

Health Consultation

FRANKLIN BURN SITE

FRANKLIN TOWNSHIP, GLOUCESTER COUNTY, NEW JERSEY

CERCLIS NO. NJD986570992

FEBRUARY 13, 1997

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

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.

HEALTH CONSULTATION

FRANKLIN BURN SITE

FRANKLIN TOWNSHIP, GLOUCESTER COUNTY, NEW JERSEY

CERCLIS NO. NJD986570992

Prepared by:

New Jersey Department of Health
Environmental Health Service
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The Franklin Burn site is located in Franklin Township, Gloucester County, New Jersey (please see inset). The site is actually comprised of seven separate parcels of land (denoted as sub-sites 1 to 7; see figure 2). Of the seven sub-sites, five are located along a portion of the Hayes Branch (sub-sites 1,3,4,5 and 6), located north of Marshall Mill Road.

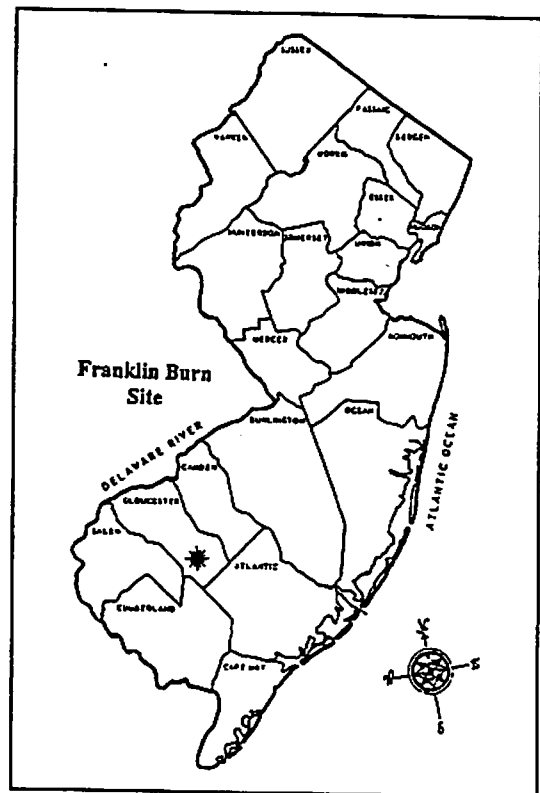
Sub-site 2 is located approximately 2.5 miles to the north of sub-sites 1,3,4,5, and 6. Sub-site 7 is located approximately 1 mile to the northeast of the clustered sub-sites (1,3,4,5, and 6), and 2,000 feet northwest of Marshall Mill Road.

Federal and State investigations of the site indicate that unpermitted copper reclamation activities occurred at the sub-site locations, beginning in the late 1960s. Piles of scrap insulated copper wire, and possibly capacitors and/or transformers were placed on the ground surface and ignited to remove paint and insulation so that the remaining copper could be recovered for sale. The burning operations resulted in the generation of ash piles containing hazardous substances and ranging in size (area) from approximately 480 to 15,000 square feet. All of the ash piles were created through similar activities and contain similar hazardous substances.

The site burning operations are reported to have ceased in 1988 and have remained inactive since that time.

In 1986, New Jersey Department of Environmental Protection (NJDEP) investigated sub-site 1 and 2, and detected heavy metals in the soils, including cadmium (197 ppm), chromium (121 ppm), copper (63,700 ppm), lead (13,700 ppm), nickel (131 ppm), and zinc (924,800 ppm).

In February 1989, the NJDEP requested the United States Environmental Protection Agency (USEPA) to assume the lead role in the assessment and remediation of sub-sites 1 and 2.



Statement Of The Issues

This Health Consultation is being performed by the New Jersey Department of Health to evaluate the public health significance of potential human exposure pathways associated with the Franklin Burn site(s). The exposure pathways being considered are the chronic ingestion and/or inhalation of contaminated soil and dust for residents living near by the Franklin Burn site(s), and contamination of domestic potable wells.

Analysis of site data and information, direct site observation, and community concerns have indicated that a completed human exposure pathway to on-site soils and ash existed prior to remediation at sub-site 5 only. Contaminants of concern at this location included polychlorinated dibenzo-dioxins (dioxins), polychlorinated dibenzofurans (furans), and heavy metals. Because of the limited accessibility to other sub-site locations, completed exposure pathways to on-site soils and ash probably did not exist.

Remedial History

Soil Contamination Investigations

Sub-sites 1 and 2

In May 1989, the USEPA conducted a removal assessment of the ash piles associated with sub-sites 1 and 2. Chemical analysis of the ash material indicated the presence of chlorinated dioxins, furans, polychlorinated biphenyls (PCBs), pesticides, and heavy metals. Removal actions initiated by the USEPA included the erection of separate perimeter chain-link fencing around sub-site 1 and sub-site 2, and the stabilization of the ash and contaminated soil on these two sub-sites with a soil bonding polymer(semi-pave) to minimize the generation and migration of dust. In May 1991, the USEPA conducted an assessment of sub-sites 1 and 2 for their potential inclusion on the National Priorities List (NPL). Maximum concentrations of contaminants detected in soil at Franklin Burn sub-site 1 included copper (176,000 ppm), lead (25,500 ppm), nickel (170 ppm), zinc (142,000 ppm), chromium (106 ppm), aroclor 1260 (106 ppm), dioxins (34 ppb), and furans (34 ppb). During the assessment of sub-sites 1 and 2, four additional sites, referred to as sub-sites 3, 4, 5 and 6, were discovered. In April 1992, the USEPA initiated a contamination study at sub-sites 3, 4, 5, and 6.

