

# Health Consultation

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Public Health Evaluation of the (Proposed) Air Monitoring Plan  
of the Preliminary Design Report for the Ciba-Geigy Superfund Site  
(Operable Unit 2)

CIBA-GEIGY CORPORATION

TOMS RIVER, OCEAN COUNTY, NEW JERSEY

EPA FACILITY ID: NJD001502517

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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## HEALTH CONSULTATION

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Prepared by:

New Jersey Department of Health and Senior Services  
Hazardous Site Health Evaluation Program  
Consumer and Environmental Health Services  
Division of Epidemiology, Environmental and Occupational Health  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry  
and the  
Agency for Toxic Substances and Disease Registry

## Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ATSDR	Agency for Toxic Substances and Disease Registry
CACCCC	Citizen's Action Committee on Childhood Cancer Cluster
CGC	Ciba-Geigy Chemical Corporation
COC	Chemical of Concern
CREG	Cancer Risk Evaluation Guideline
CV	Comparison Value
EMEG	Environmental Media Evaluation Guide
EPA	United States Environmental Protection Agency
FS	Feasibility Study
IDLH	Immediately Dangerous to Life and Health
LTAL	Long Term Action Level
MDL	Minimum Detection Level
MW	Molecular Weight
MRL	Minimal Risk Level
NAPL	Non-Aqueous Phase Liquid
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
NJDHSS	New Jersey Department of Health and Senior Services
NTC	Non-target compound
OSHA	Occupational Safety and Health Administration
PCE	Perchloroethylene (tetrachloroethylene)
PEL	Permissible Exposure Limit
PHRP	Public Health Response Plan
ppb	parts per billion
ppm	parts per million
RfC	Reference Concentration
RfD	Reference Dose
RMEG	Reference Dose Media Evaluation Guide
ROD	Record of Decision
RSD	Risk-Specific Dose
STEL	Short Term Exposure Limit
SVOC	Semi-volatile organic chemical
TCE	Trichloroethylene
TIC	Tentatively identified compound
TLV-TWA	Threshold Limit Value - Time Weighted Average
TVOC	Total Volatile Organic Chemicals
VOC	Volatile organic chemical

## Summary

At the request of the U.S. Environmental Protection Agency (EPA) Region II and the Citizen's Action Committee on Childhood Cancer Cluster (CACCCC), the New Jersey Department of Health and Senior Services (NJDHSS), under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR), has reviewed the Air Monitoring Plan [the "Plan"] of the Preliminary Design Report for remediation of the on-site source areas at the Ciba-Geigy Chemical Corporation (CGC) Superfund site located in Dover Township (Ocean County), New Jersey. The proposed Plan, which has been prepared by Ciba Specialty Chemical (Ciba), has been evaluated to determine whether the monitoring procedures and action levels for contaminants that may be released to ambient air will be protective of public health. Moreover, this Health Consultation is a culmination of a review of various drafts of the Plan and numerous discussions with EPA regarding the proposed air actions levels and other aspects of the air monitoring plan. During the course of these reviews and discussions, several recommendations were put forth by ATSDR and the NJDHSS that have been addressed by EPA and incorporated into the Plan. These changes are reflected in this Health Consultation. Moreover, ATSDR and NJDHSS provided a draft copy of this health consultation to the CACCCC, the Toxic Environment Affect Children's Health (TEACH) group, the Ocean County Health Department, and Manchester Township. Comments received from these entities and ATSDR's and NJDHSS' response to these comments are provided in this Health Consultation.

The Plan indicates that three zones of air monitoring, *i.e.*, the work area, the near field area (about 100 yards away), and the site perimeter (a minimum of 300 yards away), will be established for each of seven on-site source areas. The approximately 32,000 drums in the Drum Disposal Area (DDA) will be removed during the first two years of source area remedial actions. Excavation will take place intermittently, but will be conducted, for the first two years, simultaneously at the DDA and one of the other source areas that will be excavated over a period of approximately six years.

The Plan proposes to monitor ambient air for total volatile organic chemicals (TVOCs), particulate matter, and specific site-related chemicals of concern (COCs). The COCs include nine site-wide and five source-area specific COCs that may be released during remedial activities. In each of the three zones of action, the Plan proposes "immediate" and "short-term" action levels for each COC. In addition, "long-term" action levels are proposed for the perimeter zone. Moreover, chemical-specific monitoring will be initiated using TVOC trigger levels established for each zone and, as necessary, response actions. The Plan indicates that monitoring will take place continuously in the work and near field zones during periods of excavation and drum removal. Ambient air will also be monitored continuously at six fixed and one mobile locations along the perimeter of the site property.

Based on the review of available information and the proposed Plan, ATSDR and NJDHSS conclude that:

(1) Establishment of three zones of action, *i.e.*, work, near field, and perimeter, should be able to characterize airborne contaminants that may be emitted during remedial activities. Therefore, the proposed monitoring of COCs in these areas should adequately protect the health of workers and the public. No long-term action levels (LTALs) are necessary for the work or near field zones;

(2) Monitoring for nine site-wide and five source area-specific COCs should provide sufficient data to characterize the type and concentrations of potential airborne emissions;

(3) Installation and operation of six stationary monitoring stations (and one mobile station) along the perimeter should be sufficient to determine the potential exposure to, and thereby protect the health of, the public near the CGC property. Even though the perimeter monitoring stations will be located on CGC property (to help protect them from vandalism), they are considered to be exposure point monitors. Consequently, the continuous monitoring data that will be gathered from the stationary and mobile stations should provide sufficient information to characterize the potential exposure to the nearest off-site populations;

(4) After evaluating the action levels that are proposed in the Plan, NJDHSS and ATSDR concur that it is appropriate to utilize TVOC concentrations as the trigger levels to initiate contaminant-specific monitoring and, as necessary, response actions. Use of TVOC measurements will allow for quicker reaction and initiation of protective response actions, since identification and determination of the concentration of an individual COC requires a longer period of time than does a TVOC measurement. The use of TVOC as a trigger helps to expedite the response actions because the TVOC instruments can provide immediate readings;

(5) The Plan calls for contaminant-specific monitoring to be implemented when the TVOC trigger level is exceeded. However, in practice, contaminant-specific monitoring will be initiated before the TVOC trigger level is exceeded. Determining the identities of the individual VOCs before the TVOC trigger level is exceeded will provide an extra measure of protection for the workers and the community;

(6) NJDHSS and ATSDR have evaluated the proposed work zone and near-field action levels, and concur that they should be protective of on-site workers. These action levels should also be sufficient to determine the need to stop work and take appropriate measures to reduce the potential for COCs to exceed action levels at the perimeter;

(7) NJDHSS and ATSDR have reviewed the assumptions that were made in deriving the action levels. Most of these assumptions should be protective of public health. However, off-gassing of COCs could occur (1) during periods when excavation is not occurring, but has not been completed in a particular area, and (2) from soils brought outside for final bio-remediation. In

addition, based on the proposed schedule for remediation, activities are likely to take place during essentially every available work day for two years. Therefore, the assumption of the frequency of exposure (i.e., number of days exposed) used to derive the actions levels may be exceeded;

(8) NJDHSS and ATSDR concur with the Plan that periodic confirmatory monitoring for lead and mercury will be necessary to confirm that particulate matter action levels are protective for exposure to these metals. Moreover, NJDHSS and ATSDR believe that confirmatory monitoring for lead and mercury should be conducted if any of the particulate matter action levels are exceeded. That is, confirmatory monitoring is needed to ensure that concentrations of mercury and lead do not exceed their individual action levels. If appropriate confirmatory monitoring is performed, then the proposed action levels for particulate matter should be protective of public health;

(9) While site data indicate that lead and mercury are the most likely particle-bound air contaminants, NJDHSS and ATSDR believe that it is a prudent public health measure to perform additional particle analysis for the full spectrum of potential particle-bound contaminants; and,

(10) An odor may be the first indication to nearby residents that COC's or other compounds from the source areas are in the ambient air. However, it is important to note that the presence of an odor does not necessarily indicate that there is a public health concern.

Overall, the proposed Plan and other actions that will be taken by EPA should to be protective of public health, provided that certain additional measures are taken (see Recommendations below). To adequately address community health concerns and to protect the public health during remedial activities at the on-site source areas, NJDHSS and ATSDR recommend the following:

(1) The perimeter LTALs should be re-evaluated periodically when soil excavation, bio-remediation and drum removal has begun, to determine if any of the exposure assumptions used in their development have been exceeded. If any of the assumptions are exceeded, then the LTALs should be reconsidered and lowered if warranted;

(2) If any of the action levels for particulates are exceeded while excavating the Backfill Lagoon and Filtercake Disposal Areas, particle analyses should be conducted for airborne lead and mercury, respectively;

(3) Additional analysis for the full spectrum of potential particle-bound air contaminants should be conducted. Moreover, these analyses should be conducted especially on days when the nearest receptor population is downwind of an area being excavated (e.g., analyze particles from monitors along Cardinal Drive when excavating the Filtercake Disposal Area).

(4) The Plan, and its associated response actions, should be exercised on-site, prior to the initiation of remedial activities, under different scenarios, e.g., during work and non-work hours, prior to the initiation of remedial activities to properly train monitoring and response personnel;

(5) A method for providing up-to-date information and status regarding excavation activities, as well as procedures to address inquiries from the public; should be established;

(6) Additional on-site security measures should be taken during remediation to reduce the potential for trespassers to be exposed to the on-site excavation areas and emissions and to help protect the integrity of the air monitoring equipment; and,

(7) ATSDR should evaluate the Health and Safety Plan when it becomes available.

The EPA will implement the above ATSDR and NJDHSS recommendations 1-6. The ATSDR will follow-up on recommendation number 7.

## Purpose and Statement of Health Issues

The U.S. Environmental Protection Agency (EPA) Region II and the Citizen's Action Committee on the Childhood Cancer Cluster (CACCCC) requested that the Agency for Toxic Substances and Disease Registry (ATSDR) evaluate the public health implications of the proposed Air Monitoring Plan (the "Plan") that is described in Appendix A of the Preliminary Design Report for Operable Unit 2 of the Ciba-Geigy Chemical Corporation (CGC) Superfund site, located in Dover Township (Ocean County), New Jersey (Ciba, 2002a). This Health Consultation is being prepared by the New Jersey Department of Health and Senior Services (NJDHSS) under a cooperative agreement with ATSDR.

