DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

SDMS Document
107982

Date October 2, 2002

From Arthur Block
Sr. Regional Representative

Subject **Final Public Health Assessment for Diamond Head Oil Refinery Division, Kearny, Hudson County, NJ**

To Grisell Diaz-Cotto
ERRD/NJRB
19th fl.

Attached is a copy of the **September 12, 2002**, Public Health Assessment (PHA) for the above site. This document was prepared by the New Jersey Department of Health and Senior Services (NJDOHSS) under a Cooperative Agreement with the U.S. Agency for Toxic Substances and Disease Registry (ATSDR).

This PHA is considered **Final** and will not be reissued unless new and substantial information becomes available that would warrant reevaluation. Additional copies are available at your request.

Should you have any questions or concerns, please notify my office at (212) 637-4307 or 7-4305.

Attachment

cc:

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DHAC/PERISB		

Public Health Assessment for

DIAMOND HEAD OIL REFINERY DIVISION
KEARNY, HUDSON COUNTY, NEW JERSEY
EPA FACILITY ID: NJD092226000
SEPTEMBER 12, 2002

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

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PUBLIC HEALTH ASSESSMENT

DIAMOND HEAD OIL REFINERY DIVISION

KEARNY, HUDSON COUNTY, NEW JERSEY

EPA FACILITY ID: NJD092226000

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

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment 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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FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, fullscale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E56), Atlanta, GA 30333.

Table of Contents

Summary 1

Purpose and Health Issues 2

Background 2
- A. Site Description and History 2
- B. Demography and Land Use 4
- C. Past ATSDR/NJDHSS Involvement 4
- D. Site Visit 4

Discussion 5
- A. On-Site Contamination 5
  - Site Investigation in 1991 5
  - Site Investigation in 1999 6
- B. Off- Site Contamination 7
- C. Pathways Analysis 7
- D. Public Health Implications 8
- E. ATSDR Child Health Initiative 8
- F. Community Health Concerns 8
- G. Health Outcome Data 9
- H. Public Comment 9

Conclusions 9

Recommendations 9
- A. Cease/Reduce Exposure 9
- B. Site Characterization 10

Public Health Actions 10
- A. Public Health Actions Taken 10
- B. Public Health Actions Planned 10

Preparers of Report 12

References 13

Figures 14

Tables 19

Glossary 23

800007

Summary

The Diamond Head Oil Refinery Division (DHO) site is located at 1401 Harrison Turnpike, Kearny, New Jersey. The DHO site is situated on approximately 15 acres of land located in an urban/industrial area of Hudson County. The DHO site is currently inactive and undeveloped. The site consists of wetland areas, drainage ditches, several small ponds, and the remains of an old oil refinery operation.

Several environmental investigations have been conducted at the DHO site. Preliminary sampling was performed by the New Jersey Department of Environmental Protection in 1985. Most recently, environmental samplings were conducted in 1991 and 1999 by U.S. Environmental Protection Agency (USEPA) contractors. During these activities, the contractors collected surface and subsurface soils, sediments, groundwater and surface water samples from the site. Volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls and metals were the major contaminants detected on-site. No air monitoring data or off-site environmental data are available at this point.

Based on the information reviewed, the ATSDR and NJDHSS have concluded that the DHO site currently represents **no public health hazard**. Based upon current site conditions and data/information available to the ATSDR and the NJDHSS, there are no documented human exposures to site-related contamination in the groundwater, soil, sediments, surface water and air. This conclusion is based on the fact that an exposed (receptor) population is absent. The site is located in a remote area and has a perimeter fence, making unauthorized access difficult and unlikely. There are no known wells used for public or private drinking water supply located within 4 miles of the site or drinking water intakes located in any surface waters within 15 miles downstream of the site. There is no evidence the site impacts biota associated with the human food chain, and commercial fishing is prohibited in nearby surface waters. Moreover, there are no known special populations located near the site. According to the Hudson Regional Health Commission and the USEPA, there are no known community health concerns regarding the DHO site. Because of a lack of exposure pathways and an absence of community concerns, health outcome data was not evaluated for the DHO site.

