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July 1994

EPA Superfund Record of Decision:

Woolfolk Chemical Work Site, Fort Valley, GA

RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

WOOLFOLK CHEMICAL WORK SITE

FORT VALLEY, PEACH COUNTY, GEORGIA

OPERABLE UNIT #1: GROUNDWATER CONTAMINATION

PREPARED BY

U. S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

ATLANTA, GEORGIA

DECLARATION
of the
RECORD OF DECISION

WOOLFOLK CHEMICAL WORKS SITE
Operable Unit One: Groundwater Contamination

SITE NAME AND LOCATION

Woolfolk Chemical Works Superfund Site
Fort Valley, Peach County, Georgia

STATEMENT OF BASIS AND PURPOSE

This decision document (Record of Decision) presents the selected remedial action for the Woolfolk Chemical Works Site, Fort Valley, Georgia, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. Section 9601 et seq., and to the extent practicable, the National Contingency Plan (NCP) 40 CFR Part 300.

This decision is based on the administrative record for the Woolfolk Chemical Works Superfund Site ("the Site").

The State of Georgia, as represented by the Georgia Environmental Protection Division (GaEPD), has been the support agency during the Remedial Investigation and Feasibility Study process for the Site. In accordance with 40 CFR 300.430, as the support agency, GaEPD has provided input during this process. The State of Georgia has concurred with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Woolfolk Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare and/or the environment.

DESCRIPTION OF SELECTED REMEDY

This operable unit (OU) is the first of two planned units at the Woolfolk Site. OU #1 will address contamination of the groundwater while OU #2 will address contamination of soils, surface/storm water, structures, sediment, and air.

The major components of the selected remedy for this operable unit include:

- Further delineation of the extent and extraction of contaminated groundwater from the surficial, Upper Cretaceous (UC) water table, and UC confined aquifers.
- Treatment of the groundwater using iron co-precipitation and sand filtration with activated carbon adsorption as polishing steps, if needed.
- Discharge to a Publicly-Owned Water Treatment Works (POTW) with a contingency plan to include a National Pollutant Discharge Elimination System (NPDES) permit for surface water discharge or possibly an infiltration gallery should an NPDES permit be unattainable.
- Institutional Controls, such as deed restrictions limiting the use of groundwater at the site until performance goals are met.
- Groundwater monitoring of specific wells, including the city wells, to be further defined during Remedial Design/ Remedial Action (RD/RA) and abandonment of all others monitoring wells used during the RI/FS.
- Operation and Maintenance of the full system to be defined by an O&M Plan developed during the Remedial Design.

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. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes a permanent solution and alternative treatment technology to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining at the Site above the health-based levels until the performance goals are met, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Patrick M Tobin for 3-25-94

JOHN H. HANKINSON, JR. DATE
REGIONAL ADMINISTRATOR

Record of Decision
Woolfolk Chemical Works Site

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Record of Decision

Woolfolk Chemical Works Site
Fort Valley, Georgia

1.0 SITE LOCATION AND DESCRIPTION

The Woolfolk Chemical Works Site is located in Fort Valley, Peach County, Georgia, and includes 18 acres of the former Woolfolk Chemical Works facility. Businesses operating on the property of the former Woolfolk facility include SurePack, Inc., Georgia Ag Chem, Inc., and the Marion Allen Insurance and Realty Company. Canadyne-Georgia Corporation (CGC) also owns a one acre parcel of Site property but does not maintain an active business at the Site. SurePack, Inc. continues to formulate, package, and warehouse various organic pesticides that are used primarily in the lawn and garden market but also by peach growers.

The Woolfolk Site is located in an area with mixed commercial and residential uses. Residences are located west, south, and east of the facility, with homes to the southeast adjoining a pecan orchard. Several businesses and light industries are located along the north, northwest, and east ends of the facility, including The Norfolk Southern Railroad tracks and station.

For an area Location map and general Site map, see Figures 1.1 and 1.2, respectively.

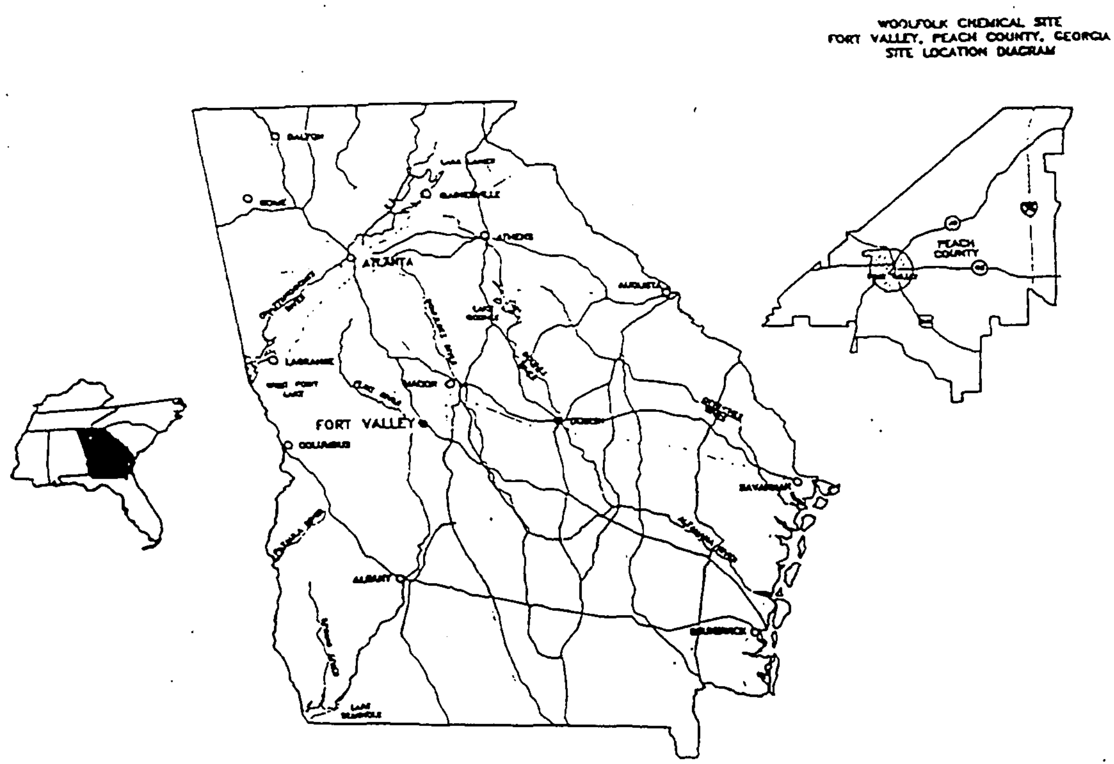

Figure 1.1: Area Map

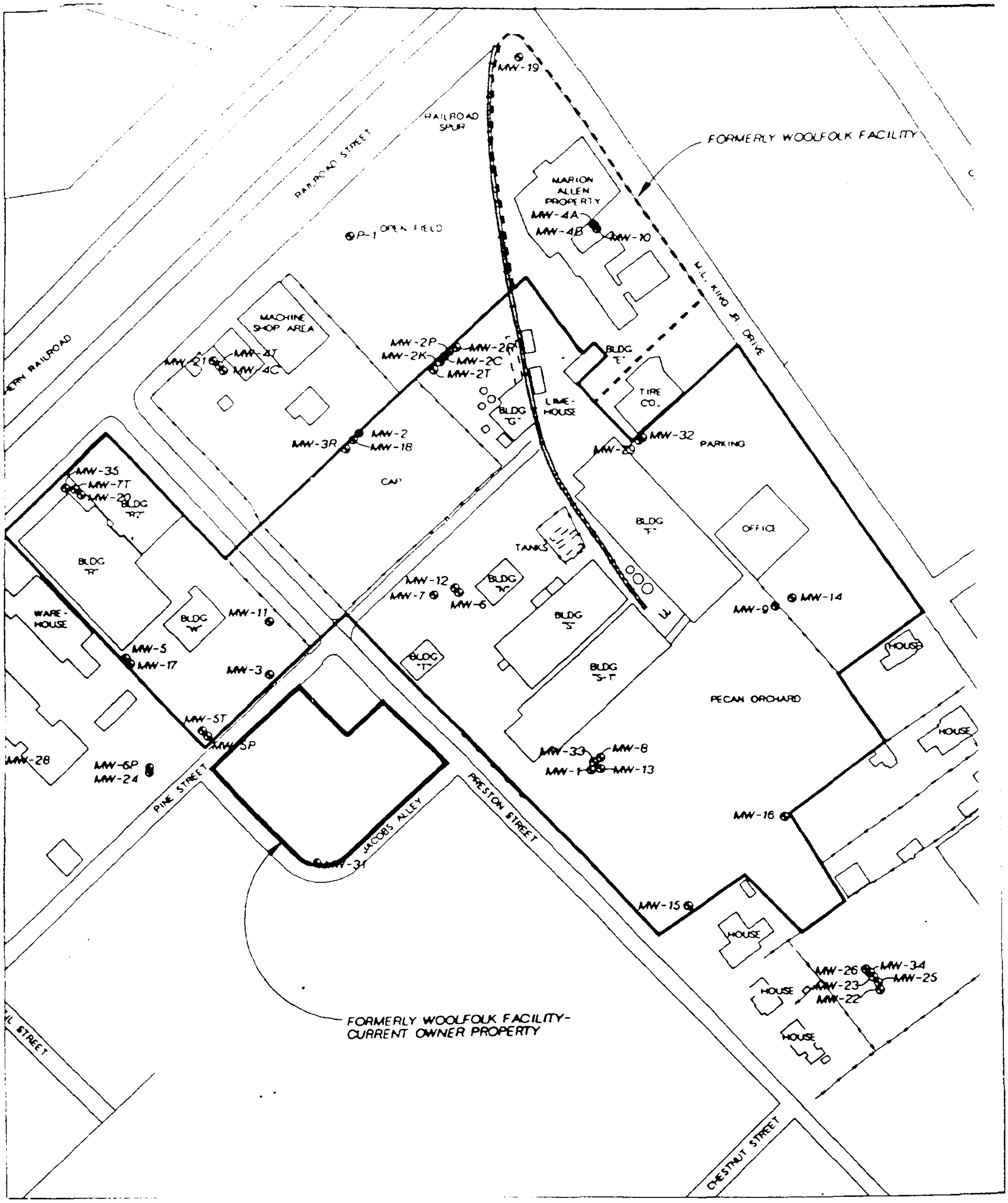

Figure 1.2: Site Map

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Throughout its history, the Woolfolk facility has been used for the production and packaging of organic and inorganic insecticides (including arsenic and lead-based products), pesticides, and herbicides. During World War II an inorganic intermediate (arsenic trichloride) was reportedly produced at the facility for the War Production Board. Production was expanded during the 1950's to include the formulation of various organic pesticides, including DDT, lindane, toxaphene, and other chlorinated pesticides. These organic pesticides and other insecticides and herbicides were formulated, packaged, or warehoused at the facility.

The J. W. Woolfolk Company owned and operated the Woolfolk Facility from 1926 until 1941, when it dissolved and conveyed its assets to Woolfolk Chemical Works, Ltd. Woolfolk Chemical Works, Ltd., reorganized into the corporation Woolfolk Chemical Works, Inc., in 1972. In 1977, Reichold, Limited acquired all of the stock of Woolfolk Chemical Works, Inc. pursuant to a stock purchase agreement. The stock purchase agreement was assigned to Canadyne Corporation a wholly owned subsidiary of Reichold, Limited. In 1984, Woolfolk Chemical Works, Inc., changed its name to Canadyne-Georgia Corporation (CGC). Also in 1984, the facility was sold to Peach County Properties, Inc. (PCPI). PCPI is the current owner of most of the former Woolfolk property, and has leased most of the property to its affiliate, SurePack, Inc., which has formulated and packaged pesticides at the facility since 1984. Another portion of the property is leased to Georgia Ag. Chemicals, which operates a warehouse and distribution facility. CGC currently retains the title to a one acre parcel of the facility used as a landfill. Marion Allen Insurance and Realty Company also owns one parcel located northwest of the operating facility (See Figure 1.2).

In September 1986, CGC completed an interim, voluntary soil remediation at the Woolfolk facility, with Applied Engineering Sciences (AES) serving as construction manager. The major remediation activities, which were funded by CGC, consisted of demolishing several buildings and excavating approximately 3,700 cubic yards of soil contaminated with a combined lead and arsenic concentration above 10,000 mg/kg. All soil with contamination levels above this concentration was disposed of at a permitted hazardous waste landfill in Emelle, Alabama. Other soils and debris were disposed of underneath an on site cap currently owned by CGC. CGC informed the Georgia Environmental Protection Division (EPD) of the investigations and cleanup activities. In August 1987, AES submitted a document to EPD entitled "Cleanup Report for the Former Woolfolk Chemical Works Plant Facility" which summarized remedial activities conducted at the facility.

In 1986, the Environmental Protection Agency (EPA) began investigations of the release or potential release of hazardous substances at the facility and requested all analytical data pertaining to the facility. This investigation led to the proposal to add the Site to the National Priorities List (NPL) in June 1988. In April 1989, EPA notified potentially responsible parties (PRPs), including CGC, SureCo, Inc., Peach County Properties, Inc., Marion Allen Corporation, and Boots Hercules/Nor-Am Corporation of their potential liability under CERCLA for response costs incurred at the Site. In April 1990, EPA and CGC completed negotiations on an Administrative Order on Consent (AOC) for Remedial Investigation/Feasibility Study (RI/FS). The AOC was signed on April 24, 1990. In August 1990, the Woolfolk facility was placed on the NPL.

The Remedial Investigation was submitted to EPA by Canadyne-Georgia in November 1992. The RI was performed to document the nature and extent of contamination for affected media, including soils, groundwater, surface/storm water, sediment and air. The objective of the RI was to gather sufficient information to develop risk management options and remedial alternatives that are appropriate for the site. The risk management options are presented in the Baseline Risk Assessment which was submitted to EPA in November 1992. The remedial alternatives are presented in the Feasibility Study which was submitted to EPA in December 1993. In conjunction with the RI/FS a bench scale treatability test was performed for the soils and groundwater at the site. The results of these tests were used to support the findings of the Feasibility Study.

During the RI/FS, high levels of arsenic contamination were found in soils in residential yards near the Woolfolk facility. The removal of residential soil contamination together with demolition of a dioxin contaminated on-facility building, is being completed pursuant to an Unilateral Administrative Order for

Removal Response activities issued by EPA to CGC, Reichold, Limited, and Canadyne Corporation on December 1, 1993.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

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 Woolfolk Chemical Works site. EPA has been working with the community surrounding the Woolfolk Chemical Works since 1990. In September 1990, press releases informing the community about the NPL listing of the site were released. 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, has been placed in the information repository. In January 1991, EPA held a public meeting to discuss the start of the RI/FS.

Most recently, in July 1993, EPA issued a press release and fact sheet on the findings of the RI study regarding soil contamination 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 our invitation to an availability session. The availability session, held on August 3, 1993 discussed the results of the RI study and ATSDR's recommendations for health precautions. Fifty people attended the session which was hosted by EPA, GaEPD, and ATSDR. Representatives of CGC were also present.

EPA's Emergency Response and Removal Branch is currently working to define the extent of off site contamination, excavating contaminated soils from residential properties, and supervising the destruction of a site dioxin contaminated building (Building E). Two sampling events of soils in resident's yards have occurred to date with results subsequently explained in meetings with the mayor and the public. CGC is complying with an Unilateral Administrative Order (UAO) requiring the disassociation of the affected residents from contaminated soils and destruction/removal of Building E.

The Feasibility Study, the Proposed Plan, and the Administrative Record (AR) for OU #1 were released to the public on January 18, 1993. These two documents were made available in both the AR, maintained in the EPA Region IV Docket Room, and the information repository at 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, 1993 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. Responses to the comments received during this comment period are presented in the responsiveness summary in Appendix A of this document.

4.0 SCOPE AND ROLE OF OPERABLE UNITS

EPA has organized the work at this Superfund Site into two operable units (OUs). The operable units are:

- OU #1: Contamination of the aquifers at the Site
- OU #2: Contamination of soils, surface/storm water, sediments, structures, and air at the Site

OU #1 addresses contamination of groundwater from past practices at the Site. The purpose of the remedy for this OU is to initiate groundwater restoration, collect data on aquifer response to remediation, and prevent possible future exposure to contaminated groundwater. The planned OU #2 will address the sources of contamination at the Site which shall include soils, surface/storm water, sediments, structures and air.

5.0 SUMMARY OF SITE CHARACTERISTICS

The major Site characteristics presented in the RI/FS Study are summarized below.

