasonably anticipated future land use assumptions. Note that groundwater is addressed in OU1, and that potential future beneficial uses of groundwater are not discussed in this ROD.
- Potential land use that will be available at the Site as a result of the selected remedy
- Estimated capital, annual operation and maintenance(O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factors that led to the selection of the remedy

WINSTON A. SMITH
DIRECTOR
WASTE MANAGEMENT DIVISION

8/30/04
DATE

DECISION SUMMARY

RECORD OF DECISION
OPERABLE UNIT #4
WOOLFOLK CHEMICAL WORKS SITE
FORT VALLEY, GEORGIA

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Site Name: Woolfolk Chemical Works Site
Location: Fort Valley, Georgia
EPA Identification Number: GAD003269578
Lead Agency: EPA
Support Agency: Georgia Department of Natural Resources, Environmental Protection Division
Source of Cleanup Monies: Superfund Trust Fund

The Woolfolk Chemical Works Site (WCW Site or Site) in Fort Valley, Georgia is a 31-acre site that resulted from the production, formulation, and packaging of pesticides, herbicides, and insecticides (including arsenic and lead-based products) at the Woolfolk Chemical Works (WCW) facility The WCW Site also includes a peach orchard located south of the facility and several properties located on Martin Luther King Drive and Oak Street which were part of a redevelopment project. The WCW Site is located in an area with mixed commercial and residential land uses. Residences are located to the west, south, and east, with homes to the southeast adjoining a peach orchard. Several businesses are located along the north, northwest, and east ends of the former plant. For a general site map, see **Figure 1-1**.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The WCW Site in Fort Valley, Georgia includes the facility where Woolfolk Chemical Works, Inc., its successors, and several other companies produced, formulated, and/or packaged pesticides, herbicides, and insecticides (including arsenic and lead-based products) from 1910 to 1999 Although initially a lime-sulfur manufacturing plant, the facility began producing arsenic-based pesticides around 1921. Production expanded during the 1950s to include dichlorodiphenyl-trichlorethane (DDT), lindane, toxaphene, and other chlorinated pesticides In 1977, a subsidiary of Reichold, Inc. acquired the stock of Woolfolk Chemical Works Inc. and later changed the name of the corporation to Canadyne Georgia Corporation (CGC). CGC continued manufacturing pesticides at the Site. In 1984, Peach County Property, Inc (PCPI) purchased all but one (1) acre of the 18-acre property from CGC From 1984 to 1986, PCPI operated at the Site, manufacturing organic pesticides In 1986, PCPI leased the Site, except for the one (1) parcel CGC retained and one (1) parcel it sold to Marion Allen Insurance, to SurePack Inc , a company which merged into SureCo in 1992. From 1986 to 1999, SurePack/SureCo operated at the Site, manufacturing various organic pesticides used primarily in the lawn and garden market and by peach growers.

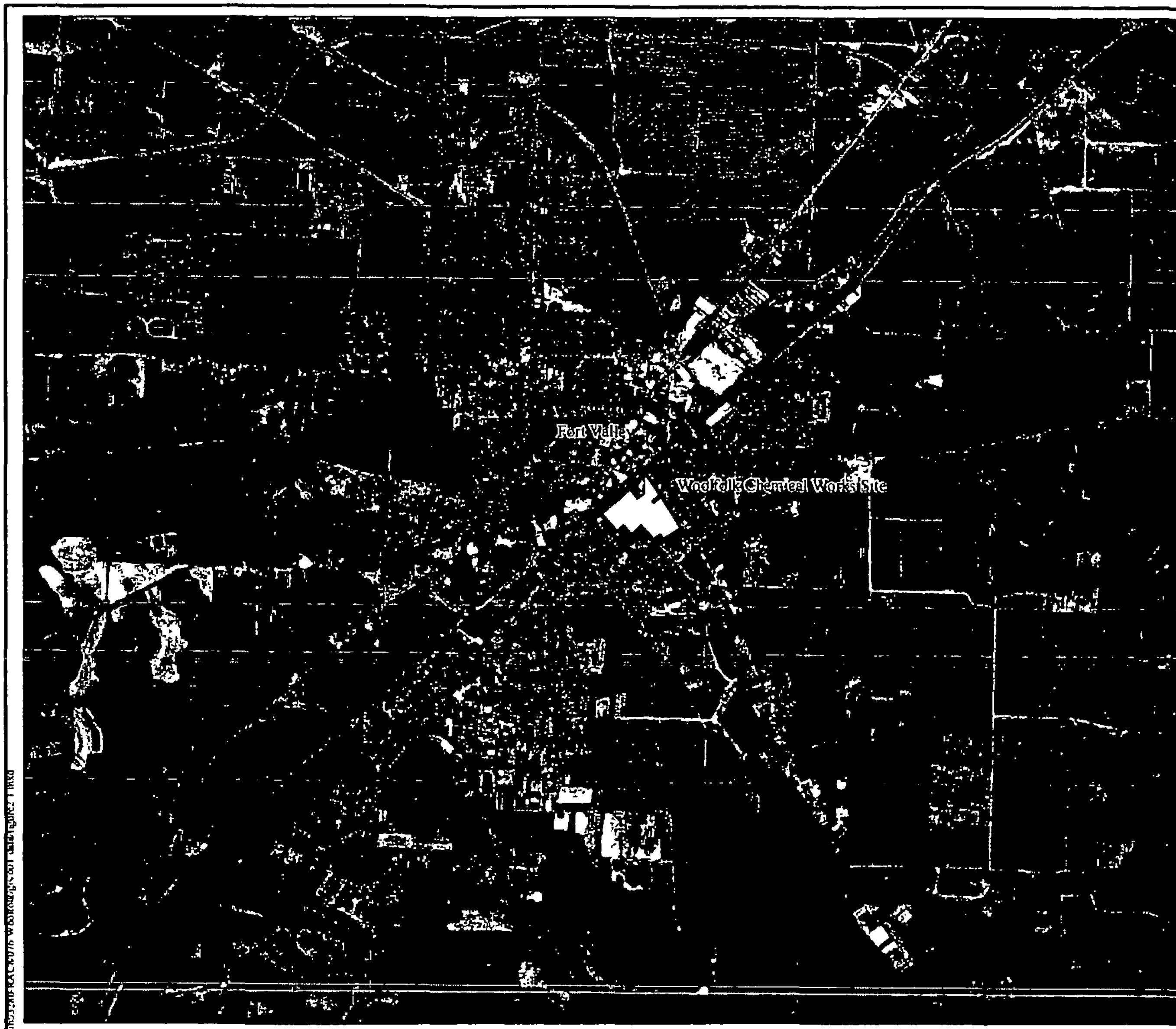

Figure 1-1

Site Map
Woolfolk Chemical Works Site
Fort Valley, Georgia

Feet
0 700 1 400 2 800 4 200 5 600

CDM

In the early 1980s, the Georgia Environmental Protection Division investigated complaints from local citizens that CGC was discharging waste products to a drainage corridor heading away from the Site. In 1986-87, CGC, as part of its sales agreement with PCPI, began a voluntary removal action, demolishing a 40,000 square-foot building and arranging for disposal of the contaminated debris at the Site. Further investigation revealed a more extensive contamination problem

After the Site was put onto the National Priority List (NPL) in August 1990, CGC entered into an Administrative Order on Consent (AOC) with EPA, agreeing to perform a Remedial Investigation/ Feasibility Study (RI/FS). The RI and the baseline risk assessment indicated that there were 48 contaminants of potential concern (COPC). However, the arsenic contamination presented the greatest risk. The results of the RI also indicated that the contamination had spread from the 18-acre facility onto the surrounding residential and commercial properties. When negotiations with CGC to conduct a removal action to remediate the immediate threat failed, EPA issued a Unilateral Administrative Order (UAO) to the company in December 1993.

Pursuant to the UAO, CGC removed more than 22,900 tons of contaminated soil and debris from 26 residential properties, as well as 26,000 tons of arsenic-contaminated soils and debris from the drainage corridor leading from the facility property. CGC was also ordered to demolish a building used to package Silvex, which contains the hazardous substance dioxin, and to remove arsenic-contaminated attic dust from eight (8) residences bordering the facility property.

In March 1994, EPA issued a Record of Decision (ROD) which provided for long term cleanup of contaminated groundwater at the Site. As a result of the ROD, a groundwater treatment system was designed and implemented for treatment of contaminated groundwater in 1998. CGC operated the system until 2002. EPA is currently in the process of better defining the extent of the contaminant plume and evaluating the effectiveness of the existing groundwater treatment system. Additional design and system modifications are likely.

In response to the removal UAO, CGC also purchased 17 properties and converted them to commercial use. As a result, EPA issued a second ROD in September 1995, which integrated the remediation and development of these properties into a library, an adult education center, and a Welcome Center. Construction of the library began in 1996 and was completed in 1998. The Welcome Center for the City was renovated and is now open. The building originally planned to be decontaminated and renovated for an adult education center was demolished by CGC in 2003 because CGC could not reach agreement on liability issues with a nonprofit group which wanted the building.

A ROD for OU3, which addressed soils, buildings, and the capped area on the former CGC plant property, as well as the storm water drainage system both on and off that property (the Preston Street portion), was originally signed on August 6, 1998. After the ROD was signed, EPA discovered new information relevant to the choice of remedy selected. Results of sampling conducted as part of the initial fund-lead remedial design indicated a very significant increase in the amount of soil under the cap and on other parts of OU3 which were above arsenic cleanup levels. In addition, the Agency subsequently finalized a regulation establishing a lower maximum contaminant level (MCL) for arsenic in groundwater, a change which would eventually require lower arsenic soil cleanup levels to ensure the long-term protectiveness of the OU3 remedy EPA concluded that the impact of both changes so fundamentally affected the remedy selected in the 1998 ROD that an amendment was warranted.

In 1995, during implementation of the removal UAO, the Agency created OU4 in order to address remaining surface soil contamination off the main facility property that is attributable to the Site. In October 1999, EPA initiated an RI/FS for OU4 using an EPA contractor. The objective of the RI was to define the nature and extent of the contamination in the neighboring residential and non-residential surface soils, the attic dust in residential properties, and the sediment in the drainage pathway to Big Indian Creek.

Approximately 330 surface soil screening samples and 50 surface soil confirmation samples were collected during the RI. The results of the OU4 RI indicated that the most significant soil inorganic contaminant is arsenic. The contamination follows both the surface water runoff/drainage migration pathway primarily to the south of the former WCW facility (OU3) and the windborne migration pathway immediately surrounding the facility and to the east and northeast of the facility in the direction of the prevailing winds While over 40 other chemicals, herbicides, and/or pesticides were used at the height of the manufacturing activity at the WCW facility, the results of the RI and previous sampling suggest that both the quantity and concentrations of arsenic present at the Site make it the primary indicator of Contaminants of Concern (COC) defined in the OU4 RI in surface soils and attics.

Based on the available data, it is believed that in the process of remediating arsenic in surface soils to acceptable levels, the other COCs in the soil will also be remediated to acceptable levels Although arsenic will be used as an indicator during the cleanup field activities, a percentage of the confirmation samples will be analyzed for the list of COCs identified in this ROD.

A second component of the RI was the investigation of the arsenic contamination in attics near the Site. The study found that arsenic levels in attic dust at certain homes in potentially affected areas near the Site are significantly greater than would be anticipated based on the levels found in samples collected from homes located in a reference area in the city of Fort Valley, away from the potentially affected area. Potentially affected areas are located immediately east, west, and south of the Site. The reference area was located further southwest of the Site Although other sources may exist, the use of arsenic at the Woolfolk plant site appears to be the most likely explanation for elevated arsenic levels in the attics of homes located in the potentially affected areas.

Current Enforcement Status: In March 2003, the Department of Justice, on EPA's behalf, filed a cost recovery action in federal district court against potentially responsible parties (PRPs) Reichold Limited, CGC, Woolfolk Chemical Works, Ltd , the J W. Woolfolk Trust, the Estate of Thomas W. Cleveland, Jacqueline Woolfolk Mathes, Peach County Property, Inc., and SureCo, Inc. In response, CGC filed a counterclaim and then submitted a petition for reimbursement to EPA's Environmental Appeal Board, pursuant to Section 106(b)(3) of the Comprehensive

Environment Response, Compensation, and Liability Act (CERCLA or Superfund), 42 U S.C. §9606(b)(3) The actions are currently stayed in both forums as settlement negotiations continue.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA has been working with the community since 1990 and has made significant efforts to insure that interested parties have been kept informed and given an opportunity to provide input on activities performed at the WCW Site. However, through the removal and remedial process, citizens of Fort Valley, as represented by the Woolfolk Citizens Response Group (WCRG), a Technical Assistance Group (TAG) partially funded by EPA, have expressed the concern that EPA is providing inadequate information to the public Although EPA has made the administrative record available in the public repository and has provided the monies for the TAG grant, it was suggested that these actions are not enough to promote a full understanding of the Superfund process. In order to further the exchange of information between EPA and the community, EPA developed a Community Information Exchange Group. This group of community-selected representatives met several times in 1995 in a public forum to discuss activities occurring at the WCW Site. A second community group was organized to provide a forum for all involved to discuss and address cleanup issues and future land use, so that the Woolfolk Site remediation results in a safe place to live, protects the environment and, where possible, aids the local economy. Known as The Alliance Group, its members generally meet every four (4) to six (6) weeks at the Peach County Courthouse or Fort Valley City Hall. The Alliance Group consists of local citizens and representatives from: The City of Fort Valley, Peach County, Fort Valley Utilities Commission, WCRG, businesses (Canadyne-Georgia Corporation, Holcomb Tire Corporation, SureCo Inc.) and Federal and State Agencies [Agency for Toxic Substances and Disease Registry (ATSDR) Georgia Division of Public Health, Georgia Environmental Protection Division (EPD), Environmental Protection Agency Region 4 (EPA), and EPA Office of Research and Development (ORD), Cincinnati, Ohio].

The Proposed Plans for OU3 and OU4 were released on July 10, 2003 for public comment. These documents were made available to the public as part of the Administrative Records (ARs) located in the EPA Region 4 Docket Room and at the information repository, located at the Thomas Public Library in Fort Valley, Georgia. The Notice of Availability of these documents was published in the Fort Valley Leader Tribune on July 8 and July 9, 2003 and in the Macon Telegraph and News on July 9, 2003. A public comment period was held from July 10, 2003 to August 10, 2003 and then extended to September 10, 2003. A public meeting for OU4 was held on July 10, 2003. At this meeting, representatives of EPA answered questions about the Site and the remedial alternatives under consideration for OU3 and OU4. A transcript of the public meeting, part of the Administrative Record for OU4, can be reviewed at the information repository at the Thomas Public Library in Fort Valley, Georgia and at the Region 4 EPA Record Center in Atlanta, Georgia In addition, a Responsiveness Summary that provides EPA comments on questions raised by the public is included as Part III of this ROD

4.0 SCOPE AND ROLE OF OPERABLE UNITS

As with many Superfund sites, the problems at the WCW Site are complex. As a result, EPA has organized the work into five (5) operable units (OUs) The five (5) OUs are

- Operable Unit 1.

A groundwater monitoring and extraction system was designed and installed in accordance with the 1995 ROD and operated until September 2002 when it was shut down by CGC. A recent groundwater monitoring report (2001) indicated that the existing extraction and treatment system was not fully containing the contamination plume and the remediation levels established in the ROD were not being achieved. Evaluation of the system is ongoing and additional monitoring wells will be required to fully determine the extent of groundwater contamination. Additional design and system modifications are likely.

- Operable Unit 2.

A property redevelopment remedy was selected in a ROD signed in September 1995 and construction was completed in 1998. A decontaminated antebellum farmhouse was remodeled into a tourist welcome center and office space for the Fort Valley Chamber of Commerce. Also, several contaminated homes were torn down to make way for a new community library The library and welcome center have been completed and are open for business.

- Operable Unit 3 :

OU3 is the portion of the Site where WCW's operations were located. EPA has determined that the original ROD that addressed OU3 and was signed in 1998 must be amended based on new information gathered during the RD that fundamentally affects the remedy selected in that ROD. As a result, in July 2003, the Agency issued and received public comments on an amended proposed plan for OU3. As noted in the amended proposed plan, the preferred remedy for OU3 will address four (4) primary areas of concern on or within close proximity to the former Woolfolk facility property: 1) soil; 2) capped area, 3) manufacturing buildings, and 4) the facility's storm water sewer system. A ROD amendment for the OU3 ROD will be issued in order to address the much larger volume of contaminated material than had been estimated in the original ROD.

- Operable Unit 4· **(The subject of this ROD)**

OU4 is the subject of this ROD. Parcels near the WCW facility with soil arsenic levels greater than 30 mg/kg have already undergone a removal action, as have three (3) homes where attic dust concentrations were greater than 1,000 mg/kg. OU4 consists of remaining cleanup actions for. surface soils (approximately 40 parcels), attic dust in residential homes (approximately 60 residences), and contaminated soils and sediment in the portion the drainage ditch pipe that drains away from the Site along Preston Street to Spillers Street.

- Operable Unit 5.

OU5 consists of a drainage ditch that extends from the Spillers Street discharge pipe to beyond the railroad discharge, into the upper tributary of Big Indian Creek. The ditch is contaminated with WCW Site-related substances The ditch was originally planned to be addressed as part of OU4 but additional ecological sampling and evaluation is needed before the ecological risk can be determined and cleanup alternatives developed. Therefore, this area has been redesignated as a separate operable unit, OU5, so the necessary sampling activities in the remaining portion of the ditch can be conducted without delaying cleanup activity in OU4.

5.0 SITE CHARACTERISTICS

5.1 Conceptual Site Model

A conceptual site model (CSM) incorporates information on the potential chemical sources, release mechanisms, affected media, potential exposure pathways, and known receptors to identify complete exposure pathways. The CSM for the WCW Site is presented in **Figure 5-1**. As seen in Figure 5-1, contamination occurred as a result of windblown migration and storm water runoff. To a lesser degree, releases may have been caused by aerial application of pesticides, direct application of pesticides for agricultural and garden use, and other pest control activities.

5.2 Site and Regional Setting

5.2.1 Site and Local Surface Water Pathways

The information presented in this section is based on the *Final Remedial Investigation Report, Woolfolk Chemical Works Site, Fort Valley, Georgia* (CH2M HILL November 1992), review of United States Geological Survey (USGS) topographic maps (USGS 1972a, 1972b, 1973, and 1974), and Site observations made on December 2, 1999.

The WCW Site lies within Fort Valley Plateau District of the Coastal Plain Physiographic Province The Fort Valley Plateau District is characterized by broad, flat topography, with few streams and low local relief. The Fort Valley Plateau is a gently rolling area that slopes to the southeast. South of Fort Valley, streams are somewhat more incised into the plateau, and relief in the streams ranges up to 100 feet in some areas along Big Indian Creek.

The WCW Site is generally flat to gently sloping, with a slope of about 1 percent toward the south. No surface water bodies or rivers exist within the former facility boundaries. The surface water runoff drainage system from the Site to Spillers Street is included in OU4. The surface water runoff drainage from Spillers Street to Big Indian Creek is included in OU5.

Surface water runoff from the facility collects in a series of open ditches along Preston Street. The runoff flows through a series of ditches, crossing Spruce Street, and then Lavender Street until discharging from a culvert into the Falls Branch tributary to Big Indian Creek at the south end of Spillers Street. A portion of the sediments in the ditch from the Site to Lavender Street has been remediated In the past, water was reported to have backed up in a tributary ditch north of Lavender Street.