Although the ATSDR and the NJDHSS have not identified completed human exposure pathways associated with the DHO site, contamination of on-site soil, sediment, surface water and groundwater is present at levels above health comparison values. Therefore, without long-term remedial action, these levels represent a potential public health concern if conditions or land use at the site change, resulting in future exposures.

Thus, the ATSDR and the NJDHSS concur with the restriction of public access to contaminated areas of the site. The ATSDR and the NJDHSS also suggest a complete delineation of potentially affected environmental media on-site. If new site data and information become available or if future changes in site conditions or land use at the site create potential human exposure pathways, the ATSDR and NJDHSS may reevaluate the public health implications of the site.

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Purpose and Health Issues

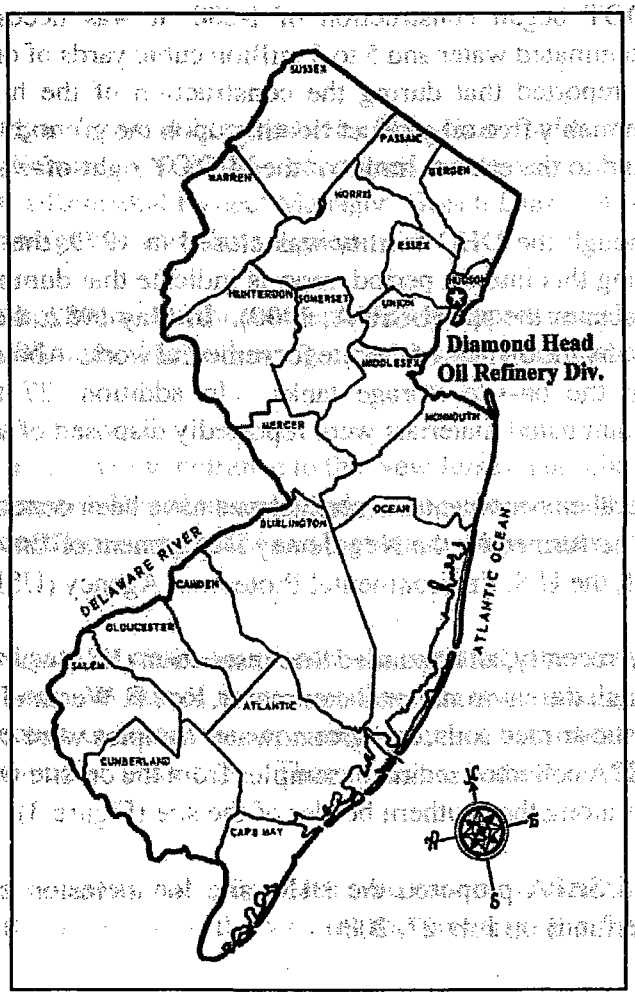
This Public Health Assessment evaluates the public health issues associated with the Diamond Head Oil Refinery Division (DHO) site, which was proposed for inclusion on the National Priorities List (NPL) on July 27, 2000. NPL or "Superfund" sites represent those sites which are associated with significant public health or ecosystem concern in terms of the nature and magnitude of contamination present and the potential to adversely impact health or the environment.

This document will evaluate human exposure pathways associated with known contaminated environmental media within, or associated with, the DHO site and the public health implications of exposures, if identified. In addition, this document will recommend actions consistent with protection of the public health, as warranted. At the DHO site, the contaminated media of concern include on-site soil, sediments, groundwater and surface water from on-site drainage.

Background

A. Site Description and History

The Diamond Head Oil Refinery Division (DHO) site is located at 1401 Harrison Turnpike, Kearny, Hudson County, New Jersey (inset). The DHO site occupies approximately 15 acres of an urban/industrial area of Hudson County (Figure 1). The site is bounded by Harrison Avenue to the north, entrance ramp M of Interstate 280 (I-280) to the east, and I-280 to the south (Figure 2). Along the western border of the site is a business known as the Campbell Distribution Foundry.



