

Health Assessment for

VINELAND STATE SCHOOL

CERCLIS NO. NJD980529887

VINELAND TOWNSHIP, CUMBERLAND COUNTY, NEW JERSEY

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

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

**HEALTH ASSESSMENT
VINELAND DEVELOPMENTAL CENTER
CUMBERLAND COUNTY
VINELAND TOWNSHIP, NEW JERSEY**

Prepared by:
Environmental Health Service
New Jersey Department of Health

Prepared for:
Agency for Toxic Substances and Disease Registry (ATSDR)

OBJECTIVES

The Remedial Investigation (RI) report on the Vineland Developmental Center has been finalized and a Record of Decision (ROD) was recently signed. Remediation is nearing completion at Site 2.

Vineland Developmental Center has five subsites within the designated main site. This health assessment focuses on public health issues by:

- * assessing current and past health effects that may be associated with the site,
- * identifying any actions, if necessary, that could be taken to prevent exposure to chemicals on the site,
- * identifying potential contaminants of concern and their exposure pathways,
- * addressing public health concerns of area residents and Vineland Developmental Center (VDC) employees,
- * reviewing the data collected during the remedial investigation and identifying data gaps,
- * identifying exposure points where samples need to be taken, and
- * assessing whether a pilot health study of the site is feasible or warranted.

SUMMARY

There are five subsites that make up the VDC site. Contamination of each of these sites were alleged to have occurred in various ways. Electromagnetic survey, soil samples, and groundwater samples taken by New Jersey Department of Environmental Protection (NJDEP) and their consultant failed to identify any area of disposal or gross contamination. Based on the Public Health Investigation in the RI, the United States Environmental Protection Agency (EPA) intends to select the no-action remedial alternative. Groundwater monitoring and a reevaluation every five years will accompany this alternative.

On the basis of the information reviewed, this site is not of public health concern under current conditions because humans are not being exposed to significant levels of hazardous substances. Since human exposure to on-site/off-site contaminants is not documented or indicated, the Vineland Development Center Site is not being considered for follow-up health studies. However, a health study of the Vineland area, incorporating other sites in the region may be warranted.

SITE DESCRIPTION

Vineland Developmental Center, formerly known as Vineland State School, is located on 195 acres in Vineland Township in Cumberland County. It is an institution for persons with mental disabilities and is run by the Department of Human Services. Five distinct subsites have been identified as potentially contaminated by hazardous materials from activity at the school between 1952 and 1976.

Site 1 is the location of a former incinerator ash landfill and was reported to contain mercury and arsenic based rodenticides and pesticides. Site 2 contained PCB contaminated soils that may have originated from decommissioned transformers. Site 3 was allegedly a disposal site for agricultural chemicals that were used on site. Site 4 was reported to have been the site of transformer oil disposal and Site 5 was allegedly a burial site for metal drums and pesticides (RI Report, 1989). The Cohansey-Kirkwood aquifer is the most important source of groundwater for Cumberland County. Nearly all groundwater in the county comes from this aquifer.

In 1980, upon learning of the potential mercury/arsenic dumping at Site 1, NJDEP made an initial visit to assess the

site and interview a retired maintenance supervisor at the school. After several rounds of potable well testing and interviews with former employees, the VDC site was included on the initial list of proposed Superfund sites published by the EPA in 1982. Based upon the results of the RI, EPA intends to select the no-action remedial alternative, based on the interpretation that no further remedial actions are necessary.

SITE VISIT

A site visit was conducted by NJDOH on October 7, 1988. Neither the site nor any subsites were posted as Superfund sites.

At the time of the visit remediation of site 2 was nearing completion. All soil with PCB levels greater than 5 mg/kg was removed from the site. Due to weather conditions, the permanent capping of the site had to be delayed but was to be completed within the next one to two weeks. A temporary chain-link fence was to come down and a permanent one was to be installed around the site. Site 2 had a security officer on watch.

A three foot high snow fence surrounds the central portion of Site 4 but it is down in some spots. All other subsites are unfenced and access is not restricted in any manner.

Site 1 is directly behind a campground area which is still in use. However, the campgrounds are surrounded by a five foot high chain-link fence. According to the Superintendent of VDC, there are plans to use this site for residential cottages with the first phase of construction to be completed within two years.

Site 3 is behind a baseball diamond and youth center which are both still active.

COMMUNITY CONCERNS

The community in the vicinity of the Vineland State School consider the site to be one of several threats to the overall quality of area groundwater. Conversations with concerned citizens identified a history of public concern with regard to the site, and defined the following issues:

- * There are fears of contracting cancer among the older, long-term residents in the area who utilized groundwater for potable purposes prior to the availability of public water.