The Plan contains a description of the methodology and subsequent actions proposed for monitoring on-site ambient air during remedial actions that will take place on the property of the Ciba-Geigy Superfund site. Remedial actions that will be conducted during a period of approximately six years include the removal of approximately 32,000 drums of waste that contain primarily organic contaminants, and the excavation and bio-treatment of approximately 150,000 cubic yards of soil from seven contaminated on-site source areas (Ciba, 2002a).

This Health Consultation evaluates the effectiveness of the Plan in protecting the public from harmful exposure to volatile, semi-volatile, and inorganic contaminants, *i.e.*, metals, that may be released to the ambient air during remedial activities. It examines a single exposure pathway, *i.e.*, the potential for inhalation by site workers and the nearby public, of exposure to chemicals of concern (COCs) that may be volatilized and/or entrained in dusts that may be released to the ambient air during source area remediation activities. This pathway is the most likely source of potential exposure to the public during the planned source area remediation activities. The chemicals of concern that are considered in this Health Consultation are limited to the volatile (and semi-volatile) compounds that may be released into the ambient air during remedial actions. Inhalation of non-volatile materials, *i.e.*, heavy metals and numerous organic dyes and associated reagents and intermediates, are not considered here, except as they may be potentially entrained in dust that is released to the atmosphere. In addition, as requested by EPA Region II, this document evaluates the action levels that have been proposed for each COC in each zone of action to determine whether they are protective of the public health. Moreover, this Health Consultation is a culmination of a review of various drafts of the Plan and numerous discussions with EPA regarding the proposed air action levels and other aspects of the air monitoring plan. During the course of these reviews and discussions, several recommendations were put forth by ATSDR and the NJDHSS that have been addressed by EPA and incorporated into the Plan. These changes are reflected in this Health Consultation. Moreover, ATSDR and NJDHSS provided a draft copy of this health consultation to the CACCCC, the Toxic Environment Affect Children's Health (TEACH) group, the Ocean County Health Department, and Manchester Township. Comments received from these entities and ATSDR's and NJDHSS' response to these comments are provided in Appendix A.

## **Background**

### **Demography and Land Use**

The Ciba-Geigy Chemical Corporation (CGC) site (EPA Facility ID: NJD001502517) is located near State Route 37 in the West Dover section of Dover Township (Ocean County), New Jersey, approximately 1 mile west of the Garden State Parkway, and 3 miles west of the business district of the Toms River section of Dover Township (see Figure 1). The Toms River forms the northeastern boundary of the CGC site. Winding River Park, an outdoor recreational area located within the flood plain of the Toms River, adjoins the site on the east and northeast. To the east of the Toms River is the Coulter Street/Whitesville Road residential area. The Cardinal Drive/Oak Ridge Parkway residential area adjoins the southeast border of the site along the west bank of the Toms River. A residential area, Pine Lake Park Estates (Manchester Township), borders the northwestern boundary of the site. Additional residential and commercial properties border the site on the south and southwest along State Route 37 (NUS, 1988; Ciba, 1999). West Dover Elementary School is located adjacent to the fence line at the southeast corner of the site.

The Ciba-Geigy Chemical Corporation (formerly Toms River Chemical Company, and now renamed Ciba Specialty Chemicals, aka Ciba) owned and operated a chemical manufacturing plant (the Toms River Plant) on the property beginning in 1952. The property consists of approximately 1,402 acres, of which 320 acres had been developed. The site boundaries currently encompass 1,359 acres. Approximately 43 acres (previously known as Tract 2), located east of the main site along Oak Ridge Parkway, were donated to Dover Township in 1959, and now comprise Winding River Park. The (now demolished) former production area, wastewater treatment plant, power plant, and administrative buildings areas occupied approximately 100 acres while the plant operated. Various disposal areas and a landfill encompass approximately 220 acres. The remaining approximately 1,000 acres are undeveloped pine forest and wetlands. Except for the areas of the site that border the Toms River, the entire CGC site is fenced, with a controlled entrance from Oak Ridge Parkway on the eastern side of the site.

### **Site History**

Beginning in 1952, the Toms River Plant produced anthraquinone-based dyes and intermediate dye products. Starting in 1959, the plant also manufactured azo dyes and their intermediates, epoxy resins, and other specialty chemicals. During peak operations, the facility had a daily production capacity of about 220,000 pounds of dyestuff and intermediates, and approximately 105,000 pounds of epoxy resins (NUS, 1988). Production of anthraquinone-based dyes ended in 1983, and azo dye production ended in 1988; epoxy resin manufacturing ended in 1990. Manufacturing operations at the plant ceased at the end of 1996 when dye standardization activities were terminated.

The manufacturing processes (estimated to be as many as 600 over more than 40 years) generated liquid and solid wastes. From about 1952 through 1977, solid and liquid process wastes were discarded in approximately twenty potential source areas located throughout CGC property. These source areas include an unlined disposal landfill containing approximately 32,000 drums, a 12-acre filtercake disposal area, a 5-acre lime sludge disposal area, a 40-acre borrow/compactor area, and numerous lagoons and basins associated with former wastewater treatment plants totaling approximately 30 acres. Several of the disposal areas were unlined. Solid wastes, including residues from manufacturing processes, were disposed of in bulk or in drums in several of the on-site source areas. Wastewater treatment sludge was stockpiled on top of a closed cell of the landfill (NUS, 1988; Ciba, 1999).

### **Summary of Previous Health Assessment Activity**

Since 1988, ATSDR and NJDHSS have performed several public health evaluations of the Ciba-Geigy Corporation Superfund site. The most recent were conducted in conjunction with the NJDHSS/ATSDR Public Health Response Plan (PHRP) that was created to address health issues associated with the Ciba-Geigy site and other sites and issues that were related to the overall Dover Township Childhood Cancer Investigation (NJDOH and ATSDR, 1996). Based on the PHRP, a series of evaluations (see NJDHSS and ATSDR, 2001a,b, and c and references therein) were performed by the NJDHSS, under cooperative agreement with ATSDR, to evaluate the public health implications of the Ciba-Geigy site.

At the request of the Citizen's Action Committee on Childhood Cancer Cluster (CACCCC), ATSDR completed a Health Consultation (ATSDR, 2000) that evaluated the Selected Remedy that was presented in the Record of Decision (ROD) for remediating CGC on-site source areas, *i.e.*, Operable Unit 2 (OU2) (EPA, 2000). ATSDR concluded that the Selected Remedy would be protective of public health over the long term, provided that appropriate precautions, including monitoring of ambient air, were taken to protect workers and the public from airborne contaminants that might be released during remedial activities at the source areas.

### **Site Visit**

On May 22, 2002, a site visit was conducted at the CGC site by NJDHSS, ATSDR, and EPA Region II personnel. The CGC (now Ciba Specialty Chemicals) site is currently occupied by remedial operations personnel only. There was evidence of trespassing as a result of vandalism, specifically, sections of the perimeter fence had been cut open in several locations along the northern boundary of the site.

## Discussion

During more than forty years of operation, several hundred chemical compounds were used or manufactured and disposed of at the CGC site. Initially, attention was focused on characterizing and remediating contaminants that were found in the ground water beneath the site (NUS, 1988). Attention then turned to characterizing and remediating contaminated soils in on-site source areas, *i.e.*, OU2 (CDM, 1993).

### Characterization of, and the Selected Remedy for, On-site Source Areas

Figure 2 shows the locations of the approximately twenty potential on-site source areas that contain elevated concentrations of VOCs, SVOCs, and metals that are described in detail in the Feasibility Study (FS) for Operable Unit 2 (OU2) (Ciba, 1999). Through this FS process, EPA determined that seven of the twenty potential source areas would undergo remedial/removal actions that would require soil excavation or drum removal (Figure 3).

The purpose of the FS was to evaluate potential alternatives that would enable the selection of a remedy for each of the potential source areas which would be protective of human health and the environment, as well as facilitate the remedial goal of groundwater restoration. Seven alternatives for potential remedial actions were proposed for consideration. The alternatives ranged from no action to the excavation and removal of all contaminated materials. Other options that were considered included natural attenuation with monitoring, containment, *ex situ* thermal treatment, *in/ex situ* bio-remediation, and a combination of the various remedial methods. The remediation strategy that was selected by the EPA is a combination of removal and bio-remediation activities. It was determined that approximately 150,000 cubic yards of contaminated soil will be excavated and treated on site by bio-remediation, and that approximately 32,000 drums will be excavated, removed, and disposed off-site (see Table 1).

Nine site-wide and five source area-specific chemicals of concern (COCs) (see Table 1) were selected to monitor on-site contamination in the seven source areas. However, in addition to these specified COCs, several hundred organic dyes, resins, and their reagents and by-products are known to be present in the surface and subsurface soils of the source areas (CDM, 1994). Many unidentified chemicals (*aka* tentatively identified compounds, *i.e.*, TICs) were also detected in samples taken from on-site soils (DS, 1997). Since most of the dyes and associated compounds that were used and manufactured by CGC are water-soluble, it is likely that they have been partitioned between the soils and ground water. However, the additional chemicals that have been identified in source areas do not have high vapor pressures, so they are not expected to volatilize when the source areas are excavated, and monitoring for these chemicals in the ambient air is not likely to be necessary. NJDHSS and ATSDR concur that the COCs that are specified in the FS and the Plan will adequately represent the compounds that may be released to the ambient air and/or included with dust that may be entrained during remedial activities.

## Characterization and Monitoring of Airborne Contaminants during Remedial Activities

As indicated in the Record of Decision (ROD) for OU2 (EPA, 2000), a combination of excavation of drums and bio-treatment of contaminated soils will be utilized to remediate seven on-site source areas. Approximately 32,000 drums will be excavated (at a rate of about 225 work days per year over the course of two years, equivalent to about 70 drums per day) from the Drum Disposal Area (DDA) and disposed off-site. In addition, about 150,000 cubic yards of contaminated soil will be excavated (at a rate of about 30 days per year for six years, equivalent to about 850 cubic yards per day) from the seven source areas and subsequently bio-remediated on-site. The treated soil will be returned to on-site property after remediation. The entire OU2 remedial action is expected to be completed in about eight years. Remedial activities will be conducted simultaneously at the DDA and one of the other areas until removal of the drums in the DDA is completed after about two years. Excavation and bio-remediation of the contaminated soils in the source areas will continue until remediation of the seven source areas is completed.