N 40° 44' 50.0" W 74° 07' 55.9

The DHO site is currently inactive and undeveloped. The site consists of wetland areas, drainage ditches, several small ponds, and the remains of an old oil refinery operation. The remaining on-site structures consist of building foundations and the concrete pads of two former storage tanks. Also, present on the site are various types of building and road construction debris.

The Diamond Head Oil Refining Company, Inc. operated an oil reprocessing facility on the

site from 1946 until November 1, 1973. From 1973 until November 3, 1976, another owner (PSC Resources), continued the oil reprocessing operation under the same name. The property was purchased in 1976 by the Ag-Met Oil Service, Inc. The Ag-Met Oil Service changed its name to Newtown Refining Corporation, but continued with the business involving the collection, refining, and recycling of liquid waste oil into fuel oil and lubricants. In January 1985, the Newtown Refining Corporation sold the property to the Mimi Urban Development Corporation. On August 23, 1985, the Mimi Urban Development Corporation changed its name to Hudson Meadows Urban Development Corporation (HMURDC). The HMURDC is the present owner of the DHO site.

During the years of its operation, the DHO refinery division used two large above-ground pits (and possibly underground tanks) to store waste oil on the site. Reportedly, the DHO refinery division intermittently dumped these stored wastes directly on the ground in several nearby on- and off-site areas. This dumping also created what was referred to as an "oil lake" in the wetland area to the south of the site.

The New Jersey Department of Transportation (NJDOT) acquired the property just south of the DHO facility in 1968 for the construction of I-280. It has been reported by the USEPA that when the NJDOT began construction of I-280, it was necessary to remove 9 million gallons of oil-contaminated water and 5 to 6 million cubic yards of oil sludge from the disposal pits. The NJDOT also reported that during the construction of the highway they found an "underground lake," presumably free oil product floating upon the groundwater. This "underground lake" was found to extend to the eastern limits of the NJDOT right-of-way to Frank's Creek to the west.

Although the DHO facility was closed in 1979, the site was not completely fenced until 1982. During this interim period, reports indicate that dumping of waste oils and other debris continued to occur at the site (USEPA, 2000). In May 1982, the Eastern Chemical Cleaning Company was hired by the owners of the site for remedial work. About 7,500 gallons of liquid waste were removed from the on-site storage tanks. In addition, 27 tons of contaminated soil were removed. Contaminated materials were reportedly disposed of at an off-site location.

Several environmental investigations have been conducted at the DHO site. Preliminary sampling was performed by the New Jersey Department of Environmental Protection (NJDEP) in 1985. In 1991, the U.S. Environmental Protection Agency (USEPA) contractor conducted a site inspection.

Most recently, an Expanded Site Inspection (ESI) was conducted in December 1999 by the USEPA through the environmental contractor, Roy F. Weston Inc. (USEPA, 2000). In the 1999 ESI, surface and subsurface soils, and groundwater samples were collected throughout the site. In addition, the USEPA collected sediment samples from the on-site wetland and pond areas, as well as the wetland areas along the southern border of the site (Figure 3).

The USEPA proposed the DHO site for inclusion on the National Priorities List (NPL, a.k.a. Superfund) on July 27, 2000.

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B. Demography and Land Use

The DHO site is located in an industrial area near the New Jersey Turnpike and I-280 (Figure 1). There are no schools, day care facilities, or homes on or within at least 1/4 mile of the property.

Population demographics based upon the 1990 census have been prepared by the ATSDR using area-proportion spatial analysis, and are presented in Figure 4. Within a one mile radius there are approximately 4,311 housing units with as many as 11,396 people.

There is a small stream west of the site, known as Frank's Creek, that reportedly accepts drainage water from the DHO site. Frank's Creek is located less than 700 feet south west from the site border. Frank's Creek flows to the south approximately another 2000 feet into the Passaic River.

C. Past ATSDR/NJDHSS Involvement

There were no ATSDR/NJDHSS activities at the DHO site prior to the February 15, 2001 site visit (see below).