5.1 GEOLOGY/PHYSIOGRAPHY

- The Site is located in downtown Fort Valley, which has a population of approximately 9,000 people. Land use surrounding the Facility is classified as industrial, commercial, and residential. The majority of the Facility consists of buildings, storage tanks, and stockpiles of equipment. A pecan orchard located on the southern portion of the facility is fenced. Residential properties border this fence to the south and east.

- The Woolfolk Facility is located in what is physiographically known as the Fort Valley Plateau District. This district lies within the Coastal Plain Providence of Georgia just south of the "fall line," which marks the boundary between the Piedmont and Coastal Plain Provinces. This district is characterized by broad, flat to very gently rolling surfaces, sloping gently to the southeast. Surface soils are moderately drained and generally consist of sandy and silty clays to clayey and silty sands.

- Several southeast flowing creeks dissect the Fort Valley Plateau District. It is bounded to the west by the Flint River and on the east by the Ocmulgee River. Although the Flint River borders this district along its western boundary, almost the entire district lies within the drainage basin of the Ocmulgee River. Surface runoff leaving the Facility is collected by the City's storm sewer system. The storm water flows generally to the east, southeast and south discharging to a series of local creeks within 1 mile from the facility. These creeks discharge to Mosy Creek approximately 7.5 miles to the east and into Big Indian Creek approximately 4 miles to the southeast.

- Topography at the Facility has land surface elevations which varies from 516 feet above mean sea level (MSL) at the northern end of the facility to 510 feet above MSL to the south. The slope at the facility is generally around 1 percent. A man-made mound installed during a voluntary clean-up by CGC, approximately 170 feet by 300 feet, with a maximum elevation of 520 feet above MSL, has been constructed at the north central portion of the Facility. The mound consists of, from top to bottom, grass, 24-inches topsoil, a filtering geotextile, 12-inches of granular drainage material, a 30-mil High Density Polyethylene (HDPE) flexible membrane liner (FML), 24-inches of compacted clay, and geotextile fabric on the subbase to the compacted clay.

Table 5-1: HISTORICAL AND CURRENT HYDROGEOLOGIC NOMENCLATURE WOOLFOLK FACILITY

Previous Hydrogeologic Unit Name*	Hydrogeologic Unit Name**
Clayton Aquifer	Surficial Aquifer
Kaolin Confining Unit	Surficial Perching Unit
Providence Aquifer	Upper Cretaceous (UC) Water Table Aquifer (UC Horizons 1 and 2)
Providence-Ripley Confining Unit	
Ripley-Blufftown Unit	UC Confined Aquifer (UC Horizon 3)
Not Specified	Tuscaloosa Confining Unit
Tuscaloosa Aquifer	Tuscaloosa Aquifer

* Terminology used throughout the Woolfolk Facility history until Phase II of the RI

** Terminology assigned by CH2M Hill, 1991 in the development of the RI.

- The Coastal Plain stratigraphy of the Fort Valley area is being reclassified by the Georgia Geological Society. Table 5-1 presents the former sequence of lithologies beneath the facility along with the hydrogeologic unit name used throughout this ROD. The units are described in the following section.

5.2 HYDROGEOLOGY

- The Facility is underlain by several hundred feet of unconsolidated sediments consisting of interbedded layers of sand, silt, and clay (See Figure 5-1). Soil from the surface to a depth of about 35 feet is silty and sandy clay (immediately underlying the surface) and sand. The lower, sandy parts of this interval contain groundwater in a unit designated in this ROD as the surficial aquifer (See Table 5-2).

- In the interval between depths of about 35 to 75 feet is a thick unit of clay consisting primarily of kaolin. The top surface of the clay unit is irregular in its topography. The kaolin unit appears to be continuous under most of the facility except to the north. Because of the dense, clayey nature of the kaolin, the layer serves as a perching layer for the surficial aquifer. The kaolin is designated as the surficial perching unit.

- Beneath the kaolin unit are three horizons of Upper Cretaceous soils. Horizon 1 consists of interbedded sands and clayey and silty sands to a depth of about 105 feet. To a depth of about 100 feet, the Upper Cretaceous sediments are unsaturated. Horizon 2 is located in the interval between 105 and 125 feet, consisting of greater amounts of silty and clayey materials. The thickness and vertical distribution of this horizon is variable, and apparently silty clay material is not present northeast of the facility which may mean that Horizon 1 and 3 soils are joined. The geologic materials in which the water table occurs are designated as the Upper Cretaceous water table aquifer and include the clayey and silty materials of the underlying unit.

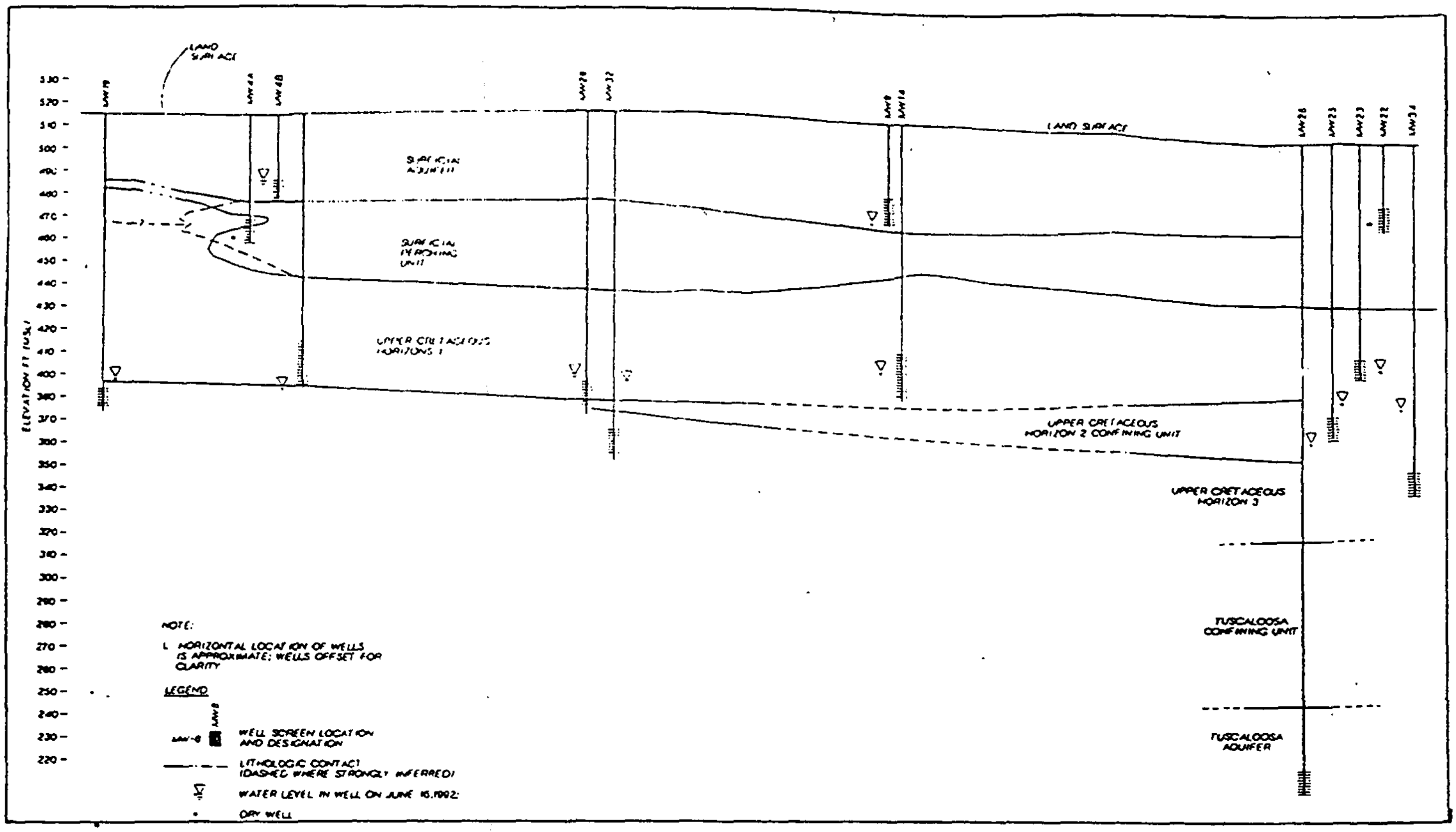

Figure 5-1: Hydrogeologic Cross Section

Table 5-2 Geologic and Hydrogeologic Units Woolfolk Facility		
Geologic Character	**Hydrogeologic Formation Name**	
Clayey and Silty Residuum	Surficial Aquifer	
Sand		
Kaolin	Surficial Perching Unit	
Interbedded sand, silt, and clay	UC Horizon 1	Upper Cretaceous Water Table Aquifer
Silty and sandy clay	UC Horizon 2	
Sand	Upper Cretaceous Confined Aquifer (UC Horizon 3)	
Clay layers with interbedded sand	Tuscaloosa Confining Unit	
Sand	Tuscaloosa Aquifer	
CH2M Hill, 1992		

- From depths of about 125 feet to 280 feet there is an alternating sequence of sands, clays, and clayey sands. At the top of the sequence is a layer of sand about 20 feet thick. This sand is considered Horizon 3 and is part of the Upper Cretaceous Confined Aquifer. The individual alternating layers of sands, clays, and clayey sands beneath this sand are typically less than 10 feet thick; their combined thickness is about 70 feet. These alternating layers are considered to be the Tuscaloosa confining unit.

- At a depth of about 275 feet, hydraulic head measurements and the appearance of the sediments in the sandy formation indicate that wells are screened in the Tuscaloosa aquifer.

- Under the EPA groundwater classification system, groundwater in the surficial aquifer and the Upper Cretaceous aquifers is considered Class IIb groundwater (a potential drinking water source), while ground water in the Tuscaloosa aquifer is considered Class IIa groundwater (a current source of drinking water).

- The direction of the groundwater flow in the surficial aquifer is generally toward the southeast. Leakage occurs through the surficial perching unit from the surficial aquifer into the Upper Cretaceous sediments below.

- The water table in the Upper Cretaceous aquifer indicates that groundwater flows generally to the north and northeast beneath most of the facility and to the east in the southeast portion of the facility.

- The hydraulic head contours in the Upper Cretaceous confined aquifer generally conform to those of the Upper Cretaceous water table aquifer, indicating that groundwater flows primarily to the northeast and east. There is also a component of the flow towards the northwest in the Upper Cretaceous confined aquifer, along the northwest side of the facility. Hydraulic heads in the Upper Cretaceous confined aquifer are typically below those of the water table, indicating vertical groundwater flow from the Upper Cretaceous water table aquifer into the Upper Cretaceous confined aquifer.

- Hydraulic head measurements in the Tuscaloosa aquifer beneath most of the facility indicate groundwater flow toward the southeast. These measurements also show a reversal in groundwater flow direction in and beyond the northwestern part of the facility. The direction of flow toward the northwest is consistent with the expected effects of pumping groundwater from the Tuscaloosa aquifer by the City of Fort Valley's wells.

- Hydraulic and lithological data indicate the potential for groundwater flow vertically downward beneath the facility. The general nature of the perched surficial unit makes it likely for the groundwater to leak downward through this unit. Downward flow is also indicated by a comparison of the hydraulic-head gradients of the Upper Cretaceous Aquifers and the Tuscaloosa Aquifer presented in Figure 5-1.

5.3 MEDIA CONTAMINATION

There were 48 chemicals of potential concern selected for analysis in the baseline risk assessment which are presented below. This section summarizes the extent of these chemicals in the groundwater, soils, surface water/sediments, structures, and air.

Volatiles

1,2-dichloroethane	chloroform
1,2-dichloropropane	xylene
acetone	carbon disulfide
chlorobenzene	tetrachloroethane
trichloroethylene	

Semi-volatiles

1,4-dichlorobenzene	2-methylnaphthalene
benzo(a)anthracene	benzo(a)pyrene
benzo(b)floranthene	benzo(g,h,i)perylene
benzo(k)fluoranthene	benzoic acid
bis(2-ethylhexyl)phthalate	chrysene
di-n-butylphthalate	di-n-octylphthalate
fluoranthene	indeno(1,2,3-cd)pyrene
naphthalene	pentechlorophenol
phenanthrene	pyrene

Pesticides

alpha-BHC	beta-BHC
delta-BHC	gamma-BHC
heptachlor	endrin ketone
4',4'-DDE	4',4'-DDD
4',4'-DDT	toxaphene
dieldrin	endosulfan I
endosulfan sulphate	endosulphan II
alpha-chlordane	gamma-chlordane

Inorganics

antimony	arsenic
cadmium	lead
selenium	

5.3.1 GROUNDWATER CONTAMINATION

- The groundwater contamination levels for each of the aquifers at this Site are presented in Table 6-1. The highest levels detected are presented in italic boldface. The performance standards (levels required to attain groundwater remediation) are set forth in Table 6-9. A comparison of these two tables gives a view of the contamination at the site. This section gives a general review of the findings from the RI.

- The levels of contamination exceeded the performance standards in the surficial, Upper Cretaceous (UC) water table, and UC confined aquifers. Trace contaminants have been detected directly beneath the site in the Tuscaloosa aquifer although recently sampling has indicated no detection of chemicals. The City of Fort Valley water wells, which draw water from the Tuscaloosa aquifer, have never shown any levels of contamination.

Surficial Aquifer and Surficial Perching Unit

- Groundwater samples were taken from 11 monitoring wells in the surficial aquifer and surficial perching unit. The presence of pesticides was detected in 7 of the 11 wells with lindane being detected most frequently. No pesticides were detected in up-gradient wells. Trace metals were detected in 8 of the 11 wells sampled. Arsenic, chromium and lead were found to have the highest levels. The most common volatile organic compound (VOC) was 1,2-dichloroethane (1,2-DCA), which was detected in 5 of the 11 wells sampled.

Upper Cretaceous Water Table Aquifer

- The groundwater samples from the monitoring wells in the Upper Cretaceous water table aquifer indicated that pesticides were present in 8 of 18 wells. Pesticides detected were the same as in the surficial aquifer sampling, but in a smaller percentage of wells. The highest concentrations of metal values were arsenic, chromium, cadmium and lead. The contaminant 1,2-DCA also was detected in the Upper Cretaceous water table aquifer.

Upper Cretaceous Confined Aquifer

- The groundwater samples from the monitoring wells in the Upper Cretaceous confined aquifer showed pesticides in five of the seven wells. No arsenic was detected; however chromium, and lead were discovered. 1,2-DCA was detected in all wells sampled. Tetrachloroethene was detected in MW-3R.

Tuscaloosa Aquifer

- Pesticides, arsenic, and chromium were not detected in the groundwater samples collected from the Tuscaloosa aquifer wells. No contaminants were detected in the City of Fort Valley Municipal Water Supply wells. Lead was detected in three of the five Tuscaloosa wells and 1,2-DCA was detected in two of the Tuscaloosa wells.

5.3.2 <u>SOIL CONTAMINATION</u>

- At the Woolfolk facility, two series of soils are identified: The Greenville series and the Grady Series. The Greenville Series soil commonly has a 4- to 8-inch surface layer of dark reddish-brown or dark brown fine sandy loam and a subsoil of dark red, friable sandy clay. The Grady Series soil has a dark gray to black fine sandy loam or sandy clay loam surface layer (5 to 10 feet) and a subsoil of firm gray clay that is sometimes mottled.

- Several pesticides (toxaphene, DDD, DDE, DDT, dieldrin, BHCs), arsenic, and lead were detected in both surface (0 to 1 foot) and subsurface (generally 1 to 8 feet) soil samples collected from locations on and off the facility. Areas with elevated concentration of one or more of these constituents include the tank farm, Area A cap, Building W, Building S, west boundary of Marion Allen Insurance and Realty company property, and the area northeast of the limehouse. As mentioned in Chapter 2, the definition and removal of residential soil contamination is being completed pursuant to a UAO issued by EPA to CGC.

- In general, volatile and semivolatile organic compounds were not detected as frequently as arsenic, lead, or pesticides in either the surface or subsurface soil samples. In addition, the concentrations of volatile and semivolatile organic compounds were lower than the other constituents.

- The remediation for soils will be addressed in OU #2.

5.3.4 SURFACE WATER AND SEDIMENT CONTAMINATION

- The sampling results indicated that surface/storm water leaving the site contained only trace levels of DDT, benzoic acid, and pentachlorophenol.

- The results of sediment sampling indicated that pesticide concentrations, with the exception of toxaphene, are generally higher on the facility than downstream (intersection of Preston and Spruce streets). Toxaphene concentrations were detected at levels up to 12 mg/kg downstream and were detected in three out of four samples throughout the stormwater conveyance system. The inorganic constituent results of the sediment samples indicated that arsenic levels were generally higher on the facility than upstream or downstream. No consistent pattern was observed with the lead results.