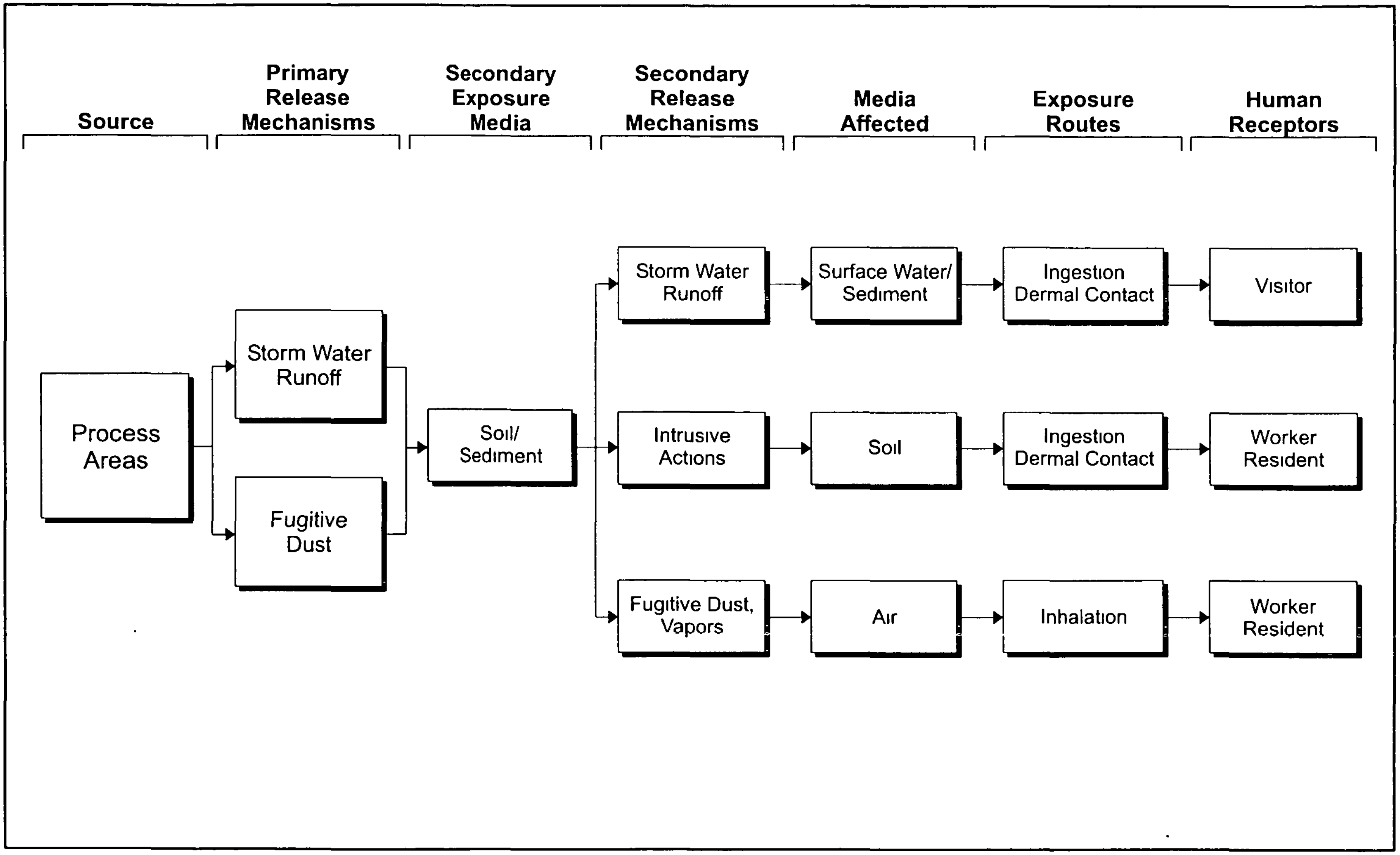

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Figure 5-1
Conceptual Site Model
Woolfolk Chemical Works Site OU4

At the discharge point at the end of Spillers Street the channel of the Falls Branch tributary is relatively narrow, about 4 to 5 feet wide, and has very narrow recent terraces, zero (0) to 0.5 feet wide An older, wider (30 to 40 foot-wide) terrace is present along the upper part of the tributary The sediments within the channel are sandy and the stream itself flows on a kaolinite layer. Farther south, but still north of the railroad tracks, the upper terrace is less well defined or absent. Approximately 1/4 mile south of the railroad tracks, the channel broadens. The tributary narrows again as it flows southward toward University Boulevard As the tributary emerges from the wood line along University Boulevard, it is very shallow and narrow The stream turns west, running along the wood line, then turns south and goes beneath University Boulevard via a large concrete culvert South of University Boulevard. The stream appears to receive additional water from runoff from the east end of the street. A very silty drainage ditch runs along the south side of University Boulevard toward the tributary, although no water was flowing in either drainage path during the December 2, 1999 Site visit As Falls Branch re-enters the woods south of the road, the material in the stream bed is considerably siltier than it is between Spillers Street and University Boulevard.

About 4,000 feet south of University Boulevard, the stream broadens into a swampy area, with no distinct channel. During the December 1999 Site visit, water was present throughout this area. Water marks on trees were approximately one and one-half (1½) to two (2) feet above the water surface at the time of the Site visit, providing evidence that the water at that time was relatively low. The tributary remains a broad swamp for at least another 4,000 feet before returning to a more distinct channel by the time it reaches Carver Road Approximately 2,000 feet south of Carver Road, Falls Branch discharges into Big Indian Creek

The surface water runoff drainage system from the Site to Spillers Street is included in OU4. The surface water runoff drainage from Spillers Street to Big Indian Creek is included in OU5.

5.2.2 Site Climate

The climatological data presented here is taken from Southeast Regional Climate Center data for the Macon Airport, Georgia Station, collected from 1961 to 1990. Fort Valley is located approximately 20 miles southwest of Macon. The average annual precipitation at Macon Airport is 44.65 inches, with the highest monthly precipitation occurring in March (4 79 inches) and February (4.74 inches). The lowest average precipitation occurs in October (2.18 inches) The area receives an average of 1.4 inches of snow annually. Average temperatures range from 45.5° Fahrenheit (F) in January to 81 5°F in July.

5.2.3 Site Geology

The Site geology presented here is summarized from the *Final Remedial Investigation Report, Woolfolk Chemical Works Site, Fort Valley, Georgia* (CH2M HILL 1992). In general, the uppermost unit of the Fort Valley Plateau is clayey and sandy to pebbly undifferentiated residuum. The residuum is believed to be underlain by undifferentiated Paleocene-Middle Eocene sediments of the Mossy Creek Formation These sediments are predominantly fine-to-medium grained sands with massive, white to grey, silty-sandy kaolin units. Previous investigations have referred to this unit as the Kaolin Unit, and it is present throughout the WCW Site

Unconsolidated Upper Cretaceous sediments underlie the undifferentiated Paleocene to Middle Eocene sediments at the WCW Site. This material is believed to be the Gaillard Formation, which contains poorly sorted sands with flakes of muscovite and beds of maroon-stained clay (kaolin), and feathers out in the northwest portion of the WCW Site. The maroon staining may be associated with bioturbation of the sediments. However, differentiation between the three (3) identified Upper Cretaceous units is based on large-scale depositional features such as cross bedding.

Below the Upper Cretaceous are Middle Cretaceous sands and clays that may be the Fort Valley area equivalent of Blufftown and Eutaw Formations. This formation, the Pio Nono Formation, is a part of the Oconee Group and consists of white, yellow, and maroon to light-green clayey sand to sandy clay

The lowermost geologic unit of interest at the WCW Site is the Tuscaloosa Equivalent. The term Tuscaloosa Equivalent has been adopted because this unit is a facies equivalent of the Alabama-West Georgia Tuscaloosa Formation in the Fort Valley area.

5.2.4 Site Hydrogeology

Five (5) main hydrogeologic units have been identified for the WCW Site. The hydrogeologic units generally can be divided into three (3) aquifers and two (2) semi-confining or confining units. They include (in descending order): 1) the surficial aquifer; 2) the Kaolin Semi-Confining Unit; 3) the Upper Cretaceous aquifer, 4) the Middle Cretaceous Confining Unit; and 5) the Tuscaloosa Equivalent.

The surficial aquifer is a sandy unit consisting of water that is perched on the Kaolin Semi-Confining Unit. Groundwater in the surficial aquifer flows generally to the southeast across the facility, following the topography of the underlying (perching) clay unit. Groundwater in the Upper Cretaceous unconfined unit (Horizons 1 and 2) slopes from southwest to northwest with a more easterly component in the southeast part of the facility Downward leakage is apparent in the western part of the facility. Water levels in this aquifer do not appear to be influenced by pumping in the Tuscaloosa Aquifer from the city water supply wells. Groundwater flow in the Upper Cretaceous Confined Unit (Horizon 3) is generally toward the northeast and east. In the Tuscaloosa Aquifer, groundwater flow is primarily to the southeast, so that the majority of the facility is downgradient of the city water supply wells. Vertical flow is downward. The Upper Cretaceous unconfined and confined aquifers converge toward the northeast.

5.3 Media Contamination

5.3.1 Soil Contamination

In a baseline risk assessment, discussed in Section 7 0, EPA required the evaluation of the risks and development of performance measures associated with the contaminated soils on OU4 properties. Using the OU 4 RI data, EPA defined arsenic, iron, lead, manganese, alpha-chlordane, chlordane, and dieldrin as COCs for OU4 surface soils.

5.3.1.1 Phase I Investigation

A total of 352 Phase I surface soil screening samples, including 25 duplicates, were collected from 327 individual parcels located in the target area and analyzed for arsenic and lead using a graphite furnace with low detection [1 milligram per kilogram (mg/kg)] capabilities. Risk-based EPA Region 9 preliminary remediation goals (PRGs) for a non-cancer point were used as screening values during the remedial investigation to assist in identifying the nature and extent of contamination prior to developing site specific remediation levels

Arsenic/Lead
Of the 352 Phase I surface soil screening samples, 31 samples were found to be over the PRG of 18 mg/kg (non-cancer endpoint) for arsenic. The distribution of arsenic contamination above the non-cancer endpoint PRG of 18 mg/kg appears to primarily follow the surface water/drainage migration pathway from the main facility southeast along Preston Street and between Preston Street and Martin Luther King Jr (MLK) Drive, extending to the south beyond Lavender Street towards the drainage ditch (See Figure 4-1 of the Final RI Report dated June 2002 as revised October 2002) The distribution of arsenic contamination also can be attributed to the air migration pathway as PRG exceedences can be found immediately surrounding the Site towards the east between MLK Jr. Drive and Oak Street, northeast between Troutman and Church Streets, and along Oakland Heights Parkway, which are all in the direction of the prevailing winds to the east/northeast of the main facility.

A total of seven (7) of the 352 Phase I surface soil samples were found to be over the PRG of 400 mg/kg for lead The distribution of lead above the PRG of 400 mg/kg appears to be sporadic, with a small area concentrated near the downtown area of Fort Valley, north of the main facility between East Main and Church Streets (See Figure 4-2 of the Final RI Report dated June 2002 as revised October 2002) Based on the waterborne or windborne transport pathway from the main facility, lead PRG exceedences would be expected, 1) southeast along Preston Street, 2) south beyond Lavender Street towards the drainage ditch, 3) immediately surrounding the Site towards the east between MLK Jr Drive and Oak Street, 4) northeast between Troutman and Church Streets, and 5) along Oakland Heights Parkway However, the lack of lead PRG exceedences in these areas suggests that the main facility is not the source of lead contamination found in the downtown Fort Valley area between East Main and Church Streets.

5.3.1.2 Phase II Investigation

A total of 52 Phase II surface soil confirmation samples, including six (6) duplicates were collected from 46 individual parcels located both inside and outside the study area and analyzed for extractible, metals, pesticides/polychlorinated biphenyls (PCBs), and dioxins/dibenzofurans.

Extractables
The most frequently detected extractables were the carcinogenic polycyclic aromatic hydrocarbons (CPAHs), including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo-a-pyrene, chrysene, and dibenzo(a,h) anthracene.

Of the 52 Phase II surface soil confirmation samples, 10 samples had at least one (1) individual CPAH with a concentration exceeding its respective PRG In addition, 16 of the 52 Phase II surface soil confirmation samples had total benzo(a)pyrene toxicity equivalent quotient (BAP TEQ) values exceeding the PRG of 62 ug/kg for benzo-a-pyrene Based on these BAP TEQ PRG exceedences, extractable organic contamination appears to be sporadically distributed outside of the Railroad Street boundary, to the north between Railroad Street and Camelia Boulevard, to the west between Central Avenue and College Streets, to the southwest between Railroad Street and University Drive, and away from OU3 and OU4 (See Figures 4-4 and 4-5 of the Final RI Report dated June 2002 as revised October 2002)

The absence of elevated concentrations of extractables along the water or windblown transport pathways indicates that extractable organic contaminants have not been widely transported from the main facility by either windborne or waterborne transport mechanisms and do not appear to be related to the main facility Based on identified waterborne or windborne transport from the main facility, extractable organic contaminant PRG exceedences would be expected southeast along Preston Street, to the south beyond Lavender Street towards the drainage ditch, immediately surrounding the Site towards the east between MLK Jr. Drive and Oak Street, northeast between Troutman and Church Streets, and along Oakland Heights Parkway However, the lack of extractable organic contaminant PRG exceedences in these areas suggest the main facility is not the source of extractable organic contamination The source of this contamination is currently unknown.

Metals

Arsenic/Lead

Arsenic and lead were the two (2) most frequently detected inorganic contaminants at concentrations above their highest respective background concentrations Arsenic was found in seven (7) of the 52 Phase II surface soil confirmation samples at concentrations above the PRG of 18 mg/kg The distribution of arsenic was consistent with the findings of the Phase I surface soil screening investigation There were no Phase II surface soil confirmation samples that exceeded the PRG of 400 mg/kg for lead.

Other Inorganics

With the exception of arsenic and lead, the other inorganic contaminants detected most frequently at concentrations above their highest respective background concentrations were barium, calcium, copper, magnesium, mercury, and zinc Isolated PRG or background exceedences also were found for beryllium, cadmium, chromium, nickel, potassium, and sodium However, based on their sporadic distribution, it would be difficult to attribute the recorded exceedences to the main WCW facility operations (See Figure 4-6 of the Final RI Report dated June 2002 as revised October 2002).

Pesticides/PCBs

The most frequently detected pesticides were chlorinated hydrocarbon insecticides including 4,4'-DDE, 4,4'-DDT, chlordane, dieldrin, and heptachlor epoxide

Of the 52 Phase II surface soil confirmation samples, 16 samples had at least one (1) individual concentration value exceeding the constituent's respective PRG The PRG exceedences were located outside of the Railroad Street boundary, to the north between Railroad Street and

Camellia Boulevard, to the west/northwest between Camelia Boulevard and Knoxville Street, and to the southwest between Railroad Street and University Drive and away from OU3 and OU4 (See Figure 4-7 of the Final RI Report dated June 2002 as revised October 2002)

Based on the identified waterborne or windborne transport pathways from the main facility, pesticide PRG exceedences caused by WCW operations would be expected southeast along Preston Street, to the south beyond Lavender Street towards the drainage ditch, immediately surrounding the Site towards the east between MLK Jr Drive and Oak Street, northeast between Troutman and Church Streets, and along Oakland Heights Parkway. However, confirmation samples collected during the RI Field Investigation indicate that two (2) of the most frequently detected chlorinated hydrocarbon insecticides (chlordane and dieldrin) were found more frequently outside the drainage pathway (64% and 79%, respectively) than inside the drainage pathway (25% and 50%, respectively) These pesticides were also found at higher concentrations outside the drainage pathway (1100 mg/kg and 500 mg/kg, respectively) than inside the drainage pathway (11 mg/kg and 23 mg/kg, respectively)

The increased frequency and concentrations of pesticides found outside the drainage pathway and the lack of pesticide PRG exceedences in these areas suggest the main facility and its property are not the sources of pesticide contamination identified in the sampling The source of this contamination is unknown and will not be addressed by the Woolfolk remediation

Dioxins/Dibenzofurans

The detected concentrations of the individual dioxin/dibenzofuran isomers for the three (3) surface soil samples collected from the study area were very low levels, ranging from 0 35 to 980 nanograms per kilogram (ng/kg) The TEQ values for these three (3) samples ranged from 0 046 to 6.6 ng/kg and were well below the EPA residential soil screening value of 1,000 ng/kg.

5.3.2 Attic Dust Contamination

As part of the residential soil removal project, the interiors of a number of homes were cleaned At that time, it was recognized that the potential existed for contamination of attics by dust from arsenic contaminated soil. A resulting soil removal action addressed 26 homes [U.S Army Corps of Engineers (USACE) 2002] In addition to these homes, a review of the site conceptual model airborne transport migration pathway identified additional homes in the potentially contaminated area To characterize the nature and extent of this potential contamination, the following actions were taken

- Characterization of the dust/arsenic deposition patterns in Fort Valley based upon selected residential attic configurations.

- Characterization of the arsenic contamination levels in Fort Valley residential attics not within the WCW potentially impacted area (i.e., background levels).

- Characterization of the arsenic contamination levels in Fort Valley residential attics within the WCW potentially impacted area.

- Four zones were identified (**Figure 5-2**) for study

- Zone I included all homes located north–northeast (NNE) of the WCW facility This included homes located on MLK Drive (Main Street), Fagan Street, Oak Street, and Troutman Street

- Zone II included all homes located south–southwest (SSW) of the WCW facility This included homes located on Preston Street, Elm Street, Beach Street, and Chestnut Street.

- Zone III included all homes located west (W) of the WCW facility. This included homes Figure 5-2 located on Pine Street and O'Neal Street.

- Zone IV included all homes within the reference area (southwest of the former WCW production site) (USACE 2002)

As indicated in **Table 5-1**, the average dust concentration within the attics of the target homes is approximately 70 percent higher than the average reference area (background) concentration. This is believed to be related to higher ambient air dust levels, which are caused by proximity to high traffic areas and local vegetation differences The study showed that there is a general west to east wind direction component to the dust patterns and the highest dust levels occur away from the ridge line near the soffit edge of the house. The exact maximum deposition point varies depending on details of the attic configuration and such factors as the number or type of adjacent trees and roof geometry (USACE 2002)

5.3.3 RI Conclusion

5.3.3.1 Soil

In summary, a review of the OU4 RI results, along with results from previous investigations, clearly indicates that the most significant surface soil inorganic contaminant is arsenic. The results demonstrate that the contaminated soils are located in the surface water runoff/drainage migration pathway primarily to the south of the former facility (OU3) and the windborne migration pathway immediately surrounding the main facility and to the east and northeast of the main facility and to the east and northeast of the main facility in the direction of the prevailing winds. With the exception of arsenic, the main facility does not appear to be the source of the extractable organic, pesticide, or other inorganic contamination.

5.3.3.2 Attic Dust

Attic arsenic levels at certain homes in the potentially affected area are significantly greater than would be anticipated based on the levels found in the reference area. Arsenic and dust levels vary spatially within attics. This variance appears to be related to type of ventilation in each attic. Ventilation type impacts turbulence in the attic and this results in settling patterns consistent with the particle size and density (USACE 2002).