D. Site Visit

On February 15, 2001, James Pasqualo, J. J. Winegar, Steve Miller and Stella Man-chun Tsai of the New Jersey Department of Health and Senior Services (NJDHSS) conducted a site visit. The NJDHSS staff were accompanied by the USEPA's Remedial Project Manager, Grisell Diaz-Cotto and the ATSDR Regional Representatives, Tom Mignone and Chris Agnew.

Weather conditions at the time of the inspection were sunny and the temperature was approximately 45 degrees F, with winds from the west at 10 - 20 mph. The following observations were made during the site visit:

- The site is located in a remote industrial area near the entrance to the New Jersey Turnpike (exit 15W) and Route I-280 West. The Campbell Distribution Foundry is located west of the site. All other areas of the site are surrounded by county roads and highways. No residential buildings were observed near the site.

- The site is currently inactive with a locked gate. A chain-link fence was installed to prevent trespassers from entering the site. However, a section of fence was observed to be missing along the east side of the property. This section of fence was apparently removed to facilitate access by machinery associated with remedial activities. There was no indication of unauthorized access to the site.

- The site is highly vegetated with extensive wetland areas. Also, observed were several small ponds at the southern edge of the property, a landfill to the west of the property, and the

foundations of previous buildings and oil tanks from previous operation. Drum carcasses and various types of construction debris were observed at different locations on the site.

- An apparent petrochemical sheen was observed on one of the small ponds.
- A pile of road work debris was dumped near the entrance to the site.

Discussion

A. On-Site Contamination

Several investigations on-site have been conducted by different agencies and site owners (USEPA, 2000). The two most detailed and recent site investigations by USEPA contractors were conducted in 1991 by Halliburton NUS Environmental Corporation (USEPA, 1991), and in 1999 by Roy F. Weston, Inc (USEPA, 2000). The summary results from these two investigations are described in this section. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and metals were the major contaminants detected on-site.

Site Investigation in 1991

On July 1 and 2, 1991, the USEPA contractor (Halliburton NUS Environmental Corporation) conducted a site inspection (SI). Several surface & subsurface soil, sediment, groundwater, surface water, liquid waste (from the top of one monitoring well), and solid waste samples were collected on-site from different locations. All samples were analyzed by the USEPA Contract Laboratory Program (CLP) laboratories for Target Compound List (TCL) organic and inorganic compounds at both low and high concentrations.

Samples collected from on-site soil and sediment samples from stained soil and areas of the "oil lake" indicated the presence of elevated VOCs, SVOCs, pesticides, PCBs and metals. Elevated levels of tetrachloroethylene (25 mg/kg) and 1,1,1-trichloroethane (3.2 mg/kg) were detected in a sample collected from the sediment of the former oil lake. Elevated levels of lead, zinc, PCBs, tetrachloroethylene and 1,1,1-trichloroethane were detected near the tank foundations.

One groundwater sample collected from a monitoring well at the eastern portion of the site indicated the presence of VOCs and SVOCs which were similar to those found in soil and sediment samples on-site.

During the site inspection, the USEPA contractor used an organic vapor analyzer (OVA), a flame ionization detector and a HNu photoionization detector to measure contaminants released from the surface soil to the air. The presence of VOCs in the air was indicated in these tests collected above the soil surface.

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Site Investigation in 1999

In December 1999, the USEPA contractor (Roy F. Weston, Inc.) conducted an Expanded Site Inspection (ESI) at the DHO site (EPA, 2000). During this investigation, the USEPA collected surface and subsurface soil samples from 20 locations in the areas of the former building and tanks, northwest of the property and areas of the former oil lake. Surface soil samples were collected at the depth of zero to two feet and analyzed for metals. (Note: the ATSDR generally considers surface soil collected from a depth of zero to 3 inches to be more representative of human exposure.) One subsurface soil sample was analyzed for VOCs, SVOCs and for pesticides/PCBs. The USEPA also collected 15 sediment samples from the on-site wetland/pond area (former oil lake area) and the wetland area extending along the southern perimeter of the site for VOCs, SVOCs, pesticides, PCBs and metals. Three sediment samples collected from a wetland northeast of the site were used to document background wetland sediment conditions. One surface water sample from the southern perimeter and four groundwater samples throughout the site were collected for analysis. Figure 3 shows locations of surface soil, subsurface soil and sediment sample locations. The summary results of on-site contamination from ESI are listed as follows:

On-Site Sediments

A total of 15 sediment samples were collected from the on-site wetland/pond area and the wetland area extending along the southern perimeter of the site. Three off-site sediment samples were collected to determine the background levels of contaminants. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs and metals.