Sub-site 3

A total of 45 soil samples were collected from the ash pile at sub-site 3. Inorganic contaminants were detected in 36 of the 45 soil samples. The maximum reported concentrations of contaminants included copper (107,732 ppm), zinc (27,970 ppm), lead (34,289 ppm), tin (4,606 ppm), and antimony (10,777 ppm). Reported results of the organic analyses indicated that dioxin/furans was present at 19.2 ug/kg (2,3,7,8-tetrachlorodibenzo-p-

dioxin [TCDD] toxicity equivalents [TEQ]). No PCBs were detected.

Sub-site 4

A total of 42 soil samples were collected from ash pile at sub-site 4. Inorganic contaminants were detected in 36 of the 42 soil samples. The maximum reported concentrations of contaminants included copper (732 ppm), zinc (258,114 ppm), and antimony (256 ppm). No PCBs were detected.

Sub-site 5

A total of 116 soil samples were collected from surface and subsurface locations in the ash pile and the surrounding soils at sub-site 5. Inorganic contaminants were detected in 108 of the 116 soil samples. The maximum reported concentrations of contaminants included copper (113,683 ppm), zinc (70,874 ppm), lead (41,883 ppm), tin (4,169 ppm), and antimony (11,265 ppm). Reported results of the organic analyses concluded that dioxin/furans was present at sub-site 5 at 1.6 ug/kg (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD] toxicity equivalents [TEQ]). No PCBs were detected in the samples collected from sub-site 5.

Sub-site 6

A total of 54 soil samples were collected from surface and subsurface locations, and from the ash pile at sub-site 6. Inorganic contaminants were detected in 40 of the 54 collected samples. The maximum reported concentrations of contaminants included copper (84,198 ppm), zinc (23,535 ppm), lead (24,225 ppm), tin (1,088 ppm), and antimony (2,670 ppm).

Sub-site 7

In July 1992, a seventh sub-site was identified . In September 1992, the USEPA expanded the contamination delineation investigation to characterize contaminants at sub-site 7. Twelve soil samples were collected from sub-site 7. Based on the analytical results, the maximum reported concentrations of contaminants included copper (190,000 ppm), zinc (12,000 ppm), lead (12,000 ppm), tin (560 ppm), and chromium (1,212 ppm).

Groundwater Contamination Investigations

The Kirkwood-Cohansey aquifer system is the predominant aquifer that underlies the region. At sub-site 1,3,5 and 6, groundwater appears to be moving west towards Hayes Branch. Most of the residences in the area of sub-sites 1 to 7 have domestic potable wells. In September 1992, the USEPA conducted groundwater investigations in the vicinity of all seven sub-sites by installing temporary monitoring wells at each of the sub-sites.

Monitoring Wells

Sub-site 1

A groundwater quality investigation was completed at sub-site 1 during September 1992. Five groundwater samples were collected with a "Geoprobe" groundwater sampler. The analytical results for VOCs indicated presence of acetone. However, the acetone was also found in the laboratory blank indicating the presence of acetone in groundwater samples as laboratory contaminant. No other organic compounds were detected. The maximum reported concentrations of inorganic contaminants included aluminum (28,000 ppb), barium (62 ppb), chromium (28 ppb), copper (66 ppb), zinc (57 ppb), manganese (298 ppb) and lead (16 ppb).

Sub-site 2

A groundwater quality investigation was completed at sub-site 2 during September 1992. Four groundwater samples were collected with a "Geoprobe" groundwater sampler from locations around the ash pile. The analytical results for VOCs indicated presence of acetone. However, the acetone was also found in the laboratory blank. No other organic compounds were detected. The maximum reported concentrations of inorganic contaminants included aluminum (56,000 ppb), barium (340 ppb), chromium (51 ppb), zinc (28 ppb), and lead (8 ppb).

Sub-site 3

A groundwater quality investigation was completed at sub-site 3 during September 1992. Four groundwater samples were collected with a "Geoprobe" groundwater sampler. Acetone and methylene chloride, both of which are common laboratory contaminants, were detected at low concentrations in the groundwater. The maximum reported concentrations of inorganic contaminants included aluminum (93,000 ppb), barium (73 ppb), chromium (7 ppb), copper (38 ppb), zinc (72 ppb), and lead (33 ppb).

Sub-site 4

A groundwater quality investigation was completed at sub-site 4 during September 1992. Four groundwater samples were collected with a Geoprobe groundwater sampler. The analytical results for VOCs indicated presence of acetone. However, the acetone was also found in the laboratory blank. No other organic compounds were detected. The maximum reported concentrations of inorganic contaminants included aluminum (8,600 ppb), barium (58 ppb), chromium (24 ppb), and zinc (13 ppb).