Although other sources may exist, the use of arsenic at the WCW facility would appear to be the most likely explanation for elevated arsenic levels in the dust in attics of homes located in the potentially affected area. The study indicated that there is not an imminent health risk threat to

Figure 5-2
Zone Location Map
USACE Attic Dust Study
Woolfolk Chemical Works Site OU4 RI/FS
Fort Valley, Georgia

Legend

- Operable Unit 2 Boundary
- Operable Unit 3 Boundary
- Attic Dust Study Zones

Zone IV is the reference
home area located southwest
of the target home area (Not Shown)

CDM

Map Filename figure3 6_ZoneLocationMap.mxd 02/06/2002

Table 5-1
Ft. Valley Attic Dust Summary Worksheet

Summary Target & Reference Data

			Avg-dust (mg/100cm2)			Arsenic (mg/kg)			Arsenic loading (ug/100cm2)
Type	Address	Attic Vent Type	Min	Max	Avg	Min	Max	Avg	Avg
Target	NA		0 8	1268 7	189 1	0 7	1194 5	157 7	29 81
Reference	NA		2 9	676 0	113 4	1 4	70 7	14 9	1 70
T/R ratio					1 7			10 5	17 6

Summary Individual Home Data

			Avg-dust (mg/100cm2)			Arsenic (mg/kg)			Arsenic loading (ug/100cm2)
Type	Address	Attic Vent Type	Min	Max	Avg	Min	Max	Avg	Avg
Target	215 Oak	Gable/Soffit	10 6	1268 7	98 0	11 4	831 7	166 6	16 32
Target	218 Oak	Gable/Ridge	24 5	1268 7	551 6	150 4	1194 5	435 7	240 31
Target	505 Preston	Gable/Soffit	20 2	351 8	155 6	50 0	235 6	106 2	16 53
Target	401 Preston	No Vent	26 9	265 9	118 4	13 3	153 7	64 7	7 66
Target	107 ONeil	Soffit Only	0 8	104 4	21 7	0 7	60 8	15 1	0 33
Reference	121 Spalding	Soffit Only	14 5	264 1	87 1	3 6	13 8	7 2	0 63
Reference	305 Lamar	Gable/Soffit	2 9	249 3	42 9	1 4	70 7	22 7	0 97
Reference	202 Kathleen	Gable/Soffit	65 0	676 0	210 1	8 4	30 8	19 4	4 08

Target / Reference Average Ratios

			Avg-dust (mg/100cm2)			Arsenic (mg/kg)			Arsenic loading (ug/100cm2)
Type	Address	Attic Vent Type	Min	Max	Avg	Min	Max	Avg	Avg
Target	215 Oak	Gable/Soffit	3 7	1 9	0 9	8 2	11 8	11 1	9 6
Target	218 Oak	Gable/Ridge	8 4	1 9	4 9	107 4	16 9	29 1	141 8
Target	505 Preston	Gable/Soffit	7 0	0 5	1 4	35 7	3 3	7 1	9 8
Target	401 Preston	No Vent	9 3	0 4	1 0	9 5	2 2	4 3	4 5
Target	107 ONeil	Soffit Only	0 3	0 2	0 2	0 5	0 9	1 0	0 2
Reference	121 Spalding	Soffit Only	5 0	0 4	0 8	2 6	0 2	0 5	0 4
Reference	305 Lamar	Gable/Soffit	1 0	0 4	0 4	1 0	1 0	1 5	0 6
Reference	202 Kathleen	Gable/Soffit	22 4	1 0	1 9	6 0	0 4	1 3	2 4

Note "Target" area signifies potenti~lly affected area any resident based on the attic use patterns residents identified in the home survey they completed (USACE 2002). However, long-term health risk from arsenic exposure could occur if exposure patterns change in the future or if residents enter their attics more often than the once per month average. Homes with arsenic concentrations in dust greater than 1,000 mg/kg would exceed the typical CERCLA action levels [incremental lifetime cancer risk (ILCR) >10^{-4} and carcinogenic hazard index (HI) >3] if exposure frequency was greater than once per month USACE 2002).

6.0 CURRENT AND POTENTIAL FUTURE LAND USES

The WCW Site is located in an area with mixed commercial and residential land uses Residences are located to the west, south, and east, with homes to the southeast adjoining a peach orchard Several businesses are located along the north, northwest, and east ends of the former plant A similar mix of future land use is anticipated for the OU4 properties, as residents and businesses will continue to inhabit the properties after remediation activities In addition, based on discussions with city officials, anticipated future land use for the WCW Site itself may include a commercial or recreational use, and residents associated with this environmental justice site have expressed interest in developing residential areas to the west and south of the Site

A Brownfields Grant for redeveloping the WCW Site has been issued to the City of Fort Valley by EPA. In addition, the City of Fort Valley, under a separate Superfund redevelopment grant issued by EPA, has approached Georgia Technical Institute of Technology to evaluate both current and future land use scenarios and to provide a design that integrates future land use with redevelopment under the Brownfields initiative. If the City of Fort Valley does develop the areas it is now considering for parks and recreational use, there will be the potential for human contact with remediated surface soils

7.0 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the Site poses if no action is taken It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action This section of the ROD summarizes the results of the baseline risk assessment for OU4.

7.1 Human Health Risk

The baseline risk assessment for human health (BRA-HH) is an analysis of the potential risks to human health caused by hazardous substances released from a site in the absence of any additional actions to control or mitigate the releases. Preparation of a BRA-HH is required by the National Contingency Plan (NCP), which states that the lead agency for a Superfund site shall conduct a site-specific BRA-HH as part of the RI process (40 CFR§300.430).

7.1.1 Identification of Chemicals of Concern

Data used in the BRA-HH were obtained by CGC in 1998, CDM in 2000, and the USACE in 2001 - 2002.

COPCs are chemicals whose data are of sufficient quality for use in the quantitative risk assessment, are potentially site-related, and represent the most significant contaminants in terms of potential toxicity to humans For this assessment, two (2) data sets were created: 1) the CDM Phase II data and 2) the arsenic and lead data from the CGC 1998 investigation and Phase I arsenic and lead data obtained by CDM in 2000. The data obtained from the USACE study were managed separately.

The Phase II CDM data were summarized to show all inorganic and organic chemicals that were positively identified in at least one (1) sample Included in this group were unqualified results and results that were qualified with a *J,* which means the chemical was present but the concentration was estimated. These values were listed as actual detected concentrations which may have the effect of under- or over-estimating the actual concentration Tentatively identified compounds (qualified with an *N*) were not included

Next, the laboratory data were tabulated to show the range of detections above the sample quantitation limit (SQL), the number of detections above the SQL, and the number of samples that were collected.

Finally, these positively identified chemicals were screened to exclude chemicals that, although present, are not important in terms of potential human health effects The screening criteria fall into two (2) categories·

(1) Inorganics that are essential nutrients or normal components of human diets were excluded Calcium, magnesium, potassium, and sodium were excluded because they are essential nutrients, and

(2) Inorganic and organic chemicals whose maximum concentration was lower than a risk-based concentration corresponding to an excess cancer risk level of 1×10^{-6} or a hazard quotient (HQ) level of 0.1 using residential land use assumptions were excluded (EPA 2001)

A list of COCs for OU4 were derived from the COPCs identified for the Site COCs are the most significant contaminants in an exposure scenario that exceed an excess cancer risk level of 1×10^{-4} or an HI of 1 More specifically, COCs have individual excess cancer risk levels equal to or greater than 1×10^{-6} or an HQ equal to or greater than 0 1 in a given exposure scenario. COPCs that exceed state or federal ARARs are also COCs. **Table 7-1** summarizes the COCs, range of detections, exposure point concentration used to estimate risk, and parcel identification and address for maximum detected concentrations.

Table 7-1
Chemicals of Concern in Soil
Woolfolk Chemical Works Site OU4

Chemical	Minimum Concentration/ Qualifier [1]		Maximum Concentration / Qualifier [1]		Screening Toxicity Values [3,4]	Units	Exposure Point	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure	Parcel ID of Maximum Concentration	Address of Maximum Concentration
Arsenic [2]	0 61	-	120	-	0 39	mg/kg	Yard	120	mg/kg	MAX	F38-5	531 W Railroad St
Lead [2]	3 8	-	4,000	-	400	mg/kg	Yard	4,000	mg/kg	MAX	F37-61	Main St
Manganese	25	-	2,400	-	180	mg/kg	Yard	2,400	mg/kg	MAX	F46-1	111 Hiley St
Alpha-Chlordane	23	J	24,000	-	1,600	ug/kg	Yard	24,000	ug/kg	MAX	F38-66B	201 Perry Railroad St
Chlordane	0 46	J	23,000	-	1,600	ug/kg	Yard	23,000	ug/kg	MAX	F38-66B	201 Perry Railroad St
Dieldrin	1 6	J	5,400	C	30	ug/kg	Yard	5,400	ug/kg	MAX	F26-148	311 College St

Footnotes

1 Minimum/maximum detected concentration in Phase II 101-SSD through 103-SSD, 111-SS through 122-SS, SS2-201 through SS2-219, and SS2-301 through SS2-319 "J" is an estimated value "C" is confirmed by GC/MS "-" is a result that did not require qualification

2 Includes CGC 1998 and Phase I data

3 Risk-based concentrations for soil obtained from EPA Region 9, Preliminary Remediation Goal Table 2000 Update Units are ug/kg for organics and mg/kg for inorganics

4 Toxicity value surrogates

chlordane used for alpha-chlordane

endosulfan used for endosulfan sulfate

endrin used for endrin aldehyde, endrin ketone

gamma-BHC (lindane) used for delta-BHC

pyrene used for acenaphthylene, benzo(g,h,i)perylene, phenanthrene

naphthalene used for 2-methylnaphthalene

7.1.2 Exposure Assessment

An exposure assessment identifies pathways where receptors may be exposed to site contaminants and estimates the frequency, duration, and magnitude of such exposures Exposure assessment involves: 1) characterization of the environmental setting, 2) identification of exposure pathways, and 3) quantification of exposure

As shown in Figure 5-1, exposure pathways are determined in a CSM that incorporates information on the potential chemical sources, release mechanisms, affected media, potential exposure pathways, and known receptors to identify complete exposure pathways. A pathway is considered complete if. 1) there is a source or chemical release from a source; 2) there is an exposure point where contact can occur, and 3) there is a route of exposure (oral, dermal, or inhalation) through which the chemical may be taken into the body.

Based on the distribution of contaminants and the potential for human contact, the following media/receptors were examined

- Soil. Potential receptors are current and future workers and current and future residents.
- Attic dust Potential receptors are current and future residents

Potentially complete exposure pathways examined in the BRA-HH included·

- incidental ingestion of soil or attic dust,
- inhalation of particulates released from soil or attic dust, and
- dermal contact with soil or attic dust

The CDM Phase II data set was comprised of 46 parcels. The surface soil results from each parcel defined the reasonable maximum exposure (RME) point concentration for COCs for each parcel The CGC 1998 data and the CDM Phase I data were evaluated similarly in that each parcel was examined separately.

Human intakes were calculated for each chemical and receptor using the RME concentrations. Estimates of human intake, expressed in terms of mass of chemical per unit body weight per time (mg/kg-day), were calculated differently depending on whether the compound is a noncarcinogen or a carcinogen For noncarcinogens, intake was averaged over the duration of exposure and is referred to as the average daily dose (ADD) For carcinogens, intake was averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). ADDs and LADDs were calculated using standard assumptions and professional judgment.

As a measure of conservatism and to avoid redundancy when evaluating residential receptors, an effort was made to identify the most sensitive receptor to calculate noncancer hazards and excess cancer risk levels In the case of noncarcinogens, a child resident is the most sensitive residential receptor, based on its lower body mass relative to the amount of chemical intake For carcinogens, a child through adult resident is the most sensitive receptor because the excess cancer risk for the child (exposure duration of 6 years) is assumed to be additive to that of an adult (exposure duration of 24 years). For these reasons, no calculations of excess cancer risk were performed for child residents and no calculations of noncancer hazards were performed for child through adult residents.

Excess cancer risk and noncancer hazards were calculated for site workers since exposure parameters (body weight, contact rate, etc) do not change over the exposure period as they do for residential receptors.

7.1.3 Toxicity Assessment

Toxicity assessment is a two-step process where the potential hazards associated with route-specific exposure to a given chemical are: 1) identified by reviewing relevant human and animal studies, and 2) quantified through analysis of dose-response relationships. EPA has conducted numerous toxicity assessments that have undergone extensive review within the scientific community.

EPA toxicity assessments and the resultant toxicity values were used in the baseline evaluation to determine both carcinogenic and noncarcinogenic risks associated with each COC and route of exposure. EPA toxicity values that were used in this assessment include.

- reference dose values (RfDs) for noncarcinogenic effects
- carcinogenic slope factors (CSFs) for carcinogenic effects

RfDs have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic (systemic) effects. RfDs are ideally based on studies where either animal or human populations were exposed to a given compound by a given route of exposure for the major portion of the life span (referred to as a chronic study). The RfD is derived by determining dose-specific effect levels from all the available quantitative studies, and applying uncertainty factors to the most appropriate effect level to determine an RfD for humans The RfD represents a threshold for toxicity. An RfD reflects the human lifetime exposure to a given chemical via a given route at a dose that should not result in adverse health effects, even for the most sensitive members of the population

RfDs for inhalation exposure (RfDi) are derived from reference concentration values (RfCs). RfCs are concentrations in air, expressed in mg/m^3, that are thought to represent a level without appreciable risk of deleterious effects during a portion of the lifetime. A human body weight of 70 kg and an inhalation rate of 20 m^3/day are used to convert between a concentration in air (RfC) expressed in mg/m^3 and an inhaled intake expressed in units of mg/kg-day.

CSFs are route-specific values derived only for compounds that have been shown to cause an increased incidence of tumors in either human or animal studies The CSF is an upper bound estimate of the probability of a response per unit intake of a chemical over a lifetime and is determined by low-dose extrapolation from human or animal studies. When an animal study is used, the final CSF is adjusted to account for extrapolation of animal data to humans. If the studies used to derive the CSF were conducted for less than the life span of the test organism, the final CSF is adjusted to reflect risk associated with lifetime exposure.

The RfDs and CSFs used in this assessment were primarily obtained from EPA's IRIS database (EPA 2001) Values that appear in IRIS have been extensively reviewed by EPA work groups and thus represent Agency consensus. If no route of exposure or values for a given compound were listed in IRIS, then EPA's Health Effects Assessment Summary Tables (HEAST) (EPA 1997c) were consulted. Where no value was listed in either IRIS or HEAST, EPA's National Center for Environmental Assessment was consulted

Oral CSFs for COCs were obtained for arsenic (1 5E +00 mg/kg/day), alpha-chlordane (3.5E-01 mg/kg/day), chlordane (3.5E-01 mg/kg/day), and dieldrin (1.6E +01 mg/kg/day) Adjusted CSFs for the dermal route for these COCs included arsenic (1.5E+00 mg/kg/day), alpha-chlordane (7 0E-01 mg/kg/day), chlordane (7.0E-01 mg/kg/day), and dieldrin (3.2E+01 mg/kg/day). These COCs are also considered carcinogenic via the inhalation route Arsenic has an inhalation unit risk factor of 4.3E-03 ug/m^3, alpha-chlordane and chlordane have inhalation unit risk factors of 1.0E-04 ug/m^3, and dieldrin has an inhalation unit risk factor of 4.6E-03 ug/m^3 No information was available for iron, lead, and manganese.

All of the COCs have toxicity data indicating their potential for adverse non-carcinogenic health effects in humans via the oral/dermal route. The available toxicity data, from chronic animal studies, indicate that arsenic affects the skin, while lead and manganese affect the central nervous system, and alpha-chlordane, chlordane, and dieldrin primarily affect the liver The oral and dermal RfDs for arsenic are 3E-04 mg/kg/day For iron, the oral and dermal RfDs are 3E-01 mg/kg/day and 6E-02 mg/kg/day, respectively For manganese, the oral and dermal RfDs are 7E-02 mg/kg/day and 4E-03 mg/kg/day, respectively For alpha-chlordane and chlordane, the oral and dermal RfDs are 5E-04 mg/kg/day and 3E-04 mg/kg/day, respectively For dieldrin, the oral and dermal RfDs are 5E-05 mg/kg/day and 3E-05 mg/kg/day, respectively.

Three (3) of the COCs have toxicity data indicating their potential for non-carcinogenic health effects via the inhalation route. Chronic animal studies indicate that manganese impacts the central nervous system while alpha-chlordane and chlordane primarily affect the liver. The inhalation reference concentrations (RfC) for manganese, alpha-chlordane, and chlordane, are 5E-05 mg/m^3, 7E-04 mg/m^3, and 7E-04 mg/m^3, respectively.

7.1.4 Risk Characterization

The final step of the BRA-HH is the risk characterization Human intakes for each exposure pathway are integrated with EPA reference toxicity values to characterize risk. Carcinogenic and noncarcinogenic effects are estimated separately.

To characterize the overall potential for noncarcinogenic effects associated with exposure to multiple chemicals, EPA uses a hazard index (HI) approach. This approach assumes that simultaneous subthreshold chronic exposures to multiple chemicals that affect the same target organ are additive and could result in an adverse health effect. The HI is calculated as follows:

$$Hazard\ Index = ADD_1/RfD_1 + ADD_2/RfD_2 + ..\ ADD_i/RfD_i$$

where

ADD_i = Average Daily Dose (ADD) for the ith toxicant
RfD_i = Reference Dose for the ith toxicant

The term ADD_i/RfD_i is referred to as the HQ

Calculation of an HI in excess of unity (1) indicates the potential for adverse health effects Indices greater than one (1) will be generated any time intake for any of the COCs exceeds its RfD. However, given a sufficient number of chemicals under consideration, it is also possible to generate an HI greater than one (1) even if none of the individual chemical intakes exceeds its respective RfD.

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. This is also referred to as incremental or excess individual lifetime cancer risk For a given chemical and route of exposure, excess lifetime cancer risk is calculated as follows:

Risk = Lifetime Average Daily Dose (LADD) × Carcinogenic Slope Factor (CSF)

These risks are probabilities that are generally expressed in scientific notation (i.e., 1×10^{-6} or 1E-6). An incremental lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper-bound, an individual has a one-in-one-million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at the site. For exposures to multiple carcinogens, EPA assumes that the risk associated with multiple exposures is equivalent to the sum of their individual risks.

Potentially complete exposure routes are:

- inadvertent ingestion of soil or attic dust,
- dermal contact with soil or attic dust, and
- inhalation of particulates released from soil or attic dust.

Parcel-specific risk and hazard calculations were completed for the residential and commercial parcels in OU4 EPA found that contaminant concentrations in surface soils at five (5) of 36 residential parcels exceeded EPA's target range for cancer risk (1E-6 to 1E-4) and/or noncancer hazard (HI $\geq$ 1) based on the RI data. Sixteen of 327 properties exceeded EPA's acceptable noncancer hazard (i.e arsenic concentrations greater than 20 parts per million) In contrast, none of the commercial properties had an excess cancer risk or noncancer hazard above EPA's target range for Superfund sites.

Lead concentrations above 400 mg/kg exceed EPA's residential screening level for lead (EPA 1994 and 1998) Screening levels are levels of contamination above which there may be enough concern to warrant a site-specific study of risk Seven (7) of 324 properties had lead concentrations above the screening level. Note: The screening levels cited for arsenic and lead are applicable to residential land use. Screening levels for commercial/industrial land use would be higher

7.1.5 Site Residents (Exposure to Attic Dust)

The study conducted by the USACE examined several possible scenarios by which residents could be exposed to arsenic in attic dust. The report noted that the exposure factors can vary greatly between residents and also between current and future residents based on attic use. Surveys conducted as part of the study indicated that most residents do not use their attics on a regular basis. Typical entry consists of a few times per year (e g., 1-3) to place or retrieve items stored in the attic No residents indicated entry for extended periods of time or on a frequent basis (e.g., weekly for several hours). This is due in large part to the fact that none of the attics were air conditioned or otherwise temperature controlled. Most of the attics lacked sufficient floored space for substantial use.

