

Health Assessment for

METALTEC/AEROSYSTEMS

FRANKLIN BOROUGH, NEW JERSEY

NOVEMBER 30, 1988

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

DRAFT

SUMMARY

The 16-acre Metaltec/Aerosystems National Priorities List site is located approximately 1 mile northeast of Route 23 in Franklin Borough, Sussex County, New Jersey. This site currently houses a light manufacturing company and a specialty glass manufacturer. Metaltec operated a metal-plating business at this location from 1965 until mid-1980, when the manufacturing operations moved to an industrial park. There were a variety of metal products produced by Metaltec, including: lipstick cases, paint spray guns, and metal ballpoint-pen casings. Process wastewater from these operations was placed into an on-site unlined, lagoon and some waste solids were disposed of in piles on the surface in areas around the property. The contaminants present in the wastewater pond were chlorinated solvents used as degreasers such as, trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1,1-trichloroethane (TCA), as well as heavy metals including copper and chromium. Vinyl chloride was also detected in the lagoon area, presumably from the bacterial degradation of PCE and TCE. The contaminants leached from the lagoon into the groundwater and contaminated the Metaltec water supply well, several residential wells, and a municipal water supply well. Four residential wells, the Metaltec/Aerosystems process supply well, and the municipal well were removed from service, in September 1980, after analytical results indicated high concentrations of volatile organic compounds (VOC's).

This site has been divided into operable units. The Remedial Investigation/Feasibility Study (RI/FS) and the Record of Decision (ROD) currently available address only certain aspects of the site, mainly the extent of soils contamination and a description of the selected remedy for that contamination. The groundwater will be addressed in a future RI/FS and ROD. While groundwater contamination is severe and its use would present a human health threat, the groundwater cannot be fully addressed in this Health Assessment because of the lack of information. The ROD adequately addresses the health concerns associated with the sources of the contamination and provides for an alternative water supply for the affected residents and industry. This site is of potential public health concern because of the risk to human health that could result from possible exposure to hazardous substances at levels that may result in adverse health effects over time. A monitoring program for the groundwater contaminants should be developed and implemented to ensure residential wells still in use in the areas around the site are not contaminated. Also, a contingency program is needed to provide an alternate water supply in the event these wells become contaminated.

BACKGROUND

A. SITE DESCRIPTION

The Metaltec/Aerosystems site is located at the intersection of Maple, Gilson, and Wildcat Roads in Franklin Borough. The 16-acre site is roughly divided in half by Wildcat Road. There are several residences adjacent to the property. The municipal well for the Borough of Franklin is approximately 400 feet east of the site. The primary drinking water for Franklin comes from Franklin Pond, which is to the northeast about 4,000 feet.

The site was divided into 4 parcels (#1, 2, 3, and 4). Parcel #1 is the largest and includes the former wastewater lagoon which was partially excavated and filled with clean soil. Its location is currently used as a parking lot for the businesses presently operating on-site. Also, within Parcel #1 is a portion of a privately owned horse corral which is across Gilson Road. The contaminants in the Parcel #1 area were VOC's and metals.

Parcel #2 is located on the northeast side of the building in the area of the loading dock. It was approximately 2,500 square feet in area and was contaminated with low concentrations of metals, no VOC's were detected.

Parcel #3 is located outside the rear door of the Metaltec building. It was estimated to be 2,500 square feet and was contaminated with metals and some VOC's.

Parcel #4 is across Wildcat Road in the former "green pile" area. The area of contamination was approximately 6,700 square feet and was contaminated with metals and VOC's.

B. SITE VISIT

The Agency for Toxic Substances and Disease Registry has not conducted a site visit to date.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. ON-SITE CONTAMINATION

For the purpose of this Health Assessment, "on-site" was considered to be the total 16-acre site, and included as on-site was the section of Parcel #1 across Gilson Road known as the horse corral. The RI indicated that the soils, surface water, and groundwater were contaminated with organic and inorganic compounds. In the area of the lagoon, the subsurface soils exhibited high concentrations of TCE, trans-1,2-dichloroethylene, and vinyl chloride. The other parcels were contaminated with metals and some VOC's, but the concentrations were not as high as those in Parcel #1. The Table of Contaminants below lists the contaminants of concern, their location, maximum concentration, and media.