Since the potential exists for the release of VOCs and particulates to ambient air during remedial activities, the Plan proposes to establish three zones of action for each of the source areas (see Tables 1 and 2) that will be remediated. Under the Plan, ambient air will be monitored at: (1) the work zone; (2) the near-field zone, located approximately 300 feet from the excavation site; and (3) the site perimeter, located a minimum of about 900 feet or more from the excavation area. Stationary and mobile meteorological stations will be established to measure local weather conditions, especially wind direction and velocity, during remedial activities. The prevailing winds at the site have historically been primarily westerly, *i.e.*, from west to east. The Plan indicates that mobile air monitoring stations will be established at the work area and at near-field zone locations. Stationary monitoring stations will also be established at six locations along the site boundary, including the two that are located on the eastern perimeter adjacent to Cardinal Drive, and one near the West Dover Elementary School adjacent to the southern corner of the CGC property (see Figure 4). An additional mobile monitoring station will also be positioned along the perimeter during each day's excavation in order to measure COC concentrations in the downwind direction.

The Plan does not propose to perform any off-site monitoring of the ambient air during remedial activities. However, even though the perimeter monitoring stations will be located on CGC property (to help protect them from vandalism), they are considered to be exposure point monitors. Consequently, the continuous monitoring data that will be gathered from the stationary and mobile stations that are adjacent to the nearby residential areas should provide sufficient information to characterize the potential exposure to these off-site populations. Therefore, ATSDR and NJDHSS believe that the placement of the monitors to be protective of public health.

The concentrations of airborne particulate matter, *i.e.*, particulates with diameter less than 10 micrometers, *i.e.*, PM<sub>10</sub> (inhalable particles), will also be monitored during excavation activities. Two of the five source area-specific COCs, namely mercury and lead, could be entrained in dust that

will be released during remedial activities. Time-weighted air monitoring for lead and mercury will not be performed; however, PM<sub>10</sub> will be monitored on a continuous basis. Based on EPA guidance, the Plan provides a rationale that indicates that if the action levels for inhalable particles are not exceeded, then the individual action levels for lead and mercury will also not be exceeded. The Plan also calls for confirmatory monitoring for lead and mercury to make sure that action levels for mercury and lead are not exceeded and that the assumption that continuous monitoring for PM will be protective of public health. ATSDR and NJDHSS concur that periodic confirmatory monitoring is indicated to determine if the assumptions stated above are correct. Moreover, ATSDR and NJDHSS believe that confirmatory monitoring for lead and mercury should be conducted if any of the particulate matter action levels are exceeded. Such confirmatory monitoring is needed to ensure that concentrations of mercury and lead do not exceed action levels. In addition, while site data indicate that lead and mercury are the most likely particle-bound air contaminants, NJDHSS and ATSDR believe that it is a prudent public health measure to perform additional particle analysis for the full spectrum of potential particle-bound contaminants.

The description of EPA's Selected Remedy in the ROD for OU2 (EPA,2000) indicates that excavated soil (about 4,000 cubic yards at a time) will initially be placed in the primary treatment area, *i.e.*, a building which will be constructed near the Equalization Basins, where volatile organic chemicals in the soil will be biologically treated. The air in the building will be monitored while soils are inside, and air emissions from the building will be treated and be required to meet permitted standards set by the New Jersey Department of Environmental Protection (NJDEP) under the provisions of New Jersey Administrative Code (NJAC) 7:27-16 (Control and Prohibition of Air Pollution by Volatile Organic Compounds). After a period estimated to be about two months, the soil will be moved to an outdoor (secondary treatment) area, where bio-remediation will continue. However, before the soils are moved outdoors, acceptable soil concentrations of the COCs must be achieved. These levels will be set to insure that the action levels will not be exceeded in the ambient air around the secondary treatment area. To confirm that the emissions are acceptable, near-field monitoring will be conducted for several days after treated soil is brought outdoors (EPA, 2002).

### **Zones of Action and Exposure Duration**

The Plan indicates that airborne emissions will be monitored in the three zones of action for three different potential exposure durations (see Table 2). NJDHSS and ATSDR concur that the proposed monitoring of the three zones of action for "immediate", "short-term", and "long-term" exposure should characterize the potential exposure to workers and the community due to emissions from the source areas. The exposure duration categories are defined in terms of the monitoring instrument that will be utilized to measure VOCs: (1) "immediate" exposure (ppbRae<sup>TM</sup>- continuous monitoring - about 1 minute response time); (2) "short-term" exposure (ppbRae<sup>TM</sup> and SRI Instruments Gas Chromatograph—for measurement of individual VOCs—up to about 30 minutes response time); and (3) "long-term" exposure (sampling with SUMMA® canisters - 8 hours mobile,

or 24 hours fixed). Confirmatory sampling for VOCs will be accomplished using SUMMA® canisters, which will take an estimated 2 to 3 days to analyze.

Source area remedial actions at CGC include about thirty separate excavation days per year at the source areas for six years (a total of about 180 excavation days), for a total of about 150,000 cubic yards. The excavations will be conducted in conjunction with about 225 drum removal events per year (a total of about 32,000 drums) that will be conducted at the DDA over a period of two years (a total of about 450 excavation days). However, off-gassing of COCs could occur during periods when excavation in a particular area is not occurring, but has not been completed, and when contaminated soils are brought outside for final bio-remediation. As a result, remedial activities are likely to take place during essentially every available work day. Therefore, emissions of COCs potentially could occur at any time while soil excavation, drum removal, and bio-remediation are occurring.

### **Capabilities of Air Monitoring Equipment**

Several instruments will be used to monitor the ambient air in the three zones of action. Table 2 summarizes the monitoring equipment, the time duration of measurement for each type of monitoring equipment, and the Minimum Detection Level (MDL) for each instrument. VOCs will initially be monitored using the ppbRae™ portable monitor, which measures Total VOCs (TVOCs) continuously, and has a MDL of 1 ppb. The ppbRae™ utilizes a 10.6 eV photoionization source.

The SRI Instruments Gas Chromatograph (GC) will be used to determine the ambient air concentrations of individual VOCs. In order to detect all COCs, this instrument is configured with three separate detectors. The sampling/analysis will take up to 30 minutes, and the range of MDLs vary from 20 ppb to 100 ppb according to the individual compound.

SUMMA® canisters will be used to provide confirmatory measurement of the concentrations of VOCs. Ambient air will be collected in a canister for about 8 to 24 hours. Analytical results will be available in about 2 to 3 days. The MDLs for the different VOCs range from about 0.2 to 1  $\mu\text{g}/\text{m}^3$ .

The Plan also indicates that three different instruments will be used to measure particulates in ambient air, specifically: (1) the Casella Cel MicroDust Pro™, a semi-portable instrument that provides continuous monitoring of Total Suspended Particulates (TSP) with a MDL of 1  $\mu\text{g}/\text{m}^3$ ; (2) the Mie DataRAM Real-Time Aerosol Monitor™, a fixed instrument with a readout every minute that is reported as a 5 minute average, that can determine both TSP and  $\text{PM}_{10}$  fractions, with a MDL of 0.1  $\mu\text{g}/\text{m}^3$ ; and (3) the TEOM® Series 1400a Ambient Particulate Monitor, a fixed station, confirmatory instrument that can be utilized to characterize TSP, or  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ , or  $\text{PM}_1$  fraction concentrations in real time. The TEOM-collected dust can also be used for confirmatory analysis for lead and mercury.

## Concept of Monitoring, Action Levels, and Response Actions for VOCs

According to the Plan, the results of monitoring for TVOCs with the ppbRae™ (and TVOCs or individual VOCs with the SRI Instruments GC) will, depending on the location, measured concentration and exposure duration, trigger a variety of response actions by on- and off-site officials (including Ciba, EPA, local police, EMS, hazardous materials (hazmat), and NJDEP emergency response personnel) that range from notification of on- and off-site officials to activation and deployment of hazmat responders. Since previous sampling has shown no evidence that any pure product, *i.e.*, non-aqueous phase liquid (NAPL), is present in identified source areas (Ciba, 1999), it does not seem likely that high concentrations of COCs will be released during excavation activities. However, if the "immediate" action level in any of the zones of action is exceeded, work will be stopped, emission control procedures will be initiated, and hazmat officials will be notified. Also, if a "short-term" action level is exceeded in any zone of action, actions will be taken to reduce emissions and upgrade worker protection. Hazmat officials will be notified after emissions are controlled. "Long-term" action levels (LTAL) have been determined for the site perimeter only, and if the LTAL is exceeded, the remediation methodology and procedures will be re-evaluated. Further details regarding emergency response actions can be found in the Draft Emergency Management Plan (Ciba, 2002b) and the Health and Safety Plan, when available.

The Plan calls for contaminant-specific air monitoring to be implemented when a TVOC trigger level (see Table 3) is exceeded. However, in practice, contaminant-specific monitoring will be initiated before the TVOC action level is exceeded (Ciba, 2002a). A possible scenario for potential exposure and prescribed response actions in the work zone is as follows. Normal TVOC background on the CGC site, as measured by the ppbRae™, was stated by Ciba personnel to be as high as about 15 ppb. If a ppbRae™ measured an increase from the background level towards the 1 ppm TVOC action level for a period of five minutes in the work zone, this would trigger use of the SRI Instruments GC in order to determine the identities of the VOCs. Identification and measurement of individual VOCs with the SRI Instruments GC would require about 20-30 minutes (possibly longer depending on the COC and its concentration). If the TVOC reading exceeded 1 ppm during that time, work would be stopped and emission control procedures would be initiated. Work would not resume until confirmation that all COCs were below their respective action levels.

Based on this anticipated scenario, NJDHSS and ATSDR concur with the Plan that the most expedient method of protecting the public health is to utilize operational trigger levels that are expressed in terms of TVOC concentration, rather than concentrations of individual COCs. As discussed in the Plan, if a ppbRae™ measurement exceeds the TVOC trigger level for a period of five minutes, response actions, *e.g.*, work stoppage, emission controls, increasing the level of personal protection, etc., will be initiated immediately, while the identity and concentration of individual VOCs are being determined by the SRI Instruments GC. Determining the identity of the individual VOCs before the TVOC action level is exceeded will provide an extra measure of protection to the workers and the community.

## Action Levels for VOCs in the Work and Near Field Zones

Action levels have been established for the work and near field zones primarily to protect site workers, but also to help determine the need to stop work and take appropriate measures to reduce the potential for the concentrations of COCs to reach levels of health concern at the perimeter and in the nearby residential areas.