- The remediation of surface/storm water and sediment contamination will be addressed in OU #2.

5.3.5 STRUCTURE CONTAMINATION

- The buildings are constructed primarily of wood and sheet metal and have wood flooring. Chemicals have been absorbed within the wood floors and have migrated through the floors to the underlying soils. Also, the wood rafters in Building W have pesticide dust on them as a result of using this building to make pesticides in powder form. Building W is located on the Georgia Ag Chem property to the west of the facility. Organic pesticides were formulated and packaged in the building. Elevated levels of arsenic, lead, pentachlorophenol, and dioxin were found in soil samples taken from the area beneath and adjacent to Building W during the Remedial Investigation.

- On the facility is a small garage-size building called "Building E". Several 30- and 55-gallon drums of silvex were brought into Building E and repackaged in pint and quart containers. Some of the silvex, which contained 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) as a contaminant, was inadvertently spilled on the wood floors, resulting in localized contamination of the floors and underlying soil with silvex, TCDD, 2,4-dichlorophenoxyacetic acid and 2,4,5-trichlorophenoxyacetic acid.

- Building E is being demolished by CGC under EPA oversight pursuant to a Unilateral Administrative Order issued by EPA to CGC, Reichold, Limited, and Canadyne Corporation. Building W will be addressed in OU #2.

Wood Samples of Building E

- Sampling of the wood in Building E was conducted during the RI to assess the extent of dioxin contamination in the flooring. Five pesticides were detected in the two wood samples collected. Concentrations ranged from 9.5 mg/kg for alpha-BHC to 2,000 mg/kg for toxaphene. Several inorganic constituents were detected in the wood samples, including arsenic (11,100 to 72,400 mg/kg) and lead (320 to 968 mg/kg). Dioxin and some of its isomers were detected in the wood samples from Building E. Concentrations ranged from 0.012 mg/kg to 37.4 mg/kg for the various isomers.

Soil Samples of Building E

- Soil samples were taken from the floor of Building E. DDT was the only pesticide found in all 10 samples, and was detected at concentrations from 0.36 to 49 mg/kg. Arsenic was detected in all samples at concentrations ranging from 63 mg/kg to 2,790 mg/kg. Lead was also identified in each of the samples from this building, at concentrations ranging from 40.1 mg/kg to 1,550 mg/kg. The data indicate that the concentrations of both arsenic and lead decrease with depth in most instances.

- The 10 Building E soil samples also were analyzed for dioxin and its isomers. Nineteen dioxin isomers were detected and were distributed evenly with depth. In most cases, concentrations decreased with depth. The highest concentration of any dioxin isomer detected was total-octachlorodibenzo-p-dioxin, which was found at a concentration of 18.5 mg/kg in a shallow (0- to 1-foot depth) soil sample. This mixture of dioxin isomers is much less toxic than the more commonly known dioxin isomer TCDD.

- Structure contamination will be addressed in OU#2.

5.3.6 AIR CONTAMINATION

- A total of 24 chemicals were detected in air samples taken during RI sampling consisting of 6 volitile organics, 4 semi-volitile organics, 12 pesticides/herbicides, and 2 inorganic (lead and arsenic).

- Air contamination will be addressed in OU #2.

6.0 SUMMARY OF SITE RISKS

CERCLA directs EPA to conduct a baseline risk assessment to determine whether a Superfund Site poses a current or potential future threat to human health and the environment in the absence of any remedial action. The baseline risk assessment provides the basis for determining whether or not remedial action is necessary and the justification for performing remedial action. The Final Baseline Risk Assessment of the Site was submitted in November 1992.

The Remedial Investigation and Baseline Risk Assessment have determined the media contaminated by the chemicals of concern. OU #1, addressed in this ROD, will manage contamination of the groundwater while OU #2, will address the remaining contaminated media.

Measurable concentrations of many of the chemicals of concern were found in the groundwater samples from the facility. For those receptor populations identified in the baseline risk assessment (i.e. on site workers, off-site residents), ingestion and exposure to groundwater are not complete exposure pathways under a current domestic use scenario. However, these pathways represent a health threat should groundwater usage result under a future land use scenario.

Actual or threatened releases (i.e. potential city well contamination) of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

6.1 CHEMICALS OF CONCERN

The chemicals which were carried through the risk assessment process are referred to as chemicals of potential concern (COPC). COPCs were selected on the basis of the following criteria: (1) their potential to unfavorably affect human health; (2) their persistence and/or mobility in the environment; (3) their presence in groundwater at levels above federal maximum contaminant levels (MCLs); (4) their presence in environmental media exceeding background levels; (5) the number of environmental media affected; and (6) the frequency of their detection in soil, air, groundwater, surface water, or sediment.

Chemicals are included in this Summary of Site Risk Section if the results of the risk assessment indicate that a contaminant might pose a significant current or future risk. These chemicals are referred to as contaminants of concern (COC). The criteria for determining the contaminants of concern are those contaminants that contribute to a pathway that exceeds a 1E-4 risk or Hazard Index (HI) of 1; chemicals contributing to these pathways need not be included if their individual carcinogenic risk contribution is less than 1E-6 or their noncarcinogenic Hazard Quotient (HQ) is less than 0.1. COCs for the groundwater and the exposure point concentrations for each of those chemicals are presented in Table 6-1. The exposure point concentrations represent the 95% upper confidence level (UCL) on the arithmetic mean or the maximum concentration if the UCL exceeds the maximum.

Current land use on and around the facility consists of industrial, commercial, and residential areas. The groundwater beneath the site has been divided into four layers. The first (the surficial perched aquifer), the second (Upper Cretaceous (UC) Water Table), and third (UC Confined Aquifers) layers are not in use currently. The fourth, the Tuscaloosa Aquifer, is the source for the City of Fort Valley's water supply. The closest City well is located within 500 ft of the Site, north of the railroad. Monitoring of the City Wells since 1985 has shown no contamination concern.

6.2 EXPOSURE ASSESSMENT

Whether a chemical is actually a concern to human health and the environment depends not only on the innate toxicity but also upon the likelihood of exposure, i.e. whether the exposure pathway is currently complete or could be complete in the future. A complete exposure pathway (a sequence of events leading to contact with a chemical) is defined by the following four elements:

- A source and mechanism of release from the source,
- A transport medium (e.g. surface water,) and mechanisms of migration through the medium,
- The presence or potential presence of a receptor at the exposure point, and
- A route of exposure (ingestion, inhalation, dermal absorption).

If all four elements are present, the pathway is considered complete.

An evaluation was undertaken of all potential exposure pathways which could connect chemical sources at the Site with potential receptors. All possible pathways were first hypothesized and evaluated for completeness using EPA's criteria. No current potentially complete exposure pathways for groundwater remained after screening but three future exposure pathways exist. The current pathways are considered to be incomplete for reasons that the population near the site is served by the municipal water system. A well survey indicated that no well exists in the areas of concern other than the municipal wells, which are screened in the Tuscaloosa Aquifer. The Tuscaloosa aquifer is an aquifer which has never been found to contain chemicals above drinking water standards.

The future pathways represent exposure pathways which could exist, in the future, if the current exposure conditions change. Exposure by each of these pathways was mathematically modeled using generally conservative assumptions.

The future pathways are:

- potential dermal exposure by potential on site residents to groundwater,
- ingestion of contaminated groundwater by potential on site residents and,
- inhalation exposure of potential on site residents.

The exposure point concentrations for each of the chemicals of concern and the exposure assumptions for each pathway were used to estimate the chronic daily intakes for the potentially complete pathways. The chronic daily intakes were then used in conjunction with cancer potency factors and noncarcinogenic reference doses to evaluate risk.

Table 6-1: Chemicals of Concern for Groundwater
Exposure Point Concentrations in mg/L[1]

Chemical	Surficial Perched Aqu.	Upper Cret. Water Table	UC Confined Aquifer	Tuscaloosa	City Wells
Inorganics					
Arsenic	***5.92***[2]	***0.853***	***0.005***	***0.005***	***0***
Cadmium	0.0043	0.0161	***0.0025***	***0.0025***	***0***
Chromium	***0.102***	0.1049	***0.35713***	***0.005***	***0***
Lead	***0.0235***	***0.04***	***0.03***	***0.0045***	***0***
Manganese	***20.5***	***3.99***	***0.134***	***0.0503***	***0***
Pesticides					
Alpha-BHC	***0.015***	***0.017***	***0.001***	0	***0***
Beta-BHC	***0.029***	0.0007	***0.0006***	0	***0***
Delta-BHC	***0.01***	0.0051	***0.0007***	0	***0***
Gamma-BHC	***0.0083***	***0.016***	***0.002***	0	***0***
Dieldrin	***0.00005***	0.0001	***0.00005***	***0.00005***	***0***
Semi-Volatile Organics					
bis(2-ethylhexyl) phthalate	0.0388	0.0272	0.0145	***0.005***	***0***
Votatile Organics					
Acetone	0.0054	0.0073	***0.058***	***0.005***	***0***
Chloroform	0.0059	0.0067	***0.005***	***0.005***	***0***
Carbon Disulfide	***0.005***	0.0254	***0.011***	***0.005***	***0***
1,2, Dichloroethane	0.0701	0.0161	***0.021***	***0.005***	***0***
1,2, Dichloropropane	0.0319	0.0145	0.0165	***0.005***	***0***
Tetrachloroethene	0.0072	***0.005***	0.0071	***0.005***	***0***

Footnotes:
1) Lognormal distribution assumed. The exposure point concentrations represent the upper 95% confidence level (UCL) on the arithmetic mean or the maximum concentration if the UCL exceeds the maximum.
2) Results in ***italic boldface*** represent the maximum concentration rather than the UCL.

The major assumptions defining exposure frequency and duration that were considered in the exposure assessment were:

- The body weights for adult residents is assumed to be 70 kilograms for adults and 15 kgs for children.
- Ingestion rates per day are estimated as 2 liters per day for adults and 1 liter per day for children.
- The exposure frequency is 350 days per year for adults and children.
- The duration of exposure was assumed to be 6 years for children and 30 years for adults.
- The showering time for dermal and inhalation exposure was assumed to be 12 minutes.

6.3 TOXICITY ASSESSMENT

Toxicity values are used in conjunction with the results of the exposure assessment to characterize site risk. EPA has developed critical toxicity values for carcinogens and noncarcinogens. These critical toxicity values are listed in Table 6-2. Cancer slope factors (CSFs) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide a high end estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "high end" reflects the conservative estimate of the risks calculated from the CSF. Cancer slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

6.4 RISK CHARACTERIZATION

Human health risks are characterized for potential carcinogenic and noncarcinogenic effects by combining exposure and toxicity information. Excessive lifetime cancer risks are determined by multiplying the estimated daily intake level with the cancer slope factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper limit, an individual has a one in one million additional (above their normal risk) chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the assumed specific exposure conditions at a site.

EPA considers individual excess cancer risks in the range of $1x10^{-4}$ to $1x10^{-6}$ as protective; however the $1x10^{-6}$ risk level is generally used as the point of departure for setting cleanup levels at Superfund sites. The point of departure risk level of $1x10^{-6}$ expresses EPA's preference for remedial actions that result in risks at the more protective end of the risk range. The health-based risk levels for OU #1 are shown in Tables 6-3, 6-4, 6-5, and 6-6.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminants' reference dose). A HQ which exceeds one (1) indicates that the daily intake from a scenario exceeds the chemical's reference dose. By adding the HQs for all contaminants within a medium or across all media and appropriate pathways to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. An HI which exceeds unity indicates that there may be a concern for potential health effects resulting from the cumulative exposure to multiple contaminants within a single medium or across media. The HIs for OU #1 are also shown in Tables 6-3 through 6-6.

Risks associated with the surficial aquifer were in a qualitative manner by comparing the concentration of chemicals in the surficial aquifer with the Upper Cretaceous (UC) confined aquifer. Accordingly, if the surficial aquifer was used as a drinking water source or for showering, it would present cancer and non-cancer risks to hypothetical future residents greater than those calculated for the Upper Cretaceous water table aquifer under the same exposure conditions due to the higher concentration of chemicals of concern in the surficial aquifer.

Table 6-2
CRITICAL TOXICITY VALUES[1]
SLOPE FACTORS (SFs) AND REFERENCE DOSES (RfDs)

Contaminants	Slope Factor (SFs)		Reference Dose (RFD)	
	Oral[2]	Inhal.	Oral[2]	Inhal.
Arsenic	1.8		$3.00E^{-4}$	
Cadmium	ND		$5.00E^{-4}$	
Chromium			$5.00E^{-3}$	
Lead	ND		ND	
Manganese			$5.00E^{-3}$	
α-BHC	6.3	6.3	ND	-
β-BHC	1.8	1.8	ND	-
δ-BHC	6.3	6.3	ND	-
γ-BHC	1.3	1.3	$3.00E^{-4}$	-
Dieldrin	16	16	$5.00E^{-5}$	-
bis(2-ethylhexyl)phthalate	$1.40E^{-4}$	-	$2.00E^{-2}$	-
Acetone	ND	-	$1.00E^{-1}$	-
Chloroform	$6.10E^{-3}$	$8.1x10^{-2}$	$1.00E^{-2}$	-
Carbon Disulfide	ND	-	$1.00E^{-1}$	2.85E-3
1,2-Dichloroethane	$9.10E^{-2}$	9.10E-2	ND	-
1,2-Dichloropropane	$6.80E^{-2}$	-	ND	1.14E-3
Tetrachloroethene	$5.10E^{-2}$	2.00E-3	$1.00E^{-1}$	-

Notes:

1 Critical toxicity values obtained from Integrated Risk Information System (IRIS) or Health Effects Assessment Summary Tables (HEAST) (USEPA, Fiscal Year 1991).
2 Also basis for deriving dermal toxicity value.
ND No data. USEPA has not derived a RfD or slope factor

Ingestion of arsenic in the UC Water Table aquifer groundwater accounts for over 90% of the calculated hazard indices and lifetime cancer risks calculated for the future on site resident. The calculated hazard indices for the on site adult and child resident were 83.2 and 202, respectively. Lifetime cancer risks calculated for the future on site adult and child resident also exceed the upper bound target risk level ($1x10^{-6}$). A summary of the risk characterization is provided in Table 6-7.

Hazard indices calculated for the future on site adult and child resident exposed to groundwater from the UC Confined aquifer were less than one for the adult resident but greater than one for the child resident. Lifetime cancer risks for future on site adult and child were $2x10^{-4}$ and $1x10^{-4}$, respectively. Lifetime cancer risks resulting from exposure to groundwater from the UC Confined aquifer resulted primarily from arsenic and to a lesser extent, the presence of low concentrations of beta-BHC, bis(2-ethylhexyl)phthalate, 1,2-dichloroethane, and tetrachloroethene.

Throughout the risk assessment process, uncertainties associated with evaluation of chemical toxicity and potential exposures arise. For example uncertainties arise in derivation of toxicity values for reference doses (RfDs) and carcinogenic slope factors (CSFs), estimation of exposure point concentrations, fate and transport modeling, exposure assumptions and ecological toxicity data. Because of the conservative nature of the risk assessment process, risk estimated in this assessment may overestimate the true risk associated with potential exposure at OU #1 of the Woolfolk Chemical Site. Uncertainties for the OU #1 at the Woolfolk Chemical Site are enumerated in Table 6-8.

6.5 ECOLOGICAL RISK/ HISTORICAL SITES

An ecological assessment evaluates potential hazardous effects on non-human species at Superfund sites. It may be a qualitative or quantitative appraisal of the actual and potential effects on the environment of a Superfund site. Not all sites provide a suitable ecological habitat. Many sites in industrial areas have little or no wildlife. The appropriate level of effort for assessing ecological risk is determined on a site-by-site basis.

The Woolfolk facility is located adjacent to the central business district of Fort Valley, Georgia, and the surrounding community consists of residential homes and small businesses. A qualitative assessment of the potential ecological effects of the Woolfolk Chemical Works facility determined that the site poses no significant ecological impacts. It is unlikely that the Woolfolk facility effects any designated wetlands due to the fact that the closest wetland is more than three miles from the Facility and is not hydraulically connected. The Woolfolk facility is not located within either the 100-year or 500-year floodplain.

It is unlikely that the facility affects either of the three identified endangered species (i.e., the Red-Cockaded Woodpecker, Kirtland's Warbler, or the Bald Eagle) that reside in the geographical area for the following reasons: 1) There are no records or reported sightings of any of these species in Peach County, and 2) the Facility and surrounding area do not provide the critical types of habitat needed for these endangered or threatened species.

There are two historical sites listed in Peach County, Georgia. These sites include the Peach County Courthouse located on West Church Street, and Strother's Farm located near the Peach/ Macon County line. It is unlikely that the Facility adversely affects the use of these historical sites nor their cultural value because they are located at least 1/2 mile from the Facility.