Table of Contaminants¹

| Lagoon area | soil (mg/kg) | bedrock well (ug/l) | overburden well (ug/l) |
|-----------------------------|-----------------|------------------------|---------------------------|
| TCE | 7,600 | 3,100 | 3,900 |
| TCA | 53 | 2,500 | 1,100 |
| t-1,2-dichloro- ethylene | 6,600 | 9,700 | 10,000 |
| vinyl chloride | | 2,700 | 3,400 |
| chromium | 8,000 | | 25 |
| copper | 3,400 | 350 | 50 |

Parcels #2, 3, 4

| | |
|----------|--------|
| chromium | 20 |
| copper | 18,000 |

1. This data was generated during the RI/FS, 1985

There were other metals detected in the disposal areas; however, the concentrations approximated background concentrations. There were some samples taken from the stream that flows through Parcels #1 and 4. In general, VOC's were not detected; however, low levels of cadmium were detected in the water and sediment samples.

B. OFF-SITE CONTAMINATION

The off-site areas are considered to be the areas containing the private residential wells and the municipal well. The contaminants were not detected in the surface soils; however, there was contamination of the groundwater with VOC's in both the surficial and bedrock aquifers. The VOC contamination caused the closing of four residential wells, Franklin Municipal Well, and the Metaltec/Aerosystems process well in September 1980. The following Table of Contaminants indicate the maximum concentrations found in the wells from August to November 1980.

Table of Contaminants

| | <u>Vargennes Well</u> | <u>Nieves Well</u> | <u>Serin Well</u> | <u>Franek Well</u> ¹ |
|---------------------------|--------------------------------|-----------------------------|-------------------|---------------------------------|
| TCE | 7,220 | 40 | 20 ₂ | 108 |
| TCA | 982 | 5 | NR ² | 1 |
| PCE | 15 | 2 | 3 | 4 |
| 1,2-dichloro- ethylene | 3,220 | 28 | 6 | 7 |
| | <u>Franklin Municipal Well</u> | <u>Metaltec/Aerosystems</u> | | |
| TCE | 5,140 | 816 | | |
| TCA | 37 | 16 | | |
| PCE | 12 | 23 | | |
| 1,2-dichloro- ethylene | 770 | 443 | | |

Note: All concentrations are in ug/l.

1. Data from April 1982.

2. NR not reported.

C. PHYSICAL HAZARDS

There were no reports of physical hazards at this site.

DEMOGRAPHICS OF POPULATION NEAR SITE

The area around the site is a rural area with some residential land use. There are several small agricultural enterprises in the vicinity. Adjacent to the site is a golf course to the northeast and a farm to the northwest. The residential wells that were closed are generally to the north, and the Franklin Municipal Well is located approximately 400 feet east of the site. The municipal well supplemented the water supply of the Borough of Franklin. The primary drinking water source for the area is Franklin Pond which is located approximately 4,000 feet northeast of the site.

EVALUATION

A. SITE CHARACTERIZATION

1. Environmental Media

Adequate samples have been taken to characterize the extent of soil contamination around the site and to establish that groundwater contamination has occurred. However, the information concerning the extent of groundwater contamination and the concentrations present was not available. The groundwater contamination will be the subject of a supplemental RI/FS and ROD. No further information is required at this time concerning soil contamination. However, more information is needed to address surface water and groundwater usage. Other information necessary for consideration would be the uses of the unnamed brook, such as: recreational fishing, irrigation, or watering of livestock.

2. Land Use and Demographics

No further demographic information is necessary at this time.

3. Quality Assurance and Quality Control

It was assumed that the analytical data has been reviewed by the U.S. Environmental Protection Agency and has met their acceptability criteria. The conclusions in this Health Assessment were based on the information received. The accuracy of these conclusions is determined by the availability and reliability of that information.

B. ENVIRONMENTAL PATHWAYS

Based on the available information, the most contaminated environmental media appear to be soil and ground water. Limited sampling of nearby streams and their sediments did not reveal any elevated concentrations of contaminants. Neither air-related nor biota pathways were investigated to determine if these environmental pathways might cause adverse health effects.

The most contaminated area was the former wastewater lagoon and it was the primary source of contamination. Contaminants disposed of in the lagoon migrated into the groundwater and have penetrated the bedrock aquifer. Results of analyses of samples from monitoring well BR4 indicated that the VOC's had migrated to at least a depth of 100 feet, (the depth of BR4). Some of the sediments and soils from the former lagoon were excavated in 1981 and the lagoon filled with clean soil. This area is presently used as a parking lot.

The soils in Parcel #2 had concentrations of chromium and copper that exceeded background levels. The chromium and copper concentrations were approximately 20 mg/kg each, while the background levels were reported as none detected. Although these concentrations are above the background levels in this specific geographical area, they are within the general background concentrations found throughout the contiguous United States. Parcel #2 is adjacent to the sidewalk leading to the front entrance and is also adjacent to the loading dock. The areas not covered with pavement are sodded, therefore, the potential for exposure should be minimal.