- * The future contamination of groundwater is a concern of residents in the area who requested that groundwater quality be monitored in the future.
- * There is still concern among residents in the area and workers at VDC that dumping occurred at the site that was not detected during the RI study.
- * In the past, several issues were associated with site #3. These included the nature and extent of the wastes interred there, a stench attributed to the dump which was detected off-site, and the presence of vermin in the area. During its operation, there was a concern over air pollution from the incinerator which was located on site #1.

ENVIRONMENTAL CONTAMINATION

Media that have been sampled at the VDC site include groundwater (monitoring wells and private potable wells) and soil. Due to the varied contamination issues and past histories, each of the five subsites is dealt with separately in this health assessment. Unless otherwise specified, information and data in this section are from the RI report.

Of the nine private drinking wells identified by NJDEP to be sampled during the Phase I investigation, seven could not be sampled. Surface pumps had been disconnected and the well pipes had either been capped or permanently sealed at these locations. One well identified by NJDEP and two alternates were sampled. Lead and mercury were detected at levels slightly above their current Maximum Contaminant Levels (MCLs). In August 1985, EPA sampled 38 wells in Vineland Township for arsenic and mercury, as a component of the Remedial Investigation/Feasibility Study (RI/FS) program at the Vineland Chemical Company (a nearby Superfund site). Neither was found above the detection limits.

Site 1

A landfill and unregulated incinerator had existed at this site in the 1950s and 1960s. Allegedly, ash generated during incineration was buried in the area adjacent to the incinerator, along with 6,000 to 8,000 metal quart containers of mercury and/or arsenic based substances, possibly rodenticides.

The former landfill is located in the east-central portion of the VDC site. It is situated between a campground facility

to the east and a pavilion located in the southwest portion. The study area around the former landfill consists of approximately 3 acres. The site is currently an open, grassy field, sloping gently downward to the north at about a two percent grade.

Monitoring well data indicated bis(2-ethylhexyl)phthalate and dieldrin as the only compounds detected in the groundwater. The presence of the phthalate in the groundwater is questionable since it was detected below the Contract Required Detection Limit (CRDL), was detected in trip blanks, and is a common laboratory contaminant. Dieldrin was detected in a well upgradient from the site at concentrations of 0.10 ug/L and 0.22 ug/L. Although these concentration are above the ambient water quality criteria and the World Health Organization guidance for dieldrin in water, the presence of dieldrin was not confirmed in later testing of the groundwater, the contaminant was detected upgradient of the site, and it is unlikely that high concentration of dieldrin can migrate through soils to groundwater.

Higher concentrations of arsenic, lead, zinc, iron, and manganese were detected in the fill material than in background soil samples. Because ash is generally enriched in metals due to concentration during the combustion of the hydrocarbon materials, higher concentrations of metals in the ash-containing soil are expected. Enrichment to the observed levels for iron, manganese, and zinc does not appear to represent a potential health or environmental hazard. Soil data and the sporadic occurrence of arsenic in groundwater do not support the allegation of a major arsenic based pesticide disposal at Site 1.

Landfill soil contained lead in an average concentration of 166 mg/kg compared to a background of approximately 10 mg/kg. New health based lead levels which are based on the ingestion of lead-tainted soil by children allow 250 mg/kg in soil if the site is accessible by children (NJDOH, 1986). Although the subsurface soils at Site 1 contain lead at concentrations above background, only sporadic low levels of this element were observed in groundwater.

Site 2

Site 2 was used as a storage area in which three transformers containing PCBs were stored. In the mid-1970s, they were removed from the site by a scrap metal company. During removal, PCB oil and/or PCB contaminated transformer fluids were spilled. Since then, vehicles and natural

transport mechanisms have spread PCB contamination over an approximately one acre area.

PCBs were found in the soil at concentrations up to 725 mg/kg. Concentrations decreased with depth and no PCBs were detected below a depth of 15 feet. Soils containing greater than 5 ppm of PCB have been removed from the site. Soils containing between 1 ppm and 5 ppm of PCBs will be capped on site.

Site 3

This site is a former landfill which allegedly accepted agricultural chemicals and incinerator ash. Reportedly, this location was used by the school as a refuse dump for an approximate ten year period during the 1950s and early 1960s.

Site 3 consists of approximately five acres in the northern half of the VDC property bordered on the north by a city park, on the west by the backyards of the residences on Becker Drive, on the east by the higher elevation, open property, and on the south by the newly built recreational building and seven other buildings that comprise the Residential Center. The heart of the site lies approximately 2,100 feet north of Site 1. Site 3 is an open grassy field, the southeast portion of which is presently a baseball field.

Analytical results from the five Site 3 monitoring wells indicated the presence of acetone and bis(2-ethylhexyl)phthalate. However, these contaminants are likely to be laboratory contamination since they were also present in the trip blank samples.