There are no wild and scenic rivers nor designated wilderness areas in Peach County. The Facility does not affect any coastal zones or coastal barriers.

Table 6-3
Noncancer Risks and Lifetime Cancer Risks
Future On site Exposure to Groundwater from the UC Water Table Aquifer
Adult Resident- Reasonable Maximum Exposure

Chemical	Chronic Hazard Quotient Ingestion	Dermal	Inhalation	Lifetime Cancer Risk Ingestion	Dermal	Inhalation
Inorganics						
Arsenic	7.79E+01	1.57E-01	*	1.80E-02	3.64E-05	*
Cadmium	8.82E-01	3.20E-02	*	na	na	*
Lead	-	-	*	nc	nc	*
Pesticides						
4,4'-DDT	3.84E-03	3.21E-03	-	2.79E-07	2.34E-07	6.88E-09
alpha-BHC	1.55E+00	3.94E-02	-	1.26E-03	3.20E-05	5.90E-07
beta-BHC	6.39E-02	1.62E-03	-	1.48E-05	3.76E-07	5.32E-10
delta-BHC	4.66E-01	1.18E-02	-	3.77E-04	9.59E-06	6.24E-09
gamma-BHC (lindane)	1.46E+00	3.71E-02	-	2.44E-04	6.21E-06	1.53E-07
Dieldrin	5.48E-02	2.53E-03	-	1.88E-05	8.66E-07	6.87E-10
Endosulfan II	3.12E-02	6.30E-05	-	na	na	na
Endosulfan Sulfate	2.74E-02	5.53E-05	-	na	na	na
Endrin Ketone	6.85E-03	2.49E-04	-	na	na	na
Semivolatile organic chemicals						
Bis(2-ethylhexyl)phthalate	3.73E-02	2.48E-03	-	4.47E-06	2.98E-07	na
Di-n-octyl phthalate	8.08E-03	1.47E-05	-	na	na	na
Volatile organic chemicals						
1,2-Dichloroethane	-	-	-	1.72E-05	1.65E-07	1.34E-06
1,2-Dichloropropane	-	-	6.43E-02	1.16E-05	2.10E-07	na
Acetone	2.00E-03	3.63E-06	-	na	na	na
Carbon disulfide	6.96E-03	6.32E-03	2.40E-01	na	na	na
Chloroform	1.84E-02	4.33E-03	-	4.80E-07	1.13E-07	1.46E-06
Tetrachlorothene	1.37E-02	9.20E-03	-	3.05E-06	2.05E-06	1.42E-07
Trichloroethene	2.28E-02	9.53E-03	-	6.46E-07	2.70E-07	2.56E-07
Xylenes (total)	7.26E-05	1.17E-05	-	na	na	na
Pathway Risk	**8.26E+01**	**3.17E-01**	**3.04E-01**	**2E-02**	**9E-05**	**4E-06**
Sum of Pathway		**8.32E+01**			**2E-02**	

(-): Hazard quotient could not be calculated due to lack of a reference dose.
na: Not applicable
*: Inhalation exposure to metals in groundwater is not assumed to occur.
nc: Lead is considered by the EPA to be a potential weak human carcinogen. Lifetime cancer risk estimates were not calculated due to lack of a slope factor.

Table 6-4
Noncancer Risks and Lifetime Cancer Risks
Future On site Exposure to Groundwater from the UC Water Table Aquifer
Child Resident- Reasonable Maximum Exposure

Chemical	Chronic Hazard Quotient Ingestion	Chronic Hazard Quotient Dermal	Chronic Hazard Quotient Inhalation	Lifetime Cancer Risk Ingestion	Lifetime Cancer Risk Dermal	Lifetime Cancer Risk Inhalation
Inorganics						
Arsenic	1.82E+02	2.91E-01	*	7.34E-03	1.82E-05	*
Cadmium	2.06E+00	5.93E-02	*	na	na	*
Lead	-	-	*	nc	nc	*
Pesticides						
4,4'-DDT	1.28E-02	9.90E-03	-	1.86E-07	1.44E-07	1.53E-08
alpha-BHC	3.62E+00	7.30E-02	-	5.87E-04	1.18E-05	5.50E-07
beta-BHC	1.49E-01	3.01E-03	-	6.90E-06	1.39E-07	4.96E-10
delta-BHC	1.09E+00	2.19E-02	-	1.76E-04	3.55E-06	5.82E-09
gamma-BHC (lindane)	3.41E+00	6.87E-02	-	1.14E-04	2.30E-06	1.43E-07
Dieldrin	1.28E-01	4.68E-03	-	8.77E-06	3.21E-07	6.42E-10
Endosulfan II	7.29E-02	1.17E-04	-	na	na	na
Endosulfan Sulfate	6.39E-02	1.02E-04	-	na	na	na
Endrin Ketone	1.60E-02	4.60E-04	-	na	na	na
Semivolatile organic chemicals						
Bis(2-ethylhexyl)phthalate	8.69E-02	4.59E-03	-	1.49E-08	7.87E-10	na
Di-n-octylphthalate	1.89E-02	2.72E-05	-	7.11E-09	na	na
Volatile organic chemicals						
1,2-Dichloroethane	1.28E-02	9.90E-03	-	8.03E-06	6.13E-08	1.25E-06
1,2-Dichloropropane	3.62E+00	7.30E-02	-	5.40E-06	7.78E-08	na
Acetone	1.49E-01	3.01E-03	-	na	na	na
Carbon disulfide	1.09E+00	2.19E-02	-	na	na	na
Chloroform	3.41E+00	6.87E-02	-	2.24E-07	4.19E-08	1.36E-06
Tetrachlorothene	1.28E-01	4.68E-03	-	1.42E-06	7.59E-07	1.33E-07
Trichloroethene	7.29E-02	1.17E-04	-	3.01E-07	9.98E-08	2.39E-07
Xylenes (total)	6.39E-02	1.02E-04	-	na	na	na
Pathway Risk	**2.01E+02**	**7.18E-01**	**0.00E+00**	**8E-03**	**4E-05**	**4E-06**
Sum of Pathway		**2.02E+02**			**8E-03**	

(-): Hazard quotient could not be calculated due to lack of a reference dose.
na: Not applicable
*: Inhalation exposure to metals in groundwater is not assumed to occur.
nc: Lead is considered by the EPA to be a potential weak human carcinogen. Lifetime cancer risk estimates were not calculated due to lack of a slope factor.

Table 6-5
Noncancer Risks and Lifetime Cancer Risks
Future On site Exposure to Groundwater from the UC Confined Aquifer
Adult Resident- Reasonable Maximum Exposure

Chemical	Chronic Hazard Quotient Ingestion	Chronic Hazard Quotient Dermal	Chronic Hazard Quotient Inhalation	Lifetime Cancer Risk Ingestion	Lifetime Cancer Risk Dermal	Lifetime Cancer Risk Inhalation
Inorganics						
Arsenic	4.57E-01	9.21E-04	*	1.06E-04	2.13E-07	*
Lead	-	-	*	nc	nc	*
Pesticides						
alpha-BHC	1.00E-01	2.55E-03	-	8.14E-05	2.07E-06	3.82E-08
beta-BHC	5.48E-02	1.39E-03	-	1.27E-05	3.22E-07	4.56E-10
delta-BHC	6.67E-02	1.69E-03	-	5.40E-05	1.37E-06	8.93E-10
gamma-BHC (Lindane)	1.37E-01	3.48E-03	-	2.29E-05	5.82E-07	1.44E-08
Dieldrin	2.74E-02	1.26E-03	-	9.39E-06	4.33E-07	3.44E-10
Semivolatile organic compounds						
Benzoic Acid*	1.71E-04	2.27E-06	-	na	na	na
Bis(2-ethylhexyl)phthalate	1.99E-02	1.32E-03	-	2.38E-06	1.59E-07	na
Di-n-butyl phthalate	1.37E-03	8.20E-05	-	na	na	na
Di-n-octyl phthalate	6.85E-03	1.24E-05	-	na	na	na
Volatile organic compounds						
1,2-Dichloroethane	-	-	-	2.24E-05	2.16E-07	1.75E-06
1,2-Dichloropropane	-	-	7.32E-02	1.32E-05	2.39E-07	na
Acetone	1.59E-02	2.88E-05	-	na	na	na
Carbon disulfide	3.01E-03	2.73E-03	1.04E-01	na	na	na
Chloroform	1.37E-02	3.23E-03	-	3.58E-07	8.45E-08	1.09E-06
Tetrachlorothene	1.95E-02	1.31E-02	-	4.34E-06	2.91E-06	2.02E-07
Pathway Risk	4.67E-01	3.09E-02	1.77E-01	2E-04	8E-06	3E-06
Sum of Pathway Risks		6.75E-01			2E-04	

(-): Hazard quotient could not be calculated due to lack of a reference dose.
na: not applicable
*: Inhalation exposure to metals in groundwater is not assumed to occur.
nc: Lead is considered by the EPA to be a potential weak human carcinogen. Lifetime cancer risk estimates were not calculated due to lack of a slope factor.

Table 6-6
Noncancer Risks and Lifetime Cancer Risks
Future On site Exposure to Groundwater from the UC Confined Aquifer
Child Resident- Reasonable Maximum Exposure

Chemical	Chronic Hazard Quotient			Lifetime Cancer Risk		
	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation
Inrorganics						
Arsenic	1.07E+00	1.70E-03	•	4.93E-05	7.89E-08	•
Lead	-	-	•	nc	nc	•
Pesticides						
alpha BHC	2.34E-01	4.73E-03	-	3.80E-05	7.66E-07	2.71E-09
beta-BHC	1.28E-01	2.58E-03	-	5.92E-06	1.19E-07	4.26E-10
delta-BHC	1.56E-01	3.14E-03	-	2.52E-05	5.08E-07	8.34E-10
gamma BHC (Lindane	3.20E-01	6.44E-03	-	1.07E-05	2.15E-07	1.34E-08
Dieldrin	6.39E-02	2.34E-03	-	4.38E-06	1.60E-07	3.21E-10
Semivolatile organic chemicals						
Benzoic Acid	4.00E-04	4.20E-06	-	na	na	na
Bis(2-ethylhexyl)phthalate	4.63E-02	2.45E-03	-	1.11E-06	5.87E-08	na
Di-n-butyl phthalate	3.20E-03	1.52E-04	-	na	na	na
Di-n-octyl phthalate	1.60E-02	2.30E-05	-	na	na	na
Volatile organic chemicals						
1,2-Dichloroethane	-	-	-	1.05E-05	7.99E-08	1.64E-06
1,2-Dichloropropane	-	-	3.42E-01	6.15E-06	8.85E-08	na
Acetone	3.71E-02	5.34E-05	-	na	na	na
Carbon disulfide	7.03E-03	5.06E-03	4.85E-01	na	na	na
Chloroform	3.20E-02	5.98E-03	-	1.67E-07	3.13E-08	1.02E-06
Tetrachlorothene	4.54E-02	2.42E-02	-	2.02E-06	1.08E-06	1.89E-07
Pathway Risk	**1.09E+00**	**5.71E-02**	8.27E-01	1E-04	3E-06	**3E-06**
Sum of Pathway Risks		**1.97E+00**			1E-04	

(-): Hazard quotient could not be calculated due to lack of a reference dose.
na: Not applicable
•: Inhalation exposure to metals in groundwater is not assumed to occur.
nc: Lead is considered by the EPA to be a potential weak human carcinogen. Lifetime cancer risk estimates were not calculated due to lack of a slope factor.

Table 6-7
Risk Characterization Summary for the Hypothetical Future Land Use Scenario
Groundwater

Exposure Source	Receptor	Hazard Index	Additional Lifetime Cancer Risk*
		RME Case	RME Case
Upper Cretaceous (UC) Water Table Aquifer	Adult	83.2	2E-02
	Child	202	8E-03
UC Confined Aquifer	Adult	<1	2E-04
	Child	1.97	1E-04
Tuscaloosa	Adult and child	None	None

* Current lifetime cancer risk without exposure to Facility chemicals is approximately 1 in 4, or 0.25. Risk with adult RME exposure to chemicals in the UC Water Table Aquifer is 0.27.

TABLE 6-8
SUMMARY OF UNCERTAINTIES ASSOCIATED WITH RISK ASSESSMENT

Assumption	Estimated Magnitude of Effect on Risk	Direction of Effect on Risk Estimate
Environmental Sampling and Analysis		
Errors in chemical analysis	Low	Over or underestimate risk
The majority of sampling wells are installed in the region of the suspected contaminant plume	Low-Moderate	Overestimate risk
Fate and Transport Modeling		
Chemical concentrations reported as "below method detection limit" are used at one-half detection limit when calculating mean chemical concentrations	Low	Over or underestimate risk
Toxicological Data		
Hazard indices (HIs) were developed assuming all toxic effects were additive	Low-Moderate	Overestimate risk
Exposure Parameters		
Conservative values were used for exposure duration, frequency, and intake levels.	Low-Moderate	Overestimate risk

6.6 PERFORMANCE STANDARDS

The establishment of health-based performance standards serves as an important means of guiding remedial activities. A health-based approach is warranted when performance standards promulgated by state or federal agencies are not available for contaminants in soil, as well as for certain groundwater contaminants. 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 a target cancer risk or hazard index which is deemed acceptable and realistic. The concept of the performance standard inherently incorporates the concept of exposure reduction which allows remedial alternatives to be flexible.

The groundwater at the Woolfolk Chemical site currently contains concentrations of Site-related contaminants at levels which would pose an unacceptable risk (cumulative risk in excess of 1×10^{-6}) to human health if the water was being used for human consumption. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

TABLE 6-9: GROUNDWATER PERFORMANCE STANDARDS

Micrograms per liter (ug/l) or parts per billion (ppb)

Chemical	Standard[1]	Chemical	Standard[1]
Inorganic		***Semi-Volatile Organic Compounds***	
Arsenic	50	bis(2-ethylhexyl)phthalate*	6
Cadmium	5	***Volatile Organic Compounds***	
Chromium	100	Acetone*	4000[3]
Lead*	15[2]	Chloroform*	3
Manganese*	200[3]	Carbon Disulfide*	300[3]
Pesticides		1,2-Dichloroethane	5
alpha-BHC*	0.01	1,2-Dichloropropane*	5
beta-BHC*	0.05	Tetrachloroethene*	5
delta-BHC*	0.01[4]		
gamma-BHC	0.2		
Dieldrin*	0.005		

NOTES:

1. The COCs in this column are cancer-causing substances unless otherwise noted. The risk-based concentrations represent a 10^{-6} risk level (or an increased chance of one additional case of cancer in one million people). Exception: The risk level for arsenic at the MCL level is 2.5×10^{-3}.
2. EPA standard from Lead and Copper Rule, 56 FR, June 7, 1991.
3. This chemical is a non-cancer causing substance. The performance standard is based on a concentration which is not likely to produce harmful health effects (HQ=1).
4. The health/risk-based number is based on the toxicity of alpha-BHC.

* Performance standard is risk-based in absence of MCLs.

The performance standards for groundwater are contained in Table 6-9. The groundwater performance standards have been generated to ensure localized isolation and treatment of contaminated groundwater which exceeds the health-based groundwater performance standards established at the $1x10^{-6}$ risk level. The $1x10^{-6}$ risk level is protective but can only be achieved in light of the current surface off-site soils removal, the future OU #2 which will address on site soils and other media, the limited potential of groundwater use currently and in the future, continued local resident's municipal water use in the area, and the deed restrictions that are planned for this operable unit.

Health based performance standards for groundwater protection are based on a $1x10^{-6}$ risk level for carcinogens and a hazard quotient of 1 for noncarcinogens. Setting the performance standards for the groundwater contamination at the $1x10^{-6}$ risk level is consistent with the NCP's requirement for establishing performance standards within the $1x10^{-4}$ to $1x10^{-6}$ range. The performance standards for groundwater are listed in Table 6-9.

The groundwater performance standards will be applied at the Site to ensure that any future groundwater consumers will not be exposed to unacceptable concentrations of Site-related chemicals in the groundwater. The concentrations presented represent either the regulated Maximum Contaminant Level (MCL) or the health-based performance standards which was developed for those chemicals of concern which do not have MCLs.

7.0 DESCRIPTION OF ALTERNATIVES

The following is a description of remedial alternatives evaluated to provide a range of cleanup options for the Woolfolk Site. All actions presented below would be conducted in a manner that minimizes impact in accordance with regulations. The alternatives for the remediation of contaminated groundwater in OU #1 at the Woolfolk Chemical Works Site were evaluated in the Feasibility Study Report and presented in the Proposed Plan for the Site.