Sub-site 5

A groundwater quality investigation was completed at sub-site 5 during September 1992. Four groundwater samples were collected with a "Geoprobe" groundwater sampler. The analytical results for VOCs indicated presence of acetone. However, the acetone was also found in the laboratory blank. No other organics were detected. The maximum reported concentrations of inorganic contaminants included aluminum (1,900 ppb), barium (130 ppb), copper (16 ppb), and zinc (14 ppb).

Sub-site 6

A groundwater quality investigation was completed at sub-site 6 during September 1992. Three groundwater samples were collected with a "Geoprobe" groundwater sampler. No organic compounds were detected. The maximum reported concentrations of inorganic contaminants included aluminum (1,700 ppb), barium (98 ppb) and chromium (10 ppb).

Sub-site 7

A groundwater quality investigation was completed at sub-site 7 during September 1992. Five groundwater samples were collected with a "Geoprobe" groundwater sampler. The analytical results for VOCs indicated presence of acetone. However, acetone was also found in laboratory blank. No other organic compounds were detected. The maximum reported concentrations of inorganic contaminants included aluminum (36,000 ppb), barium (110 ppb), chromium (180 ppb), copper (980 ppb), zinc (230 ppb), and lead (110 ppb). Based on the results of groundwater sample analyses, the USEPA had determined need for additional groundwater investigations at sub-sites 1, 3, 5, 6, and 7.

Residential Well Sampling

Most of the residences in the area of sub-sites 1,2,3,4,and 5 have domestic potable wells. During preliminary groundwater investigation conducted by USEPA, no residences could be located in the vicinity of sub-sites 6 and 7. The sub-site 6 is the empty lot across from sub-site 5.

Sub-sites 1, 3, and 4

In May 1991, the USEPA conducted groundwater investigations in the vicinity of sub-site 1, 3, and 4. Four samples were collected from three domestic wells used for potable purposes. A common laboratory contaminant, 2-butanone, was detected in one sample. No other organic compounds were detected. The maximum reported concentrations of inorganic contaminants included copper (145 ppb), iron (142 ppb), manganese (1,250 ppb estimated value), zinc (1,940 ppb estimated value) and lead (5.8 ppb).

Sub-site 2

In May 1991, the USEPA conducted groundwater investigations in the vicinity of sub-site 2. Seven samples were collected from six domestic wells used for potable purposes. A common laboratory contaminant, bis(2-ethylhexyl)phthalate, was detected in one sample. No other organic compounds were detected in the domestic well samples. The maximum reported concentrations of inorganic contaminants included copper (315 ppb), iron (256 ppb), manganese (91.2 ppb), zinc (36.3 ppb estimated value) and lead (7.9 ppb).

Sub-site 5

Water samples collected from the domestic well did not show any site related contaminants. As part of removal activities at sub-sites 5, the USEPA replaced the septic system and installed a new potable well for the residence located at sub-site 5.

Summary

Residential well sampling data did not indicate the presence of contaminants exceeding ATSDR drinking water comparison values or New Jersey State primary drinking water standards (maximum contaminant levels). New Jersey State secondary drinking water standards, which are primarily aesthetic, were exceeded for manganese (50 ppb) at sub-sites 1,2,3 and 4. Lead concentrations exceeded the proposed maximum contaminant level goal (MCLG) of 0 ppb, but not the 15 ppb action level set by USEPA. The action level is not a maximum contaminant level (MCL), it is a level at which removal and/or remedial action is to take place.

Additional groundwater samples will be collected from new monitoring wells to be drilled at sub-sites 1, 3, 5, 6 and 7, and from existing residential wells. These samples will be analyzed to obtain data on groundwater quality on and around the sub-sites.

Soil Removal Activities

In March 1993, the USEPA initiated additional removal activities at sub-sites 1, 2, and 3 which included the excavation of contaminated soil and on-site stockpiling of contaminated soil and ash. In addition, a temporary "cap" was constructed and drainage controls were implemented as necessary.

The ash and contaminated soil at sub-sites 4, 5, 6, and 7 have been excavated and transported to an off-site facility for stabilization and disposal. Post-excavation soil sampling was conducted to verify that the soil excavation activities were effective in removing the hazardous substances. Excavated areas have been filled with clean soil. The USEPA completed all removal activities at sub-sites 4, 5, 6, and 7 in May 1993.

Remedial Investigation/ Feasibility Study

The USEPA completed a remedial investigation/ feasibility study in February 1994.^(1,2) The purpose of this RI/FS, was to perform a limited investigation of the nature and extent of contamination at the site, and was limited to the following:

- 1) The nature of contamination in each of the consolidated soil/ash piles at sub-sites 1, 2 and 3 relative to potential treatment/disposal alternatives;
- 2) Groundwater contamination at sub-sites 1, 3, 5, 6 and 7;
- 3) Surface water and sediments contamination in wetlands, along the Hayes Branch, adjacent to, or on, sub-sites 1, 5, and 6;
- 4) Groundwater samples will be collected from new monitoring wells to be drilled at sub-sites 1, 3, 5, 6 and 7, and from existing residential wells and will be analyzed to obtain data on groundwater quality on and around the site.