Table 3 summarizes the proposed work zone and near field action levels for “immediate” and “short-term” duration exposure to each of the COCs. Nitrobenzene has the lowest published occupational exposure guidance concentration of the twelve VOCs, *i.e.*, an eight hour duration time-weighted average of 1 ppm, so it was designated in the Plan as the short-term trigger level concentration for real time monitoring for TVOCs at the work or near field zones. As previously stated, the Plan indicates that, if this TVOC concentration is approached, compound-specific monitoring will be utilized to verify that each contaminant present is below its respective action level. For example, the proposed action level for short-term exposure to nitrobenzene in the work zone is 1 ppm. If necessary, actions will be taken to reduce emissions and upgrade worker personal protective equipment.

NJDHSS and ATSDR have evaluated the proposed work zone and near-field action levels and concur that they should be protective for on-site workers. The TVOC trigger levels should be able to determine the need to stop work and to take appropriate measures, as necessary, to reduce the potential for COCs to exceed action levels at the perimeter.

## Action Levels for VOCs at the Site Perimeter

Perimeter action levels are specifically designed to protect the community from harmful exposures. As with the work and near field zones, the Plan presents proposed Action Levels for VOCs at the site perimeter. The “immediate” and “short-term” action levels for VOCs that are proposed for the site perimeter are summarized in Table 3. For example, the “immediate” action level for nitrobenzene at the perimeter is given as 20 ppm, *i.e.*, 10% of the IDLH, and the “short-term” action level for nitrobenzene at the perimeter is given as 0.1 ppm (100 ppb), *i.e.*, 10 % of the ACGIH Threshold Limit Value Time Weighted Average (TLV-TWA).

The proposed “long-term” action levels (LTAL) for the COCs at the site perimeter are summarized in Table 4. The LTALs were derived by modifying the EPA Reference Concentration (RfC), or Risk-Specific Dose (RSD) for carcinogens, for each of the COCs by an exposure frequency factor that is based on the expected number of days of excavation. The LTALs contain several conservative assumptions, as follow: 1) 24-hour a day exposure is assumed at the perimeter during excavation activities, 2) chemicals are assumed to be present 24-hours per day instead of just the 8-hours of excavation activities on any given day; and 3) although exposure to many of the COCs would only occur on an occasional basis, it is assumed that potential exposures are consecutive (Ciba, 2002a). NJDHSS and ATSDR have reviewed these assumptions and believe that they are

protective of public health. However, the assumption of the frequency of exposure (i.e., number of days potentially exposed), a major factor in determining the long-term action levels, has the potential to be violated. Therefore, the NJDHSS and ATSDR believe that the perimeter LTALs should be re-evaluated periodically once the excavations, bio-remediation and drum removal have begun, to determine if the frequency of exposure assumption, or any of the exposure assumptions used in the development of these LTALs, should be reconsidered, and if lowering the current LTALs is warranted.

It should be noted that the odors of the VOCs that could be emitted during remediation activities may be an earlier indicator of their presence than air monitoring equipment. The human nose is, in some cases, more sensitive than available instruments, so it is possible that some people may smell the COCs at concentrations that are below the action levels. As noted in Table 5, the odor thresholds for several of the COCs are less than 1 ppm, including nitrobenzene, 2-chlorotoluene, 1,2-dichlorobenzene, and naphthalene. The odor could provide an indication to nearby residents that COC's from the source area are in the ambient air. In addition, odors from other compounds that are not COCs may also be detected during remediation. However, it is important to note that the presence of an odor does not necessarily indicate that there is a public health concern.

### **Action Levels for Particulates**

Since dust may be generated as a result of the excavation activities, the Plan proposes to monitor the concentration of particulates in ambient air in each of the three zones of action. The concentrations of airborne particulates will be measured with several different instruments that are capable of determining the concentration (and, if desired, the size distribution) of the particles with varying detection limits. The Plan indicates that there is no "immediate" action level for particulates in any zone of action. However, "short-term" action levels have been proposed for each zone, and a "long-term" action level has been designated for the site perimeter (see Table 6). The long-term perimeter action levels are based on the National Ambient Air Quality Standards (NAAQS) of 150  $\mu\text{g}/\text{m}^3$  (24-hour average) and 50  $\mu\text{g}/\text{m}^3$  (annual average). The short-term action level is based on the OSHA 8-hour occupational exposure standards for particulates of 15  $\text{mg}/\text{m}^3$  (total dust) or 5  $\text{mg}/\text{m}^3$  (respirable fraction). The Plan proposes that work stoppage and/or dust minimization actions be initiated if any of the short-term action levels are exceeded.

Heavy metals have been designated as source area-specific contaminants in two areas, including lead in the Backfill Lagoon Area, and mercury in the Filtercake Disposal Area. As previously indicated, NJDHSS and ATSDR concur with the Plan that, if any of the particulate matter action levels are exceeded, confirmatory monitoring for lead and mercury should be conducted to determine if the particulate matter action levels are protective for exposure to these metals. That is, confirmatory monitoring is needed to ensure that the concentrations of mercury and lead do not exceed their individual action levels. If appropriate confirmatory monitoring is performed, then the proposed action levels for particulate matter should be protective of public health. In addition, while site data indicate that lead and mercury are the most likely particle-bound air contaminants, NJDHSS

and ATSDR believe that it is a prudent public health measure to perform additional particle analysis for the full spectrum of potential particle-bound contaminants.

### **Summary of NJDHSS and ATSDR Evaluation of Proposed Action Levels**

After evaluating the action levels that are proposed in the Plan, NJDHSS and ATSDR concur with the Plan that it is appropriate to utilize TVOC concentrations as the trigger levels that would initiate contaminant-specific monitoring and, as necessary, response actions. Use of TVOC measurements will allow for quicker reaction and initiation of protective response actions, since identification and determination of the concentration of an individual COC requires a longer period of time than does a TVOC measurement. Since each source area contains a mixture of COCs and other contaminants, it is probable that a mixture of chemicals will volatilize during (and after) excavation activities. A measurement of TVOC concentration will include all of the compounds that are present in ambient air. The TVOC short-term trigger levels that were proposed by Ciba are summarized in Table 3. However, as previously indicated, NJDHSS and ATSDR believe that the perimeter VOC-specific LTALs should be re-evaluated periodically when the soil excavations, bio-remediation, and drum removal have begun to determine if any of the exposure assumptions that were used to derive the perimeter LTALs are exceeded. If it is determined that any of the assumptions have been exceeded (e.g., frequency of exposure), then consideration should be given to lowering the proposed LTALs.

The use of TVOC measurements as trigger levels will simplify and help expedite response actions by relying on several key values instead of many chemical-specific ones. As the Plan is quite complex, the action levels and associated response actions should be practiced on-site, prior to initiation of remedial activities, under different scenarios, e.g., during work and non-work hours, prior to the initiation of remedial activities to properly train monitoring and response personnel.

### **Conclusions**

The NJDHSS and the ATSDR have reviewed the proposed the Plan for monitoring of on-site ambient air during remedial activities that include excavating soils, bio-remediation, and drum removal. ATSDR's and NJDHSS' evaluation is a culmination of a review of various drafts of Ciba's air monitoring plan and numerous discussions with EPA regarding the proposed air action levels and other aspects of the air monitoring plan. During the course of these reviews and discussions, several recommendations were put forth by ATSDR and the NJDHSS that have been addressed by EPA and incorporated into the Plan. Moreover, ATSDR and NJDHSS provided a draft copy of this health consultation to the CACCCC, the Toxic Environment Affect Children's Health (TEACH) group, the Ocean County Health Department, and Manchester Township. Comments received from these entities and ATSDR's and NJDHSS' response to these comments are provided in this Health Consultation.

Overall, the proposed plan and other actions that will be taken by EPA should be protective of public health provided that certain additional measures are taken (see Recommendations below). Based on the review of available information and the proposed plan, ATSDR and NJDHSS conclude that:

(1) Establishment of three zones of action, *i.e.*, work, near field, and perimeter, should be able to characterize airborne contaminants that may be emitted during remedial activities. Therefore, the proposed monitoring of COCs in these areas should adequately protect the health of workers and the public. No long-term action levels (LTALs) are necessary for the work or near field zones;

(2) Monitoring for nine site-wide and five source area-specific COCs should provide sufficient data to characterize the type and concentrations of potential airborne emissions;

(3) Installation and operation of six stationary monitoring stations (and one mobile station) along the perimeter should be sufficient to determine the potential exposure to, and thereby protect the health of, the public near the CGC property. Even though the perimeter monitoring stations will be located on CGC property (to help protect them from vandalism), they are considered to be exposure point monitors. Consequently, the continuous monitoring data that will be gathered from the stationary and mobile stations should provide sufficient information to characterize the potential exposure to the nearest off-site populations;

(4) After evaluating the action levels that are proposed in the Plan, NJDHSS and ATSDR concur that it is appropriate to utilize TVOC concentrations as the trigger levels to initiate contaminant-specific monitoring and, as necessary, response actions. Use of TVOC measurements will allow for quicker reaction and initiation of protective response actions, since identification and determination of the concentration of an individual COC requires a longer period of time than does a TVOC measurement. The use of TVOC as a trigger helps to expedite the response actions because the TVOC instruments can provide immediate readings;

(5) The Plan calls for contaminant-specific monitoring to be implemented when the TVOC trigger level is exceeded. However, in practice, contaminant-specific monitoring will be initiated before the TVOC trigger level is exceeded. Determining the identities of the individual VOCs before the TVOC trigger level is exceeded will provide an extra measure of protection for the workers and the community;

(6) NJDHSS and ATSDR have evaluated the proposed work zone and near-field action levels, and concur that they should be protective of on-site workers. These action levels should also be sufficient to determine the need to stop work and take appropriate measures to reduce the potential for COCs to exceed action levels at the perimeter;

(7) NJDHSS and ATSDR have reviewed the assumptions that were made in deriving the action levels. Most of these assumptions should be protective of public health. However, off-gassing of COCs could occur (1) during periods when excavation is not occurring, but has not been

completed in a particular area, and (2) from soils brought outside for final bio-remediation. In addition, based on the proposed schedule for remediation, activities are likely to take place during essentially every available work day for two years. Therefore, the assumption of the frequency of exposure (i.e., number of days exposed) used to derive the actions levels may be exceeded;

(8) NJDHSS and ATSDR concur with the Plan that periodic confirmatory monitoring for lead and mercury will be necessary to confirm that particulate matter action levels are protective for exposure to these metals. Moreover, NJDHSS and ATSDR believe that confirmatory monitoring for lead and mercury should be conducted if any of the particulate matter action levels are exceeded. That is, confirmatory monitoring is needed to ensure that concentrations of mercury and lead do not exceed their individual action levels. If appropriate confirmatory monitoring is performed, then the proposed action levels for particulate matter should be protective of public health;

(9) While site data indicate that lead and mercury are the most likely particle-bound air contaminants, NJDHSS and ATSDR believe that it is a prudent public health measure to perform additional particle analysis for the full spectrum of potential particle-bound contaminants; and,

(10) An odor may be the first indication to nearby residents that COC's or other compounds from the source areas are in the ambient air. However, it is important to note that the presence of an odor does not necessarily indicate that there is a public health concern.