Table 7-1: Operable Unit #1 Alternatives

Alternative Number	Medium	Remedial Action	Present Cost (millions)
1	Groundwater	No Action	$ 0
2	Groundwater	Pump Surficial and Upper Cretaceous Aquifers, On site treatment, Discharge to POTW and Institutional controls.	$ 2.3

The assembled site-specific alternatives represent a range of distinct waste-management strategies addressing the human health and environmental concerns posed by Operable Unit #1. Although the selected remedial alternative will be further refined during the predesign and design phases, the analysis presented below reflects the fundamental components of the various alternatives considered feasible for this Site.

7.1 ALTERNATIVE 1: No-action

The no action alternative is carried through the screening process as required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This alternative is used as a baseline for comparison with other alternatives that are developed. Under this alternative, EPA would take no further action to minimize the impact the contamination of groundwater has on the area. Groundwater contamination would remain and possibly migrate. There is no cost associated with this alternative since no additional activities would be conducted.

7.2 ALTERNATIVE 2: Groundwater Extraction, Treatment, and Discharge to POTW

This alternative requires the design, construction, and maintenance of an extraction and treatment system that includes extraction wells, iron co-precipitation and sand filtration with activated-granular carbon units as a polishing unit, if necessary, discharge to a publicly-owned treatment works (POTW), and institutional controls. If a POTW permit can not be obtained a National Pollutant Discharge Elimination System (NPDES) permit or an on site infiltration gallery will be pursued. Installation of extraction wells into the surficial aquifer, the UC Water Table aquifer, and the UC Confined aquifers will control groundwater flow and prevent contaminant migration. Pumping the surficial aquifer will intercept contamination that would otherwise migrate downward into the Upper Cretaceous aquifers. Meanwhile pumping the Upper Cretaceous Water Table and Confined aquifers will reduce the contaminant mass limiting further degradation of that zone and limit downward migration of contaminants to the Tuscaloosa Aquifer. The extraction and treatment system will be operated until performance standards, as identified in Table 6-9, are met.

Groundwater migrating from the facility in both the surficial, the UC Water Table, and the UC Confined aquifer will be intercepted and extracted. The number of wells and their location will be optimized to capture all water migrating laterally and vertically in the surficial, water table, and the confined aquifers.

Groundwater extracted from the surficial aquifer and UC Water Table aquifer will be treated to remove arsenic using iron co-precipitation and sand filtration. After treatment it would be discharged to the City of Fort Valley POTW along with the groundwater from the Upper Cretaceous confined aquifer. Arsenic in the surficial and UC Water Table aquifers is possibly the only contaminant of sufficient concentration to merit treatment prior to discharge. Verification of the contaminant levels throughout the remediation for all of the aquifers will be required. Preliminary discussion with both the Georgia EPD and the City of Fort Valley have indicated support with limiting on site treatment of groundwater of sufficient concentration. Formal approval must be obtained prior to discharge from both parties. If needed, an activated carbon unit will be added as a polishing unit but is not part of the current cost estimates. The system will be housed in an adequately sized treatment building and have the proper controls to allow it to function with minimal operator attention.

If approval from the EPD or the City of Fort Valley with respect to the discharge of wastewater to the POTW is unattainable, an NPDES permit for surface water discharge must be sought. If a NPDES permit is not attainable on site an infiltration gallery will be investigated for the discharge of treated water. Should either of these be required, changes will be implemented to the treatment process of groundwater from all the aquifers in order to comply with discharge requirements.

During the remedial design for this project, field scale treatability studies will be conducted to determine the effectiveness of the treatment system. The treatment process of the remedy will be used if proven effective by these treatability studies in reducing the contamination in the extracted water. Other treatment technologies for groundwater may be found to be effective and may be implemented if the timeframe for remediation may be retained, however, a ROD amendment or an Explanation of Significant Differences (ESD) may be required. Final methods will be determined during the remedial design of the remedy.

Institutional controls of this alternative includes limiting access to contaminated groundwater, monitoring groundwater quality, and abandoning selected monitoring wells. Although these controls help reduce risks associated with contact with contaminated groundwater, they do not reduce the contamination or achieve the remedial action objectives. This alternative will limit access to contaminated water by future users. On the basis of the groundwater-use survey performed during the RI, there are no known current users of the surficial aquifer, Upper Cretaceous water table, nor the confined aquifers within one-half mile of the Woolfolk Facility.

Groundwater, including extraction from the city wells, will be monitored quarterly as a part of the implementation of this alternative to determine the effectiveness of the remedy. Abandoning existing contaminated wells which will no longer be of use will limit access to contaminated groundwater. Some wells at the facility may be allowing contaminants to migrate downward into deeper parts of the hydrogeological system, thereby causing the contamination to spread. These wells will be abandoned in a manner that would prevent the contamination and will comply with State regulations applying to closure of abandoned wells.

Operation and maintenance of the systems will also be required. This shall include development and implementation of an Operation and Maintenance Plan. The plan will address all aspects of the system's operation and the laws governing O&M activities at Superfund sites. It shall also define responsibilities, timeframes, procedures, and schedules for these activities. It is estimated that the extraction and treatment system for groundwater may potentially operate for 68 years to achieve all performance standards. The source removal activities under OU #2 may reduce the timeframe for groundwater remediation under this OU.

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

This section of the ROD provides the basis for determining which alternative provides the best balance with respect to the balancing criteria in Section 121 of CERCLA and in Section 300.430 of the NCP. The major objective of the FS was to develop, screen, and evaluate alternatives for remediation of the site.

EPA evaluated each alternative by the standard criteria shown in Table 8-1 to determine which would best reduce risks posed by the Site. To be considered as a remedy, the alternative must protect human health and the environment, and comply with applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, states that any remedial action selected for a site must attain, at a minimum, a degree of remediation that ensures protection of human health and the environment. In addition, levels or standards of control under federal or state environmental laws (ARARs) must be attained with respect to any hazardous substance, contaminant or pollutant remaining on-site at the completion of remedial actions. Potential ARARs for the Site are listed in Section 8.2.

The selected alternative must meet the threshold criteria of overall protection of human health and the environment and compliance with all ARARs (or be granted a waiver for compliance with ARARs). Any alternative that does not satisfy both of these requirements is not eligible for selection. The Primary Balancing Criteria are the technical criteria upon which the detailed analysis is primarily based. The final two criteria, known as Modifying Criteria, assess the public's and the state agency's acceptance of the alternative. Based on these final two criteria, EPA may modify aspects of a specific alternative.

Table 8-1: Breakdown of Evaluation Criteria

THRESHOLD CRITERIA	PRIMARY BALANCING CRITERIA	MODIFYING CRITERIA
-Overall protection of human health and the environment	-Long-term effectiveness	-State acceptance
-Compliance with ARARs (or invoking a waiver)	-Reduction of toxicity, mobility, or volume	-Community acceptance
	-Short-term effectiveness	
	-Implementability	
	-Cost	

The following analysis is a summary of the evaluation of alternatives for remediating the groundwater contamination at the Woolfolk site under each of the criteria. A comparison is made between each of the alternatives for achievement of a specific criterion.

Threshold Criteria

8.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative #1 would provide no protection from the present contamination levels. Taking no action at the site in regards to groundwater will allow contamination to continue to migrate both laterally and vertically. Either of these migration pathways has the potential to contaminate the city water system. Taking no action would also not lessen the potential on site residents from coming in contact with the groundwater contamination. Alternative #2 would provide adequate protection of human health if the alternative components are designed, constructed, operated, and maintained properly by extracting, treating, and restricting use of contaminated groundwater until performance standards are met.

8.2 COMPLIANCE WITH ARARs

The evaluation of the ability of the alternatives to comply with ARARs includes a review of chemical-specific, action-specific, and location-specific ARARs. The requirements of federal and state laws are identified and applied to remedial actions as ARARs using the approach outlined in the EPA's CERCLA Compliance with Other Laws Manual (EPA/540/G-89/006, August 1988).

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant or contaminant, location, or other circumstances at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that are not directly applicable to a hazardous substance, pollutant or contaminant, location, or other circumstances at a CERCLA site but address problems or situations sufficiently similar to those encountered at the CERCLA site, and whose use is well suited to the particular site. The judgement of the relevance and appropriateness of a requirement to a remedial action depends on the substances in question, the physical nature of the site, or other circumstances at the site.

In order to comply with CERCLA requirements, selected remedial actions must attain ARARs unless a waiver is invoked. Performance standards for a remedial action will generally be based on chemical-specific and location-specific ARARs or health-based levels.

In the event that an ARAR does not exist, other pertinent guidelines and standards should be considered. These are commonly referred to as To-Be-Considered (TBC). Risk-specific doses (RSDs), reference doses (RFDs), health advisories (HAs) and state and federal guidelines and criteria, etc. are example TBCs.

Alternative #1 does not meet ARARs. For example, Maximum Contaminant Levels (MCL) are not met by Alternative #1. The performance standards (Chemical-specific ARARs), presented in Table 6-9, lindane (gamma-BHC) is the MCL of 0.2 parts per billion (ppb). The observed concentration of lindane in the surficial aquifer, presented in Table 6-1, is 8.3 ppb. Alternative #2 will meet all identified ARARs. In the above example, pumping the defined aquifer until the performance standards have been met will meet the identified ARAR. All identified ARARs, including those for the State, for Alternative #2 are presented in Appendix B.

Primary Balancing Criteria

8.3 LONG-TERM EFFECTIVENESS

Under Alternative #1, contamination would remain at its current levels of effectiveness or would worsen with time. As shown above, migration of the contamination cannot be prevented in the long term should no action be taken. Alternative #2 would permanently reduce contamination of groundwater to safe levels and would, therefore, be an effective long-term and permanent remedy if the alternative components are designed, constructed, operated, and maintained properly.

8.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

Alternative #1 would not reduce toxicity, mobility or volume. The levels of contamination will remain toxic should no action be taken to remove them from the aquifers. The potential for migration and the overall volume will remain the same or increase should no action be taken. Alternative #2 would pump, collect and treat the groundwater beneath the facility in the surficial and Upper Cretaceous aquifers. The extraction scheme will intercept contamination migrating off the facility and create an upward gradient from the underlying Tuscaloosa aquifer preventing contamination of this zone, therefore, reducing mobility. Toxicity and volume will be reduced by treatment of extracted groundwater using iron co-precipitation, sand filtration, and possibly activated carbon as a polishing unit.

8.5 SHORT-TERM EFFECTIVENESS

Alternative #1 would not require construction or excavation that would cause a health risk to workers, therefore, Alternative #1 is effective in the short-term. However, Alternative #1 would be less effective in achieving the overall groundwater performance standards in the shortest time period. Alternative #2 will induce a temporary increase in short-term risk by potentially causing a temporary increase in fugitive dust generation during normal remedial construction activities. However, dust control measures will be instituted in order to lessen the effect of any dust. Alternative #2 also increases the possibility of a construction related accident. Safety practices adequately followed during construction will limit the number of accidents which may occur during the implementation of Alternative #2.

8.6 IMPLEMENTABILITY

Alternative #1 would require no action to implement. Technological expertise, services, equipment and materials are adequately available for the implementation of Alternative #2. Iron co-precipitation, sand filtration, and activated carbon systems are available or easily designed for implementation at the site. The pump and treat technology has been extensively used in remediation activities in the past. Drilling and installing wells at the facility has been difficult due to drilling conditions but wells have been installed in all aquifers in the past. The treatment plant and extraction system piping would also need to be placed so as not to effect activities related to OU #2.

8.7 COST

Alternative #1 would not require any additional cost. The present cost of Alternative #2 is estimated to be $2,390,000. These costs include groundwater extraction, institutional controls, groundwater treatment, operation and maintenance during the implementation of the alternative as well as post remediation monitoring. While Alternative #2 is more costly, the added effectiveness justifies the additional cost.

Modifying Criteria

8.8 STATE ACCEPTANCE

The State of Georgia, as represented by the Georgia Environmental Protection Division (GaEPD), has been the support agency during the Remedial Investigation and Feasibility Study process for the Woolfolk Chemical Works site. In accordance with 40 CFR 300.430, as the support agency, GaEPD has provided input during this process. The State of Georgia concurred with the selected remedy on March 23, 1994. The letter of concurrence is in Appendix C.

8.9 COMMUNITY ACCEPTANCE

EPA has determined community acceptance of the preferred alternative after considering comments received during the public comment process associated with the Proposed Plan. EPA has included a Responsiveness Summary in Appendix A of this ROD, which addresses those comments. The community seems generally supportive of EPA's selected remedy.

9.0 SUMMARY OF SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected a remedy for OU #1 at the Site. The selected remedy is Alternative #2. The area of concern at this Site for OU #1 is defined as the area where the level of contamination is above the performance standards set forth in Section 6.6 of this ROD. The extent of the contamination will be further defined during the Remedial Design/Remedial Action phases. The selected remedy provides for the following:

1) Further delineation of the extent and extraction of contaminated groundwater from the surficial, Upper Cretaceous (UC) water table, and UC confined aquifers.

2) Treatment of the groundwater using iron co-precipitation and sand filtration with activated carbon adsorption as polishing steps, if needed.

3) Discharge to a Publicly-Owned Water Treatment Works (POTW) with a contingency plan to include a National Pollutant Discharge Elimination System (NPDES) permit for surface water discharge or possibly an infiltration gallery should an NPDES permit be unattainable.

4) Institutional Controls, such as deed restrictions limiting the use of groundwater at the site until performance goals are met.

5) Groundwater monitoring of specific wells, including the city wells, to be further defined during Remedial Design/ Remedial Action (RD/RA) and abandonment of all others monitoring wells used during the RI/FS.

6) Operation and Maintenance of the full system to be defined by an O&M Plan developed during the Remedial Design.

At the completion of this remedy, the risk associated with this Site has been calculated at 10^{-6} for cancer risks and a Hazard quotient of 1, which is determined to be protective of human health and the environment. The total present cost of the selected remedy, Alternative #2, is estimated at $ 2,300,000 for capital costs and $90,000 for O&M costs over the next thirty years. O&M costs assume an O&M period which will be further defined during the RD/RA.

A- GROUNDWATER REMEDIATION

Groundwater remediation will address the contaminated groundwater in the Surficial aquifer and the Upper Cretaceous aquifers at the Site. Groundwater remediation will include extraction of contaminated groundwater, treatment, and discharge to a Publicly-Owned Treatment Works (POTW).

A-1. The major components of groundwater remediation to be implemented include:

- Fencing of the Site and treatment facility;
- Extraction and on site treatment of groundwater by iron co-precipitation and sand filtration treatment with granulated carbon adsorption as a polishing step if needed;
- Drainage controls to divert runoff from Site;

- Institutional controls, such as deed and land-use restrictions;
- Operation and Maintenance Plan;
- Groundwater monitoring, including City of Fort Valley Water Wells.

Air emissions during the cleanup will be monitored to ensure safety of workers and residents near the Site.

A.2. Extraction, Treatment, and Discharge of Contaminated Groundwater

This remedy requires the construction and maintenance of an extraction and treatment system that includes extraction wells, iron co-precipitation and sand filtration with activated-granular carbon units as a polishing unit, if necessary, discharge to a publicly-owned treatment works (POTW), and institutional controls. If a POTW permit can not be obtained a National Pollutant Discharge Elimination System (NPDES) permit or an on site infiltration gallery will be pursued. Installation of extraction wells into the surficial aquifer, the UC Water Table aquifer, and the UC Confined aquifers will control groundwater flow and prevent contaminant migration. Pumping the surficial aquifer will intercept contamination that would otherwise migrate downward into the Upper Cretaceous aquifers. Meanwhile pumping the Upper Cretaceous Water Table and Confined aquifers will reduce the contaminant mass limiting further degradation of that zone and limit downward migration of contaminants to the Tuscaloosa Aquifer. The extraction and treatment system will be operated until performance standards, as identified in Table 9-1, are met.

Groundwater migrating from the facility in both the surficial, the UC Water Table, and the UC Confined aquifer will be intercepted and extracted. The number of wells and their location will be optimized to capture all water migrating laterally and vertically in the surficial, water table, and the confined aquifers.

Groundwater extracted from the surficial aquifer and UC Water Table aquifer will be treated to remove arsenic using iron co-precipitation and sand filtration. After treatment it would be discharged to the City of Fort Valley POTW along with the groundwater from the Upper Cretaceous confined aquifer. Quarterly verification of the contaminant levels throughout the remediation for all of the aquifers will be required. Preliminary discussion with both the State of Georgia and the City of Fort Valley have indicated no problems with limiting treatment to groundwater which does not meet the performance standards. Formal approval must be obtained prior to discharge from both parties. If needed, an activated carbon unit will be added as a polishing unit but is not part of the current cost estimates. The system will be housed in an adequately sized treatment building and have the proper controls to allow it to function with minimal operator attention.