ATSDR Activities

In September 1991, the USEPA requested the ATSDR to comment on appropriateness of proceeding with the removal action at Franklin Burn sub-sites 3, 4, and 5. The entire sub-site 5 was located in the yard of a private residence. Migration of ash had discolored soil in the front yard and driveway. Children were observed playing on the ash area during site visit by the USEPA. Based on site conditions at that time, the October 1991 health consultation concluded that the concentration of metals detected at the Franklin Burn sub-sites 3, 4, and 5 were at levels that may pose a threat to the public health and remedial measures would be justified.⁽³⁾ The human exposure pathway of concern identified in the report was the ingestion of contaminated soils (and dusts) by children playing near the ash piles. The report also concluded that children are sensitive to neurological effects resulting from lead exposure. Soil concentrations of 500 - 1000 mg/kg can begin to effect blood lead levels of children residing in these areas. The concentrations of chromium, antimony and zinc were at levels that would result in doses above the USEPA chronic reference doses for these metals, based on a 10 kg child ingesting 200 mg of soil per day.

In November 1992, the USEPA requested the ATSDR to review results of dust samples acquired from inside a residence on site. The USEPA was planning a soil removal at the site and wanted to know if the contamination inside the house would pose a health threat of sufficient magnitude to warrant inclusion in the remediation effort. Two adults and five young children live in the house. They were temporarily relocated during the removal action. Dust samples were collected from the carpeting, rugs, a couch, and the linoleum floor in the kitchen using a HEPA vacuum. The dust was analyzed for heavy metals. The analyses of dust sample indicated presence of heavy metals including lead (540 ppm),

barium (210 ppm), arsenic (17 ppm), copper (1,500 ppm), chromium (40 ppm), nickel (45 ppm), antimony (17 ppm) and zinc (720 ppm). Based on the level of contaminants detected, the November 1992 health consultation concluded that the lead was the only contaminant found at levels that would represent a health threat.⁽⁴⁾ The concern would be for the children living in the house who may ingest lead contaminated dust. The children were at increased risk since their developing nervous system are more vulnerable to lead's toxic effects. The consultation recommended that after remediation of the contaminated soil, the inside of the house should be thoroughly cleaned to limit recontamination.

Current Conditions of Site

On January 31, 1996, James Pasqualo and Narendra P. Singh of the New Jersey Department of Health (NJDOH) and Matt Westgate, USEPA Remedial Project Manager visited the Franklin Burn sites.

Since the 1992 ATSDR Health Consultations, conditions at the Franklin Burn sub-sites have changed physically. Removal activities at sub-sites 1, 2, and 3 have been completed. All ash and contaminated soil had been excavated and stockpiled on-site, and temporary caps had been placed over the piles.

Sub-sites 1, 2, and 3 are fenced and there is limited accessibility to sub-site 4 and 7. At sub-sites 4 and 7, all contaminated soil and ash has been excavated and transported to an off-site facility for stabilization and disposal.

At sub-sites 5 and 6, all contaminated soil above the water table has been excavated and transported to an off-site facility for stabilization and disposal. At sub-sites 4, 5, 6, and 7, excavated areas have been backfilled with clean soil. Sub-site 5 currently contains a single family residence occupied by a family of 7 people.

Health Outcome Data Evaluation

There are multiple sources of health outcome data in the state of New Jersey. State and local data for health outcome information include the New Jersey State Cancer Registry, Birth Defects Registry, Vital Statistics Records, Renal Dialysis Network and Hospital Discharge Reports. Federal databases such as those maintained by the agencies within the US Department of Health and Human Services (i.e., National Cancer Institute, National Institute for Occupational Safety and Health) are not site-specific, but may be used for comparison or evaluation purposes. Health outcome data was not reviewed for this site. There were approximately 10 to 12 people exposed to the contaminants at sub-site 5. Of these, seven were full time residents. Thus, health outcome data for the sub-site 5 were not reviewed as the population size was too small for the application of relevant data bases to yield statistically significant results.

Demographics

Sub-sites 1 through 7 are located in rural areas and are comprised of residential yards and open fields. Of the seven sub-sites, five are located along a portion of the Hayes Branch (sub-sites 1,3,4,5 and 6), located north of Marshall Mill Road. The population surrounding sub-site 1,3,4,5 and 6 is approximately 500 within a one-mile radius. Sub-site 2 is located approximately 2.5 miles to the north of sub-sites 1,3,4,5,and 6. The population surrounding sub-site 2 is approximately 5,000 within a one-mile radius. Sub-site 7 is located approximately 1 mile to the northeast of sub-sites 1,3,4,5, and 6, and 2,000 feet northwest of Marshall Mill Road. Sub-site 7 does not contain a population within one mile radius.