### **Recommendations**

To adequately address community health concerns and to protect the public health during remedial activities at the on-site source areas, NJDHSS and ATSDR recommend the following:

(1) The perimeter LTALs should be re-evaluated periodically when soil excavation, bio-remediation and drum removal has begun, to determine if any of the exposure assumptions used in their development have been exceeded. If any of the assumptions are exceeded, then the LTALs should be reconsidered and lowered if warranted;

(2) If any of the action levels for particulates are exceeded while excavating the Backfill Lagoon and Filtercake Disposal Areas, particle analyses should be conducted for airborne lead and mercury, respectively;

(3) Additional analysis for the full spectrum of potential particle-bound air contaminants should be conducted. Moreover, these analyses should be conducted especially on days when the nearest receptor population is downwind of an area being excavated (e.g., analyze particles from monitors along Cardinal Drive when excavating the Filtercake Disposal Area).

(4) The Plan, and its associated response actions, should be exercised on-site, prior to the initiation of remedial activities, under different scenarios, *e.g.*, during work and non-work hours, prior to the initiation of remedial activities to properly train monitoring and response personnel;

(5) A method for providing up-to-date information and status regarding excavation activities, as well as procedures to address inquiries from the public, should be established;

(6) Additional on-site security measures should be taken during remediation to reduce the potential for trespassers to be exposed to the on-site excavation areas and emissions and to help protect the integrity of the air monitoring equipment; and,

(7) ATSDR should evaluate the Health and Safety Plan when it becomes available.

The EPA will implement the above ATSDR and NJDHSS recommendations 1-6. The ATSDR will follow-up on recommendation number 7.

## Certification

This Health Consultation was prepared by the New Jersey Department of Health and Senior Services (NJDHSS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It has been produced in accordance with approved methodology and procedures existing at the time the Health Consultation was begun.



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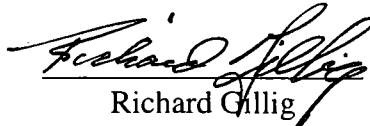
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The Division of Health Assessment and Consultation, ATSDR, has reviewed this Health Consultation and concurs with its findings.



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**Tables**

**Table 1. Summary of Chemicals of Concern and Source Areas (Ciba, 1999)**

Source Area	Site-wide COCs	Source Area Specific Contaminants	Excavation Volume (cu. yds.)
Drum Disposal Area (DDA)	TCB, DCB, CB, NAP, NB, PCE, TCE	TOL, MEK, MIBK	63,900 plus 32,000 drums
Filtercake Disposal Area (FCD)	TCB, DCB, CB	Mercury	24,900
East and West Equalization Basins (EB)	TCB, DCB, 2CT, CB, NB	NONE	21,500
Backfilled Lagoon Area (BLA) Northern and Southern Drying Lagoons	TCB, 2CT, NAP, TCP	Lead	25,000
Former South Dye Area (SDA)	TCB, DCB, 2CT, TCP	NONE	10,900
Former Building 108 Underground Storage Tank Area (FB108)	TCB	NONE	400
Borrow Compactor Area (BCA)	TCB, DCB, CB, NAP, TCE	NONE	800

COC - Chemical of Concern  
 CB - Chlorobenzene  
 2CT - 2-Chlorotoluene  
 DCB, 1,2-Dichlorobenzene  
 NAP - Naphthalene  
 NB - Nitrobenzene  
 PCE - Perchloroethylene  
 TCB - 1,2,4-Trichlorobenzene  
 TCE - Trichloroethylene  
 TCP - 1,2,3-Trichloropropane  
 MEK - Methyl ethyl ketone  
 MIBK - Methyl isobutyl ketone  
 TOL - Toluene

**Table 2. Summary of Proposed Monitoring Instruments (Ciba, 2002)**

<b>Zone of Action (distance)</b>	<b>Instrument</b>	<b>Response Time</b>	<b>MDL</b>
Work Zone	<u>VOCs</u> ppbRae (TVOC) SRI Instruments GC (VOC specific)	Continuous Up to 30 min	1 ppb 20-100 ppb
	<u>Particulates</u> Casella (TSP)	Continuous	1µg/m <sup>3</sup>
Near field (100 yds)	<u>VOCs</u> ppbRae (TVOC) SRI Instruments GC (VOC specific)	Continuous Up to 30 min	1 ppb 20-100 ppb
	<u>Particulates</u> Casella (TSP)	Continuous	1µg/m <sup>3</sup>
Perimeter (Minimum 300 yds)	<u>VOCs</u> ppbRae (TVOC) SRI Instruments GC (VOC specific) SUMMA canister (mobile)(VOC specific)	Continuous Up to 30 min 8 hr sample	1 ppb 20-100 ppb 0.2-1µg/m <sup>3</sup>
	<u>Particulates</u> Casella (TSP) Mie Dataram (TSP, PM <sub>10</sub> ) TEOM (TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , metals)	Continuous 5 min avg 1 hr avg	1µg/m <sup>3</sup> 0.1µg/m <sup>3</sup> -----

GC - Gas Chromatograph

VOC - Volatile Organic Compound

TVOC - Total Volatile Organic Compounds

MDL - Minimum Detection Level

TSP - Total Suspended Particulates

PM<sub>10</sub> - Particulate matter less than 10 micrometers in diameter

PM<sub>2.5</sub> - Particulate matter less than 2.5 micrometers in diameter

--- Not indicated

**Table 3. Proposed Immediate and Short Term Trigger Levels for Total Volatile Organic Chemicals (TVOCs) and Action Levels for Specific Volatile Organic Chemicals of Concern (COCs), in parts per million (ppm). (Ciba, 2002a)**

Contaminant	Work and Near Field Zones		Site Perimeter Zone	
	Immediate (ppm)	Short Term (ppm)	Immediate (ppm)	Short Term (ppm)
Total VOCs	NE	1	NE	0.1
Chlorobenzene	500	10	100	1
2-Chlorotoluene	NE	50	NE	5
1,2-Dichlorobenzene	25	25	5	2.5
1,2,4-Trichlorobenzene	2.5	NE	0.5	NE
Nitrobenzene	100	1	20	0.1
Naphthalene	15	10	7.5	1
Tetrachloroethylene	75	25	15	2.5
Trichloroethylene	100	50	50	5
1,2,3-Trichloropropane	50	10	10	1
Toluene	150	50	30	5
Methyl Ethyl Ketone	300	200	150	20
Methyl Isobutyl Ketone	75	50	37	5

NE = Not established

Table 4. Proposed Long Term Action Levels (LTALs) for Specific Volatile Organic Chemicals of Concern (COCs), in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and in parts per million (ppm). (Ciba, 2002a)

Contaminant	EPA Carcinogenicity Category	EPA Reference Concentration (RfC), ( $\mu\text{g}/\text{m}^3$ )	Site Perimeter Zone	
			Long Term ( $\mu\text{g}/\text{m}^3$ )	Long term (ppm)**
Chlorobenzene	D	60	365	0.08
2-Chlorotoluene	NE	70	426	0.08
1,2-Dichlorobenzene	D	200	1,217	0.2
1,2,4-Trichlorobenzene	D	4	24	0.003
Nitrobenzene	D	2	3	0.0006
Naphthalene	C	3	37	0.007
Tetrachloroethylene	UR	490	47*	0.007
Trichloroethylene	UR	21	71*	0.01
1,2,3-Trichloropropane	NE	5	2*	0.0003
Toluene	D	400	649	0.17
Methyl Ethyl Ketone	D	1,000	1,622	0.55
Methyl Isobutyl Ketone	NE	80	130	0.03

EPA Carcinogenicity Categories: C = Possible human carcinogen; D = Not classifiable; NE = Not established

\* LTAL based on potential cancer effects

\*\* LTALs also given in ppm for comparison to immediate and short term action levels (Table 3).

Conversion between ( $\mu\text{g}/\text{m}^3$ ) and (ppm), at room temperature, is as follows, where MW = molecular weight:

$$\mu\text{g}/\text{m}^3 = (\text{ppm} \times \text{MW}/24.45) \times 1,000$$

Table 5. Odor Thresholds for Volatile Organic Chemicals of Concern (COCs), in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and in parts per million (ppm). (AIHA, 1995)

Contaminant	Molecular Weight	Odor Threshold	
		In $\mu\text{g}/\text{m}^3$	In ppm
Chlorobenzene	112.56	6,000	1.3
2-Chlorotoluene	126.60	210	0.04
1,2-Dichlorobenzene	147.00	720	0.12
1,2,4-Trichlorobenzene	181.45	Unknown	Unknown
Nitrobenzene	123.11	1,900	0.37
Naphthalene	128.16	200	0.038
Tetrachloroethylene	165.83	319,000 – 481,000	47 – 71
Trichloroethylene	131.39	440,000 – 591,000	82 – 110
1,2,3-Trichloropropane	147.43	Unknown	Unknown
Toluene	92.14	6,000 – 41,000	1.6 – 11
Methyl Ethyl Ketone	72.11	47,000 – 50,000	16 – 17
Methyl Isobutyl Ketone	100.16	400 – 33,000	0.1 – 8

Conversion between ( $\mu\text{g}/\text{m}^3$ ) and (ppm), at room temperature, is as follows, where MW = molecular weight:

$$\mu\text{g}/\text{m}^3 = (\text{ppm} \times \text{MW}/24.45) \times 1,000$$

**Table 6. Proposed Short Term and Long Term Action Levels for Particulate Matter, in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). (Ciba, 2002a)**