If approval from the State or the City of Fort Valley with respect to the discharge of wastewater to the POTW is unattainable, an NPDES permit for surface discharge must be sought. If a NPDES permit is not attainable on site an infiltration gallery will be investigated for the discharge of treated water. Should either of these be required, changes will be implemented to the treatment process of groundwater from all the aquifers in order to comply with discharge requirements.

During the remedial design for this project, field scale treatability studies will be conducted to determine the effectiveness of the treatment system. The treatment process outlined above will be used if proven effective by these treatability studies in reducing the contamination in the extracted water. Other treatment technologies for groundwater may be found to be effective and may be implemented if the timeframe for remediation may be retained, however, a ROD amendment or an Explanation of Significant Differences (ESD) may be required. Final methods will be determined during the remedial design of the remedy.

Institutional controls of this alternative includes limiting access to contaminated groundwater, monitoring groundwater quality, and abandoning selected monitoring wells. Although these controls help reduce risks associated with contact with contaminated groundwater, they do not reduce the contamination or achieve the remedial action objectives. This alternative will limit access to contaminated water by future users. On the basis of the groundwater-use survey performed during the RI, there are no known current users of the surficial aquifer, Upper Cretaceous water table, nor the confined aquifers within one-half mile of the Woolfolk Facility.

Groundwater, including extraction from the city wells, will be monitored quarterly as a part of the implementation of this alternative. Abandoning existing contaminated wells which will no longer be of use will limit access to contaminated groundwater. Some wells at the facility may be allowing contaminants to migrate downward into deeper parts of the hydrogeological system, thereby causing the contamination to spread. These wells will be abandoned in a manner that would prevent the contamination and will comply with State regulations applying to closure of abandoned wells.

Operation and maintenance of the systems will also be required. This shall include development and implementation of an Operation and Maintenance Plan. The plan will address all aspects of the system's operation and the laws governing O&M activities at Superfund sites. It shall also define responsibilities, timeframes, procedures, and schedules for these activities. It is estimated that the extraction and treatment system for groundwater have to operate for 68 years to achieve all performance standards.
The source removal activities under OU #2 may reduce the timeframe required for groundwater remediation under this operable unit.

A-3. Performance Standards

a. Treatment Standards

Groundwater shall be treated until the performance standards set forth in Table 9-1 are attained at the wells designated by EPA.

b. Discharge Standards

Discharges from the groundwater treatment system shall comply with all ARARs, including, but not limited to, substantive requirements of the NPDES permitting program under the Clean Water Act, 33 U.S.C. {1251 et seq., and all effluent limits established by EPA}. All identified ARARs are presented in Appendix B of this ROD.

c. Design Standards

The design, construction and operation of the groundwater treatment system shall be conducted in accordance with all ARARs, including but not limited to the RCRA requirements set forth in 40 C.F.R. Part 264 (Subpart F-Groundwater monitoring requirements). All identified ARARs are presented in Appendix B of this ROD.

d. Other Standards

In addition, the selected remedy shall comply with those ARARs identified in Section 10.2 (Attainment of ARARs) and in Appendix B of this ROD.

B. Compliance Monitoring

Groundwater monitoring shall be conducted on- and off-site. After demonstration of compliance with Performance Standards, the groundwater shall be monitored for five years. If monitoring indicates that the Performance Standards set forth in Paragraph A.3(a) are being exceeded at any time after pumping has been discontinued, extraction and treatment of the groundwater will recommence until the Performance Standards are once again achieved.

TABLE 9-1: GROUNDWATER PERFORMANCE STANDARDS

Micrograms per liter (ug/l) or parts per billion (ppb)

Chemical	Standard[1]	Chemical	Standard[1]
Inorganic		***Semi-Volatile Organic Compounds***	
Arsenic	50	bis(2-ethylhexyl)phthalate*	6
Cadmium	5	***Volatile Organic Compounds***	
Chromium	100	Acetone*	4000[3]
Lead*	15[2]	Chloroform*	3
Manganese*	200[3]	Carbon Disulfide*	300[3]
Pesticides		1,2-Dichloroethane	5
alpha-BHC*	0.01	1,2-Dichloropropane*	5
beta-BHC*	0.05	Tetrachloroethene*	5
delta-BHC*	0.01[4]		
gamma-BHC	0.2		
Dieldrin*	0.005		

NOTES:

1 The COCs in this column are cancer-causing substances unless otherwise noted. The risk-based concentrations represent a 10^{-6} risk level (or an increased chance of one additional case of cancer in one million people). Exception: The risk level for arsenic at the MCL level is 2.5×10^{-3}.

2 EPA standard from Lead and Copper Rule, 56 FR, June 7, 1991.

3 This chemical is a non-cancer causing substance. The performance standard is based on a concentration which is not likely to produce harmful health effects (HQ=1).

4 The health/risk-based number is based on the toxicity of alpha-BHC.

* Performance standard is risk-based in absence of MCLs.

This remedy will achieve substantial risk reduction through treatment of the principal threat at OU #1 of the Woolfolk Chemical Superfund Site. The principal threat is the groundwater contamination for this OU. Soils, structures, surface/storm water, sediment, and air will be addressed in OU #2.

Air emissions from the Site will be monitored to ensure compliance with the Clean Air Act. Air monitoring will be conducted to ensure that contaminant concentrations do not exceed levels considered to be safe for human health. If levels are exceeded, mitigative procedures such as vapor capture will be employed to prevent harmful levels of air emissions from leaving the Site.

The selected alternative for OU #1 of the Woolfolk Chemical site is consistent with the requirements of Section 121 of CERCLA and the NCP. The selected alternative will reduce the mobility, toxicity, and volume of contaminated groundwater at the Site. In addition, the selected alternative is protective of human health and the environment, will attain all Federal and State applicable or relevant and appropriate requirements, is cost-effective, and utilizes permanent solutions to the maximum extent practicable. The selected alternative for OU #1 is consistent with previous and projected remedial actions at the Site.

Based on the information available at this time, the selected remedy represents the best among the criteria used to evaluate remedies, especially in light of the ongoing removal action The remedy is believed to be protective of human health and the environment, will attain ARARs, will be cost effective, and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

The goal of this remedial action is to restore the groundwater in the surficial and Upper Cretaceous aquifers to beneficial use (as drinking water) at this Site. The performance standards for this remedial action are listed in Table 9-1. Based on information obtained during the remedial investigation, and the analysis of all remedial alternatives, the selected remedy will be able to achieve this goal. Groundwater contamination may be especially persistent in the immediate vicinity of the contaminant's source, where concentrations are relatively high. The ability to achieve performance standards at all points throughout the area of attainment, or plume, cannot be determined until the extraction system has been implemented, modified as necessary, and plume response monitored over time. If the selected remedy cannot meet the specified remediation goals, at any or all of the monitoring points during implementation, contingency measures and goals will be defined and implemented to replace the selected remedy and goals for these portions of the plume. Such contingency measures will, at a minimum, prevent further migration of the plume and include a combination of containment technologies, treatment, and institutional controls. These measures are considered to be protective of human health and the environment, and are technically practicable under the corresponding circumstances.

The selected remedy will include groundwater extraction and monitoring, during which the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

- at individual wells where performance standards have been attained, pumping may be discontinued;
- alternating pumping at wells to eliminate stagnation points;
- pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into groundwater; and
- installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

To ensure that performance standards continue to be maintained, the aquifer will be monitored at least annually for five years following discontinuation of groundwater extraction for those wells where pumping has ceased.

The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at least every five years in accordance with CERCLA section 121(c) and the NCP.

10.0 STATUTORY DETERMINATION

Under its legal authority, EPA's primary responsibility at Superfund Sites is to undertake remedial actions that achieve adequate protection of human health and the environment and attain all ARARs. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedy must also be cost effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy protects human health and the environment through isolation and treating a principal threat remaining at OU #1 of the Site, the contaminated groundwater. The selected remedy, extraction of groundwater, provides protection of human health and the environment by reducing, and controlling risk through treatment, engineering controls and/or institutional controls. The surface and subsurface soils at OU #1 of the Site are not addressed with this ROD but will be fully remediated through removal actions and OU #2 activities which will mitigate these sources of contamination to groundwater.

10.2 ATTAINMENT OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Remedial actions performed under CERCLA must comply with all applicable or relevant and appropriate requirements (ARARs) unless a waiver is invoked. All alternatives considered for the Site were evaluated on the basis of the degree to which they complied with these requirements. The selected remedy was found to meet or exceed all ARARs that have been identified in Appendix B attached to this ROD.

10.3 COST EFFECTIVENESS

The estimated cost of EPA's selected remedy is $2,390,000. Cost effectiveness is determined by comparing the cost of all alternatives being considered with their overall effectiveness to determine whether the costs are proportional to the effectiveness achieved. EPA evaluates the incremental cost of each alternative as compared to the increased effectiveness of the remedy. The selected remedy does cost more than the no action alternative; however, effectiveness achieved by the remedy justifies the higher cost. The remedy is considered cost effective.

10.4 UTILIZATION OF PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE

EPA believes the selected remedy is the most appropriate cleanup solution for the Woolfolk Chemical Works Site and provides the best balance among the evaluation criteria for the remedial alternatives evaluated. This remedy provides effective protection in both the short-term and long-term to potential human and environmental receptors, is implementable, and is cost-effective. The selected remedy, by pumping and treating contaminated groundwater until performance standards are met, meets the statutory requirement to utilize permanent solutions to the maximum extent practicable.

10.5 PREFERENCE FOR TREATMENT AS A PRINCIPLE ELEMENT

The statutory preference for treatment will be met because the selected remedy treats the contaminated groundwater which is a principal threat posed by the Site.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the proposed plan.

APPENDIX A:

RESPONSIVENESS SUMMARY

WOOLFOLK CHEMICAL WORKS SITE

OPERABLE UNIT #1: GROUNDWATER CONTAMINATION

FORT VALLEY, PEACH COUNTY, GEORGIA

RESPONSIVENESS SUMMARY
WOOLFOLK CHEMICAL WORKS SITE
OPERABLE UNIT #1: GROUNDWATER CONTAMINATION
FORT VALLEY, PEACH COUNTY, GEORGIA

The U.S. Environmental Protection Agency (EPA) held a public comment period from January 18, 1994 through February 17, 1994 for interested parties to give input on EPA's Proposed Plan for Remedial Action at the Woolfolk Chemical Superfund Site in Fort Valley, Peach County, Georgia. A public meeting was conducted by EPA on February 1, 1994, at the Hunt School Complex in Fort Valley. At the meeting EPA presented the Proposed Plan for the Woolfolk Chemical Works Site, Operable Unit #1, which was 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 of the remedial action for the Woolfolk Site.

This responsiveness summary for the Woolfolk Site is divided into the following sections.

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 Woolfolk 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 remedial design.

I. Overview

The preferred remedial alternative was presented to the public in a Proposed Plan released on January 18, 1994. A public meeting was held February 1, 1994 with about 70 people attending. The selected alternative consists of:

- Further delineation of the extent and extraction of contaminated groundwater from the surficial, Upper Cretaceous (UC) water table, and UC confined aquifers.
- Treatment of the groundwater using iron co-precipitation and sand filtration with activated carbon adsorption as polishing steps, if needed.
- Discharge to a Publicly-Owned Water Treatment Works (POTW) with a contingency plan to include a National Pollutant Discharge Elimination System (NPDES) permit for surface water discharge or possibly an infiltration gallery should an NPDES permit be unattainable.
- Institutional Controls, such as deed restrictions limiting the use of groundwater at the site until performance goals are met.

- Groundwater monitoring of specific wells, including the city wells, to be further defined during Remedial Design/ Remedial Action (RD/RA) and abandonment of all others monitoring wells used during the RI/FS.

- Operation and Maintenance of the full system to be defined by an O&M Plan developed during the Remedial Design.

In general, the public was in agreement with EPA on the proposed remedial actions to be taken at the Site.

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 Woolfolk Chemical Works site. EPA has been working with the community surrounding the Woolfolk Chemical Works since 1990. In September 1990, press releases informing the community about the NPL listing of the site were released. 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, has been placed in the information repository. In January 1991, EPA held a public meeting to discuss the start of the RI/FS.

Most recently, in July 1993, EPA issued a press release and fact sheet on the findings of the RI study regarding soil contamination 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 our invitation to an availability session. The availability session, held on August 3, 1993 discussed the results of the RI study and ATSDR's recommendations for health precautions. Fifty people attended the session which was hosted by EPA, GaEPD, and ATSDR. Representatives of CGC were also present.

EPA's Emergency Response and Removal Branch is currently working to define the extent of off site contamination, excavating contaminated soils from residential properties, and supervising the destruction of a site dioxin contaminated building (Building E). Two sampling events of soils in resident's yards have occurred to date with results subsequently explained in meetings with the mayor and the public. CGC is complying with an Unilateral Administrative Order (UAO) requiring the disassociation of the affected residents from contaminated soils and destruction/removal of Building E.

The Feasibility Study, the Proposed Plan, and the Administrative Record (AR) for OU#1 were released to the public on January 18, 1993. These two documents were made available in both the AR, maintained in the EPA Region IV Docket Room, and the information repository at 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, 1993 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. Responses to the comments received during this comment period are presented in the responsiveness summary in Appendix A of this document.

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

Comment 1: Concern was raised about the data submitted by the PRPs regarding the testing of the City Wells. There was also a concern that the City Wells had been contaminated at one time.

EPA Response:

Canadyne-Georgia Corporation (CGC) has sampled the City Wells and wells screened in the Tuscaloosa aquifer located on-site since 1984. The results of the sampling from those wells has never shown there to be contamination above action levels in any of the City Wells. In December 1985, reports from an October sampling event showed levels of lead in the City Well #1. These levels were 14 parts per billion (ppb) and 3 ppb of lead which are below current action levels of 15 ppb. It should be noted that this action level has been revised from 50 ppb to 15 ppb in the Lead and Copper Rule, 56 FR, June 7, 1991.

Regardless of the fact that the levels were below the action level, the wells were re-sampled in December, 1985 the results of which were published in a report dated February, 1986 which showed no levels of lead in this well. The explanation given for the lead levels shown in the December results was that there was a possible Quality Assurance problem. This means that there may have been another source of lead (i.e. well casing, leaching from the soils, ..) that was not sufficiently taken into consideration during the sampling event. When these errors occur, sampling results are questionable and the best possible action is to re-sample. Re-sampling of the City Wells since 1985 has not shown levels of any contaminant in the City wells.

In order for EPA to be certain that the data provided from CGC is accurate? EPA has a number of techniques for assuring that the company is not falsifying its results. One is to sample along with the company. This technique is called split sampling. An EPA representative is present at the time of the sampling event. In the case of groundwater, when the sample of water is taken from the well, EPA takes some of it and analyzes it at an independent laboratory. The results must be comparable or EPA requires the company to re-sample. These techniques have been used to assure quality sampling results from the City Wells. Acceptance between EPA's sampling and the Company's data has been good.

Concern #2: Why was the City of Fort Valley Well #1 capped.

EPA Response:

The Superfund program does not involve itself with the day to day operation of a municipal water system unless it has been shown that this system is being affected by a Superfund site. The City of Fort Valley Water Wells have shown no contamination and hence no action is required by the water treatment plant. In discussions with the Fort Valley Utility Commission regarding the closure of City Well #1, it has been indicated that the well was closed due to structural problems and not contamination from the Woolfolk Superfund site.

Concern #3: Concerns were raised about significant time requirements for remediation of the groundwater.

EPA Response:

Remediation of groundwater has been known to take significant amounts of time. The pump and treat technology is limited in the rates and amounts of water that can be pumped and extracted. Extraction levels can be very slow due to the nature of the soils and the amount of water flowing through the area. What is of most concern to EPA is that the groundwater contamination is not allowed to spread further which would result should nothing be done.

The time estimates for remediation of the groundwater are as follows: Surficial Aquifer is 18 years; Upper Cretaceous Water Table is 68 years; and the UC Confined Aquifer is 30 years. These are estimated times for remediation which will be revised during the design phase after we gather more information about the system. These timeframes may also be reduced by the source control measures implemented under OU #2. As alluded to above, the system will prevent further spread of contamination by drawing the contamination back toward the wells. This will also prevent downward migration to the Tuscaloosa aquifer preventing contamination of the City Water system. Source removal activities under Operable Unit (OU) #2 will reduce the time required to remediate the groundwater further protecting the City Water system.

<u>Concern #4:</u> What are the contamination levels?