A summary of population statistics calculated using an area-proportion spatial analysis technique, within one mile of the sub-site 1,2,3,4,5 and 6 is presented in Table 1. Franklin Township, has a population of approximately 20,000 people. Only sub-site 5 is located in the private yard of a residence. Areas surrounding the other sub-sites are sparsely populated. The location of residences around these sub-sites varies in distance from 100 to 200 feet.

Table 1 - Summary Statistics Within One Mile of the Sub-site 1,2,3,4,5 and 6

Total Number of People	2,306
Children aged 6 and younger	269
Adults aged 60 and older	585
Females aged 15 - 45	151
White	2,045
Black	230
American Indian, Eskimo, Aleut	1
Asian or Pacific Islander	6
Other	24
Hispanic Origin	52
Total Housing Units	755

Community Health Concerns Evaluation

Residents had expressed concerns regarding potential health effects associated with exposure to site related contaminants, especially for children living adjacent to sub-site 5 who used the area for recreational purposes. The significance of this exposure is addressed in the Public Health Implications section.

In April 1992, the Gloucester County Health Department tested 5 children for blood lead levels who live at sub-site 5. The range of blood lead levels detected were 3 to 4 ug/dl. The lead levels detected in their blood were not indicative of significant lead exposure and were not at levels expected to cause adverse health effects. None of the blood lead levels exceeded the 10 ug/dl blood lead level (elevated level) cited in the ATSDR Toxicological Profile for Lead.⁽⁹⁾

The removal actions taken by the USEPA has isolated site contaminants and precluded any current exposure potential to soil contamination. In addition, current private potable well data does not indicate site related contaminants at levels of public health significance. The ATSDR/NJDOH have not identified any additional community health concerns associated with the Franklin Burn site(s).

DISCUSSION

Pathways Analyses

To determine whether residents at sub-site 5 were exposed to contaminants, NJDOH evaluates the environmental and human components that lead to human exposure. This pathways analysis consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) route of human exposure; and (5) an exposed population.

NJDOH classifies exposure pathways into three groups: (1) "completed pathways", that is, those in which exposure has occurred, is occurring, or will occur; (2) "potential pathways", that is, those in which exposure might have occurred, may be occurring, or may yet occur; and (3) "eliminated pathways", that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified.

Eliminated Pathways

On-Site Soils

Site data and information suggest the presence of a completed exposure pathway in the past for on-site soils for sub-site 5. Remedial progress has eliminated the potential for present or future human exposure to on-site soils for all sub-sites including sub-site 5.

Completed Exposure Pathway

Current Domestic Potable Wells

Current site data and information indicates that a completed exposure pathway via ingestion does exist in the vicinity of sub-sites 1, 2, 3, and 4. The presence of low levels of inorganic contaminants including copper, lead, zinc, iron and manganese were detected in domestic potable wells. However, domestic well sampling data did not indicate the presence of inorganic contaminants exceeding ATSDR drinking water comparison values or New Jersey State primary drinking water standards (maximum contaminant levels criteria). The New Jersey State's secondary drinking water standards, which are primarily aesthetic, were exceeded for manganese (50 ppb) at sub-sites 1,2,3 and 4. Lead concentrations exceeded the proposed maximum contaminant level goal (MCLG) of 0 ppb, but not the 15 ppb action level set by USEPA. The action level is not a maximum contaminant level (MCL), it is a level at which removal and/or remedial action is to take place.

Additional groundwater samples will be collected from new monitoring wells to be drilled at sub-sites 1, 3, 5, 6 and 7, and from existing domestic wells. These samples will be analyzed to obtain data on groundwater quality on and around the sub-sites. Should future data indicate a need, this pathway will be re-evaluated.

Past Residential Soils

The human exposure pathway of concern to be evaluated (as identified in previous ATSDR Health Consultations) is the ingestion of contaminated soils and dusts by children playing near the ash piles at sub-site 5. Sub-site 5 is located in the yard of a private residence, and posed a direct threat to residents, especially children, living at or nearby the site. The residence at sub-site 5 is occupied by a family of 7 people including 5 children. The potential for exposure existed from around 1970 until 1992 when the soil removal operation began. Approximately 10-12 persons were likely chronically exposed to site related contaminants through this pathway. Presently, all contaminated soils above the water table has been excavated and have been backfilled with clean soil thus eliminating the source of contamination and interrupting the pathway for current and future exposure.

Public Health Implications

This section contains discussion of the health effects in persons exposed to specific contaminants (for completed pathways), health outcome data, and addresses specific community health concerns. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease.

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimal Risk Level (MRL) and the USEPA's Reference Dose (RfD). When exposure (or dose) is below the MRL or RfD, then non-cancer adverse health effects are unlikely to occur. MRLs are developed for each type of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRLs in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effects of the contaminants detected in the environmental media has been considered on an individual basis. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

Federal and State investigations of sub-site 5 indicate that unpermitted copper reclamation activities began approximately in 1970 and continued until 1992 (22 years). The maximum reported concentrations of contaminants included lead (41,883 ppm) and tin (4,169 ppm). Reported results of the organic analyses indicated that dioxin/furans was present at sub-site 5 at 1.6 ug/kg (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD] toxicity equivalents [TEQ]).