<b>Action Level Measurement Term</b>	<b>Work Zone</b>	<b>Near Field Zone</b>	<b>Site Perimeter Zone</b>
Short Term ( $\mu\text{g}/\text{m}^3$ )	5,000	4,000	400
Long Term ( $\mu\text{g}/\text{m}^3$ )	No LTAL	No LTAL	150 (24 hour average) 50 (annual average)

**LTAL = Long Term Action Level**

**Short Term Action Levels are based on a five minute exposure.**

**The OSHA Permissible Exposure Limit for nuisance dust is 15,000  $\mu\text{g}/\text{m}^3$  (total) or 5,000  $\mu\text{g}/\text{m}^3$  (respirable fraction (NIOSH, 1997). The ACGIH Threshold Limit Value for nuisance dust is 10,000  $\mu\text{g}/\text{m}^3$  (inhalable) and 3,000  $\mu\text{g}/\text{m}^3$  (respirable) (ACGIH, 2002).**

**The National Ambient Air Quality Standard for particulates (PM10) is 50  $\mu\text{g}/\text{m}^3$  (annual average) and 150  $\mu\text{g}/\text{m}^3$  (24 hour average).**

## Figures

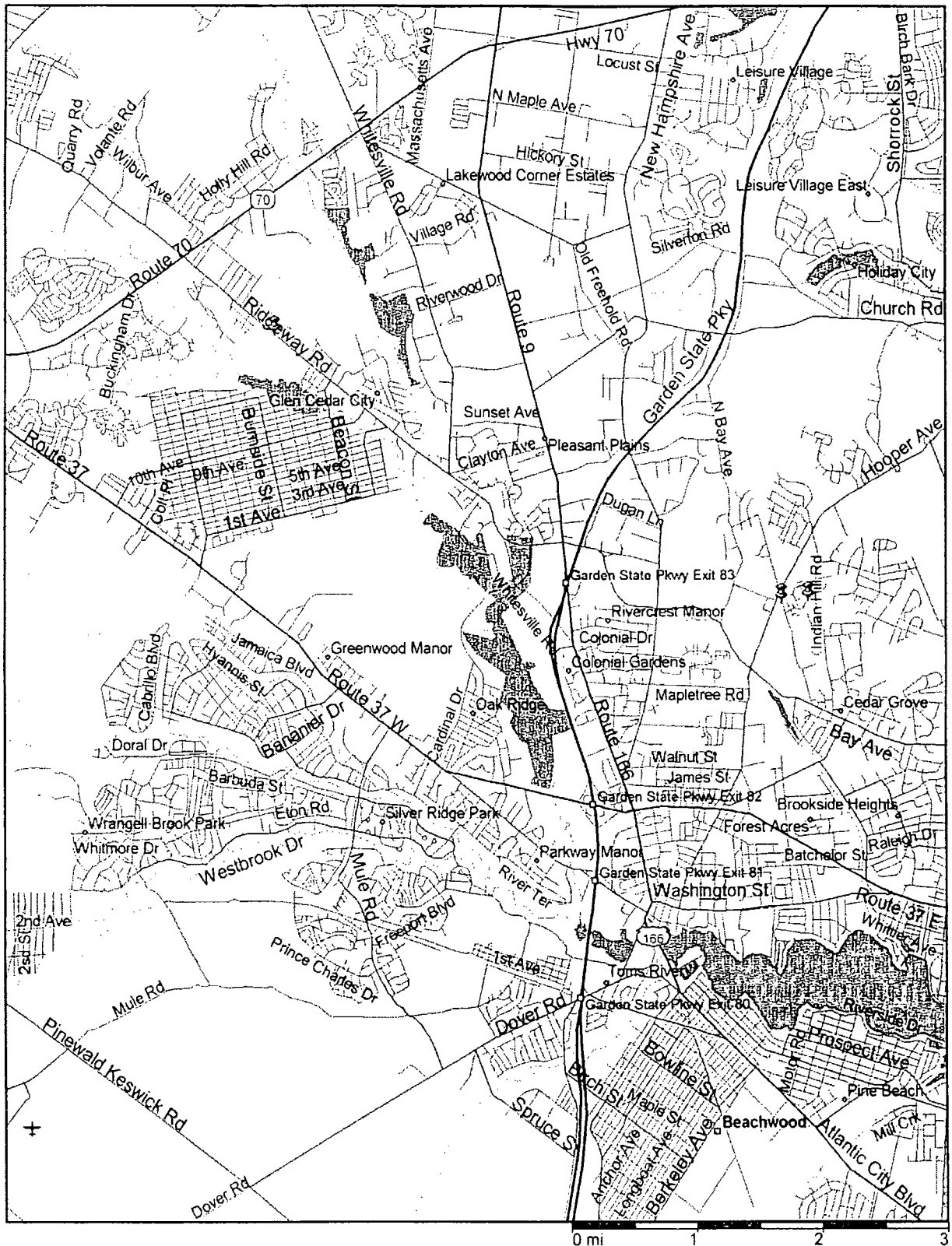


Figure 1. Ciba-Geigy Corporation Superfund Site Location

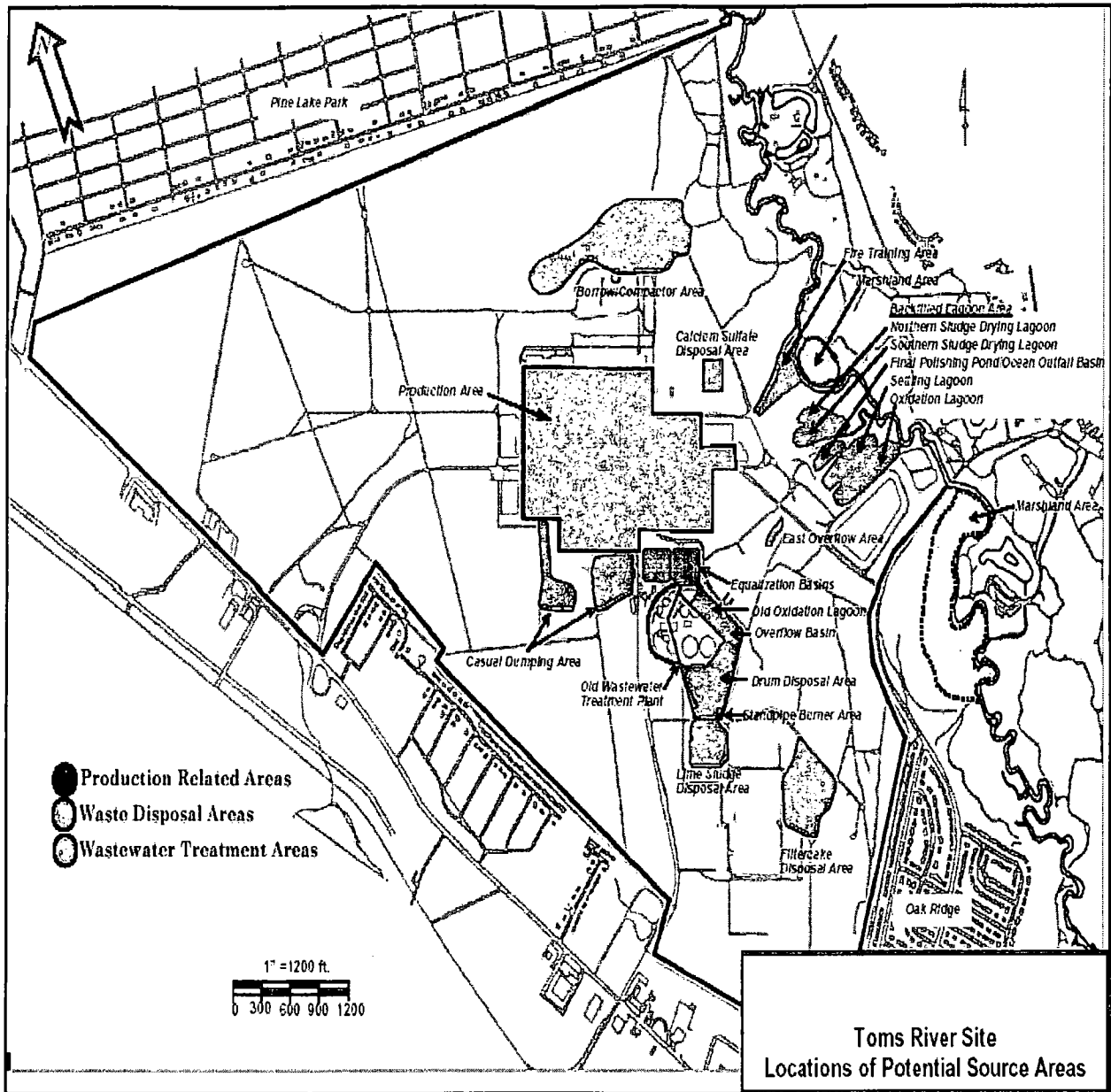
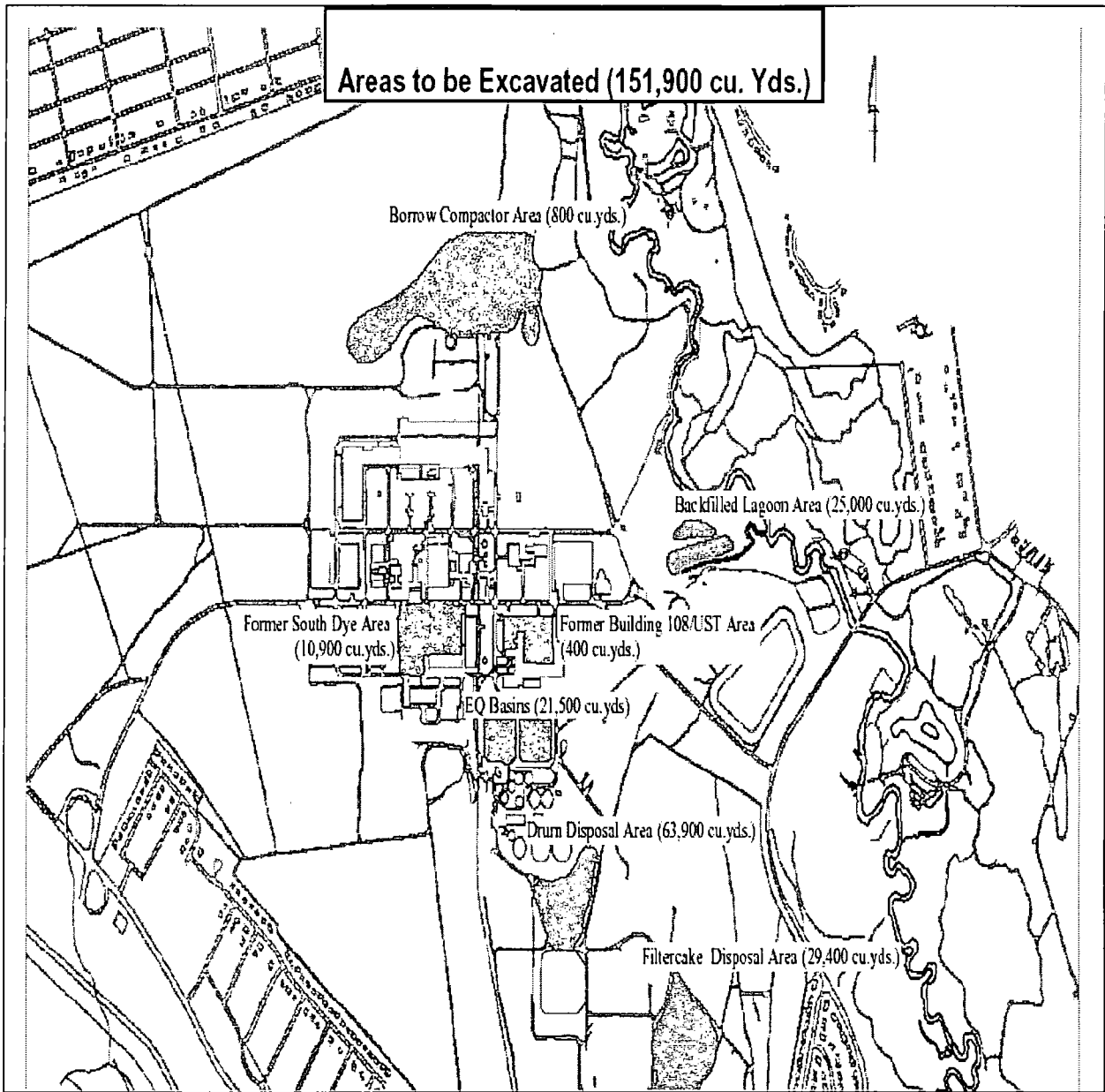