The USACE study employed the same exposure routes and intake assumptions that were used in the examination of residential exposures to soil. Exposure frequencies of yearly, monthly, weekly and daily were examined. Among the findings and conclusions were

Attic arsenic levels at certain homes in the target area are significantly greater than would be anticipated based on the levels found in the reference area.

- Although other sources may exist, the use of arsenic at the WCW facility appears to be the most likely explanation for this finding
- Arsenic and dust levels vary spatially within attics This variance appears to be related to attic ventilation type Ventilation type impacts air turbulence in the attic and results in settling patterns consistent with particle size and density.
- Based on the attic use patterns stated by current residents in the home survey, no resident's exposure appears to present an imminent health risk.
- Long term health risk from arsenic exposure may occur if exposure patterns change in the future or if residents were to enter their attic more often than once per month on average.
- Homes with arsenic concentrations greater than 1,000 mg/kg exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than once per month.

None of the commercial properties had an excess cancer risk or HI above EPA's target range for Superfund sites Note: Both excess cancer risk and noncancer hazards were calculated for site worker receptors This contrasts with the approach that was used to evaluate residential receptors. Since a child resident is the most sensitive receptor for noncancer hazards, noncancer hazards were evaluated for child resident receptors only. Similarly, since the child to adult resident is the most sensitive receptor for evaluating cancer risk, only the child to adult resident receptor was used to evaluate excess cancer risk.

In the future, commercial properties may be redeveloped for residential use. Potential receptors would be residents. Potentially complete exposure routes for residents are the same.

- inadvertent ingestion of soil or attic dust,
- dermal contact with soil or attic dust, and
- inhalation of particulates released from soil or attic dust.

Using residential land use assumptions, one (1) parcel exceeds EPA's target range for Superfund sites in that the calculated HI is greater than 1 The principal contaminant was chlordane, present as alpha-chlordane at 24 mg/kg, and as chlordane at 23 mg/kg. The excess cancer risk was 1×10^{-4}, which is within EPA's acceptable target range. When residential land use exposure assumptions were applied to the remaining properties, the excess cancer risk and HIs were within EPA's acceptable target ranges

7.1.6 Performance Standards

The establishment of health-based performance standards serves as an important means of guiding remedial activities A health-based approach is utilized when performance standards promulgated by state and federal agencies are not available The approach to developing health-based standards is derived from the risk assessment process The risk assessment is essentially a process by which the magnitude of potential cancer risks and other health effects at a site can be evaluated quantitatively A performance standard is established by back-calculating a health protective contaminant concentration given exposure assumptions and a target cancer risk or a hazard index which are acceptable and realistic. The concept of the performance standard inherently incorporates the concept of exposure reduction which allows remedial alternatives to be flexible The performance standards for soil at OU4 are presented in **Table 7-2**

7.1.7 Uncertainty Assessment

The use of exposure scenarios adds a considerable degree of uncertainty to a risk assessment. Since actual exposure frequencies are unknown, estimates were based on available guidance. Actual exposure is not expected to exceed the values used and may be much lower. The use of conservative assumptions in the exposure assessment is believed to result in a potential overestimate of risk While actual site risk may be lower than the estimates presented here, it is not likely to be greater.

RfDs and CSFs for the COCs were derived from EPA sources. RfDs are determined with varying degrees of uncertainty depending on such factors as the basis for the RfD [no-observed-adverse-effect-level (NOAEL) versus lowest-observed-adverse-effect-level (LOAEL)], species (animal or human), and professional judgment. The calculated RfD is therefore likely overly protective, and its use may result in an overestimation of noncancer risk. Similarly, the CSFs developed by EPA are generally conservative and represent the upper-bound limit of the carcinogenic potency of each chemical

Instead of using all the historical data collected over eight (8) years and an equal number of investigations prior to CDM work in 2000, a decision was made to use a subset of the available information This decision was a compromise based on the recognition that a large amount of data had been collected, different objectives directed the investigations, and changes had transpired (i.e , excavations) since the data was collected. At the same time, this compromise still reflects the importance of arsenic as the principal COC and the fact that its presence or absence has driven cleanups in the past and will likely do so in the future Limiting the analysis in this way may contribute to underestimating the risk at individual parcels if additional contaminants were present at significant levels.

Table 7-2
Performance Standards
Residential Land Use Assumptions
Woolfolk Chemical Works Site OU4

Chemicals of Concern	Detections[1] mg/kg		Cancer Risk Level[2] mg/kg			Hazard Quotient Level[3] mg/kg			Selected Performance Standard mg/kg	Basis
	Min	Max	1E-6	1E-5	1E-4	HQ = 0 1	HQ = 1	HQ = 3		
Surface Soil										
Arsenic[4]	0 6	120	0 3	3	30	2	20	60	20	HQ=1 and within EPA's acceptable carcinogenic risk range
Lead[4]	3 8	4,000	NA	NA	NA	NA	NA	NA	261	Consistent with State of Georgia HSRA residential standard for soil and also below EPA's residential action level for soil
Manganese	25	2,400	NA	NA	NA	400	4,000	12,000	494	Consistent with State of Georgia HSRA residential standard for soil and also below EPA's residential action level for soil
Alpha-Chlordane	0 023	24	1	10	100	3	30	90	26	Consistent with State of Georgia HSRA residential standard for soil and within EPA's acceptable carcinogenic risk range
Chlordane	0 00046	23	1	10	100	3	30	90	26	Consistent with State of Georgia HSRA residential standard for soil and within EPA's acceptable carcinogenic risk range
Dieldrin	0 0016	5 4	0 03	0 3	3	0 3	3	9	0 66	Consistent with State of Georgia HSRA residential standard for soil and within EPA's acceptable carcinogenic risk range
Attic Dust										
Arsenic	0 7	1,194 5	0 39	3 9	39	2 4	23	71	71	HQ=3 based on daily exposure scenario to attic dust

Notes

1 Minimum/maximum detected concentration in Phase II samples 101-SSD through 103-SSD, 111-SS through 122-SS, SS2-201 through SS2-219, and SS2-301 through SS2-319

2 Remediation goals based on oral, inhalation and dermal contact using adult / child resident land use exposure assumptions

3 Remediation goals based on oral, inhalation and dermal contact using child resident land use exposure assumptions

4 Includes CGC 1998 and Phase I data, preliminary screening value is 400 mg/kg

Acronyms

NA Not applicable

HQ Hazard quotient (noncancer risk)

Calculations are in Tables H-4 1 and H-4 2 in Appendix H of the Final RI Report dated June 2002 as revised October 2002

7.2 Ecological Risk

Several COPCs in soil were defined for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides either because HQs were greater than one (1) or because no Region 4 screening-level bench mark values were available. The screening-level ecological risk assessment (SERA) demonstrated the potential for risk to ecological receptors from exposure to the drainage ditch from Lavender Street to beyond the railroad discharge into the upper tributary of Big Indian Creek. The assessment also recommended organizing a meeting to initiate development of the problem formulation phase for a baseline ecological risk assessment. Because of the time involved in completing the ecological risk assessment, the process will be continued under OU5. Ecological concerns in the portion of the ditch remaining in OU4 (the ditch extending from the main facility to Spillers Street) will be addressed by overlaying pavement, which removes the pathways for contamination.

8.0 REMEDIAL ACTION OBJECTIVES

CERCLA and the NCP define remedial action objectives (RAOs) that are applicable to all Superfund sites They relate to the statutory requirements for the development of remedial actions Site-specific RAOs relate to potential exposure routes and specific contaminated media, such as soil, and are used to identify target areas of remediation and contaminant concentrations.

They require an understanding of the contaminants in their respective media and are based upon the evaluation of risk to human health and the environment, protection of groundwater, information gathered during the RI, applicable guidance documents, and federal and state ARARs RAOs must be identified as specifically as possible without unduly limiting the range of alternatives that can be developed for detailed evaluation

Based on the COCs and remediation levels established to reduce human health risk identified for the Site, the recommended RAOs for OU4 are as follows.

Soil

- prevent ingestion, inhalation, or direct contact with surface soil that contain concentrations in excess of the remedial levels,
- prevent ingestion or inhalation of soil particulates in air with concentrations in excess of the remediation levels;
- permanently and/or significantly reduce the mobility/toxicity/volume (M/T/V) of characteristic hazardous waste with treatment, and
- control future releases of contaminants from surface soils to ensure protection of human health and environment

Attic Dust

- prevent ingestion, inhalation, or direct contact with attic dust that contains concentrations above background concentrations.

9.0 DESCRIPTION OF ALTERNATIVES

Contaminants with concentrations above remediation levels and technologies which most effectively address the contaminants were considered in the development of remedial action alternatives The goal in developing remedial action alternatives is to provide a range of cleanup options together with sufficient information to adequately compare alternatives against each other.

Except for the No Action Alternative, all the alternatives include several common elements listed below.

Common Elements of Alternatives 9.2 through 9 4

- Soils with arsenic concentrations of 20 to 30 mg/kg will be addressed (higher levels have already been removed)
- Approximately 57,000 cubic yards of soil will be addressed
- **Contaminated soils resulting from activities at the WCW facility** will be moved to and managed in the Corrective Action Management Unit (CAMU) designated for OU3 in accordance with CAMU regulations
- The yards will be backfilled with clean soil and planted with vegetation
- Wastes resulting from attic dust decontamination activities will be consolidated with contaminated soils in the OU3 CAMU

- A drainage pipe that drains away from the Site along Preston Street to Spillers Street will be flushed with water in order to decontaminate it. Deed restrictions preventing penetration of the pavement barrier above portions of the drainage ditch will be recorded in the appropriate land records office In addition, continued compliance with groundwater use restrictions in accordance with the OU1 ROD will be required

- The selected remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risk at OU4 through removal, treatment, engineering controls, and/or institutional controls such as land and/or groundwater use restrictions on a property deed.

9.1 Alternative 1 - No Action

Cost Summary
Estimated Capital Cost $0
Estimated Annual O&M Cost: $20,350 (cost associated with monitoring)
Estimated Present Worth Cost: $243,000
Estimated Time To Implement. < 1 year

Under this alternative, no action would be taken to remedy the contaminated surface soil or other solid media at OU4. The alternative would only involve the continued monitoring of soil, sediment, and surface water quality at OU4. Approximately 100 samples would be collected from the affected areas and analyzed for the COCs every five (5) years for 30 years Public health evaluations conducted every five (5) years would enable EPA to assess the ongoing risks to human health and the environment posed by OU4. The evaluations would be based on the data collected from media monitoring.

9.2 Alternative 2—Soil Excavation, Transportation to Main Facility for Treatment with Solidification/Stabilization/Composting/ Fixation; Attic Dust Decontamination

Cost Summary
Estimated Capital Cost: $8.4 million
Estimated Annual O&M Cost: $232,500
Estimated Present Worth Cost: $9.4 million
Estimated Time To Implement 2 years

Soil
This alternative involves excavating contaminated surface soil and transporting it to a central area in the main facility (OU3) for consolidation and staging. Alternative 2 assumes that on-site treatment via solidification/stabilization/composting/fixation will be necessary in order to meet clean-up criteria and would be performed before the treated material could be incorporated into OU3 backfill, or, alternately, a portion of the treated material disposed off-site in a RCRA Subtitle D landfill depending on the OU3 Site earthwork balance (i e , the selected remedy for OU3 must be able to incorporate the OU4 soils without significantly impacting land contours and elevations) Excavated OU4 areas would be backfilled with clean top soil. The final treatment system would depend upon the outcome of treatability testing and would be determined during the remedial design phase. Note that the use of OU3 for disposal of treated material would mean that OU3 and OU4 remediation would occur within the same general time frame or OU4 would occur before OU3 and the soil temporarily stockpiled (and covered) awaiting OU3 activities.

Based on the data collected during the RI, none of the residential properties have an average arsenic concentration above 30 ppm and could therefore be used as backfill in areas to be paved over without further testing. Without further testing, arsenic concentrations below 317 mg/kg can be left under the pavement within the former facility property (OU3) The backfill criteria for unpaved areas is 20 ppm arsenic The RI data suggest, that with additional testing to confirm that unpaved cleanup criteria are met, some of the excavated soils could also be used as backfill in areas that will remain unpaved.

Generally, the extent of contamination for surface soil can be estimated by developing contour lines corresponding to the remediation level for each COC. The COCs then can be grouped by category and a composite contour for each group developed by overlaying the individual contaminant contours A composite contour for the combined groups can be developed and the area inside that contour measured to determine the total area of contamination. Finally, volumes can be determined by multiplying the horizontal extent of contaminated soil by a vertical extent of one (1) foot using the health based remedial goals (RGs) for the Site. While over 40 other chemicals, herbicides, and/or pesticides were used at the height of the manufacturing activity at the WCW facility, the results of the RI and previous sampling suggest that the quantity and concentrations of arsenic present at the Site make it the primary indicator of contaminants of concern in surface soils and attics. Based on the available information, it is believed that in the process of remediating arsenic in soils to acceptable levels, the other COCs in the soil will also be remediated to acceptable levels. Although arsenic will be used as an indicator during the cleanup field activities, a percentage of the confirmation samples will be analyzed for the list of COCs identified in this ROD. **Figure 9-1** illustrates the parcels sampled during the RI where arsenic in surface soil was at levels above 20 mg/kg. Sixty parcels contained surface soil arsenic levels above 20 mg/kg The volume of soil associated with the parcels depicted on Figure 9-1 was calculated as approximately 75,000 cubic yards (cy). This volume assumes the entire lateral surface within the boundary of a parcel is above the proposed remediation level. A reduction of 25% was taken to reflect the fact that some of the soils are covered by structures or paved areas or may not contain arsenic above the remediation level Based on these assumptions, the volume of contaminated soil was reduced to approximately 57,000 cy. This amount was further reduced by an additional 15,000 cy, the approximate amount of contaminated soil removed from several of the parcels during a time-critical removal conducted in 2002-2003 because those soils contained arsenic levels greater than 30 mg/kg. As a result of these adjustments, the remedial alternatives developed for this ROD focus on the remaining 42,000 cy of contaminated soil.

Contaminants within soil would be physically bound or enclosed within a stabilized mass (solidification) or chemical reactions would be induced between a stabilizing agent and the contaminant to reduce its mobility (stabilization). Solidification/ stabilization treatment technologies include the addition of cement, lime, pozzolan, silicate-based additives or chemical reagents that physically or chemically react with the contaminant. These materials chemically react with water to form a solid cementious matrix which improves the handling and physical characteristics of the waste. They also raise the pH of water which may help precipitate and immobilize some heavy metal contaminants.

Another treatment option for this alternative is the use of a patented chemical treatment process. Sevenson's patented MAECTITE® chemical treatment process. This process stimulates chemical bonding to nucleate substituted mixed mineral forms in the apatite and barite mineral groups that are stable and resistant to leaching in a variety of extraction fluids and pH ranges, although multiple-valence metallic cations such as arsenic may need redox manipulation through oxidizers/reducants. The end product of the MAECTITE® treatment is a nonhazardous material similar to soil, but with no volume increase and minimal increase in mass. Once treated and confirmed to be nonhazardous, the soil could be disposed in an unlined excavation at OU3.

Attic Dust

Alternative 2 also includes the remediation of arsenic contaminated attic dust in selected residences Three (3) homes where attic dust arsenic concentrations were greater than 1,000 mg/kg have already been addressed by a time critical removal action and, therefore, are not addressed as part of this alternative. However, approximately 19 homes with arsenic attic dust concentrations ranging from 500 to 1,000 mg/kg will undergo a decontamination of the attic to reduce dust and arsenic concentrations. The following steps are anticipated:

- Preparation of the attic in a manner similar to an asbestos removal action to minimize dispersion of dust

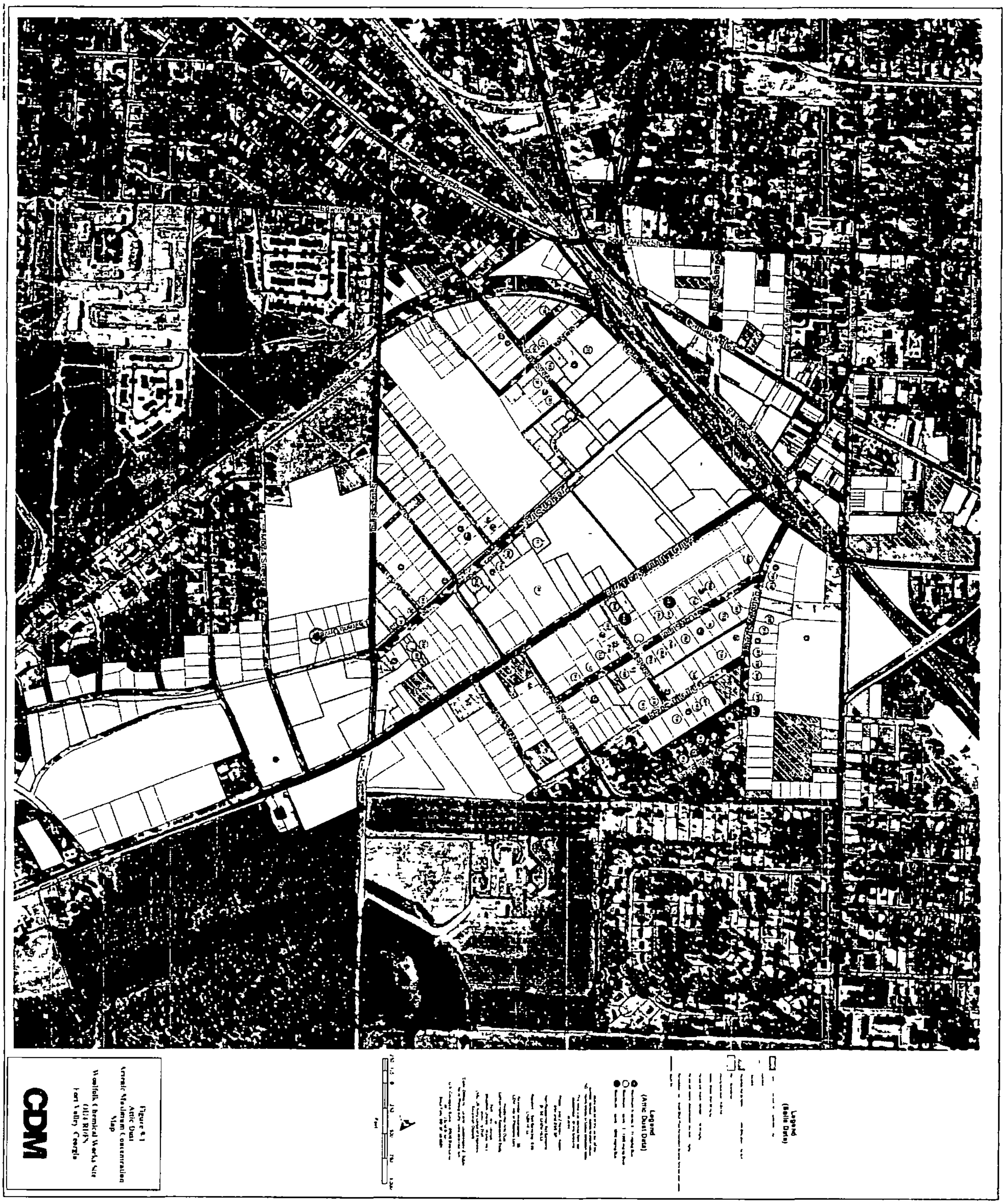
Figure 6-1
Attic Dust
Arsenic Maximum Concentration
Map
Woolfolk Chemical Works Site
OU4 RI/FS
Fort Valley, Georgia
CDM
Legend
(Attic Dust Data)
Legend
(Soils Data)
Feet

- Removal of all insulation and other items from the attic Insulation will be disposed and all resident personal property will be high-efficiency particulate air (HEPA) vacuumed and damp wiped (if possible) and returned to resident
- HEPA vacuum and damp wipe attic when possible
- Use of a lock down agent to encapsulate any remaining dust.
- Replacement of removed insulation with new insulation
- Appropriate disposal of contaminated waste material resulting from the decontamination process
- Confirmation sampling

An additional 41 homes where arsenic attic dust concentrations range from 71 mg/kg (background) to 500 mg/kg will undergo the following procedures.