The toxicological evaluation of the completed exposure pathway at the sub-site 5 is based upon an adult exposure duration of twenty-two (22) years, and a duration of 10 years for children. Exposure dose calculations were based upon the maximum concentrations detected, thus representing a worse case exposure scenario.

In evaluating the toxicological significance of past exposure of adult residents to heavy metals and dioxin in soils, the following assumptions were made: a body weight of 70 kg and an ingestion rate of 100 mg/day. For children, the following assumptions were made: a body weight of 20 kg and an ingestion rate of 200 mg/day.

Lead

There is no current MRL or RfD for chronic oral exposure for lead. Inhaling or ingesting more than 500-1,000 micrograms of lead per gram of soil was a range previously considered by the CDC that could cause elevated blood lead levels in children. However, the CDC has since withdrawn this guideline due to the seriousness of lead exposure among children. Based on the assumptions cited above and the maximum levels of lead detected in soil samples at sub-site 5, the estimated exposure dose for children (0.42 mg/kg/day) was above the Lowest Observed Adverse effect levels (LOAEL) for cardiovascular effects in rats, and above the LOAEL for serious neurological effects in monkeys cited in the ATSDR Toxicological Profile for Lead.

As previously stated, the Gloucester County Health Department performed lead screening for the 5 children residing at sub-site 5. The blood lead levels of the children exposed to site related contaminants were in the range of 3 to 4 ug/dl. The lead levels detected in their blood were not indicative of significant lead exposure and were not at levels expected to cause adverse health effects.

The estimated exposure dose for adults (5.9×10^{-2} mg/kg/day) was above the Lowest Observed Adverse effect levels (LOAEL) for cardiovascular effects in rats, and slightly below the LOAEL for serious neurological effects in monkeys cited in the ATSDR Toxicological Profile for Lead.⁽⁵⁾ At such levels non-carcinogenic adverse health outcomes among non-hypersensitive adults are not likely.

Lead is considered by the USEPA to be a probable human carcinogen. However, there are limited data describing the carcinogenicity of lead in humans. A cancer slope factor for lead has not been established; lifetime excess cancer risk estimates could not be calculated at this juncture.

Tin

There is no current MRL or RfD for chronic oral exposure for tin. The inorganic tin compounds usually enter and leave the human body rapidly when person breath or eat them, not causing harmful effects. Human and animal studies show that large amounts of tin compounds can cause stomachaches, anemia, liver and kidney problems. Based on the maximum levels of tin detected in soil samples at the sub-site 5, estimated exposure doses were below the No Observed Adverse Effect Level (NOAEL) for chronic exposure in animals, for effects other than cancer as cited in the ATSDR Toxicological Profile for Tin.⁽⁶⁾ At such levels adverse health effects among non-hypersensitive adults or children are not likely. There is no evidence that tin or it's compounds cause cancer in humans. Animal studies show that inorganic tin compounds do not cause cancer in rats and mice.

Dioxins/Furans (Dioxin Equivalent)

Reported results of the organic analyses concluded that dioxins/furans were present at sub-site 5 at 1.6 ug/kg (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD] toxicity equivalents [TEQ]). Dioxin equivalent concentrations were calculated using USEPA's 1987 Toxic Equivalency Factors (TEF). The calculation is based on a hypothetical scenario where all of the highest results were found together in one location. Furthermore, the scenario assumes that within each of the isomer groups, only the most toxic isomer is present; an assumption which is very unlikely.

Exposure to tetrachlorodibenzo-p-dioxin (TCDD) probably occurred in the residents and children who played on the site through ingestion of dioxin contaminated soil. ATSDR currently maintains a policy where residential surface soil concentrations of 1.0 ppb (or less) of dioxin are considered protective of the public health.

The estimated exposure dose for adults is same order of magnitude as the chronic oral Minimal Risk Level (MRL) of 0.000000001 (1×10^{-9}) mg/kg/day. The estimated exposure dose for children, however, slightly exceeds this MRL. Exposure doses do not exceed the no observed adverse effect levels (NOAELs) for chronic exposure in animals (for effects other than cancer) cited in the ATSDR Toxicological Profile for this compound. The present evaluation is based on dioxin equivalent in soil samples, it is highly unlikely that adults or children who played on the site will suffer any adverse health effects from their exposure to dioxins/furans.

Studies have shown that dioxin is a possible human carcinogen, and is associated with soft tissue sarcomas. There is no current oral carcinogenic slope factor from which to calculate a Lifetime Excess Cancer Risk (LECR) for dioxin exposure at the site. However, calculated exposure doses yield an estimated human cancer risk level representing an insignificant or no increased risk of cancer in adults and children, based on the information presented in the ATSDR Toxicological Profile for Dioxin.⁽⁷⁾