Parcel #3 soils exhibited low concentrations of VOC's, with TCE being the most concentrated. Chromium (20 mg/kg) and copper (1,600 mg/kg) were also detected above background concentrations.

Parcel #4 is across Wildcat Road from the plant and includes the area of the former green piles. High levels of copper and zinc were detected along with lower concentrations of chromium, PCE and TCE. In 1981 the green piles were removed from the area. Parcel #4 is in a wetlands area and has a small stream flowing through it. Surface water and sediment analyses during the RI indicated only minimal contamination with metals; however, cadmium was detected in the sediment.

Though demonstratively contaminated, the ground water pathways at this site cannot be precisely delineated with available information because of the complex hydrogeology. Contamination has been measured in both the surficial aquifer and the bedrock aquifer.

The surficial aquifer is contained within the glacial drift and weathered bedrock materials that extend from surface to the unweathered bedrock. The surficial aquifer is probably hydraulically connected to the unnamed tributary of Wildcat Brook that flows on the east side of the site.

The ground water flow in the bedrock aquifer is through fractures, joints, and weathered foliation surfaces. Weathered contact surfaces between rock groups apparently also provide a major flow path. One contact flow zone is to the east side of the site between the gneiss and a marble formation. This gneiss/marble contact zone is apparently part of the flow network of fractures and joints that is intercepted by the Franklin municipal well. Pump tests of the municipal well indicate hydraulic connection with monitoring wells in both the surficial and bedrock aquifers along Wildcat road on the east side of the Metaltec plant. The pump test indicates that the Metaltec site is the probable source of the municipal well contamination.

Under nonpumping conditions ground water flow in both aquifers is generally toward the northwest. Flow is also vertically upward from the

bedrock aquifer into the surficial aquifer. However both vertical and lateral flow directions may be reversed in the vicinity of pumping bedrock wells as demonstrated by the municipal well pump test.

Apparently, all nearby residences used bedrock wells for domestic water supply in 1980. Since the discovery in 1980 of contamination in the municipal well and four residential wells, those wells have apparently not been used and uncontaminated municipal water has been supplied to the affected residences.

The vertical and lateral extent of the ground water contamination is unknown. Two possible ground water flow paths may lead to human exposure. It is possible that pumping wells, particularly those intercepting the dolomite/gniess contact zone, may draw the contaminants into a water supply well. Also contaminants from either the surficial aquifer or the bedrock aquifer, or both, may be discharging in the unnamed tributary of Wildcat Brook. There was minimal information available on the extent of groundwater contamination. From the data that was available, the groundwater appears to be seriously contaminated with VOC's and continues to be a public health threat.

There was no indication of air monitoring being performed. While most of the contamination is beneath the surface, the concentration of the VOC's present will be of concern during excavations, especially in the former lagoon area.

C. HUMAN EXPOSURE PATHWAYS

The domestic use of area groundwater presents the most probable exposure pathway. Currently, there is insufficient information to determine the extent of the contamination or the magnitude of the public health threat associated with the use of contaminated groundwater.

The potential for dermal exposure from contaminated soils appears minimal at this time. The most highly contaminated soils were excavated and placed in an off-site repository for hazardous wastes and clean soil brought in as fill. The highly contaminated areas were covered with sod or pavement, thus reducing the potential for direct contact. During remedial activities dermal contact could become a concern. All remedial workers should be properly equipped and trained to follow all appropriate precautions such as using personal protective equipment.

Inhalation exposure to the VOC's is currently likely to be of minimal concern. The most contaminated area is covered with clean soil and pavement. The potential for exposure increases during the excavations of the contaminated areas. The remedial workers should be properly equipped and trained in following all appropriate precautions such as the use of personal protective equipment, including respirators.

Recreational or agricultural use of the nearby tributary of Wildcat Brook could lead to human exposure. No information was available on the use of that stream or the existence of any consumable fish.

PUBLIC HEALTH IMPLICATIONS

The contaminants of greatest concern found in the groundwater and soils were PCE, TCE, trans-1,2-dichloroethylene, vinyl chloride, and TCA. Generally, this class of compounds can cause liver and kidney damage and Central Nervous System effects if there is exposure to high concentrations. The concentrations producing these acute effects are similar to the concentrations found in the former lagoon area soils and groundwater.