- Preparation of the attic in a manner similar to an asbestos removal action to minimize dispersion of dust.
- Removal of all personal property from the attic Items will be HEPA vacuumed and damp wiped (if possible), bagged (when possible), and returned to resident
- Attic surfaces will be HEPA vacuumed and damp wiped when possible.
- Preparation of advisory notices containing information on the safe use of attic space for residents.
- Appropriate disposal of contaminated waste material resulting from the decontamination process
- Confirmation sampling

If warranted, the steps in the attic dust decontamination process may be changed to improve the efficiency of the overall process based on the outcome of testing conducted during the cleanup (e.g , changing the sequence of steps)

Drainage Pipe
A final component of this alternative is the decontamination of the portion of the drainage ditch composed of pipe which begins at the facility and leads to Spillers Street The pipe will be flushed to remove any potentially contaminated sediment and soil that has accumulated so they can be treated along with the excavated surface soils Water used to decontaminate the pipe will need to be managed, treated if necessary, and properly disposed Deed restrictions preventing penetration of the pavement barrier above portions of the drainage ditch will be recorded in the appropriate land records office.

Distinguishing Feature: The soils will be transported from the residential areas (OU4) to the former manufacturing facility (OU3) to be evaluated and, if necessary, treated with the OU3 soils

9.3 Alternative 3—Treatment and Offsite Disposal; Attic Dust Decontamination

Cost Summary
Estimated Capital Cost. $17 6 million
Estimated Annual O&M Cost· $232,500

Estimated Present Worth Cost $18 million
Estimated Time To Implement 2 years

Soil
This alternative consists of transporting contaminated soils offsite to a treatment facility for treatment and disposal Contaminated OU4 surface soils would be excavated and transported from each residence/parcel to a central area on the main facility (OU3) for consolidation, evaluation, treatment (if necessary), and staging before disposal in an offsite Subtitle D disposal facility Alternately, offsite shipment of soil in trucks to an off-site treatment facility could be initiated followed by disposal in an offsite Subtitle D disposal facility Note that the use of OU3 for staging of material would mean that OU3 and OU4 remediation would occur within the same general time frame, or OU4 would occur before OU3 and the soil temporarily stockpiled (and covered) awaiting OU3 activities. This alternative will remove all contaminated soils above remediation levels from OU4

Water would be used to minimize fugitive dust emissions during soil excavation, transport, and handling Any stockpiles of material during interim storage would be covered by tarps or plastic sheeting to minimize fugitive dust and runon/runoff emissions Surface water runoff, fugitive emissions, and treated soils would be monitored to ensure that the RAOs were being met.

After removal of all applicable contaminated soils, the excavations will be backfilled with clean soil and vegetation planted.

Attic Dust and Drainage Pipe
Alternative 3 also includes the remediation of arsenic contaminated attic dust in selected residences and the decontamination of the drainage ditch pipe as described under Alternative 2.

Distinguishing Feature: Removal of all OU4 contaminated soil from the Site (OU3 and OU4).

9.4 Alternative 4—Soil Excavation, Transportation to Main Facility for Consolidation and Off-Site Transportation and Subtitle C Landfilling (Option 1); or Subtitle D Landfilling ($15 million) or Use as OU-3 Backfill (Option 3); Attic Dust Decontamination

Cost Summary - Disposal at Subtitle C Landfill
Estimated Capital Cost· $30.8 million
Estimated Annual O&M Cost: $466,000
Estimated Present Worth Cost $31 3 million
Estimated Time To Implement 2 years

Cost Summary - Disposal at Subtitle D Landfill
Estimated Capital Cost: $14.5 million
Estimated Annual O&M Cost: $466,000
Estimated Present Worth Cost $15 million
Estimated Time To Implement 2 years

Cost Summary - Use as OU3 Backfill
Estimated Capital Cost $4.9 million
Estimated Annual O&M Cost: $466,000
Estimated Present Worth Cost $5.4 million
Estimated Time To Implement· 2 years

Soil
Alternative 4 is similar to Alternatives 2 and 3 in that the excavated soils from OU4 would be consolidated at the main facility (OU3) and then either used as backfill for OU3, which is the primary aim and preferred option for this alternative, or disposed offsite. However, Alternative 4 differs from Alternative 2 in that treatment is not needed prior to use of the soils as an onsite backfill, and it differs from Alternative 3 in that treatment to meet OU3 clean-up criteria or Subtitle D (offsite disposal) criteria is not anticipated based on the levels of contaminants detected during the RI (However, should contaminant levels be high enough to necessitate disposal at a Subtitle C landfill, pre-treatment would be required)

Contaminated OU4 surface soils would be excavated and transported from each residence/parcel to a central area on the main facility for consolidation and staging From there, the excavated soils would be readily available for use as backfill in the OU3 remediation effort Using the excavated soils as OU3 backfill would require that OU3 and OU4 remediation occur within the same general time frame, or OU4 would occur before OU3 and the soil temporarily stockpiled (and covered) awaiting OU3 activities. Additionally, using the OU4 excavated soil as backfill requires that site earthwork is balanced, and contaminant levels do not exceed OU3 paved and/or unpaved area remediation levels Depending on where backfill is to be used, backfill arsenic levels must not exceed 20 ppm (unpaved areas) or 317 ppm (paved areas) If the timing of the the OU3 and OU4 remediations cannot be coordinated, the OU4 soils will have to be disposed offsite. In addition, if the excavated OU4 soils do not meet OU3 backfill criteria, the off-site shipment of soil in trucks to a RCRA landfill could be initiated after consolidation on OU3 In either case, this alternative will remove all contaminated soils from OU4.

Water would be used to minimize fugitive dust emissions during soil excavation, transport, and handling. Any stockpiles of material during interim storage would be covered by tarps or plastic sheeting to minimize fugitive dust and runon/runoff emissions Surface water runoff, fugitive emissions, and treated soils would be monitored to ensure that the RAOs were being met.

After removal of all applicable contaminated residential soils, the excavations will be backfilled with clean soil and vegetation will be replanted

Attic Dust and Drainage Pipe
Alternative 4 also includes the remediation of arsenic-contaminated attic dust in selected residences and the decontamination of the drainage ditch pipe as described under Alternative 2

Distinguishing Feature: No treatment of soil to meet either OU3 backfill criteria or Subtitle D offsite disposal criteria is anticipated

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The alternatives are evaluated against the threshold and primary balancing criteria specified in the NCP to ensure that the selected remedial alternative will. 1) protect human health and the environment, 2) comply with or include a waiver of ARARs, 3) be cost-effective, 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and 5) address the statutory preference for treatment as a principal element

Overall Protection of Human Health and the Environment
Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. All of the alternatives except Alternative 1 (No Action) would provide protection of human health and the environment by eliminating, reducing, or controlling risk at OU4 through removal, treatment, engineering controls, and/or institutional controls such as land and/or groundwater use restrictions on a property deed

Compliance with ARARs
All the alternatives, except Alternative 1, would comply with ARARs Because Alternative 1 is not protective of human health and the environment and would not comply with ARARs, it will be eliminated from further consideration under the remaining seven (7) criteria.

Long-Term Effectiveness and Permanence
Each alternative was assessed for the long-term effectiveness and permanence it presents, along with the degree of certainty that the alternative will prove successful Factors considered as appropriate included

- magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities. The characteristics of the residuals are considered to the degree that they remain hazardous, taking into account their T/M/V and propensity to bioaccumulate

- adequacy and reliability of controls such as containment systems and institutional controls such as land and/or groundwater use restrictions on a property deed that are necessary to manage treatment residuals and untreated waste This factor addresses the uncertainties associated with land disposal for providing long-term protection from residuals, the assessment of the potential need to replace technical components of the alternative; and the potential exposure pathways and risks posed should the remedial action need replacement.

Alternatives 2, 3, and 4 all provide equal long-term effectiveness and permanence because all the contamination above the remediation levels would be excavated, treated (if required), and disposed in either in an offsite landfill or used as OU3 backfill

Reducing Toxicity, Mobility or Volume Through Treatment (T/M/V)
The degree to which each alternative employs recycling or treatment that reduces T/M/V was assessed, including how treatment is used to address the principal threats posed by OU4. Factors

considered, as appropriate, included the following:

- treatment or recycling processes that alternatives employ and materials they will treat;
- amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled,
- degree of expected reduction of T/M/V of the waste due to treatment or recycling and specification of which reduction(s) are occurring;
- degree to which treatment is irreversible,
- type and quantity of residuals that will remain following treatment, considering persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents, and
- degree to which treatment reduces inherent hazards posed by principal threats at the Site.

Alternatives 2, 3, and 4 are similar in reduction of T/M/V at the OU4 properties through removal of contaminated soil from OU4 The treatment components of Alternatives 2 and 3 may increase the volume of treated material and do not decrease the toxicity of encapsulated metals-contaminated soil, but do further reduce mobility compared to Alternative 4

Short-Term Effectiveness

The short-term effectiveness of each alternative was assessed considering the

- short-term risks that might be posed to the community during implementation of an alternative,
- potential impacts on workers during remedial action and effectiveness and reliability of protective measures,
- potential environmental impacts of remedial action and effectiveness and reliability of mitigative measures during implementation, and
- time until protection is achieved.

Alternatives 2, 3, and 4 are similar in short-term effectiveness regarding worker and community considerations although Alternative 3 and the offsite disposal options of Alternative 4 would involve additional considerations associated with transporting material offsite for disposal Equipment, materials, and techniques designed to control dust and run-off would be required for all of the alternatives. The OU3 backfill option of Alternative 4 would present the least risk from a short-term prospective, because it would not take as long to implement since neither treatment nor offsite transport would be needed.

Implementability

The ease or difficulty of implementing each alternative was assessed by considering the following types of factors as appropriate·

- Technical feasibility, including technical difficulties and unknowns associated with construction and operation of a technology, reliability of technology, ease of undertaking additional remedial actions, and ability to monitor effectiveness of remedy

- Administrative feasibility, including activities needed to coordinate with other offices and agencies and ability and time required to obtain any necessary approvals and permits from other agencies (e.g., off-site disposal).

- Availability of services and materials, including availability of adequate offsite treatment, storage capacity, and disposal capacity and services; availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources, availability of services and materials; and availability of prospective technologies

All of the alternatives require some level of excavation Alternative 4 is the simplest because it only requires excavation and consolidation of soil prior to its use as OU3 backfill or offsite disposal (assuming backfill and disposal criteria can be met without treatment) Alternative 2 would be more difficult to implement because it assumes the need for solidification/ stabilization prior to using the soil as OU3 backfill Alternative 3 is the most difficult to implement because it involves both solidification/ stabilization and the logistics involved in transportation of the treated material to an offsite facility

Cost
Cost estimates for each alternative were based on conceptual engineering and design The type of costs that were assessed included.

- capital costs, including both direct and indirect costs,
- annual O&M, and
- net present worth of capital and O&M costs.

The present worth of each alternative provides the basis for the cost comparison. The present worth cost represents the amount of money that, if invested in the initial year of the remedial action at a given rate, would provide the funds required to make future payments to cover all costs associated with the remedial action over its planned life

The present worth analysis was performed on all remedial alternatives using a 7 percent discount rate over a period of 30 years Although each alternative includes the same attic dust and drainage pipe decontamination components, the soil components differ from alternative to alternative, meaning that overall cost will differ from alternative to alternative.

The option of using OU3 as backfill in Alternative 4 ($5.4 million) is the least expensive, followed by Alternative 2 ($9 4 million), the Subtitle D Offsite Disposal option of Alternative 4 ($15 million), and Alternative 3 ($18 million) The Subtitle C landfill disposal option for Alternative 4 is the most expensive alternative ($31 3 million).

Agency Acceptance
The Georgia Department of Natural Resources, Environmental Protection Division concurs with the selected remedy for OU4

Community Acceptance
Based on comments made by citizens at the public meeting held on July 10, 2003 and in comments submitted during the comment period, it is believed that the community concurs with the selected remedy for OU4, and requests that it be implemented as soon as possible

11.0 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 CFR §300 430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied

Because of the potential for wind entrainment and/or surface runoff and the nature of much of OU4 (occupied residential properties), surface soils and attic dust with elevated levels of contaminants are considered principal threats. Except for Alternative 1 (No Action), all the alternatives will achieve substantial risk reduction by removing the source materials constituting the principal threats at OU4

12.0 SELECTED REMEDY

12.1 Remedy Description

Alternative 4 (OU3 backfill option) is the Selected Remedy Based on information currently available, the lead agency believes the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the alternatives This alternative is recommended because it will provide substantial risk reduction by removing the source material constituting a principal threat at OU4 and will provide the same protection at a lower cost than Alternatives 2 and 3. There is no difference in the long and short term effectiveness between the Selected Remedy and the other alternatives Implementation is the simplest for the Selected Remedy compared to Alternatives 2 and 3. EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA Section 121(b). 1) be protective of human health and the environment; 2) comply with ARARs (or justify a waiver), 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element

As previously stated, the selected remedy will address three (3) areas of contamination surface soils, attic dust, and a drainage pipe. The contaminated OU4 surface soils will be excavated and transported from each residence/parcel to a central area on the main facility for consolidation and staging From there, the excavated soils will be readily available for use as backfill in the OU3 remediation effort There are two (2) general types of areas where the soils will be used as backfill, areas to be paved over and areas that will remain unpaved For use in an area to be paved over, backfill must not contain arsenic in concentrations above 317 ppm Based on the data collected during the RI, none of the residential properties have an average arsenic concentration above 30 ppm and could therefore be used as backfill in areas to be paved over without further testing The backfill criteria for unpaved areas is 20 ppm arsenic. The RI data suggest, that with additional testing to confirm that unpaved cleanup criteria are met, some of the excavated soils could also be used as backfill in areas that will remain unpaved.

The use of OU4-excavated soils as backfill at OU3 can result in a cost- and logistics-efficient operation Under other circumstances, these contaminated residential soils would be excavated (although they would probably not require treatment) and would be transported to an offsite landfill Using residential soil as OU3 backfill would save transportation and landfill disposal cost for OU4 as well as the cost of purchasing and transporting of backfill soils for OU3 Using the estimated volume of soils from the residences in OU4 as backfill could save as much as $4,000,000 in OU4 costs (landfill fees and additional transportation mileage) and as much as $400,000 in OU3 cost (clean fill purchase and additional transportation), while providing equal or greater protection to human health and the environment Realizing these cost savings would require that OU3 and OU4 remediation occur within the same general time frame or that OU4 would occur before OU3 and the soil temporarily stockpiled (and covered) awaiting OU3 activities It would also require that site earthwork balance for the OU3 remediation is maintained. If the timing of the OU3 and OU4 remediations cannot be coordinated to realize these costs savings, the OU4 soils will have to be disposed offsite.

The second component of the selected remedy involves the remediation of arsenic contaminated attic dust in selected residences. Three homes (3) where attic dust arsenic concentrations were greater than 1,000 mg/kg have been addressed by a time critical removal action and, therefore, are not addressed as part of this alternative. However, approximately 19 homes with arsenic attic dust concentrations ranging from 500 to 1,000 mg/kg will undergo a decontamination of the attic to reduce dust and arsenic concentrations The following steps are anticipated:

- Preparation of the attic in a manner similar to an asbestos removal action to minimize dispersion of dust
- Removal of all insulation and other items from the attic. Insulation will be disposed and all resident personal property will be high-efficiency particulate air (HEPA) vacuumed and damp wiped (if possible) and returned to resident
- Attic will be HEPA vacuumed and damp wiped when possible
- Use of a lock down agent to encapsulate any remaining dust.
- Replacement of removed insulation with new insulation.
- Appropriate disposal of contaminated waste material resulting from the decontamination process
- Confirmation sampling.

An additional 41 homes where arsenic attic dust concentrations range from 71 mg/kg (background) to 500 mg/kg will undergo the following procedures

- Preparation of the attic in a manner similar to an asbestos removal action to minimize dispersion of dust
- Removal of all personal property from the attic. Items will be HEPA vacuumed and damp wiped (if possible), bagged (when possible) and returned to resident
- Attic surfaces will be HEPA vacuumed and damp wiped when possible
- Preparation of advisory notices containing information on the safe use of their attic space for residents.
- Appropriate disposal of contaminated waste material resulting from the decontamination process
- Confirmation sampling

Note, that if warranted, the steps in the attic dust decontamination process may be changed to improve the efficiency of the overall process, based on the outcome of testing conducted during the cleanup (e.g , changing the sequence of steps)

The final component of this alternative is the decontamination of the portion of the drainage ditch which begins at the facility and leads to Spillers Street that is composed of pipe. The pipe will be flushed to remove any potentially contaminated sediment and soil that has accumulated so that they can be treated along with the excavated surface soils. Water used to decontaminate the pipe will need to be managed, treated if necessary, and properly disposed

12.2 Selected Remedy Cost

A cost estimate for the selected remedy is included as **Table 12-1** and includes costs associated with soil excavation, attic dust mitigation, and drainage pipe decontamination. While Table 12-1 details costs for each of the three (3) options possible under the selected remedy, the primary goal of the selected remedy is to use the excavated soil as a backfill for the OU3 remediation. Soil analytical data collected during the OU4 RI indicate that arsenic concentrations are well below the criteria for placement in a paved area (317 ppm), and with testing, it may be possible to use some of the soil as backfill in unpaved areas (20 ppm).

The cost summary table is based on the best available information regarding the anticipated scope of the remedial action Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design phase. Major changes may be documented in the form of a memorandum to the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment The projected cost is based on an order-of-magnitude engineering cost estimate that is expected to be within +50 or -30 percent of the actual project cost.