In the soil samples, polycyclic aromatic hydrocarbons (PAHs) were detected. These compounds are a diverse class of compounds formed during the incomplete combustion of organic materials and would be expected to occur in an ash-containing soil. The total concentrations of PAHs in the soil samples ranged from 0.5 mg/kg to 50 mg/kg. The NJDEP has a guideline for action when total concentrations of base/neutral extractable compounds exceed 10 mg/kg. PAHs are generally poorly soluble in water and tightly adsorbed to soil; therefore, these compounds are not expected to have high mobility in soils. No PAHs were observed in the groundwater. Dermal contact is a route of exposure for PAHs, but is not considered to pose a public health concern due to the low concentration of PAHs and the degree of skin absorption of PAHs from contaminated soils.

The presence of DDT and its degradation products (DDE and DDD) were detected in one soil boring (out of 21 borings). Discrete samples from the boring indicated that DDT and its degradation products were present at between 1 and 170 ppm, with the highest concentration at 5 feet.

Site 4

A former gravel pit and New Jersey Department of Transportation (NJDOT) maintenance yard, Site 4 was also allegedly the disposal site for transformer oil from at least two electrical transformers, between 1952 and 1957. DOT used the site for storage of concrete and other inert material and road repair equipment.

The site is 1,200 feet east of the former landfill at Site 1. Residences are south of the site on Meadow Drive, east on Megan Court; fields and woods are to the west and north. The study area is a two acre, nearly level, open, grassy lot with a depression in the southeast portion due to the former gravel pit operations.

No organic compounds were detected above the CRDL in the Site 4 groundwater samples.

Of the metals detected in both the background soil and the fill material, only lead exceeded an action level proposed by NJDOH (250 mg/kg). The mean lead concentrations in the fill was 67 mg/kg. However, the highest concentration was 410 mg/kg, and two of the 10 samples exceeded 100 mg/kg.

Three subsurface soil samples outside the fenced disposal area contained residues of DDT, DDE and dieldrin. The location of the pesticide contamination in a single portion of the site suggests a surface disposal of unknown quantities of these pesticides. The pesticide contamination has not yet been delineated. No pesticide residues were detected in the groundwater at the surface of the aquifer at this site.

Site 5

It is alleged that sometime between 1952 and 1957, approximately 10 cubic yards of pesticides contained in bags and rusted five-gallon metal containers were buried here in a pit 10 to 15 feet deep.

This site is about 250 feet north of the water tower. Site 5, a portion of the former VDC agricultural area, is approximately 1,100 feet west of the former landfill located on Site 1. To the north is a former sewage digestion house and a former piggery. Directly to the south is a parking lot and to

the east and west are open, grassy fields. The study area was approximately 6,000 square feet.

No volatile organic compounds were detected in the groundwater above the CRDL, except for bis(2-ethylhexyl)-phthalate which was also present in the sample blanks. Of the inorganic compounds, none were detected above the CRDL in the groundwater samples.

Residues of DDT and DDE were observed in the surface soil samples. Concentrations ranged from 56 ug/kg to 370 ug/kg. These concentrations do not suggest a mass disposal of pesticides by burial, since DDT was not observed at high concentrations below the surface soils.

QUALITY ASSURANCE/QUALITY CONTROL

According to conversations with DEP, the data that is used in this health assessment has passed a QA/QC review. Common laboratory contaminants (phthalates, methylene chloride, and acetone) were detected in a number of samples. However, the presence of these compounds in both the test samples and the trip field blanks, along with historical information that indicates that these compounds were not disposed of at the site, indicate that the presence of the compounds in the samples is due to contamination in the laboratory. Another laboratory related question is whether the CRDL for arsenic (10 ug/l) is too high.

DEMOGRAPHICS

The site is a state school with approximately 1,050 clients in residence. The school serves a special population of women with mental disabilities between the ages of 15 and 96 years. There is a hospital at the VDC which provides services for both male and female patients with mental disabilities.

Approximately 12,000 people live within a four mile radius of the site. There are private wells in use within the vicinity of, but not on, the VDC property. The number of private and public wells in use in the area was not clearly presented in the RI report. Although all homes in the area are reported to be on public water, there is a well close to the site that has not been sealed and could be developed. In addition, there is at least one private well approximately one-half mile upgradient from some of the VDC sites that is currently used for potable water. (Personal communication,

local health officer). Both of these wells are in the shallow aquifer.

Other problem areas around the VDC include:

- a) Vineland Chemical -- another Superfund site five miles west-northwest of VDC,
- b) Nascolite Site -- which handles methacrylate. Methacrylate has migrated into the groundwater. This site is five miles south-southwest of VDC.
- c) Vineland Water District has two wells with trichloroethethylene (TCE) contamination; one well is four miles northwest of VDC.
- d) the town of Buena, which is two miles north of VDC, has benzene and TCE contamination of groundwater.