Figure 2. Ciba-Geigy Source Areas



**Figure 3. Source Areas to be Excavated**

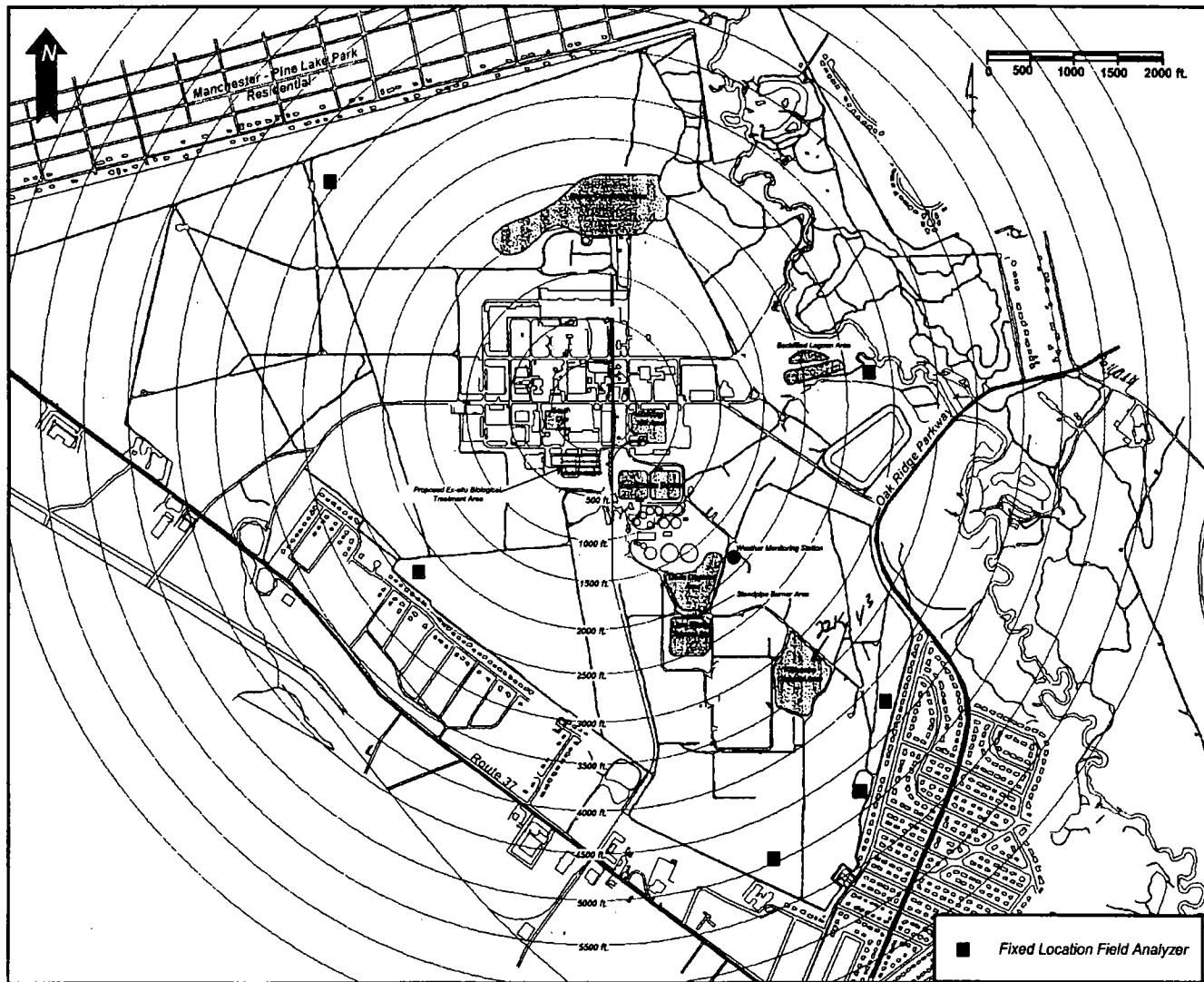


Figure 4. Ciba-Geigy Fixed Air Monitoring Locations

## Appendix A

### **ATSDR and NJDHSS Response to Comments Provided by the Citizen's Action Committee on Childhood Cancer Cluster (CACCCC), the Toxic Environment Affect Children's Health (TEACH) group, the Ocean County Health Department, or Manchester Township**

Comment 1: After reviewing this Public Health Evaluation I find it very vague and incomplete.

Response: Please see responses to individual comments below which will, hopefully, address this general comment.

Comment 2: Why wasn't all information reviewed? "Based on the review of **available information** and the proposed Plan, ATSDR and NJDHSS conclude"... What types of information wasn't reviewed and does this affect the completeness of this report?

Response: The only information pertinent to making conclusions and recommendation regarding the overall protectiveness of the air monitoring plan, which was not reviewed for this health consultation, was the Health and Safety Plan. ATSDR has committed to review this plan when available. ATSDR will revisit the conclusions and recommendations of this health consultation in light of any new information contained in the Health and Safety Plan.

Comment 3: The vagueness of this report is up to interpretation as to whether the recommendations have to be followed or not. Example "...using TVOC trigger levels established for each zone and, **as necessary**, response actions.", etc...throughout this report.

Response: ATSDR's and NJDHSS' role in evaluating the overall air monitoring plan and the action levels was to provide our opinion on the overall protectiveness of the plan. ATSDR and NJDHSS are not regulatory agencies and therefore our recommendations are not enforceable. The EPA has enforcement authority and is responsible for managing the risk related to the clean-up of the Ciba-Geigy site. The EPA does concur with our conclusions and they plan on implementing the recommendations in this health consultation. The health consultation will be changed to reflect that EPA has agreed to implement our recommendations.

Comment 4: "Installation and operation of six stationary monitoring stations (and one mobile station) along the perimeter should be sufficient to determine the potential exposure to, and thereby protect the health of, the public near the CGC property." I have asked, and the community has asked for off site monitoring as an assurance that we know what the public has been exposed to from this remediation. The EPA failed this community when they failed to monitor off-site air emissions at Reich farm.

Response: As indicated in the health consultation, the placement of the monitors at the fence line, especially adjacent to residences along Cardinal Drive and the West Dover School, is, for all intent and purposes, at the nearest exposure points. That is, the levels of contaminants in the air detected on the Ciba-Geigy side of the fence will be very similar the levels on the community side of the fence (in the backyards of the residents along Cardinal Drive and in the playground of the West Dover School). Moreover, it is important to note, that the main goal of the overall air monitoring plan is to prevent harmful exposures to the community. From this standpoint, the monitors that are located at the excavation site and between the excavation site and the fence line are critical to achieving this goal. Again, ATSDR and NJDHSS conclude that the overall air monitoring plan is protective as long as our recommendations set forth in this health consultation are implemented.

Comment 5: Please reference the source document that has been established where the EPA Region II Remedial Program Manager has committed to: **“contaminant-specific monitoring will be initiated before the TVOC trigger level is exceeded.”**

Response: The text will be changed to indicate that reference for this statement is the Air Monitoring Plan, Appendix A, Preliminary Design Report.

Comment 6: Less emphasis should be place on the word “should” and replaced with “shall” in the appropriate sections.

Response: Please see response to comment 3 above.

Comment 7: I want all assumptions to be protective of public health, please re-evaluate. **“Most of these assumptions appear to be protective of public health.”** Also please state what assumptions did not appear to be protective of public health.

Response: It states in the Action Levels for VOCs at the Site Perimeter section of the health consultation that “NJDHSS and ATSDR have reviewed these assumptions and believe that they are protective of public health. However, the assumption of frequency of exposure (i.e., number of days potentially exposed), a major factor in determining the long-term action levels (LTALs), has the potential to be violated. Therefore, the NJDHSS and ATSDR believe that the perimeter LTALs should be re-evaluated periodically once the excavations, bio-remediation and drum removal have begun, to determine if the frequency of exposure assumption, or any of the exposure assumptions used in the development of these LTALs, should be reconsidered, and if lowering the current LTALs is warranted.” The use of the word “appear” is appropriate in this context in that the assumptions as stated are conservative and ATSDR and NJDHSS believe that they are protective of public health. However, these are assumptions and we feel it important that all assumption that have gone into the development of the action levels, especially the frequency of exposure assumptions, should be verified once remediation begins.