CONCLUSIONS

- 1) The Franklin Burn site(s) represented a public health hazard in the past. Based upon the exposure assumptions cited above, adults and children were likely exposed to lead in soils at sub-site 5 at levels of public health concern. The potential for exposure existed from around 1970 until 1992, when the soil removal operation began. Presently, all contaminated soils above the water table has been excavated and have been backfilled with clean soil thus eliminating the pathway for current and future exposure.
- 2) There is no current MRL or RfD for chronic exposure for lead. Inhaling or ingesting more than 500-1000 micrograms of lead per gram of soil was a range previously considered by CDC that could cause elevated blood lead levels in children. The blood lead levels of the children exposed to site related contaminants were in the range of 3 to 4 ug/dl. The lead levels detected in their blood were not indicative of significant lead exposure and were not at levels expected to cause adverse health effects. While other sub-sites were frequented to the degree necessary to comprise a significant exposure dose for adults and children.
- 3) Past exposures to dioxin were evaluated. Based on a dioxin concentration of 1.6 ppb, exposure doses calculated for residents (adults) were the same order of magnitude as the chronic oral Minimal Risk Level (MRL) of 0.000000001 (1×10^{-9}) mg/kg/day. The estimated exposure dose for children, however, slightly exceeded this MRL. Calculated exposure doses do not exceed the no observed adverse effect levels (NOAELs) for chronic exposure in animals (for effects other than cancer). Calculated exposure doses give an estimated human cancer risk level representing an insignificant or no increased risk of cancer in adults and children, based on the information presented in the ATSDR Toxicological Profile for Dioxin.⁷⁾ The quantitative risk mentioned above, which is based on a worst-case scenario, represents an insignificant or no increased risk of cancer in adults and children. It is highly unlikely that children who played on the site will suffer any adverse health effects from their exposure to dioxin/furans.
- 4) Current human exposures are occurring from domestic potable wells through ingestion pathways in the vicinity of the Franklin Burn sub-sites 1, 2, 3, and 4. However, the detected concentrations of the inorganic contaminants were below ATSDR drinking water comparison values, and below New Jersey primary drinking water standards (maximum contaminant levels). The New Jersey secondary drinking water standards, which are primarily aesthetic, were exceeded for manganese (50 ppb) at sub-sites 1,2,3 and 4. Lead concentrations exceeded the proposed maximum contaminant level goal (MCLG) of 0 ppb, but not the 15 ppb action level set by USEPA. The action level is not a maximum contaminant level (MCL), it is a level at which removal and/or remedial action is to take place.

RECOMMENDATIONS

- 1) Concerns about on-going exposure to the contaminated groundwater exist. It is therefore recommended that monitoring of the domestic potable wells continue for sub-sites 1, 2, 3, and 4 to evaluate levels of inorganic compounds.
- 2) Results of the on-going environmental monitoring program for groundwater quality (specifically sub-sites 1-7) should be periodically reviewed for public health significance when available. Should the data indicate a change in site conditions, it will be evaluated within the context of potential public health implications.

RECOMMENDATIONS OF THE HEALTH ACTIVITIES RECOMMENDATIONS PANEL (HARP)

The data and information developed in the health consultation for the Franklin Burn site, Franklin Township, Gloucester County, New Jersey, has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow-up with respect to health actions. The panel determined that the community health education and health professional education being conducted by the New Jersey Department of Health are the appropriate follow-up health activities. The panel also suggested that further well monitoring be continued. No other follow-up actions are indicated at this time.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Franklin Burn site contains a description of the actions to be taken at or in the vicinity of the site. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. ATSDR/NJDOH will provide an annual follow-up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this site review and update, and will be provided to persons who request it. The public health actions taken or to be implemented are as follows:

Actions Undertaken by ATSDR/NJDOH

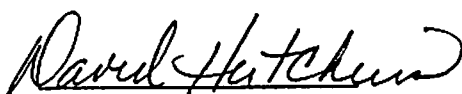
1. A physician newsletter, *Health and Hazardous Waste*, prepared by Environmental Health Service (EHS) has been sent to 158 Gloucester County physicians.

Actions Planned

1. The NJDOH is assessing the need for additional outreach to the community regarding the Franklin Burn site(s). Dependant on need, an availability session will be conducted to document and address community concerns.
2. Physician education, in form of appropriate Case Studies in Environmental Medicine and Gloucester County Environmental Resource Guides for Health Care Professionals, will be provided to area physicians.
3. This consultation will be provided to the Gloucester County Health Department to convey NJDOH concerns regarding secondary contamination in potable wells.

CERTIFICATION

The Public Health Consultation for the Franklin Burn site was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Public Health Consultation was initiated.



Technical Project Officer, SPS, SSAB, DHAC

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



Section Chief, SPS, SSAB, DHAC, ATSDR

DOCUMENTS REVIEWED

1. Superfund Accelerated Cleanup Model Remedial Investigation/Feasibility Study Draft Final Work Plan Volume I, Franklin Burns Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., February 1994.
2. Superfund Accelerated Cleanup Model Remedial Investigation/Feasibility Study Draft Final Field Sampling Plan, Franklin Burns Site, Franklin Township, Gloucester County, New Jersey. Malcolm Pirnie, Inc., February 1994.
3. Health Consultation Report, Franklin Burn Site (sub-site 5), Franklin Township, Gloucester County, New Jersey. ATSDR, November 1992.
4. Health Consultation Report, Franklin Burn Site (sub-site 3,4, and 5), Franklin Township, Gloucester County, New Jersey. ATSDR, October 1991.
5. Toxicological Profile for Lead. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. April 1993.
6. Toxicological Profile for Tin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. September 1992.
7. Toxicological Profile for Dioxin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. June 1989.