<u>EPA Response:</u>

Results of testing of the groundwater are summarized in Table 6-1 of the Record of Decision. Levels in this table indicated in italic boldface are actual maximum concentrations detected during the testing. Other levels presented are estimates derived from mathematical calculations completed for the Baseline Risk Assessment. As an example the level of Aresenic found in the surficial aquifer is 5,920 parts per billion (ppb). The performance standard (Table 6-9) which the treatment is required to meet is 50 ppb.

<u>Concern #5:</u> Will EPA allow comments on the design of the groundwater remediation.

<u>EPA Response:</u>

EPA made available $50,000 through its TAG grant process for the Community action group to hire an independent consultant to review the files related to the Site. The remedial design will be included as part of these files. Although EPA is not required to have a formal public meeting, EPA will continue to consider all requests for meetings on an individual basis. EPA regards public comments as an important part of the process for remediation of the Site.

<u>Concern #6:</u> Concern was raised about the former reinjection wells at the site.

<u>EPA Response:</u>

The reinjection wells used by the plant prior to the removal.actions taken by CGC in 1986 have been abandoned and meet standards established by the State of Georgia, Water Well Standards Act of 1985, Section 12-5-134 Standards of Wells and Boreholes, Paragraph 6(I). The paragraph states that "abandoned individual, non-public, public, irrigation and industrial wells shall be filled, sealed, and plugged by a water well contractor licensed by the council." The wells were closed by Greene's Water Wells, Inc., under direction of Jarrell Greene-Georgia State License #29.

<u>Concern #7:</u> A comment was raised about the groundwater beneath the drainage ditch.

<u>EPA Response:</u>

Groundwater beneath the drainage ditch has not been sampled though is not believed to be of concern. Groundwater contamination is caused by levels of concentration deposited in a large volume of soil. Though the levels of the contamination in the ditch are elevated, the volumes are considered to be small and hence not of concern for the groundwater. The levels are of concern to the children who may be exposed while playing in the ditch and also the environmental receptors (aquatic biota) in and around the ditch. It is for these reasons that the ditch is being investigated through the removal action as part of the Unilateral Order for off-site soils issued by EPA to CGC on December 1, 1993.

Concern #8: A concern was raised that soil remediation will protect the underlying groundwater, and thus groundwater remediation to MCLs or health-based concentrations in the surficial (perched water table) aquifer is unnecessary.

EPA Response

The remediation of groundwater contaminant source areas is designed to minimize the time required for groundwater remediation in all aquifers beneath the site, including the surficial aquifer. The site (source area) remediation under OU #2 will ultimately protect the deeper aquifers. However, using the logic expressed by this comment, one can make the argument that because the source area is being remediated under OU#2 to levels which should cause no further groundwater degradation, it is unnecessary to conduct any groundwater remediation at all. This is counter to EPA's position, namely, that:

- Current levels of groundwater contamination exceed health based and MCL concentrations and are therefore unacceptable.
- The groundwater remedial action at this site should include active remedial measures in all aquifers containing a current or potential source of drinking water, to attain MCLs. This approach is in accordance with EPA regulations which specify that MCLs are the relevant and appropriate standards to be attained by the groundwater remedial action for all current or potential sources of drinking water, and reflects EPA's position that absence of such active remedial measures will likely not result in attainment of the MCLs within an acceptable time frame.

Concern #9: The Point of Compliance should be at the Site Boundary.

EPA Response:

The commenter believes that a "point of compliance" for groundwater should be established at the Woolfolk property boundary. EPA defines an "Area of Attainment" for groundwater remedial actions as any points outside the area of waste remaining in place, and up to the boundary of the contaminant plume (EPA/540/G-88/003, OSWER Directive 9283.1-2, December, 1988, Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites. EPA's goal is to reach applicable or relevant and appropriate (ARARs) for groundwater within this "Area of Attainment" as rapidly as possible, consistent with engineering constraints and with site specific conditions. While the groundwater within the site boundary is not expected to be utilized as a drinking water source for the foreseeable future, EPA believes that in the absence of active groundwater remediation throughout the area where groundwater is now contaminated, it will require an excessively long period of time for groundwater remedial action objectives to be attained. Regardless of the point of compliance, active groundwater remedial action across the area of groundwater contamination would reduce the time for the groundwater remedial action to attain the groundwater remedial action objectives. CGC cited a review of Region IV Records of Decisions that indicates "...at two-thirds of the sites discussed, the point of compliance was designated to be the site or property boundary or the edge of a waste management unit...". Designating the edge of a waste management unit or waste management area as a groundwater point of compliance would be consistent with the referenced EPA guidance document, and with the concept of a groundwater compliance point in the uppermost aquifer beneath a site, as it is established by RCRA regulations (40 CFR Part 264 §264.95). Designating the site property boundary as the point of compliance is not consistent with the referenced EPA guidance, nor with the concept of a compliance point as it is used in the RCRA program, nor with EPA's intent to restore groundwater quality within a time frame that is reasonable. Defining the entire site as a "waste management area" is inappropriate; however, for wastes which are left in place at the site (i.e. landfilled), EPA would not require groundwater compliance monitoring beneath the wastes.

Concern #10: There is insufficient yield in the Surficial Aquifer to qualify as a Usable Drinking-Water supply.

EPA Response:

The commenter contends that groundwater in the surficial aquifer is not a potential source of drinking water because of the probable low yield of this aquifer. EPA has made an evaluation of the potential yield in the surficial aquifer and has determined that for at least some parts of the surficial aquifer beneath the facility, it is probable that a sustained yield of 150 gallons per day is attainable. This yield is the cutoff point for a minimum yield of a Class II groundwater under EPA's groundwater classification system (in Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy, USEPA 1986). The preamble to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300) states on page 8732 (Federal Register Volume 55, Number 46, March 8, 1990, page 8732) "EPA's Superfund program uses EPA's Groundwater Protection Strategy as guidance when determining the appropriate remediation for contaminated groundwater at CERCLA sites." Based upon this citation and the minimum yield criterion, EPA considers that some of the groundwater in the surficial aquifer is a potential source of drinking water where MCLs are ARARs. Because all groundwater in the surficial aquifer is in the same "groundwater unit", as this term is defined in the referenced EPA groundwater classification document, an equivalent level of protection is necessary for the entire volume of surficial aquifer groundwater. EPA does acknowledge that the modeling analysis of the potential yield from the surficial aquifer is not absolutely conclusive with regard to the potential yield of the aquifer. If, during the groundwater remedial action, long term groundwater withdrawal from the surficial aquifer demonstrates that EPA should not consider the surficial aquifer groundwater as a potential source of drinking water, or if impracticability of attaining MCLs in the surficial aquifer groundwater is demonstrated, then remediation of the surficial aquifer groundwater to drinking water standards may not ultimately be required. However, for purposes of specifying in the Operable Unit #1 Record of Decision the remediation goals that the EPA's selected groundwater remedy expects to achieve (i.e. attainment of ARARs for groundwater in all current or potential sources of drinking water), the groundwater in the surficial aquifer must be included, based upon the best evidence available to EPA at this time. It is also important to note that due to the hydraulic connection between the surficial aquifer and underlying aquifers, surficial aquifer groundwater remediation would be required by EPA, regardless of the groundwater classification for the aquifer. Thus, the issue of the surficial aquifer groundwater classification is irrelevant to EPA's selected remedial technology.

Concern #11: EPA's Position on the Shallow Aquifer is inconsistent.

EPA Response:

EPA's position has changed, but it was based on the evaluation of the data received during the RI/FS, not on inconsistent or arbitrary judgement. The commenter also states that EPA's position on the shallow aquifer is inconsistent. Initially, EPA Region IV had verbally communicated to CGC, in advance of any actual analysis to support CGC's speculation, that groundwater in the surficial aquifer at the Woolfolk site might not be considered by the EPA as a potential source of drinking water. CGC was also informed that if EPA did not consider the surficial aquifer groundwater to be a potential source of drinking water, then drinking water MCLs would not apply as ARARs for that groundwater. In that case, remedial objectives for the groundwater in the surficial aquifer would be structured so that both further groundwater contamination in lower aquifers, and the time required for groundwater remediation for those lower aquifers would be minimized.

Subsequent to this preliminary assessment of the surficial aquifer groundwater by EPA Region IV, actual data analysis by EPA Region IV led to the conclusion that groundwater in the surficial aquifer was a potential source of drinking water. EPA Region IV has never stated that groundwater flow from up-gradient of the Woolfolk site (i.e. "dilution", for purposes of evaluating the effects of contaminant introduction into the aquifer through contaminant leaching from soils) is nonexistent. Rather, to provide a "worst-case" estimate of the effects of contaminant migration through those soils, the dilution was assumed to be nonexistent by EPA Region IV in a modeling analysis to evaluate soil remediation levels for groundwater protection. EPA has in fact made an estimate of the surficial aquifer groundwater flow from up-gradient under very low flow conditions (less than what has been observed at the site) and has concluded that some groundwater flow from up-gradient should occur under those exceptionally low flow conditions.

Concern #12: Manganese is included in the chemicals of concern for this ROD though eliminated from the Baseline Risk Assessment (BRA).

EPA Response:

Manganese was detected in on-site groundwater at levels well above the 200 ppb health-based value. The only justification for not including it as a COC would be if legitimate ground water background levels equalled or exceeded this level. No background samples were taken at the site, therefore, manganese has not been deleted.

Concern #13: Concern was raised over the level to which lead will be remediated.

EPA Response:

The 15 ppb action level for lead is a value applied at the tap per the drinking water standards set forth in the Lead and Copper Rule, 56 FR, June 7, 1991. Superfund has adopted this value as the remedial goal for groundwater.

Concern #14: Concern was raised over the performance standard for chloroform.

EPA Response:

The chloroform performance level is an example of a situation where the MCL for treated drinking water is not appropriate as a remedial level. The MCL of 100 ppb for four (4) trihalomethanes (one of which is chloroform) is a compromised MCL in recognition of its chlorine source, a chemical intentionally added to drinking water as a microbicidal agent to purify water. Three (3) ppb is a more appropriate health-based number for chloroform in groundwater at this site that originates from an undesirable contaminant source.

Concern #15: The State of Georgia Environmental Protection Division (EPD) has a policy regarding the remediation of groundwater which states that "EPD requires that all chemical contaminants in all groundwater be remediated to the maximum contaminant levels (MCL) or (when an MCL does not exist), to a background value ...".

EPA Response:

Since Georgia's policy of remediating to a background level in the absence of an MCL is not based on any promulgated regulatory standard or enacted statutory standard of general applicability, it can not be considered an applicable requirement nor relevant and appropriate requirement (ARAR). EPA will, therefore, in accordance with its normal approach, remediate the groundwater based on the MCLs and, when there is no MCL for a contaminant, based on health/risk-based calculations, whichever is lower, for all aquifers.

Concern #16: Many concerns were raised by the public regarding their health from their exposure to the contaminants.

EPA Response:

EPA is not qualified to discuss health aspects. However, EPA has contacted the Agency for Toxic Substances and Disease Registry (ATSDR) in order that these public concerns can be addressed. ATSDR attended the public meeting with EPA on February 1, 1994 and the site is currently under consideration for further action by their office.

IV. Concerns to be Addressed in the Future

EPA will continue to address community concerns about the site. The remedial design and remedial action will be given the utmost priority in order to limit further exposure of the residents to the contamination at the site. EPA will also work closely with City representatives including the Fort Valley Utility Commission to ensure that the Remedial Actions meet with their approval.

Appendix B:

Applicable Requirements

or

Relevant and Appropriate Requirements

(ARARs)

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Container Storage (Onsite)	Containers of RCRA hazardous waste must be: • Maintained in good condition • Compatible with hazardous waste to be stored • Closed during storage (except to add or remove waste)	RCRA hazardous waste (listed or characteristic) held for a temporary period before treatment, disposal, or storage elsewhere (40 CFR 264.10) in a container (i.e., any portable device in which a material is stored, transported, disposed of, or handled).	40 CFR 264.171 40 CFR 264.172 40 CFR 264.173	Relevant and Appropriate Applicable	These requirements would be relevant and appropriate for any non-hazardous waste which might be containerized and stored onsite prior to treatment or final disposal. If any of the wastes are determined to be classified as hazardous wastes, the requirements would be applicable. Containerized hazardous substances or hazardous wastes must be stored while onsite in a structure that is designed, operated, and maintained in accordance with 40 CFR 264.171-178.
	Inspect container storage areas weekly for deterioration.		40 CFR 264.174		
	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.		40 CFR 264.175		
	Keep containers of ignitable or reactive waste at least 50 feet from the facility's property line.		40 CFR 264.176		
	Keep incompatible materials apart. Separate incompatible materials stored near each other by a dike or other barrier.		40 CFR 264.177		
	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers, liners.		40 CFR 264.178		
Direct Discharge of Treatment System Effluent	Applicable federal water quality criteria for the protection of aquatic life must be complied with when environmental factors are being considered.	Surface discharge of treated effluent.	50 FR 30784 (July 29, 1985)	Applicable	See the initial screening table for chemical-specific ARARs.

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Direct Discharge of Treatment System Effluent (Continued)	Applicable federally approved state water quality standards must be complied with. These standards may be in addition to or more stringent than other federal standards under the CWA.	Surface discharge of treated effluent.	40 CFR 122.44 and state regulations approved under 40 CFR 131	Applicable	If Georgia state regulations are more stringent than federal water quality standards, the Georgia standards will be applicable to direct discharge. The state has authority under 40 CFR 131 to implement direct discharge requirements within the state, and should be contacted on a case-by-case basis when direct discharges are contemplated.
	Use of best available technology (BAT) economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutant control technology (BCT) is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis.	Surface discharge of treated effluent	40 CFR 122.44(a)	Applicable	If treated effluent is discharged to surface waters, these treatment requirements will be applicable. Permitting and reporting requirements will be applicable only if the effluent is discharged at an offsite location. The permitting authority and should be contacted on a case-by-case basis to determine effluent standards.
	The discharge must conform to applicable water quality requirements when the discharge affects a state other than the certifying state.	Surface water discharge affecting waters outside Georgia.	40 CFR 122.44(d)(4)	Not ARAR	No discharge is expected to affect surface water outside Georgia.
Direct Discharge of Treatment System Effluent (Continued)	Discharge limitations must be established for all toxic pollutants that are or may be discharged at levels greater than those that can be achieved by technology-based standards.	Surface discharge of treated effluent.	40 CFR 122.44(e)	Applicable	Exact limitations are based on review of the proposed treatment system and receiving water characteristics, and are usually determined on a case-by-case basis. The permitting authority should be contacted to determine effluent limitations.
	Discharge must be monitored to assure compliance. Discharger will monitor: • The mass of each pollutant • The volume of effluent • Frequency of discharge and other measurements as appropriate Approved test methods for waste constituents to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided.	Surface discharge of treated effluent.	40 CFR 122.44(i)	Applicable	These requirements are generally incorporated into permits, which are not required for onsite discharges. The substantive requirements are applicable, however, in that verifiable evidence must be offered that the discharge standards are being met. The permitting authority should be contacted to determine monitoring and operational requirements.

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Direct Discharge of Treatment System Effluent (Continued)	Permit application information must be submitted, including a description of activities, listing of environmental permits, etc. Monitor and report results as required by permit (at least annually) Comply with additional permit conditions such as: • Duty to mitigate any adverse effects of any discharge • Proper operation and maintenance of treatment systems		40 CFR 122.21 40 CFR 122.44(i) 40 CFR 122.41(i)	Applicable	
	Develop and implement a Best Management Practices (BMP) program and incorporate in the NPDES permit to prevent the release of toxic constituents to surface waters. The BMP program must: • Establish specific procedures for the control of toxic and hazardous pollutant spills • Include a prediction of direction, rate of flow, and total quantity of toxic pollutants where experience indicates a reasonable potential for equipment failure • Assure proper management of solid and hazardous waste in accordance with regulations promulgated under RCRA	Surface water discharge.	40 CFR 125.100 40 CFR 125.104	Applicable	These issues are determined on a case-by-case basis by the NPDES permitting authority for any proposed surface discharge of treated wastewater. Although a CERCLA site remediation is not required to obtain an NPDES permit for onsite discharges to surface waters, the substantive requirements of the NPDES permit program must be met by the remediation action if possible. The permitting authority should be consulted on a case-by-case basis to determine BMP requirements.
	Aproved test methods for waste constituent to be monitoried must be followed. Detailed requirements for analytical procedures and quality controls are provided. Sample preservation procedures, container materials, and maximum allowable holding times are prescribed.	Surface water discharge.	40 CFR 136.1-136.4	Applicable	These requirements are generally incorporated into permits, which are not required for onsite discharges. The substantive requirements are applicable, however, in that verifiable evidence must be offered that standards are being met. The permitting authority should be consulted on a case-by-case basis to determine analytical requirements.