12.3 Expected Outcome of the Selected Remedy

Implementation of the selected remedy will significantly reduce risks associated with continued residential land use of the remediated properties Residual risks in each parcel are estimated to be within EPA's acceptable risk range There are no anticipated adverse socio-economic impacts for

Table 12-1
Alternative 4 (Soil) -- Excavation with Use as OU3 backfill, Attic Dust Decontamination

PRESENT WORTH COST

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley, Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL COST DOLLARS
MOBILIZATION/DEMOBILIZATION				
Transport Equipment & Staff	each	1	$100,000	$100,000
Temporary Facilities	each	1	$75,000	$75,000
EXCAVATION				
Soil Excavation	cy	57,000	$10	$570,000
Dust Control & Placement in Storage Area	cy	57,000	$10	$570,000
Backfill Excavated Areas with Clean Fill/Treated Soil	cy	57,000	$10	$570,000
Grading & Compacting	acre	40	$5,000	$200,000
Seed & Mulch	acre	40	$2,000	$80,000
DRAINAGE DITCH PIPE CLEANING	linear foot	10,500	$51	$535,500
ATTIC DUST DECONTAMINATION				
Decontamination and Replacement of Insulation				
Pre-clean, HEPA vacuum, and wet-clean	home	60	$810	$48,600
Containment Barrier	home	60	$300	$18,000
Portable Decontamination Facility	home	60	$38	$2,280
Negative air machine	home	60	$294	$17,640
Air Monitoring	home	60	$500	$30,000
Post-Decontamination inspection/sampling	home	60	$500	$30,000
Removal of contaminated insulation	home	19	$1,740	$33,060
Installation of new insulation	home	19	$720	$13,680
Disposal of contaminated material (disposal charges)	cy	200	$21	$4,200
EQUIPMENT & MATERIALS				
Health & Safety Equipment	each	1	$100,000	$100,000
Subtotal - Capital Cost				$2,997,960
Contractor Fee (10% of Capital Cost)				$299,796
Legal Fees, Licenses & Permits (5% of Capital Cost)				$149,898
Engineering & Administrative (15% of Capital Cost)				$449,694
Subtotal				$3,897,348
Contingency (25% of Subtotal)				$974,337
TOTAL CONSTRUCTION COST				$4,871,685
PRESENT WORTH O&M COST				$465,565
TOTAL PRESENT WORTH COST				$5,337,250

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Table 12-1 (continued)
Alternative 4 (Soil) -- Excavation with Use as OU3 backfill, Attic Dust Decontamination

OPERATION & MAINTENANCE COSTS

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley, Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL ANNUAL COST, DOLLARS	OPERATION TIME, YEARS	PRESENT WORTH
PRE-OU3 PIACEMENT MONITORING						
Soil Sample Analyses	week	52	$2,000	$104,000	2	$188,034
EXCAVATION MONITORING						
Confirmatory Sample Analyses	samples	100	$500	$50,000	2	$90,401
AIR QUALITY MONITORING	week	52	$1,000	$52,000	2	$94,017
SUBTOTAL				$206,000		$372,452
CONTINGENCY (25% of Subtotal)				$51,500		$93,113
TOTAL				$257,500		$465,565

This option assumes that soil would be charcaterized as nonhazardous and would require no further treatment
Estimated acreage requiring remediation 40 acres
1 ton = 1 cy

Transportation and disposal costs developed from R S Means 1999

Attic Dust Decontamination is based on the following assumptions 60 houses with attic dust arsenic concentrations of 71 to 1000 mg/kg will require decontamination Each home has a surface area of 4,500 sq ft that will require decontamination Of the 60 houses, 19 (with concentrations ranging from 500 to 1000 mg/kg arsenic) will require removal of 3,000 sq ft of old insulation and installation of 3,000 sq ft of new installation Assume hazardous landfill disposal for contaminated materials

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Table 12-1 (continued)
Alternative 4 (Soil) – Excavation, Offsite Transportation, and Disposal at Subtitle D Landfill, Attic Dust Decontamination

PRESENT WORTH COST

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley, Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL COST DOLLARS
MOBILIZATION/DEMOBILIZATION				
Transport Equipment & Staff	each	1	$100,000	$100,000
Temporary Facilities	each	1	$75,000	$75,000
EXCAVATION				
Soil Excavation	cy	57,000	$10	$570,000
Dust Control & Placement in Storage Area	cy	57,000	$10	$570,000
Backfill Excavated Areas with Clean Fill/Treated Soil	cy	57,000	$10	$570,000
Grading & Compacting	acre	40	$5,000	$200,000
Seed & Mulch	acre	40	$2,000	$80,000
OFFSITE LANDFILLING				
Truck Transport	truckload	3,200	$700	$2,240,000
Disposal at Subtitle D Landfill	ton	57,000	$65	$3,705,000
DRAINAGE DITCH PIPE CLEANING	linear foot	10,500	$51	$535,500
ATTIC DUST DECONTAMINATION				
Decontamination and Replacement of Insulation				
Pre-clean, HEPA vacuum, and wet-clean	home	60	$810	$48,600
Containment Barrier	home	60	$300	$18,000
Portable Decontamination Facility	home	60	$38	$2,280
Negative air machine	home	60	$294	$17,640
Air Monitoring	home	60	$500	$30,000
Post-Decontamination inspection/sampling	home	60	$500	$30,000
Removal of contaminated insulation	home	19	$1,740	$33,060
Installation of new insulation	home	19	$720	$13,680
Disposal of contaminated material (disposal charges)	cy	200	$21	$4,200
EQUIPMENT & MATERIALS				
Health & Safety Equipment	each	1	$100,000	$100,000
Subtotal - Capital Cost				$8,942,960
Contractor Fee (10% of Capital Cost)				$894,296
Legal Fees, Licenses & Permits (5% of Capital Cost)				$447,148
Engineering & Administrative (15% of Capital Cost)				$1,341,444
Subtotal				$11,625,848
Contingency (25% of Subtotal)				$2,906,462
TOTAL CONSTRUCTION COST				$14,532,310
PRESENT WORTH O&M COST				$465,565
TOTAL PRESENT WORTH COST				$14,997,875

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Table 12-1 (continued)
Alternative 4 (Soil) -- Excavation, Offsite Transportation, and Disposal at Subtitle D Landfill, Attic Dust Decontamination

OPERATION & MAINTENANCE COSTS

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL ANNUAL COST, DOLLARS	OPERATION TIME, YEARS	PRESENT WORTH
PRE-LANDFILL MONITORING						
Soil Sample Analyses	week	52	$2,000	$104,000	2	$188,034
EXCAVATION MONITORING						
Confirmatory Sample Analyses	samples	100	$500	$50,000	2	$90,401
AIR QUALITY MONITORING	week	52	$1,000	$52,000	2	$94,017
SUBTOTAL				$206,000		$372,452
CONTINGENCY (25% of Subtotal)				$51,500		$93,113
TOTAL				$257,500		$465,565

This option assumes that soil would be charcaterized as nonhazardous and would require no further treatment
Estimated acreage requiring remediation 40 acres
1 ton = 1 cy
Assumes transport of 18 tons/truck load and availability of a disposal facility within 350 miles
Assumes a 5% increase in volume of soil treated via solidification/stabilization
Transportation and disposal costs developed from R S Means 1999

Attic Dust Decontamination is based on the following assumptions 60 houses with attic dust arsenic concentrations of 71 to 1000 mg/kg will require decontamination Each home has a surface area of 4,500 sq ft that will require decontamination Of the 60 houses, 19 (with concentrations ranging from 500 to 1000 mg/kg arsenic) will require removal of 3,000 sq ft of old insulation and installation of 3 000 sq ft of new installation Assume hazardous landfill disposal for contaminated materials

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Table 12-1 (continued)
Alternative 4 (Soil) -- Excavation, Offsite Transportation, and Disposal at Subtitle C Landfill
Attic Dust Decontamination

PRESENT WORTH COST

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley, Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL COST DOLLARS
MOBILIZATION/DEMOBILIZATION				
Transport Equipment & Staff	each	1	$100,000	$100,000
Temporary Facilities	each	1	$75,000	$75 000
EXCAVATION				
Soil Excavation	cy	57,000	$10	$570,000
Dust Control & Placement in Storage Area	cy	57,000	$10	$570,000
Backfill Excavated Areas with Clean Fill/Treated Soil	cy	57,000	$10	$570,000
Grading & Compacting	acre	40	$5,000	$200,000
Seed & Mulch	acre	40	$2,000	$80,000
OFFSITE LANDFILLING				
Truck Transport	truckload	3,200	$700	$2,240,000
Landfill Hazardous Solid Bulk Waste requiring stabilizati	ton	57,000	$241	$13,737,000
DRAINAGE DITCH PIPE CLEANING	linear foot	10,500	$51	$535,500
ATTIC DUST DECONTAMINATION				
Decontamination and Replacement of Insulation				
Pre-clean, HEPA vacuum, and wet-clean	home	60	$810	$48,600
Containment Barrier	home	60	$300	$18,000
Portable Decontamination Facility	home	60	$38	$2,280
Negative air machine	home	60	$294	$17 640
Air Monitoring	home	60	$500	$30 000
Post-Decontamination inspection/sampling	home	60	$500	$30 000
Removal of contaminated insulation	home	19	$1,740	$33,060
Installation of new insulation	home	19	$720	$13,680
Disposal of contaminated material (disposal charges)	cy	200	$21	$4,200
EQUIPMENT & MATERIALS				
Health & Safety Equipment	each	1	$100,000	$100,000
Subtotal - Capital Cost				$18,974,960
Contractor Fee (10% of Capital Cost)				$1,897,496
Legal Fees, Licenses & Permits (5% of Capital Cost)				$948,748
Engineering & Administrative (15% of Capital Cost)				$2,846,244
Subtotal				$24,667,448
Contingency (25% of Subtotal)				$6,166,862
TOTAL CONSTRUCTION COST				$30,834,310
PRESENT WORTH O&M COST				$465,565
TOTAL PRESENT WORTH COST				$31,299,875

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Table 12-1 (continued)
Alternative 4 (Soil) – Excavation, Offsite Transportation, and Disposal at Subtitle C Landfill, Attic Dust Decontamination

OPERATION & MAINTENANCE COSTS

Discount Rate 7%

Site Name Woolfolk OU4 Site
Site Location Fort Valley, Georgia

ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL ANNUAL COST, DOLLARS	OPERATION TIME, YEARS	PRESENT WORTH
PRE-LANDFILL MONITORING Soil Sample Analyses	week	52	$2 000	$104 000	2	$188,034
EXCAVATION MONITORING Confirmatory Sample Analyses	samples	100	$500	$50,000	2	$90,401
AIR QUALITY MONITORING	week	52	$1,000	$52,000	2	$94,017
SUBTOTAL				$206,000		$372,452
CONTINGENCY (25% of Subtotal)				$51,500		$93,113
TOTAL				$257,500		$465,565

This option assumes that soil would be characterized as hazardous and would require treatment prior to disposal in Subtitle C landfill
Estimated acreage requiring remediation 40 acres
1 ton = 1 cy
Assumes transport of 18 tons/truck load and availability of a disposal facility within 350 miles
Assumes a 5% increase in volume of soil treated via solidification/stabilization
Transportation and disposal costs developed from R S Means 1999

Attic Dust Decontamination is based on the following assumptions 60 houses with attic dust arsenic concentrations of 71 to 1000 mg/kg will require decontamination Each home has a surface area of 4,500 sq ft that will require decontamination Of the 60 houses, 19 (with concentrations ranging from 500 to 1000 mg/kg arsenic) will require removal of 3,000 sq ft of old insulation and installation of 3,000 sq ft of new installation Assume hazardous landfill disposal for contaminated materials

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the selected remedy

The selected remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risk at OU4 through removal, treatment, engineering controls, and/or institutional controls such as land and/or groundwater use restrictions on a property deed.

13.0 STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of **hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes**. The following sections discuss how the Selected Remedy meets these statutory requirements

Protection of Human Health and the Environment

The selected remedy, Alternative 4 (Option 3) will protect human health and the environment through the excavation and removal of contaminated surface soil and sediments from OU4 and the decontamination of residential attics to remove attic dust with elevated levels of arsenic The Selected Remedy will eliminate the threat of exposure to the COCs via direct contact with or ingestion of contaminated soil There are no short term threats associated with the Selected Remedy that cannot be readily controlled In addition, no adverse cross-media impacts are expected from the Selected Remedy.

The selected remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risk at OU4 through removal, treatment, engineering controls, and/or institutional controls such as land and/or groundwater use restrictions on a property deed.

Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy of excavation and removal of contaminated surface soils and sediments and decontamination of attics to remove contaminated attic dust complies with all ARARs. The ARARs are presented in detail in **Tables 13-1** and **13-2**

Other Criteria , Advisories, or Guidance To Be Considered (TBCs) for This Remedial Action

In implementing the Selected Remedy, a number of non-binding criteria are TBCs These include

Guidance for the Data Quality Objectives Process, EPA QA/G-4 August 2000.

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Table 13-1
Summary of Potential Federal Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Contaminant-Specific			
Clean Air Act	42 USC § 7409		Monitoring
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Air quality levels that protect public health	
Resource Conservation and Recovery Act			Sample collection and analysis
Identification and Listing of Hazardous Waste	40 CFR Parts 262-265 and Parts 124, 270, and 271	Defines those solid mining-related wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 262-265, 124, 270, and 271	
Clean Water Act	33 USC § 1251-1376		Review permit requirements during design phase
NPDES	40 CFR Part 122	General permits for discharge from construction	
Dredge and Fill Requirements [Section 404(b)(1)]	40 CFR Part 230	Action to prohibit discharge of dredged or fill material into wetland without permit	
Location-Specific			
National Historic Preservation Act	16 USC § 470, 36 CFR Part 800	Requires federal agencies to take into account the effect of any federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in, or eligible for, inclusion in the National Register of Historic Places (NRHP)	Survey of adjacent properties to determine status
Archeological and Historic Preservation Act	16 USC § 469, 40 CFR § 6 301(c)	Establishes procedures to preserve historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program	Survey of adjacent properties to determine status

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Table 13-1 (continued)
Summary of Potential Federal Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Floodplain Management Executive Order	Executive Order 11988	Action to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values of the floodplain	Determination of location of 100 year floodplain
Wetlands Management Executive Order	Executive Order 11990	Action to minimize the destruction, loss or degradation of wetlands	Activities limited to residential, commerical properties and/or manmade structures
Protection of Wetlands and Floodplains	40 CFR Part 6, Appendix A	Contains EPA's regulations for implementing Executive Orders 11988 and 11990	Same as for two executive orders listed above
Historic Sites, Buildings and Antiquities Act	16 USC §§ 461-467, 40 CFR § 6 301(a)	Requires federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks	Survey of adjacent properties to determine status
Endangered Species Act	16 USC §§ 1531, 40 CFR Part 6 302, 50 CFR Part 402	Requires action to conserve endangered species within critical habitat upon which species depend, includes consultation with the Department of the Interior	Review of previously completed wildlife survey
Fish and Wildlife Coordination Act	16 USC §§ 661-666c	Any federal agency which proposes or authorizes a modification to a stream, or water body which may affect fish and wildlife must consult with the Fish and Wildlife Service This act requires protection of fish and wildlife resources	No water body modification is anticipated, no additional action required
Migratory Bird Treaty Act of 1973	16 USC §§ 703	Established a prohibition, unless permitted, to pursue, hunt, capture, kill, or take any migratory bird or attempt any of these actions Also protects migratory birds in their environments	No impact to migratory birds is anticipated

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Table 13-1 (continued)
Summary of Potential Federal Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Emergency Wetlands Resources Act of 1986	16 USC §§ 3901	Requires the Secretary to establish a National Wetlands Priority Plan and report to Congress on the loss of wetlands including the role federal agencies have in the loss of these wetlands	No impact to wetlands is anticipated
U S Fish and Wildlife Service Mitigation Policy	NPI#89-02	Provides for the policy to develop consistent and effective recommendations to protect and conserve natural resources Also allows federal and private developers to incorporate mitigation measures into the early stages of planning	No impact to natural resources is anticipated
National Environmental Policy Act of 1969	16 USC §§ 4331 40 CFR Part 1501	Requires federal agencies to prepare comprehensive environmental impact statements for every recommendation on proposals for legislation and federal actions which might significantly affect the quality of the environment	No adverse effect on environment is anticipated
Resource Conservation and Recovery Act	40 CFR Part 264	Requires hazardous waste facilities to be (1) located at least 200 feet from a fault and (2) designed to withstand a 100-year flood if located in the 100-year floodplain	No additional action at OU4 will be required, will be considered during OU3 design
Action-Specific			
Hazardous Materials Transportation Act			Adherence to all appropriate transportation regulations
Hazardous Materials Transportation Regulations	49 CFR Parts 10, 171-177	Regulates transportation of hazardous materials, including mining wastes that are not exempt under the Bevill Amendment	

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Table 13-1 (continued)
Summary of Potential Federal Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Resource Conservation and Recovery Act			
Criteria for Classification of Solid Waste Disposal Facilities and Practices	40 CFR Part 257	Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment and thereby constitute prohibited open dumps	No additional action required at OU4
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards that apply to persons transporting hazardous waste within the U S if the transportation requires a manifest under 40 CFR Part 262	Adherence to all appropriate transportation regulations
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR Part 264	Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste	No additional action required at OU4
Clean Water Act	33 USC § 1342		
NPDES	40 CFR Part 122	Requires permits for the discharge of pollutants from any point source into waters of the United States	Review permit requirements during design phase
Dredge and Fill Requirements [Section 404(b)(1)]	40 CFR Part 230	Action to prohibit discharge of dredged or fill material into wetland without permit	
Occupational Safety and Health Administration Requirements	29 CFR 1910	Establishes requirements for workers at remedial action sites Any remedial action on-site must be performed in accordance with applicable OSHA standards	Development and adherence to a site health and safety plan

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Table 13-2
Summary of Potential State Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Contaminant-Specific			
Hazardous Sites Response	GA Chapter 391-3-19	Establishes policies, procedures, requirements, and standards to implement the Georgia Hazardous Site Response Act (O C G A 12-8-90) In particular, Chapter 391-3-19- 07 establishes the risk reduction standards	Review during project implementation
Air Quality Control	GA Chapter 391-3-1	Establishes the policies, procedures, requirements, and standards to implement the Georgia Air Quality Control Law (O C G A Section 12-9-1) States that no person shall construct or operate any facility from which air contaminants may be emitted in such a manner as to fail to comply with any applicable standards of performance or any other requirement for a hazardous air pollutant established by EPA	Monitoring
Location -Specific			
Erosion and Sedimentation Control	GA Chapter 391-3-7	Establishes the requirements for obtaining a permit before any land disturbing activity is undertaken A plan must be developed before any land disturbance In addition, any land disturbing activity proposed within a 100-year floodplain must not adversely affect adjacent upstream or downstream properties by causing flooding, erosion, or sedimentation	Review permit requirements during design phase
Rules for Environmental Planning Criteria	GA Chapter 391-3-16	Establishes criteria for the protection of groundwater recharge areas and wetlands	Review applicability of criteria during design phase

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Table 13-2 (continued)
Summary of Potential State Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Game and Fish	O C G A Section 27	Wildlife species identified as endangered or threatened will be protected from harm, and that the disturbance, mutilation, or destruction of wildlife homes is prohibited	Review of previously completed wildlife survey
Endangered Wildlife & Windflower Preservation Acts of 1973	GA Code 12-6-172	Protection of endangered or threatened species that are state listed and not federally listed, or are more stringently listed by the state act than the federal act	Review of previously completed wildlife survey
Criteria for Siting Solid Waste Handling Facility	GA Chapter 391-3-4- 05	Provides criteria that must be met for a site proposed as a solid waste handling facility Defines requirements and restrictions for sites proposed for 100-year floodplain areas, wetlands, fault areas, seismic impact zones, and significant groundwater recharge areas	No additional action at OU4 will be required, will be considered during OU3 design
Action-Specific			
Hazardous Waste Management	GA Chapter 391-3-11	Establishes policies, requirements and standards to implement the Georgia Hazardous Waste Management Act (O C G A 12-8-60) Promulgated for the purpose of protecting and enhancing the quality of the State's environment and protecting the public health, safety, and well-being of its citizens Subparagraphs within this rule include 391-3-10- 04 (notification of hazardous waste activities), 391-3-10- 07 (identification and listing of hazardous waste), and 391-3-10- 11 (hazardous waste facility permits)	Monitoring, sample collection and analysis Review permit appllicability during design phase
Transportation of Hazardous Materials	GA Chapter 672-10	Establishes the requirements for the transportation of hazardous materials and obtaining permits for such transportation	Adherence to all appropriate transportation regulations

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Table 13-2 (continued)
Summary of Potential State Applicable or Relevant and Appropriate Requirements
Woolfolk OU4 Site

Standard, Requirement Criteria, or Limitation	Citation	Description	Action to be Taken to Attain Requirement
Air Quality Control	GA Chapter 391-3-1	Establishes policies, requirements, and standards to implement the Georgia Hazardous Waste management Act (O C G A Section 12-9-1) States that no person shall construct or operate any facility from which air contaminants are or may be emitted in such a manner as to fail to comply with any applicable standards of performance or any other requirement for a hazardous air pollutant established by EPA Establishes a system for classifying air pollution sources and assures compliance with emission control standards Sets forth ambient air quality standards which establishes certain maximum limits on parameters of air quality considered desirable for the preservation and enhancement of the quality of the State's air resources	Monitoring

Notes

CFR Code of Federal Regulations
NPDES National Pollutant Discharge Elimination System
OCGA Official Code of Georgia
USC United States Code

Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, EPA Region 4, November 2001.

EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, Final, QA/R-5 March 2001.

Cost-Effectiveness

In EPA's judgement, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent In making this determination, the following definition was used "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness " (40 CFR §300 430(f)(1)(ii)(D)). EPA evaluated the overall effectiveness of those alternatives that satisfied the threshold criteria (were both protective of human health and the environment and ARAR-compliant) by assessing three (3) of the five (5) balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness) Overall effectiveness was then compared to costs to determine cost-effectiveness The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is $5.4 million Using OU4 excavated soils as backfill at OU3 can result in a cost- and logistics-efficient operation Under other circumstances, these contaminated residential soils would be excavated (although they would probably not require treatment) and would be transported to an offsite landfill. However, in this case, the soil removed from the residences (after sampling to ensure that the concentration is below 20 ppm arsenic and would not cause unacceptable leaching into the groundwater) could be used as subsurface backfill in the unpaved areas. Based on the data available, none of the residential properties would have an average arsenic concentration above 30 ppm and could therefore be used as backfill in areas to be paved over without testing Using residential soil as backfill in OU3 would save transportation and landfill disposal cost for the OU4 surface soils. In addition, this same action would save the cost of purchasing and transporting of backfill soils for OU3 Using the estimated volume of soils from the residences in OU4 as backfill could save as much as $ 4,000,000 in OU4 costs (landfill fees and additional transportation mileage) and as much as $400,000 in OU3 costs (clean fill purchase and additional transportation) while providing equal or greater protection to human health and the environment.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at OU4 The RI data indicate that all the OU4 soils, at a minimum, already meet the criteria for use as a backfill material in paved areas for the OU3 remediation without undergoing treatment. With analytical testing, some of the soil could be used as a backfill in unpaved areas as well Additionally, when the attic dust is removed from the attics to be decontaminated, it will be consolidated and homogenized with the comparatively much larger volume of OU4 soils to prevent hotspots in the backfill Once homogenized, the consolidated material will meet OU3 criteria for use as a backfill in paved areas without treatment.

Preference for Treatment as a Principal Element
The Selected Remedy does not satisfy the statutory preference for treatment as a principal element because the RI data indicate that the final disposition of the OU4 soils (and attic dust) designated in the Selected Remedy can be accomplished without additional treatment to meet the criteria for placement in OU3.

Five-Year Review Requirements
Because the Selected Remedy results in hazardous substances, pollutants, or contaminants remaining on the Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five (5) years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

14.0 Documentation of Significant Changes

To fulfill CERCLA §117(b) and NCP §§300 430(f)(5)(iii)(B) and 300.430(f)(3)(ii)(A), the ROD must document and discuss the reasons for any significant changes made to the Selected Remedy from the time the Proposed Plan was released for public comment to the final selection of the remedy Several of the soil performance standards have been lowered to be consistent with GA Hazardous Site Response Act (HSRA) residential standards for soil The new remediation levels fall within EPA's carcinogenic risk range and/or meet EPA's residential action level for soil at the Site.

15.0 References

CDM Federal Programs Corporation. 2002 *Final Remedial Investigation Report for Operable Unit 4, Remedial Investigation/Feasibility Study, Woolfolk Chemical Works Site, OU4, Fort Valley, peach County, Georgia* October

CH2M HILL 1992 *Final Remedial Investigation Report, Operable Unit 1, Woolfolk Chemical Works Site, Fort Valley, Georgia*, November

USACE (U S Army Corps of Engineers) 2002. *Residential Attic Dust Contamination Assessment Study at Fort Valley, Georgia* (Woolfolk Chemical Works, Inc.).

USEPA (U.S Environmental Protection Agency) 1994. *Revised Interim Soil Lead (Pb) Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive 9355.4-12.

USEPA (U.S Environmental Protection Agency) 1998 *Clarification to the 1994 Revised Interim Soil Lead (Pb) Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive 9200 4-27P

USGS (U S Geological Survey) 1972a. Perry West Quadrangle, Georgia, 7.5-minute series topographic map. Photo revised 1984.

USGS 1972b Marshallville Quadrangle, Georgia, 7 5-minute series topographic map Photo inspected 1981

USGS 1973. Fort Valley West Quadrangle, Georgia, 7 5-minute series topographic map. Photo revised 1985.

USGS 1974 Fort Valley East Quadrangle, Georgia, 7 5-minute series topographic map

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
WOOLFOLK CHEMICAL WORKS SITE
OPERABLE UNIT #4: CONTAMINATION
FORT VALLEY, PEACH COUNTY, GEORGIA

The U S Environmental Protection Agency (EPA) held a public comment period from July 10, 2003 through September 10, 2003 for interested parties to give input on EPA's Proposed Plan for Remedial Action at the Woolfolk Chemical Works Superfund Site (WCW Site or Site) in Fort Valley, Peach County, Georgia A public meeting was conducted by EPA on July 10, 2003, at the Pettigrew Center located at Fort Valley State University in Fort Valley, Georgia. At the meeting EPA presented the Proposed Plans for the WCW Site's Operable Unit #3 (OU3) and Operable Unit #4 (OU4), which were based on the results of the Remedial Investigation and Feasibility Study (RI/FS)

A responsiveness summary is required to document how EPA addressed citizen comments and concerns about the Site, as raised during the public comment period All comments summarized in this document have been factored into the final decision about the remedial action for OU4.

This responsiveness summary is divided into the following section, and covers questions, concerns, and comments regarding OU4 or both OU3 and OU4

I. Overview: This section discusses the recommended alternative for remedial action and the public reaction to this alternative

II. Background on Community Involvement and Concerns: This section provides a brief history of community interest and concerns regarding the Site

III. Summary of Major Questions and Comments Received During the Public Comment Period and EPA's Responses: This section presents comments submitted during the public comment period and provides the responses to these comments.

IV. Concerns to be Addressed in the Future: This section discusses community concerns of which EPA should be aware during future actions

I. Overview

The preferred remedial alternative was presented to the public in a Proposed Plan released on July 10, 2003. A public meeting was held July 10, 2003 with about 71 people attending. EPA held a 30-day comment period from July 10, 2003 to August 10, 2003 and extended it to September 10, 2003 upon request from a potentially responsible party. EPA announced the public meeting and comment period in the Fort Valley Leader-Tribune and the Macon Telegraph prior to the start of the comment period EPA also mailed out the proposed plan to approximately 605 people on the WCW Site mailing list

The Proposed Plan addressed several areas of concern and proposed EPA's preferred alternative for each. These areas included the soil on residential and commercial properties, contamination of the drainage pathway from the former WCW facility along Preston Street to Spillers Street, and dust in the attics of surrounding homes

People making comments for the record at the public meeting did not express opposition to the Proposed Plan Most of the commentors were trying to gain a better understanding of the material presented by EPA. Commentors generally posed their issues, ideas, and concerns in question format that included such topics as· the CERCLA Superfund process, the contents of the cap area, the possibility of aquifer contamination, the difference between soil cleanup goals of 317 ppm versus 20 ppm, the location of streets relative to the designated consolidation/excavation areas, the details of the more recent emergency removal action, the distribution of the other 48 COPCs and their correlation to arsenic, the location of homes whose attic dust was recently removed, the availability of referenced documents, groundwater contamination concerns, water system issues, and exposure to attic dust

II. Background on Community Involvement and Concerns

EPA has made significant efforts to insure that interested parties have been kept informed and given an opportunity to provide input on activities at the WCW Site EPA has been working with the community surrounding the WCW facility since 1990. In September 1990, press releases which informed the community about the addition of the Site to the National Priorities List (NPL) were issued Subsequent interviews were held that Fall to develop a Community Relations Plan (CRP) The information repository was established in October 1990, at the Thomas Public Library, 213 Persons Street, Fort Valley, Georgia The CRP, which was finalized in November 1990, was placed in the Administrative Record (AR) for OU4, located in the information repository. In January 1991, EPA held a public meeting to discuss the start of the RI/FS.

In July 1993, EPA issued a press release and fact sheet on the findings of the RI regarding soil contamination in residential areas and health precautions recommended by the Agency for Toxic Substances and Disease Registry (ATSDR) On August 2-3, 1993, EPA conducted door-to door visits to the potentially affected residents to further distribute the fact sheet and extend an invitation to an availability session The availability session, held on August 3, 1993 discussed the results of the RI and ATSDR's recommendations for health precautions. Fifty people attended the session, which was hosted by EPA, the Georgia Environmental Protection Division (GaEPD), and ATSDR. Representatives of Canadyne-Georgia Corporation (CGC) were also present.

EPA's Emergency Response and Removal Branch determined the extent of contamination which needed immediate response, excavated contaminated soils from the majority of residential properties, and completed the destruction of a dioxin-contaminated building (Building E) located on WCW property. CGC conducted this work, with EPA oversight, to comply with an Unilateral Administrative Order (UAO) requiring the company to relocate some affected residents and destroy and remove Building E. Approximately 3,700 cubic yards of contaminated soil were excavated and disposed of at a permitted hazardous waste landfill in Emelle, Alabama. Other soil and debris were disposed of underneath an onsite cap Throughout this process, EPA has met with the residents individually and held numerous public meetings

The Feasibility Study, the Proposed Plan, and the AR for OU1, which addressed contaminated groundwater, were released to the public on January 18, 1994. These two (2) documents were made available in both the EPA Region IV Docket Room and the information repository near the Site. The notice of availability of these documents and the AR was published on January 18, 1994 in various local publications. A public comment period was held from January 18,1994 to February 17, 1994. In addition a public meeting was held on February 1, 1994 At this meeting representatives from EPA, ATSDR, and the State of Georgia answered questions about problems at the Site and the remedial alternatives under consideration for addressing contaminated groundwater. Comments on the OU1 Proposed Plan were addressed in the Responsiveness Summary attached to the OU1 Record of Decision (ROD).

EPA also hosted a series of five (5) meetings with a group of 11 community members representing different views throughout the community The group formed under the already existing Technical Assistance Grant (TAG) group, the Woolfolk Citizens Response Group (WCRG), and was called the Community Information Exchange Group (CIEG). The purpose of the group was to meet in a public forum and discuss activities occurring at the WCW Site. The CIEG met from March through June 1995 and concentrated on issues related to OU2 and future actions at the Site. The remedy for OU 2 addressed the redevelopment of certain properties near the WCW facility into a library and other facilities

Another group, the Alliance Group, provides a forum for all involved to discuss and address cleanup issues and future land use, so that the Woolfolk Site remediation results in a safe place to live, protects the environment and, where possible, aids the local economy. The Alliance Group generally meets every four (4) to six (6) weeks at the Peach County Courthouse or Fort Valley City Hall The Alliance Group consists of local citizens and representatives from: The City of Fort Valley, Peach County, Fort Valley Utilities Commission, WCRG, businesses (Canadyne-Georgia Corporation, Holcomb Tire Corporation, SureCo Inc), and Federal and State Agencies [Agency for Toxic Substances and Disease Registry (ATSDR) Georgia Division of Public Health, Georgia Environmental Protection Division (EPD), Environmental Protection Agency Region 4 (EPA) and EPA Office of Research and Development (ORD), Cincinnati, Ohio].

A Feasibility Study Addendum, a Proposed Plan, and the rest of the AR for OU2 were prepared and made available to the public in the EPA Region 4 Docket Room and the information repository near the Site on July 18, 1995 The notice of availability of these documents and the AR was published on July 18, 1995 in various local publications. A public comment period was held from July 18, 1995 to September 15, 1995 In addition, a public meeting was held on August 29, 1995. At this meeting representatives from EPA and the State of Georgia answered questions about problems at the Site and the remedial alternatives under consideration. EPA addressed those comments in the responsiveness summary in Appendix A of the OU2 ROD

A FS Addendum, a Proposed Plan, and the rest of the AR for OU3 were prepared and made available to the public on July 10, 2003 in EPA Region 4's Docket Room and in the information repository near the Site The notice of availability of these documents and the entire AR was published on July 3, 2003 in various local publications A public comment period was held from July 10, 2003 to September 10, 2003. In addition a public meeting was held on July 10, 2003 At this meeting representatives from EPA and the State of Georgia answered questions about problems at the Site and the remedial alternatives under consideration. EPA addressed those comments in the responsiveness summary in Appendix A of the OU3 ROD

EPA provided a fact sheet to the community in February of 1996 on the status of all cleanup activities at the WCW Site. EPA continued to work with the WCRG, the recipient of EPA's Superfund TAG, and their technical advisor, throughout 1996 and 1997 on such groundwater issues as the design for the groundwater cleanup remedy (OU1), redevelopment of the properties addressed by the OU2 ROD, and on both OU3 and 4 issues. In addition, EPA responded to numerous letters and phone calls from citizens and to Congressional inquiries to insure that the Fort Valley community had sufficient information on Superfund activities at the WCW Site.

III. Summary of Major Questions and Comments Received During the Public Comment Period and EPA's responses.

Citizens Comments

Mailing List Additions/Corrections (only) - **(OU3, OU4)**
Several individuals who responded during the public comment period had no specific comments They were just requesting that EPA either add or update their contact or mailing address information The mailing list has been updated to include the latest information

Monetary Compensation - **(OU3, OU4)**
Several individuals responded during the public comment period to inform EPA about where they lived, either now or previously, and the proximity of where they reside(d) to the former facility. These individuals asked about receiving monetary compensation for their potential exposure to chemicals previously used at the former WCW facility The majority of individuals based their request on heresay from neighbors or friends who previously received compensation from CGC.

CERCLA, also known as Superfund, and its implementing regulations in the National Contingency Plan (40 CFR Part 300) govern EPA actions at all Superfund removal and remedial Sites, including the WCW Site The statute and rules do not authorize EPA to pay any type of compensation from the Superfund or from any other source to persons who are potentially injured by contamination at a Superfund Site Such damages can only be recovered in private law suits under state common law.

The only time EPA became involved with compensation for persons impacted by the Woolfolk Site contamination was when it reviewed the amount of relocation payments potentially responsible party (PRP) CGC made to residents displaced during removal activities the company conducted pursuant to the December 1, 1993 UAO As part of its oversight of the UAO's implementation, EPA ensured that CGC made payments commensurate with those provided for in the Uniform Relocation Act.

Any questions related to previously agreed-upon private settlements should be directed to CGC

Exposure/Human Health Risk Assessment - **(OU3, OU4)**
Several individuals cited specific health problems they themselves or their deceased relatives experienced and their relationship to the former facility. Individual health concerns included both current conditions and conditions of deceased individuals, including breathing problems, blood pressure problems, headaches, skin conditions, swollen appendages, gastrointestinal irritation, anemia, miscarriage, and cancer. Several of these individuals cited confirmation of contaminated soil on their property.

Several individuals were concerned about the potential for exposure to contamination by either breathing dust or ingesting groundwater. One individual said discolored (yellow) groundwater was used for both potable and irrigation purposes.

While it is possible that the afflictions several individuals suffered were connected in some way to the contamination associated with the former facility, these types of problems can have many possible causes The only way to state with any certainty whether there is a connection to the Site is through an epidemiological investigation Such a study would examine whether there is an increased likelihood of disease due to exposure to contaminants released from the Site Such studies are generally conducted by ATSDR

With regard to groundwater, residents obtain water from the City of Fort Valley which has six (6) operating municipal wells located within a 12 mile radius of the Site that are set in the Tuscaloosa aquifer at depths in excess of 500 ft As a municipal supplier, the City of Fort Valley regularly checks the water quality for compliance with state and federal water quality standards. Residents in the vicinity of the Site who obtain water from private wells should contact EPA since testing of the water may be advisable.

General Statements **(OU3, OU4)**
Several individuals voiced their opinions about the extent of contamination in the air, soil, and groundwater as it relates to the WCW Site and the inefficiency of both CGC and EPA to identify the extent of contamination, alleviate their health concerns, and implement a remedy.

One individual specifically requested to receive any and all information about the cleanup

Several individuals thought that EPA was doing a good job and were in general very pleased with the Proposed Plan

Canadyne-Georgia Corporation Letter to Angela Leach
Regarding Proposed Plans for Operable Unit 3 and 4
(September 10, 2003)

Concern 1:
Questions about absence of required documents in ARs **(OU3, OU4)**

EPA Response:
EPA has prepared the ARs for OU3 and OU4 in compliance with the requirements of 42 U.S.C. Section 9613(k)(1), as well as 40 CFR §§300 800, 300 810, and 300.825 In response to this comment and previous requests by CGC, EPA reviewed both ARs to ensure that all documents which formed the basis for the selection of the response actions, as well as any others required by law, have not been inadvertently omitted.

CGC Comments (September 10, 2003)

Operable Unit 3 and Operable Unit 4 Feasibility Study Addenda and Proposed Plans

Concern 2:
CGC asserts that EPA has arbitrarily chosen overly conservative cleanup goals for arsenic - contaminated surface and subsurface soils for both Operable Units 3 and 4. **(OU3, OU4)**

EPA Response:
The arsenic cleanup goal of 20 mg/kg for surface soil was selected based on site-specific arsenic data and human health exposure scenarios, as required by CERCLA. The results of these human health risk assessment calculations and summary of conclusions can be found in the Final Human Health Risk Assessment found in Section 5 of the Final RI Report dated October 2002. The arsenic cleanup goal of 20 mg/kg for subsurface soil was selected based on site-specific subsurface soil arsenic data and fate and transport modeling for protection of groundwater, conducted by EPA's Senior Hydrogeologist. The results of the groundwater protection fate and transport modeling calculations and summary of conclusions can be found in a report titled, "Woolfolk Chemical Site Review of Arsenic Soil Remedial Goals for Groundwater Protection," dated February, 2001.

Concern 3:
CGC asserts that EPA withheld documents related to the development of arsenic cleanup goals for soil, dust, and sediment at the WCW Site in violation of federal law. Furthermore, CGC has requested that EPA suspend consideration of the current Proposed Plans for OU3 and OU4 to allow time for CGC/CTEH to work with EPA to develop new arsenic cleanup goals based on probabilistic risk assessment and site-specific data. **(OU3, OU4)**

EPA Response:
As indicated in EPA's response to Concern 2, the human health risk assessment and conclusions

used as the basis for the arsenic cleanup goal for surface soil can be found in the Risk Assessment dated June 2002 Furthermore, the groundwater protection fate and transport modeling calculations and conclusions can be found in a report titled, "Woolfolk Chemical Site Review of Arsenic Soil Remedial Goals for Groundwater Protection," dated February, 2001.