The vinyl chloride found in the groundwater at the site is thought to be produced from the bacterial degradation of TCE and PCE. The concentrations of vinyl chloride that were detected are several orders of magnitude above the National Primary Drinking Water standards. Vinyl chloride is a known human carcinogen causing angiosarcomas of the liver in workers exposed to high concentrations (Wagoner 1983). Other target organ cancers linked to vinyl chloride exposure are liver, lung, and brain cancers (Wagoner 1983). The population at risk would primarily be the remedial workers during cleanup actions and those people who may use the contaminated groundwater. Persons having preexisting liver, kidney, cardiac, and pulmonary diseases are particularly at risk.

TCE is a VOC that was detected in the residential wells, as well as, in the municipal well and the Metaltec/Aerosystems process water well. Although TCE maybe stable in the groundwater for periods ranging from months to years, under certain conditions it can degrade to form vinyl chloride. The concentrations of TCE found in off-site wells was 3 orders of magnitude above the established regulatory maximum contaminant level (MCL) for drinking water of 5 ug/l. TCE has been indicated in some studies as a carcinogen in laboratory animals; consequently, it has been designated as a potential human carcinogen. Exposure to TCE in the untreated water from contaminated residential wells or by distribution through the municipal water supply system may cause adverse health effects.

TCA concentrations in the groundwater on-site were above the established MCL of 200 ug/l. Data from studies exposing animals to TCA have been insufficient to evaluate its (TCA) animal or human carcinogenicity. There is potential for manifestations of acute and chronic, non-carcinogenic effects to occur after prolonged exposure to Parcel #1 concentrations.

The compound trans-1,2-dichloroethylene was present at concentrations in the groundwater and soils on-site at concentrations 2 orders of magnitude above the proposed MCL goal of 70 ug/l.

Chromium has been detected in the soils of Parcels #1-4. In some areas the concentration exceeds the background by several orders of magnitude. Chromium exists primarily in two oxidation states, +3 and +6. While trace quantities of chromium +3 are essential for carbohydrate metabolism, chromium +6 is a human carcinogen by the inhalation exposure route. The concentrations present may cause, through ingestion, acute effects such as acute renal tubular necrosis. Also, dermatitis and allergic skin reactions can occur with dermal exposure.

CONCLUSIONS AND RECOMMENDATIONS

Based on information reviewed, ATSDR has concluded that this site is of potential public health concern because of the potential risk to human health resulting from the possible exposure to hazardous substances at concentrations that may result in adverse health effects. As previously discussed in the Background and Human Exposure Pathways Sections, human exposures have probably occurred or may occur through the domestic use of contaminated groundwater. The groundwater is to be investigated in a supplemental RI/FS and ROD.

The ROD for soils contamination adequately addresses the issues of health concern for the sources of contamination. Currently, there appears to be no exposure to the contaminated soils either on-site or off-site. The population of most concern for this operable unit is the remedial workers. The contamination was in the subsurface soils and in the case of the most contaminated area was beneath a parking lot. During excavation procedures, exposure to VOC's and chromium at concentrations of human health concern can occur through inhalation and dermal contact.

It appears that past exposure to high concentrations of VOC's occurred through the domestic use of groundwater. The available information indicated that residential wells were contaminated with VOC's and that four wells were removed from service when the contamination was discovered. No information was available to indicate the length of time the residents were exposed to these contaminants before the wells were removed from service. Nor was there any information on when the municipal well was contaminated, how many people were served by this well, distribution system dilution factors, etc.

The recommendations are as follows:

1. Provide to remedial workers proper equipment and training in following all appropriate precautions such as the use of personal protective equipment.
2. Implement optimal dust control measures during excavations to reduce suspended particulates and volatilization.
3. Provide ATSDR with historical information including prior to 1980 results concerning sampling and/or monitoring of the residential wells and the municipal well. Conduct well survey in the area to identify all wells and current uses.
4. Develop and implement a monitoring program for other residential wells in the area.
5. Implement institutional controls to prevent installation of drinking water wells within the site area.
6. Unless the plant process water well will be used in the remedial efforts, this well should be properly plugged and abandoned to reduce the vertical flow of contaminants.

7. The potential flow of contaminants from the ground water to the nearby streams should be investigated in the supplemental RI.
8. A survey for any potentially contaminated consumable plants and animals, particularly fish, should be performed.
9. Nonuse of the previously contaminated residential wells should be confirmed during the supplemental RI. Household uses other than drinking water could lead to adverse health effects. Proper plugging and abandonment of all highly contaminated wells should be considered.
10. In accordance with Comprehensive Environmental Response, Compensation, and Liability Act as amended, the Metaltec/Aerosystem site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to off-site contaminants has previously occurred, this site is not being considered for follow-up health studies at this time because no current exposures are occurring and there is no adequate way to evaluate past exposures.

PREPARER OF REPORT

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