ENVIRONMENTAL DATA GAPS

The claim of the disposal and dumping of chemicals at the VDC site has not been substantiated, by electromagnetic study, soil samples, and groundwater samples. Data gaps would exist if chemicals were dumped in an area that was not investigated.

EXPOSURE PATHWAYS

Human exposure to contaminants from the VDC subsites could occur via groundwater and direct contact. The major pathway of concern is groundwater since the VDC is located over the Cohansey-Kirkwood aquifer, which is the main water source for the County. There are also numerous private potable wells in the area. To date, only minor contamination has been detected in monitoring and potable wells, none of which can be attributed to the site.

Direct contact with soil is a potential exposure pathway. However, due to the low levels of contaminants, chronic or acute effects are not likely.

There was a concern over inhalation of PCB contaminants that were detected on Site 2. This site has recently been remediated.

PUBLIC HEALTH IMPLICATIONS

There is reported to be a long standing problem of elevated blood lead levels in several of the residents at VDC. Some VDC clients have a history of pica (eating paint chips or

soil) that may make them particularly susceptible to increased levels of environmental exposures (NJDOH, 1987). Based on the concentration in the soil and the amount of time patients would spend on the sites, elevated blood levels are not likely to be from the VDC sites.

There were no groundwater contaminants in the shallow aquifer that could be attributed to the site. The deeper aquifer is partially protected by a large clay lens. In addition, groundwater is reportedly not used in the vicinity of the VDC sites and therefore does not pose a public health concern.

With the exception of the PCBs and lead on site 1, concentrations of contaminants in the soils were too low to be considered of public health concern. The elevated concentrations of lead on site 1 were sporadic enough to only be a concern if a 2-3 year old child with pica visited the same small parcel of land on a continual basis. This scenario would not occur based on current and projected land use.

PCB soil concentrations at Site 2 were a public health concern. PCBs are a Group B carcinogen (possible human carcinogen). This area was remediated. The PCBs in the soil did not migrate to the groundwater and should not have an impact on groundwater quality.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information reviewed, this site is not of public health concern under current conditions because humans are not being exposed to significant levels of hazardous substances. As noted in exposure pathways and public health implications section no significant environmental and human exposure pathways have been identified and no significant human exposure is evident. With the remediation of Site 2, exposure to PCBs in soil is not occurring.

The remedial investigation of the Vineland Development Center site did not substantiate the allegation of pesticide, metal, and organic chemical dumping that had been made. Nor did the investigation detect any areas (with the exception of site 2) of gross contamination. Site 2 has been adequately remediated.

A water main was constructed and homes in the area were placed on public water. However, there are private wells in

the area that are no longer used and could be developed. These wells need to be sealed.

Future groundwater monitoring is recommended, to ensure that:

- * a disposal area, outside of the area that was investigated, does not exist on the campus,
- * further actions, if necessary, can be taken to prevent use of the groundwater, and
- * actions can be taken to reinvestigate the site if groundwater contaminants are detected.

Under the Superfund legislation the site will need to be reevaluated every five years. If situations at the site change in the future, the public health implications of the site may need to be reevaluated. For example, if groundwater movement is altered due to the installation of a production well upgradient of the site, wells that are upgradient of the site and still in use will require additional investigation or monitoring. In its current condition, the selection of the no-action alternative at the Vineland Development Center does not pose a public health concern.

In accordance with CERCLA as amended, the Vineland Developmental Center site has been evaluated for appropriate follow-up with respect to health effects studies. Since human exposure to on-site and off-site contaminants is not documented or indicated, the Vineland Development Center site is not being considered for follow-up health studies at this time. However, if data become available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has occurred in the past, ATSDR and NJDOH will reevaluate this site for any indicated follow-up.

This Health Assessment was prepared by the State of New Jersey, Department of Health, Environmental Health Service, under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concur with its findings.

REFERENCES

Superfund documents:

Remediation Investigation Report, July 1989
Record of Decision, September 1989
ATSDR Site Summary, June 20, 1988
Hazard Rank Scoring Package, August 9, 1982
Site Inspection Report, July 29, 1982

NJDOH, 1986. Lead in Soil: Recommended Maximum Permissible Levels.

NJDOH, 1987. Memorandum: Lead Poisoning in State Developmental Centers. Maternal and Child Health Service.

Interviews:

Community Representatives
Geologist, NJDEP
Site Manger, NJDEP
Technical Coordinator, NJDEP
Superintendent, VDC
Local Health Officer, Vineland Board of Health
Meeting in August 1989 to Discuss Remedial Alternatives
(between NJDEP, EPA, ATSDR, and NJDOH).

File review:

Technical Coordinator, NJDEP