Comment 8: In the following paragraph please change “may be necessary” and “should be” to “will be necessary” and “shall be”:

“NJDHSS and ATSDR concur with the Plan that periodic confirmatory monitoring for lead and mercury **may be** necessary to determine if the particulate matter action levels are protective for exposure to these metals. Moreover, NJDHSS and ATSDR believe that confirmatory monitoring for lead and mercury **should be** conducted if any of the particulate matter action levels are exceeded. That is, confirmatory monitoring is needed to ensure that concentrations of mercury and lead do not exceed their individual action levels. If appropriate confirmatory monitoring is performed, then the proposed action levels for particulate matter should be protective of public health; and,”

Response: ATSDR will change the language to indicate that periodic confirmatory monitoring for lead and mercury **will be** necessary to confirm that the particulate matter action levels are protective for exposures to these metals. As indicated above in response to comment 3, EPA will be performing this confirmatory monitoring.

Comment 9: Please remove the word “low” in the following paragraph. You may be implying an odor is only conducive indication of low concentrations.

“An odor may be the first indication to nearby residents that **low** concentrations of source area COCs or other compounds are in the ambient air. However, it is important to note that the presence of an odor does not necessarily indicate that there is a public health concern.”

Response: We agree with this comment and will revise the text.

Comment 10: Page 3 items 1-3 contain the word “should,” please change to shall.

Response: Please see response to comment 2 above.

Comment 11: “A method for providing up-to-date information and status regarding excavation activities, as well as procedures to address inquiries from the public, should be established;”....

The EPA has already decided not to provide up to date information or real time information. Again I have requested real time data for the public to view especially on air monitoring via the Internet. Again the public is not being informed adequately especially for families that have a child with cancer and want to protect them from any exposure. Beside the above, delaying for 24 hours the data release, there are no guarantees the data may be accurate.

Response: ATSDR and NJDHSS were asked to determine if the air monitoring plan was protective of public health. As stated in the health consultation, we believe that the plan is protective as long as certain actions are taken, as outlined in our recommendations to

EPA. We thought it important that some method for providing up-to-date information to the community be established by the EPA and they concur with the recommendation. As previously, mentioned, EPA has enforcement authority and is responsible for managing the risk relating to the clean-up of the Ciba-Geigy site. What method EPA chooses does not effect ATSDR's and NJDHSS' overall conclusion regarding the protectiveness of the air monitoring plan.

Comment 12: Are we sure the below statement to be true? I do not recall a fence line on the northern area of the site. **"The entire CGC site is fenced, with a controlled entrance from Oak Ridge Parkway on the eastern side of the site."**

Response: The northern area of the site is fenced. As noted in the health consultation, during the site visit on May 22, 2002, ATSDR and NJDHSS staff noted the breeches in the fence on the northern side of the site. However, after further inquiry with EPA, it does appear that there is not a fence along Ciba-Geigy property adjacent to the Toms River. The text of the health consultation will be revised.

Comment 13: "Consequently, the continuous monitoring data that will be gathered from the stationary and mobile stations that are adjacent to the nearby residential areas **should** provide sufficient information to characterize the potential exposure to these off-site populations." Vague statement, I want to be assured that these six monitors provide proper protection to this community.

Response: ATSDR and NJDHSS believe that the placement of the monitors in the work zone, near-field zone, and the perimeter is protective of public health. The text will be revised to make this clear.

Comment 14: "Based on EPA guidance, the Plan provides a rationale that indicates that if the action levels for inhalable particles are not exceeded, then the individual action levels for lead and mercury will also not be exceeded." Please explain in detail the EPA guidance and the rationale behind this.

Response: EPA's rationale is explained in Attachment C of the Air Monitoring Plan, which is available in the repositories.

Comment 14: "The Plan indicates that airborne emissions will be monitored in the three zones of action for three different potential exposure durations (see Table 2). NJDHSS and ATSDR concur that the proposed monitoring of the three zones of action for "immediate", "short-term", and "long-term" exposure **will likely be sufficient** to characterize the potential exposure to workers and the community due to emissions from the source areas."

If the standards being used are not conservative enough, then please re-evaluate. The public needs to be assured it is protected, not "will likely be sufficient", either it is or isn't. Please explain why we can assure the public is being protected?

Response: ATSDR and NJDHSS believe that the planned monitoring in the three zones of action for three different potential exposures durations to be protective of public health--the text of the health consultation will be revised to make this clear.

Comment 15: "The excavations will be conducted in conjunction with about 225 drum removal events per year (a total of about 32,000 drums) that will be conducted at the DDA over a period of two years (a total of about 450 excavation days)."

Is the drum excavation day, a 24-hour period? If so, is the removal of three drums per hour (over a 24 hr period) realistic? Are the drums being sampled? And is it safe to remove drums around the clock?

Response: The details of how EPA plans on excavating and removing drums is provided in the Drum Handling Plan which is available for review in the repositories.

Comment 16: However, **in practice**, contaminant-specific monitoring will be initiated before the TVOC action level is exceeded (Personal Communication, EPA Remedial Project Officer, August 2002).

"In practice", where is the source document for this practice? And is there any penalties or fines associated with failing to follow or initiate any protective actions?

Response: Please see response to comment 5 above.

Comment 17: "Even though the perimeter monitoring stations will be located on CGC property (to help protect them from vandalism), they are considered to be exposure point monitors. Consequently, the continuous monitoring data that will be gathered from the stationary and mobile stations should provide sufficient information to characterize the potential exposure to the nearest off-site populations;"

I do not agree with this conclusion. We have asked for offsite air monitoring to know what the public is receiving. Some equipment on the Ciba site has already been stolen, so the conclusion for having it on site to protect it from vandalism is not valid. I want to be assured the public is being protected.

Response: Please see response to comment 4 above.

Comment 18: Under references, why are we referencing a "draft report"?

Response: It is our understanding that the final version of the Source Control Remedial Investigation Report did not change appreciably from the draft report (CDM, 1993). Therefore, relying on the draft version of this report does not effect the overall conclusions and recommendations of this health consultation.

Comment 19: Table 3, will a value be established for total VOCs in the "Work and Near Field Zones" for the "Immediate" action level.

Response: No, the more conservative short-term TVOC number of 1 ppm will be used as the trigger for contaminant-specific monitoring and other actions. As shown in Table 3 of the health consultation, the 1 ppm level was chosen because it was less than or equal to any of the immediate or short-term chemical-specific action levels. The nearest immediate action level for the work or near-field zones is 2.5 ppm for 1,2,4-trichlorobenzene.

Comment 20: Since prevailing winds are Westerly, the fixed locations of the monitoring devices appear to need additional units on the Northeast side of the site. **DRAFT** Report included Fig.4 shows only one fixed location on the Northeast bordering the Toms River. I would suggest additional permanent monitoring stations between the Backfilled Lagoon location and the first of two located on the Eastern fence-line along Cardinal Drive.

Response: The reason there is not a monitor located in this area is because the placement of the fixed monitoring devices are biased towards evaluating the contaminant levels in air leaving the site in areas adjacent to populated areas off-site. However, as stated in the air monitoring plan, a mobile station will be placed at the site perimeter in a position downwind of the disposal area being excavated on any given day.

Comment 21: While TVOCs and (limited as this list is) COC identification appear to be adequately addressed in the plan, contaminant bound particulates appear inadequately addressed for the following reasons:

Inadequate number and/or location placement of fixed stations.

COCs are limited by both number and class of contaminants.

Coal was the original fuel used on this site as an energy source possibly leaving PAHs bound to soil particles still on site.

Although lead and mercury are addressed as possible particulate concerns when the excavation occurs for the FCD area and the BFL area, what about any other contaminants that may be bound to soils disturbed during excavation or movement to treatment indoors for bio-treatment and back outdoors for additional treatment before returning "clean" soils to the excavated site?

The public has repeatedly requested tenting of excavation locations due to particulate threat of travel from excavation sites to surrounding community neighborhoods.

Older mapping of previous investigations have shown the LSD to be called the Arsenic Pit, which may well have been a geographic nickname to the site workers at the time, designed to differentiate between one area from another.

Are there no other specific contaminants or classes of contaminants to be analyzed at all areas of soil excavation when TVOCs are exceeded, other than heavy metals lead and mercury in the BFL and FCD?

And finally, Page 7, Par. 4, lines 3,4&5, (CDM, 1994) (DS, 1997) note hundreds of organic dyes, resins, TICs, etc. in surface and subsurface soils.

Response: While site data indicate that lead and mercury are the most likely particle-bound air contaminants, additional particle analyses for the full spectrum of contaminants is a prudent public health action. ATSDR and NJDHSS have discussed this with EPA and they have agreed to conduct these analyses. ATSDR and NJDHSS recommend that these analyses should be conducted especially on days when the nearest receptor population is downwind of an area being excavated (e.g., analyze filter samples from monitors along Cardinal Drive when excavating the Filtercake Disposal Area. The health consultation will be updated to include the above conclusion and recommendation.

Comment 22: How will "clean" soils be determined to be clean? Will the results of all contaminant testing be documented, unlike the Reich Farm site that just listed how much soil was excavated and thermally treated, but lacked any information about the contaminants and concentrations?

Response: Details of the soil clean-up levels can be found in the 2000 EPA Record of Decision which can be found in the repository.

Comment 23: Do you know when the Health and Safety Plan will be available for public review?

Response: It is ATSDR and NJDHSS' understanding the Health and Safety Plan will be available for review once a contractor is chosen to perform the work; however, we do not know a specific timeframe for when the plan will be available for public comment. The EPA will provide ATSDR and NJDHSS with a draft copy of the plan for review.

Comment 24: I concur with your evaluation that off-gassing is possible at any point in the excavation, movement and storage of contaminated soils, since it is noted that there is an ambient 15ppb, without the planned remedial activities in operation.

Response: ATSDR and NJDHSS thank you for your comment.

Comment 25: Suggesting exercising the plan and associated response actions, under different scenarios prior to the on-site remedial activities is an excellent recommendation.

Response: ATSDR and NJDHSS thank you for your comment.

Comment 26: I agree with the recommendations of the NJDHSS and ATSDR.

Response: ATSDR and NJDHSS thank you for your comment.