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions[a]	Requirement	Prerequisites	Citation	ARAR	Comments
Discharge to POTW[c]	Pollutants that pass through the POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger health/safety of POTW workers are prohibited.	Indirect discharge to a POTW.	40 CFR 403.5	Applicable	If any liquid is discharged to a POTW, these requirements are applicable. In accordance with guidance, a discharge permit may be required even for an onsite discharge, since permitting is the only substantive control mechanism available to a POTW.
	Specific prohibitions preclude the discharge of pollutants to POTWs that: • Create a fire or explosion hazard in the POTW • Are corrosive (pH<5.0) • Obstruct flow resulting in interference • Are discharged at a flow rate and/or concentration that will result in interference • Increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104°F (40°C)				Categorical standards have not been promulgated for CERCLA sites, so discharge standards must be determined on a case-by case basis, depending on the characteristics of the waste stream and the receiving POTW. Some municipalities may have published standards for non-categorical, non-domestic discharges. Changes in the composition of the waste stream due to pretreatment process changes or the addition of new waste streams may require renegotiation of the permit conditions.
	Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.		40 CFR 403.5 and local POTW regulations		
	RCRA permit-by-rule requirements must be complied with for discharges of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe.		40 CFR 264.71 and 40 CFR 264.72		

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Surface Water Control	Prevent run-on, and control and collect runoff from a 24-hour, 25-year storm (waste piles, land treatment facilities, landfills).	Land-based treatment, storage, or disposal units.	40 CFR 264.251(c)(d) 40 CFR 264.273(c)(d) 40 CFR 264.301(c)(d)	Relevant and Appropriate Applicable	The requirements for control of run-on and run-off will be relevant and appropriate to all remediation alternatives that manage non-hazardous waste and include onsite land-based treatment, storage, or disposal. The requirements will be applicable to any remediation measures that include land-based treatment, storage, or disposal of hazardous wastes.
Injection Wells	Complete application for injection well permit.	Injection of fluids into the subsurface.	40 CFR 144.31 40 CFR 144.32 40 CFR 144.40 40 CFR 144.51 40 CFR 144.52	Applicable	
	Injection shall not cause contaminants to migrate into underground sources of drinking water that will cause adverse health effects.		GA Rule 391-3-6.13	Applicable	

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions[a]	Requirement	Prerequisites	Citation	ARAR	Comments
Discharge to POTW (Continued)	Area from which materials are excavated may require cleanup to levels established by closure requirements.	Disposal by disturbance of hazardous waste and moving it outside the unit or area of contamination.	40 CFR 264 Disposal and Closure Requirements	Relevant and Appropriate Applicable	If contaminated materials that are not hazardous wastes are excavated from the site during remediation, the RCRA requirements for disposal and site closure (of the excavated area) become relevant and appropriate. See discussions under Capping, Clean Closure, Closure with Waste In-Place, etc. If the excavated materials can be classified as hazardous wastes, the disposal and closure requirements would be applicable.
	Movement of excavated materials to a previously uncontaminated, onsite location, and placement in or on land may trigger land disposal restrictions.	Materials containing RCRA hazardous wastes subject to land disposal restrictions.	40 CFR 268 (Subpart D)	Relevant and Appropriate Applicable	The land disposal restrictions restrict disposal of certain hazardous wastes. Some wastes may be derived from or may be sufficiently similar to restricted wastes to make the land disposal restrictions relevant and appropriate. For wastes that can be classified as restricted hazardous wastes, the restrictions are applicable after November 8, 1988. After this date, land disposal is prohibited for these wastes unless they are treated to defined standards. Chemical characterization of the wastes will be necessary to determine the applicability or relevance of this requirement.
Excavation (Continued)	Devise fugitive dust and odor emission control plan for this action if existing site plan is inadequate.		CAA Section 101[b] and 40 CFR 52[b]	Applicable	See discussions under Construction of new landfill.
Operation and Maintenance (O&M)	Post-closure care to ensure that site is maintained and monitored.		40 CFR 264.1	Relevant and Appropriate Applicable	Post-closure requirements for operation and maintenance of the Woolfolk facility are relevant and appropriate to new disposal units with non-hazardous waste, or existing units capped in-place. In cases where the wastes are determined to be hazardous wastes, and new disposal units are created, the post-closure requirements will be applicable.

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Tank Storage (Onsite)	Tanks must have sufficient structural strength to ensure that they do not collapse, rupture, or fail. Waste must not be incompatible with the tank material unless the tank is protected by a liner or by other means. Tanks must be provided with secondary containment and controls to prevent overfilling, and sufficient freeboard maintained in open tanks to prevent overtopping by wave action or precipitation. Impact the following: overfilling control, control equipment, monitoring data, waste level (for uncovered tanks), tank condition, above-ground portions of tanks (to assess their structural integrity), and the area surrounding the tank (to identify signs of leakage). Repair any corrosion, crack, and leak. At closure, remove all hazardous waste and hazardous waste residues from tanks, discharge control equipment, and discharge confinement structures.	Storage of RCRA hazardous waste (listed or chacteristic) not meeting small quantity generator criteria held for a temporary period greater than 90 days before* treatment, disposal, or storage elsewhere (40 CFR 264.10), in a tank (i.e., any portable device in which a material is stored, transported, disposed of, or * handled). A generator who accumulates or stores hazardous waste on-site for 90 days or less in compliance with 40 CFR 262.34(a)(1-4) is not subject to full RCRA storage requirements. Small quantity generators are not subject to the 90 day * limit (40 CFR 262.34(c), (d), and (e)).	40 CFR 264.191 40 CFR 264.191 40 CFR 264.193-194 40 CFR 264.195 40 CFR 264.196 40 CFR 264.197	Aplicable	These requirements would be applicable to the construction and use of tank storage at Woolfolk.
Tank Storage (Continued)	Store ignitable and reactive waste so as to prevent the waste from igniting or reacting. Ignitable or reactive wastes in covered tanks must comply with buffer zone requirements in "Flammable and Combustible Liquids Code." Tables 2-1 through 2-6 (National Fire Protection Association, 1976 or 1981).		40 CFR 264.198	Potentially Applicable	

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions*	Requirement	Prerequisites	Citation	ARAR	Comments
Tank Storage (Continued)	Storage Prohibitions: Storage of banned wastes must be in accordance with 40 CFR 268. When such storage occurs beyond one year, the owner/operator bears the burden of providing that such storage is solely for the purpose of accumulating sufficient quantities to allow for proper recovery, treatment, and disposal.		40 CFR 268.50	Potentially Applicable	
Treatment	Standards for miscellaneous units (long term retrievable storage, thermal treatment other than incinerators, open burning, open detonation, chemical, physical, and biological treatment units using other than tanks, surface impoundments, or land treatment units) require new miscellaneous units to satisfy environmental performance standards by protection of groundwater, surface water, and air quality, and by limiting surface and subsurface migration.	Use of other units for treatment of hazardous wastes. These units do not meet the definitions for units regulated elsewhere under RCRA.	40 CFR 264 (Subpart X)	Relevant and Appropriate Applicable	The requirement will be relevant and appropriate to the construction, operation, maintenance, and closure of any miscellaneous treatment unit (a treatment unit that is not elsewhere regulated) constructed on the PGDP site for treatment and/or disposal of non-hazardous wastes. These requirements would be applicable to the construction and operation of a miscellaneous treatment unit for the treatment and/or disposal of hazardous wastes.
	Treatment of wastes subject to ban on land disposal must attain levels achievable by best demonstrated available treatment technologies (BDAT) for each hazardous constituent in each listed waste.	Effective date for CERCLA actions is November 8, 1988, for F001-F005 hazardous wastes, dioxin wastes, and certain "California List" wastes. Other restricted wastes have different effective dates as promulgated in 40 CFR 268	40 CFR 268 (Subpart D)	Applicable Relevant and Appropriate	These regulations are applicable to the disposal of any waste that can be defined a restricted wastes. These requirements are relevant and appropriate to the treatment prior to land disposal of any wastes that contain components of restricted wastes in concentrations that make the site wastes sufficiently similar to the regulated wastes. The requirements specify levels of treatme that must be attained prior to land disposal.

Table B-1
IDENTIFICATION OF POTENTIAL ACTION-SPECIFIC ARARs FOR WOOLFOLK CHEMICAL WORKS

Actions[a]	Requirement	Prerequisites	Citation	ARAR	Comments
Treatment (Continued)	Design and operating standards for unit in which hazardouds waste is treated.	Treatment of hazardous waste in a unit.	40 CFR 264.190-264.192 (Tanks) 40 CFR 264.601 (Miscellaneous Treatment Units) 40 CFR 265.373 (Thermal Treatment Units)	Applicable Relevant and Appropriate	These regulations are applicable to the disposal of hazardous waste. These requirements are relevant and appropriate for design and operation of treatment units which treat non-RCRA hazardous waste.
	Devise fugitive and odor emission control plan for this action.		CAA Section 101[b] and 40 CFR 52[b]	Applicable	See discussions under Air Stripping.
	File an Air Pollution Emission Notice (APEN) with state to include estimation of emission rates for each pollutant expected.		40 CFR 52[b]	Applicable	See discussions under Air Stripping.

NOTES for TABLE B-1:

[a]Action alternatives from ROD keyword index.
[b]All of the Clean Air Act ARARs that have been established by the Federal Government are covered by matching state regulations. The state has the authority to manage these programs through the approval of its implementation plans (40 CFR 52, Subpart G).
[c]Bulk storage requires the preparation and implementation of a spill prevention, control, and countermeasures (SPCC) plan (see 40 CFR 761.65(c)(7)(ii) for specifications of container sizes that are considered "bulk" storage containers). Substantive requirements may be ARARs if bulk storage is performed on the site.
[d]Class I wells and Class IV wells are the relevant classifications for CERCLA. Class I wells are used to inject hazardous waste beneath the lowermost formation containing an underground source of drinking water within one-quarter mile of the injection well. Class IV wells are used to inject hazardous or radioactive waste into or above a formation containing an underground source of drinking water within one-quarter mile of the injection well.
[e]These regulations apply regardless of whether the remedial action discharges into the sewer or trucks the waste to an inlet to the sewage conveyance system located "upstream" of the town.

Table B-2
IDENTIFICATION OF POTENTIAL LOCATION-SPECIFIC ARARs AT WOOLFOLK CHEMICAL WORKS

	Location	Requirement	Prerequisite(s)	Citation	ARAR	Comments
1.	Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Action to recover and preserve artifacts	Alteration of terrain that threatens significant scientific, prehistorical, historical, or archaeological data	National Archaeological and Historical Preservation Act (16 USC Section 469); 36 CFR Part 65	Unknown	Should scientific, prehistorical, or historical artifacts be found at the site, this will become applicable.
2.	Critical habitat upon which endangered species or threatened species depends	Action to conserve endangered species or threatened species, including consultation with the Department of the Interior	Determination of endangered species or threatened species	Endangered Species Act of 1973 (16 USC 1531 et seq.); 50 CFR Part 200, 50 CFR Part 402	Unknown	No endangered species are known to exist on the site.
3.	Within coastal zone	Conduct activities in manner consistent with approved state management programs	Activities affecting the coastal zone including lands thereunder and adjacent shorelands	Coastal Zone Management Act (16 USC Section 1451 et seq.)	Potentially Applicable	The site has direct access to coastal areas.

TABLE B-3 IDENTIFICATION OF CHEMICAL-SPECIFIC ARARS FOR THE WOOLFOLK CHEMICAL WORKS SITE		
CLEAN WATER ACT - 33 U.S.C. §§ 1251-1376		
A	40 CFR Part 131 - Ambient Water Quality Criteria	Suggested ambient standards for the protection of human health and aquatic life.
R&A	40 CFR Part 403 - National Pretreatment Standards	Sets standards to control pollutants which pass through or interfere with treatment processes in publicly-owned treatment works or which may contaminate sewage sludge.
RESOURCE CONSERVATION AND RECOVERY ACT - 42 U.S.C. §§ 6901-6987		
R&A	40 CFR Part 261 - Identification and Listing of Hazardous Wastes	Defines those solid wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 263-265 and Parts 124, 270, and 271.
R&A	40 CFR Part 262 - Standards Applicable to Generators of Hazardous Waste	Establishes standards for generators of hazardous waste.
CLEAN AIR ACT - 42 U.S.C. §§ 7401-7642		
R&A	40 CFR Part 50 - National Primary and Secondary Ambient Air Quality Standards	Establishes standards for ambient air quality to protect public health and welfare.
SAFE DRINKING WATER ACT - 40 U.S.C. §§ 300		
R&A	40 CFR Part 141 - National Primary Drinking Water Standards	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water systems.
R&A	PL No. 99-339 100 Stat. 462 (1986) - Maximum Contaminant Level Goals (MCLGs)	Establishes drinking water quality goals set at levels of no known or anticipated adverse health effects with an adequate margin of safety.

A ------ APPLICABLE REQUIREMENTS WHICH WERE PROMULGATED UNDER FEDERAL LAW TO SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION LOCATION OR OTHER CIRCUMSTANCE AT THE WOOLFOLK CHEMICAL WORKS SITE.

R&A- RELEVANT AND APPROPRIATE REQUIREMENTS WHICH WHILE THEY ARE NOT "APPLICABLE" TO A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT THE WOOLFOLK CHEMICAL WORKS SITE, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE WOOLFOLK CHEMICAL WORKS SITE THAT THEIR USE IS WELL SUITED TO THE SITE.

TABLE B-4 IDENTIFICATION OF POTENTIAL GEORGIA STATE ARARS FOR THE WOOLFOLK CHEMICAL WORKS SITE		
R & A	Air Quality Act of 1978 O.C.G.A. § 12-9-1 et seq. and Rules, Chapter 391-3-1.	Establishes standards for ambient air quality to protect public health and welfare.
R & A	Safe Drinking Water Act O.C.G.A. § 12-5-170 et seq. and Rules Chapter 391-3-5.	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water systems.
R & A	Georgia Water Quality Control Act O.C.G.A. § 12-5-20 et seq. and Rules, Chapter 391-3-6.	Establishes treatment standards for public water systems.
R & A	Well Standards Act of 1991, O.C.G.A. § 12-5-120 et seq.	Requirements regarding the closure of abandoned wells.

A ----- APPLICABLE REQUIREMENTS WHICH WERE PROMULGATED UNDER FEDERAL LAW TO SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION LOCATION OR OTHER CIRCUMSTANCE AT THE WOOLFOLK CHEMICAL WORKS SITE.

R&A - RELEVANT AND APPROPRIATE REQUIREMENTS WHICH WHILE THEY ARE NOT "APPLICABLE" TO A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT THE WOOLFOLK CHEMICAL WORKS SITE, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE WOOLFOLK CHEMICAL WORKS SITE THAT THEIR USE IS WELL SUITED TO THE SITE.

APPENDIX C:

STATE CONCURRENCE

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154 Atlanta, Georgia 30334
Joe D. Tanner, Commissioner
Environmental Protection Division
Harold F. Reheis, Director
404/656-2833 404/656-7802

March 23, 1994

VIA FACSIMILE

Timothy R. Woolheater
Remedial Project Manager
South Superfund Remedial Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365

RE: Comments on Draft ROD for OU1 - Woolfolk Chemical Works Superfund Site, Fort Valley, Georgia

Dear Mr. Woolheater:

As you know, we have reviewed the proposed Record of Decision for remediation of contaminated groundwater at the Woolfolk site and have provided you with comments. To reiterate our position, all groundwater in Georgia is considered a potential source of drinking water. Were this site being remediated under a Georgia authority, the action levels for all contaminants in groundwater would be MCLs or background for those contaminants having no MCL.

We understand that EPA plans to remediate certain contaminants (i.e., chemicals of concern) in groundwater to concentrations that represent either the MCL or the health-based cleanup goal which was developed for those chemicals of concern which do not have MCLs. EPA has indicated that the Georgia standards noted above are not ARARs and, as such, will institute the MCL/health-based standard approach in lieu of state standards. The actual remediation will, in general, involve pumping and treating groundwater with subsequent discharge to a POTW. Alternate discharge routes will be investigated, should the POTW prove unable to handle the treatment system effluent.

Assuming that EPA has adequately identified all chemicals of concern and their respective clean-up levels, EPD concurs that EPA's plan (including the pump-and-treat/discharge strategy) for remediating groundwater is the best alternative to pursuing the Georgia standards. We also want to reiterate our position that the ROD should explicitly state the schedule and protocol for monitoring Fort Valley drinking water wells in order to ensure the continued safety of the residents.

I hope this information is sufficient for your needs. If you have any further questions regarding this matter, please call Ken Mitchell of my staff at 404-657-8645.

Sincerely,

Jennifer R Kaduck

Jennifer Kaduck, Chief
Hazardous Waste Management
Branch

Attachments

File: Woolfolk
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