Analytical results of these samples indicated the presence of VOCs, SVOCs, pesticides, PCBs and metals. Some of these contaminants, including polycyclic aromatic hydrocarbons (PAHs), heptachlor epoxide, PCBs and metals, were above health-based comparison values (Table 1).

On-Site Surface and Sub-Surface Soil

A total of 20 surface (0-2 feet) and sub-surface soil samples were collected for metal analysis. The analysis results indicated elevated metal levels throughout the site. The compounds exceeding health-based comparison values and the NJDEP's soil cleanup criteria are listed in Table 2.

One sub-surface soil sample (SS07) was analyzed for VOCs, SVOCs, pesticides and PCBs. An elevated level of benzo(a)pyrene (5.7 mg/kg) was detected in this sample.

On-Site Surface Water

One surface water sample collected from a drainage pathway was analyzed for VOCs, SVOCs, pesticides, PCBs and metals. The surface water sample was collected from a drainage pathway that leaves the site. The results of analyses indicated the presence of elevated VOCs (trichloroethene or TCE at 5 μg/L) in this sample.

On-Site Groundwater

A total of four groundwater samples were collected on-site for metal analyses. Elevated arsenic, chromium, lead, manganese, thallium and vanadium were detected in these samples (Table 3).

On-Site Air Monitoring

No on-site air monitoring samples were collected during the Expanded Site Inspection (ESI) in 1999.

B. Off- Site Contamination

There are no data or information available on contaminant levels in off-site environmental media.

C. Pathways Analysis

This section contains a discussion of the exposure pathways at the site and their public health implications, if applicable. An exposure pathway is the process by which an individual is exposed to contaminants that originate from some source of contamination.

A completed exposure pathway must include each of five elements that link a contaminant source to a receptor population. The five elements of a completed exposure pathway are as follows:

(1) Source of contamination;
(2) Environmental media and transport mechanisms;
(3) Point of exposure;
(4) Route of exposure; and
(5) Receptor population.

ATSDR/NJDHSS 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.

At the DHO site, the environmental media have been shown to be contaminated at levels of potential public health concern (i.e., above health-comparison values). However, based upon current site conditions and data /information available to the ATSDR and the NJDHSS, there are no documented human exposures to site-related contamination in groundwater, soil, sediments, surface water and air. This conclusion is based on the fact that a receptor population is absent. The site is located in a remote area and has a perimeter fence, making unauthorized access difficult and unlikely. Also,

800014

as noted during the site visit, on 2/15/01, there was no indication of any unauthorized access at the site. There are no known wells used for public or private drinking water supply located within 4 miles of the site (USEPA, 1991). No known drinking water intakes are located in any surface waters within 15 miles downstream of the site. In addition, there is no evidence the site impacts biota associated with the human food chain. Commercial fishing is prohibited in nearby surface waters (USEPA, 1991). Finally, there are no known special populations located within the influence of the site or community health concerns about exposures or adverse health effects.

D. Public Health Implications

There are no identified completed exposure pathways associated with the DHO site. Thus, there are no public health implications to be evaluated. There are environmental contaminants on the site which are at concentrations above the health comparison values. Future changes in land use or site accessibility may result in potential future exposures at levels above health-comparison values.

E. ATSDR Child Health Initiative

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination in their environment. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from a waste site. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors closer to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most important, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

Under current conditions, there were no identified completed exposure pathways associated with the DHO site. If site conditions change that result in potential exposures to children or pregnant women, the NJDHSS/ATSDR will reexamine childhood health issues.