INTERVIEWS/PERSONAL COMMUNICATIONS:

1. Site Remediation Program, USEPA/Site Manager.
2. Gloucester County Health Department/Senior Environmental Specialist.

PREPARERS OF REPORT

Preparer of Report:

Narendra P. Singh, M.D., M.S., C.I.H.
Research Scientist
ATSDR Health Assessment Project
Environmental Health Service
New Jersey Department of Health

ATSDR Regional Representative:

Arthur Block
Senior Regional Representative; Region II
Regional Operations
Office of the Assistant Administrator

ATSDR Technical Project Officer:

David Hutchins
Environmental Health Scientist
Superfund Site Assessment Branch
Division of Health Assessment and Consultation

Any questions concerning this document should be directed to:

ATSDR Project Manager
Environmental Health Service
New Jersey Department of Health
210 South Broad Street
CN 360
Trenton, NJ 08625-0360

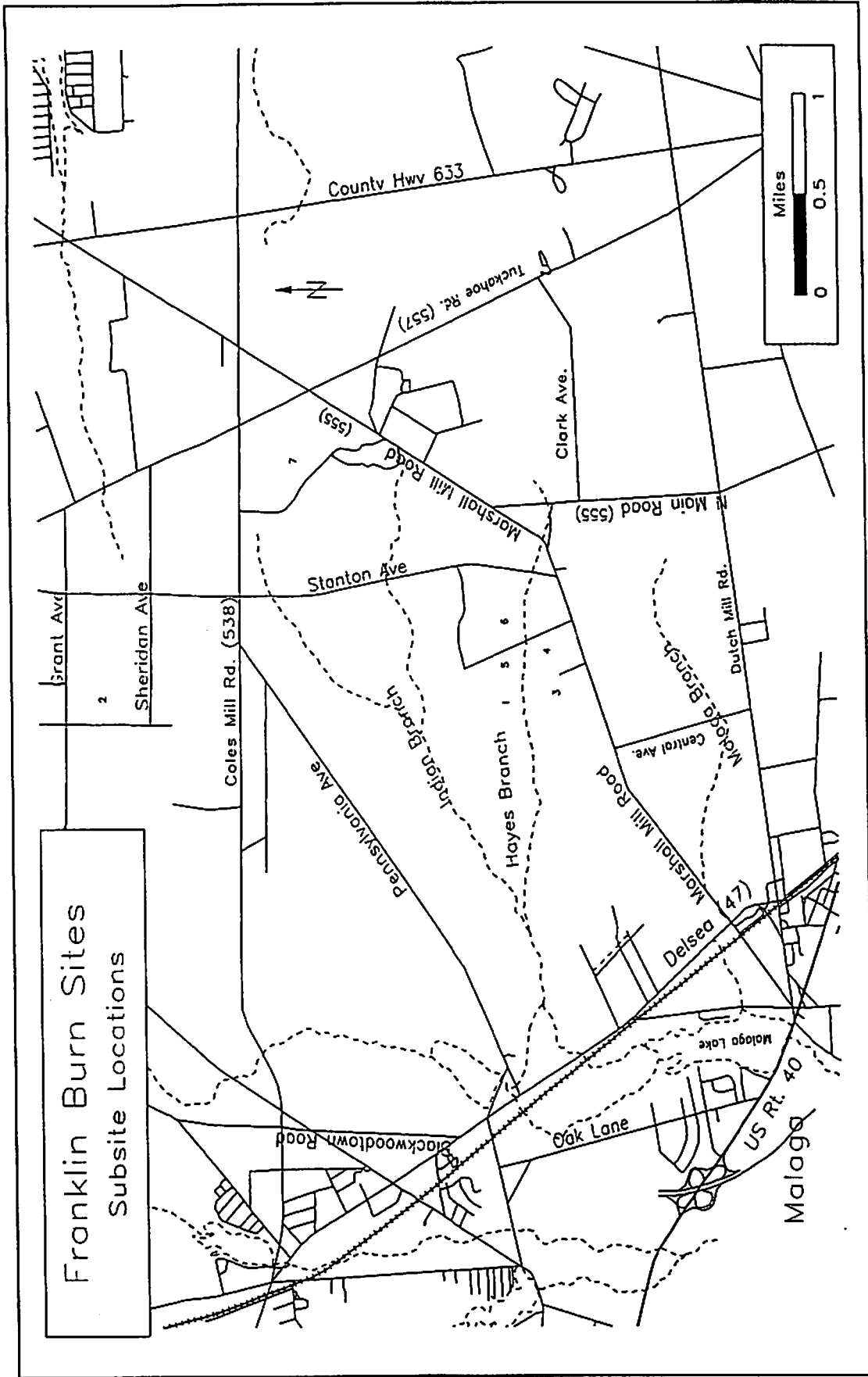


Figure 2 - Franklin Burn; Sub-site Locations