All documents used to develop the arsenic cleanup levels for OU3 and OU4 are located in the ARs

Concern 4:
CGC asserts that EPA gives no explanation for the limited bioavailability of arsenic in soil in the development of cleanup goals for OU3 and OU4 **(OU3, OU4)**

EPA Response:
The risk assessment was prepared according to EPA guidance In general, Region 4 will not accept any adjustment in the 100% bioavailability default assumption in the exposure equation without extensive supporting data. Credible site-specific bioavailability studies for arsenic require animal testing and are costly and time-consuming to perform

Concern 5:
CGC asserts that an arsenic soil cleanup goal of 245 ppm is protective of groundwater at the OU3 and OU4. **(OU3, OU4)**

EPA Response:
As indicated in EPA's response to Concern 2, the groundwater protection fate and transport modeling calculations and conclusions can be found in a report titled, "Woolfolk Chemical Site Review of Arsenic Soil Remedial Goals for Groundwater Protection," dated February, 2001.

Concern 6:
CGC asserts that EPA's proposal to remediate residential attic dust is unlawful and unscientific **(OU4)**

EPA Response:
The United States Army Corps of Engineers' (USACE) attic dust risk assessment employed the same exposure routes and intake assumptions that were used in the calculation of residential exposures to soil Yearly, monthly, weekly, and daily exposure frequencies were examined. Among the assessment's conclusions were·

- Based on the attic use patterns stated by current residents in the home survey, no resident's exposure appears to present an imminent health risk.
- Long term health risk from arsenic exposure may occur if exposure patterns change in the future or if residents were to enter their attic more often than once per month on average.
- Homes with arsenic concentrations greater than 1,000 mg/kg exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than once per month.
- Homes with arsenic concentrations greater than the reference concentration (71 mg/kg)

exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than daily (350 times per year)

Lacking assurances about current and future attic use patterns, the Agency's proposed remedy is both scientifically justified and reasonable

Concern 7:
CGC asserts that EPA did not follow its own requirement to submit the proposed remedies to the National Remedy Review Board prior to issuing the Proposed Plans for OU3 and OU4. **(OU3, OU4)**

EPA Response:
EPA did follow its own requirements Submittal to the National Review Board is required if the costs of the Selected Remedy for each OU are greater than $30,000,000 or are greater than 50% more than the costs of the least expensive remedy that meets the threshold criteria, protection of human health and the environment and meeting ARARs.

Concern 8:
CGC asserts that EPA incorrectly stated the history of OU1 in the Proposed Plan as it relates to CGC's discontinued involvement at OU1 **(OU3, OU4)**

EPA Response:
EPA believes that it correctly stated the history of OU1 as it relates to CGC's discontinued involvement in the Proposed Plan and that the Agency operated within its authority when it directed CGC to perform necessary actions pursuant to the UAO for OU1.

Concern 9:
CGC indicates that several additional comments generated by CH2M Hill and CTEH on the Proposed Plan require consideration and response **(OU3, OU4)**

EPA Response: Comment noted

Attachment A - CTEH's Comments and Enclosures

I. Recalculation of Probalistic Risk Assessment (PRA) for the Woolfolk Site

Concern 10:
CTEH indicates that CTEH responded to the comments in Dr Ted Simon's document titled, "The Development of Arsenic Soil, Dust, and Sediment Clean-Up Levels for OU-4 at the Woolfolk Chemical Works Superfund Site," dated September 23, 1999, and revised parts of the PRA. The revisions produced a new residential soil cleanup goal of 190 mg/kg. **(OU4)**

EPA Response:
The process for conducting PRAs was not followed Thus, EPA used a standard methodology to determine remediation levels The entire process CTEH used in conducting the probabilistic determination of the arsenic cleanup level of 190 mg/kg for OU3 and OU4 departed significantly from the procedures explicitly outlined in EPA guidance.

A summary of risk policy issues related to the OU4 cleanup raised in Appendix A of the PRA, submitted on behalf of CTEH, are discussed below

The Need for a Workplan and Close Consultation with EPA
In EPA's January 26, 2000 memorandum referred to in this comment, EPA noted the need for a work plan and for close consultation with EPA as the document was prepared No work plan was submitted and CTEH did not communicate with EPA until the document was submitted

Chapter 1 of RAGS, Volume 3 states "A workplan should be developed and submitted for review before commencement of a PRA The workplan should document the combined decisions of the RPM and risk assessor in the risk assessment, and positions of the stakeholders Chapter 2 of RAGS, Volume 3 states. "A PRA workplan should be developed early in the risk assessment planning process for the site regardless of who will actually develop the PRA (e g., EPA, EPA contractor, or PRP) " If a PRP performs the PRA, the workplan should be submitted to EPA for review and approval prior to commencing the PRA It should describe the intended PRA in sufficient detail so that EPA can determine if the work products will actually address risk assessment and management needs It is important that the risk assessor and RPM discuss the scope of the probabilistic analysis and the potential impact it may have on the remedial investigation/feasibility study. In general, regions should not accept probabilistic analysis when a workplan for the analysis has not been submitted to the Agency, and approved by the regional risk assessor and RPM." Without an approved workplan, EPA will not accept the probabilistic evaluation of the cleanup level for OU3 and OU4. The process for conducting PRA's was not followed See response to Concern 10 Thus, EPA used a standard methodology to determine remediation levels

Stakeholder Involvement
Chapter 6 of the PRA guidance emphasizes the importance of stakeholder involvement and education throughout the RI/FS process. The active and concerned citizens in the Woolfolk

community were not involved, educated, or informed about the process of determining the probabilistic cleanup level of 190 mg/kg Such a failure would make community acceptance of the probabilistic cleanup level very unlikely Community acceptance is one (1) of the nine (9) criteria to consider when choosing a Superfund remedy

Attachment B - CH2M Hill's Technical Memorandum and Enclosures

<u>Soil Cleanup Goal for Groundwater Protection</u>

The results of the groundwater protection fate and transport modeling calculations and summary of conclusions can be found in a report titled, "Woolfolk Chemical Site Review of Arsenic Soil Remedial Goals for Groundwater Protection," dated February, 2001

<u>Selected Remedial Actions for OU3 and OU4</u>

OU4- Dust

Concern 11:
Section 2 9, page 2-35 of the OU4 FS (October 2002) states that the Remedial Action Objective for Attic Dust is to "prevent ingestion, inhalation, or direct contact with attic dust that contains concentrations above background concentrations " The RI/FS process mandated by CERCLA requires that a Baseline Risk Assessment be performed in order to evaluate Human Health Risks and develop cleanup goals It appears that EPA has defaulted to background concentrations without conducting an appropriate risk assessment as required **(OU4)**

EPA Response:
The USACE attic dust risk assessment concluded that homes with arsenic concentrations greater than 71 mg/kg exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than daily (350 times per year). It happens that 71 mg/kg arsenic is the same as the reference concentration, but the Agency did not, as the comment alleges, default to background concentrations without performing the requisite risk assessment

Concern 12:
The OU4 Proposed Plan states on page 7 that the site-specific, time-critical risk range "was developed assuming a resident would spend one day per month in the attic " This exposure scenario is overly conservative and has resulted in a risk-based cleanup goal that is unjustifiably low **(OU4)**

EPA Response:
The USACE attic dust risk assessment employed the same exposure routes and intake assumptions that were used in the examination of residential exposures to soil Yearly, monthly, weekly, and daily exposure frequencies were examined Among the assessment's conclusions were.

- Based on the attic use patterns stated by current residents in the home survey, no resident's exposure appears to present an imminent health risk.
- Long term health risk from arsenic exposure may occur if exposure patterns change in the future or if residents were to enter their attic more often than once per month on average.

- Homes with arsenic concentrations greater than 1,000 mg/kg exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than once per month
- Homes with arsenic concentrations greater than the reference concentration (71 mg/kg) exceed the EPA's target risk range for Superfund sites if exposure frequency is greater than daily (350 times per year).

Lacking assurances about current and future attic use patterns, the Agency's proposed remedy is both scientifically justified and reasonable

OU4 Soils

Concern 13:
1 Page 8 of the OU4 Proposed Plan states "In the future commercial/industrial properties may be redeveloped for residential use, meaning that potential receptors would be residents. Using residential land assumptions for these commercial/industrial properties will provide an additional measure of protection for the community In addition, the residential land assumptions will allow the City of Fort Valley more flexibility in preparing a redevelopment plan "

Neither EPA nor the City of Fort Valley has provided the evidence of a redevelopment plan. **(OU4)**

EPA Response:
The WCW Site is located in an area with mixed commercial and residential land uses Residences are located to the west, south, and east, with homes to the southeast adjoining a peach orchard Several businesses are located along the north, northwest, and east ends of the former plant The same mix of future land use is anticipated for the OU4 properties, as residents and businesses will continue to inhabit the properties after remediation activities are completed. In addition, based on discussions with city officials, anticipated future land use for the WCW Site may include commercial or recreational use Residents associated with this environmental justice area have expressed interest in developing residential areas to the west and south of the Site.

A Brownfields Grant for redeveloping the former WCW Site has been issued by EPA. In addition, the City of Fort Valley, under a separate redevelopment grant issued by EPA, has approached Georgia Institute of Technology to evaluate both current and future land use scenarios and to provide a design that integrates future land use with redevelopment under the Brownfields initiative The city is currently considering redevelopment of the WCW facility property into recreational areas or park Such scenarios could result in potential human contact with surface soils which will undergo remediation.

Concern 14:
Question 1 - Is there a redevelopment plan? **(OU3, OU4)**

EPA Response:
See response to Concern 13

Attachment 1 - Specific Comments

Concern 15:
Question 18 - Do the proposed plans contemplate removal of soils at properties with concentrations less than 20 mg/kg arsenic? If so, what is the rationale? **(OU4)**

EPA Response:
At OU4, surface soils with arsenic concentrations greater than 20 mg/kg will be remediated.

Concern 16:
Attachment C - All FOIA Letters **(OU3, OU4)**

EPA Response: There were several letters written by Daniel H Sherman IV of Long Aldridge & Norman to U S. EPA requesting specific information These letters have been or are currently being processed under the Freedom Of Information Act (FOIA)

The attorneys contend that EPA inappropriately withheld documents related to the development of arsenic soil, dust, and sediment clean up levels at the Woolfolk Site. It cites, as an example, EPA's responses to a FOIA request submitted on January 22, 2001 In the request, the company asked for, among other things, copies of all documents that related in any way to the Woolfolk Chemical Works Site dated, generated by, received by, or transmitted to Region 4 subsequent to April 1, 1999. According to CGC, a potentially responsive document, a January 26, 2000 memorandum, prepared by toxicologist Ted W. Simon, was not provided in any of EPA's partial responses to the FOIA or listed on any partial indices of withheld documents

The Agency responds to all information requests it receives pursuant to the FOIA statute, its implementing regulations at 40 CFR Part 2, Subpart A, and Agency guidance. Staff members make every effort to provide timely responses to each request. When the amount of potentially relevant documents is voluminous, as in this case, the Agency often provides requesters with partial responses while it continues evaluating the remaining documents in the case files. Unfortunately, the January 26, 2000 document CGC cited, one (1) of approximately 8,000 documents in the case file, was unintentionally omitted from all of the responses. This document was released in response to a subsequent FOIA request

CGC's challenge of Region 4 decisions to withhold specific relevant documents, pursuant to the exemptions specified in the statute, is currently the subject of an appeal the company filed with EPA Headquarters FOIA Staff, Records, Privacy and Collection Branch, as required by 40 CFR §2.104(j)

Canadyne-Georgia Corporation Comments (October 8, 2003)

Cover Letter Dated October 8, 2003

Concern 17:
CGC states **OU4's** AR includes a December 20, 2000 memorandum written by EPA's Dr Elmer Akins in which he suggested a cleanup goal of 20 mg/kg. Dr Akins said the cleanup goal is consistent with the most frequent arsenic cleanup levels presented in RODs for other Superfund sites around the country CGC disputes this, identifying higher arsenic cleanup goals at other sites, including 230 ppm at the Commencement Bay Nearshore/Tideflats Superfund Site in Ruston and Tacoma, Washington and 70 ppm at the Vasquez Boulevard and I-70 Superfund Site in Denver, Colorado **(OU4)**

EPA Response:
EPA has reviewed the comment but agrees with Dr Akins' Memo dated December 20, 2000.

Concern 18:
CGC expands on the Vasques Boulevard and I-70 Superfund Site comments, by noting that the Baseline Human Health Risk Assessment states that EPA determined that the relative bioavailability of arsenic in soils, when compared with readily soluble form of arsenic (sodium arsenate), ranged from 0.18 to 0.45, with a mean value of 0.31, and concluded that the upper confidence limit for the relative bioavailability of arsenic in soils was 0 42 Secondly, EPA took note of a fact it ignored at Woolfolk: that to the best of USEPA's knowledge, there has never been a single case of acute arsenic toxicity reported in humans that was attributable to arsenic in soil. Thirdly, with respect to soil ingestion, EPA found that children, on average, ingest 31 mg/day (in contrast to the 10 mg/day default value), and that the 95% intake for 7 and 365 days are 133 and 106 mg/day (in contrast to a default of 200 mg/day) Finally, the cleanup goal for the Vasquez Site of 70 ppm is 3 5 times the goal proposed for the Woolfolk Site. The September 25, 2003 Record of Decision for the Vasquez Site reflects all of these issues. **(OU4)**

EPA Response:
EPA has reviewed the comment but agrees with Dr Akins' Memo dated December 20, 2000

WOOLFOLK CITIZENS RESPONSE GROUP

Concern 19:
WCRG asserts that instead of seeking corrective measures, EPA has used its testing practices in off site areas to justify doing nothing and because nothing has been done at least two (2) citizens have died **(OU3, OU4)**

In addition, WCRG has requested testing of the entire community during the Remedial Phase due to site-related contaminants being identified by ATSDR in the haul routes from the Site.

Additional concerns for OU4 include:

A EPA did not explore a background standard for attic dust before a risk-based formula had been developed and adopted

EPA Response:
The comment correctly notes that there are no standard assumptions to use to evaluate attic dust The approach that was used is the same that was used to evaluate exposure to soil. The results of the assessment showed that monthly exposure to attic dust containing greater than 1,000 mg/kg arsenic would result in unacceptable risk Further, the assessment showed that daily exposure (350 times per year) would result in unacceptable risk at arsenic concentrations greater than 71 mg/kg (the reference concentration) Surveys conducted as part of the USACE study indicated that most residents do not use their attics on a regular basis Typical entry consists of a few times per year (e g , 1-3) to place or retrieve items stored in the attic No residents indicated entry for extended periods of time or on a frequent basis (e.g , weekly for several hours). This is due in large part to the fact that none of the attics are air conditioned or otherwise temperature controlled. Most of the attics lack sufficient floored space for substantial use Since EPA has no assurances about current or future attic use patterns, selection of 71 mg/kg is a reasonable goal

Concern 19 (continued)
B To date, no testing under residential properties has been conducted The concern seemed to be associated with plumbing coming into contact with contaminated soil and the potential for corrosion similar to that which occurred at the water treatment plant.

EPA Response:
Exposure under houses is expected to be minimal In general, good hygiene practices will greatly reduce/eliminate any potential for exposure via direct contact scenarios.

GA EPD Comments and EPA Responses (dated July 1, 2004)

Comment 1:
On page 12 of the ROD it states that 31 of the Phase I surface soil samples were above the Region 9 PRG of 18 mg/kg of arsenic. The Region 9 PRG for arsenic is 0 39 mg/kg, which is the value used for screening as reported on Table 7 2 of the ROD. Page 12 of the ROD should be revised to say how many samples were above the Region 9 PRG of 0 39 mg/kg of arsenic.

EPA Response:
Although EPA acknowledges that the Region 9 PRG for arsenic is 0.39 mg/kg (cancer endpoint), a Phase 1 Field Screening criterion of 18 mg/kg (Region 9 PRG – non-cancer endpoint) was selected to quickly and cost-effectively determine the distribution of arsenic in residential surface soils for the OU4 Site Using the cancer endpoint criterion of 0.39 mg/kg would have resulted in detections for 98 percent of all background (reference area) and over 99 percent of all source (target area) samples collected during the RI and been of little value in determining the distribution of arsenic in surface soils at the OU4 Site Furthermore, to achieve a Contract Required Quantitation Limit (CRQL) for the suggested cancer endpoint criterion of 0.39 mg/kg, would have required the use of a much more expensive analytical instrument (ICPMS) to perform the field screening effort.

Comment 2:
On page 12 of the ROD it states that the PRG (assumed to mean the Region 9 PRG) of benzo(a)pyrene is 62 mg/kg, yet the Region 9 PRG is actually 0.062 mg/kg or 62 ug/kg This value should be revised

EPA Response:
Comment noted EPA will change this typographical error

Comment 3:
On page 22 the oral reference doses (RfDo) listed for manganese, alpha chlordane and chlordane are incorrect. The correct RfDos are 1 4E-01 mg/kg day for manganese and 2.0E-04 mg/kg day for both chlordane and alpha chlordane. All values are from IRIS. Not only should these values be changed in the text, but they also should be carried through the risk assessment calculations used to derive the remedial levels

EPA Response:
As noted in Footnote 4, Table 5.1 in Appendix H to the final RI report, Non-Cancer Toxicity Data -- Oral/Dermal, the RfDo for manganese in IRIS is 1.4E-1 mg/kg/day based on the NOAEL of 10 mg/day For soil exposure, Region 4 policy is to subtract the average daily dietary exposure (5 mg/day) from the NOAEL to determine a "soil" RfDo When this is done, a "soil" RfDo of 7E-2 mg/kg/day results According to IRIS, retrieved July 19, 2004, the Chronic Health Hazard Assessments for Noncarcinogenic Effects Reference Dose for Chronic Oral Exposure (RfD) for chlordane is 5x10-4 mg/kg-day, not 2 E-4 mg/kg-day as

the comment claims. This value was used as a surrogate for alpha-chlordane as well.

Comment 4:
EPD was unable to reproduce the risk levels listed in Table 7.2 of the ROD Please include a table of the exposure parameters used and a sample calculation as part of the ROD. In addition, we were unable to determine if the same receptors are exposed to the contaminated attic dust and surface soil If they are, EPA should consider the accumulative risk posed by these two pathways on the receptors at the site when determining remedial levels

EPA Response:
The exposure parameters used to calculate risk are contained in Tables 4.1 through 4.3 in Appendix H to the final RI report. Example calculations are in Tables H-2 1 through H-2 7 in Appendix H to the final RI report. The receptors for the attic dust and soil were considered separately because the samples from the attics and the residential areas were not co-located. For this reason, it is not reasonable to consider the risks additive.

Comment 5:
Several of the contaminants detected in the Phase I and II sampling were considered not to be associated with the Woolfolk site based on their distribution EPD would like to have the distribution maps be included in the ROD.

EPA Response:
The Phase I Field Investigation screening effort was for arsenic and lead only The distribution of contaminants other that arsenic that were detected during the Phase II Confirmation Sampling were depicted in Figures 4-4, 4-5, 4-6, and 4-7 of the Final RI Report These 4 figures are quite large (E-size drawings) and could not be easily included in the Final ROD These 4 figures as well as the Final RI Report can be found in the AR for this OU