F. Community Health Concerns

In order to gather information on community health concerns at the DHO site, the NJDHSS spoke with the Hudson Regional Health Commission, Division of Environmental Health, and the USEPA Remedial Project Manager. According to our conversations with these agencies, there are no current community concerns regarding the DHO site.

The ATSDR and the NJDHSS will review and evaluate any community health concerns which may arise. Future removal work at the site and the release of the public health assessment may generate interest among the public during the public comment period. A public availability session is not

currently being planned at this site. A public availability session to gather community concerns and comments will be held in the future if a need is indicated.

G. Health Outcome Data

Because of a lack of exposure pathways and an absence of community concerns, health outcome data was not evaluated for the DHO site.

H. Public Comment

This Public Health Assessment was released for public comment during the period July 9 through August 10, 2002. No comments were received.

Conclusions

Hazard Category: Diamond Head Oil Refinery Division Site

Based on the information reviewed, the ATSDR and NJDHSS have determined that the Diamond Head Oil Refinery Division (DHO) site currently represents **no public health hazard.** This evaluation is predicated upon the fact that past and current completed human exposure pathways are not likely to exist under the past and current land use conditions, respectively.

Although the ATSDR and the NJDHSS have not identified completed human exposure pathways associated with the DHO site, on-site soils, sediments, surface water, and groundwater contamination is present at levels of potential public health concern (i.e., above health-comparison values). Without long-term remedial action, future changes in land use or other conditions at the site may result in potential human exposure pathways that may require a reevaluation by ATSDR and the NJDHSS of the hazard posed by the site.

Recommendations

A. Cease/Reduce Exposure Recommendations

1. It is prudent to continue the restriction of public access to contaminated areas of the site. The break in the perimeter fence should be mended to discourage unauthorized site access.

2. If new site data or information become available, the ATSDR and NJDHSS may reevaluate the site to determine the need for other cease/reduce exposure recommendations, as necessary.

800016

B. Site Characterization

The following information is needed for additional evaluation of the public health impact from the DHO site:

1. A complete delineation of potentially affected environmental media related to the site should be conducted. This should include taking soil samples at depths that better represent surface conditions; ATSDR recommends 0-3" sampling to evaluate surface conditions.

Public Health Actions

The Public Health Action Plan (PHAP) for the Diamond Head Oil Refinery Division site contains a description of the actions to be taken by ATSDR and/or NJDHSS at or in the vicinity of the site subsequent to the completion of this Public Health Assessment. 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. Included is a commitment on the part of ATSDR/NJDHSS to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR/NJDHSS are as follows:

A. Public Health Actions Taken

1. Available environmental data and other relevant information for the DHO site have been evaluated to determine human exposure pathways and public health issues.

2. The NJDHSS has prepared a Citizen's Guide to this Public Health Assessment for the DHO site which will be made available to local health agencies and other interested parties.

B. Public Health Actions Planned

1. The ATSDR and the NJDHSS will coordinate with the appropriate environmental agencies to develop plans to implement the cease/reduce exposure and site characterization recommendations and will evaluate new site data when it becomes available.

2. This Public Health Assessment will be placed in a local repository, and will be provided to persons who request it.

3. The ATSDR and the NJDHSS will reevaluate and expand the Public Health Action Plan (PHAP) as warranted. New environmental, toxicological, or health outcome data, or the results of implementing the above proposed actions, may determine the need for additional actions at this site.

Certification

This Public Health Assessment 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 is in accordance with approved methodology and procedures existing at the time the Public Health Assessment was begun.

Gregory V. Ulirsch
Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

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

for Roberta Erlwein
Chief, SSAB, DHAC, ATSDR

800018

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References

1. USEPA 2000, Hazard Ranking System Documentation Package, Diamond Head Oil Refinery Div., Kearny, Hudson County, New Jersey, July 2000, prepared by Roy F. Weston Inc.

2. USEPA 1991, Final Draft, Site Inspection Report, Diamond Head Oil Refinery Div.,Kearny, Hudson County, New Jersey, December 31, 1991, prepared by Halliburton NUS Environmental Corporation.

Figures

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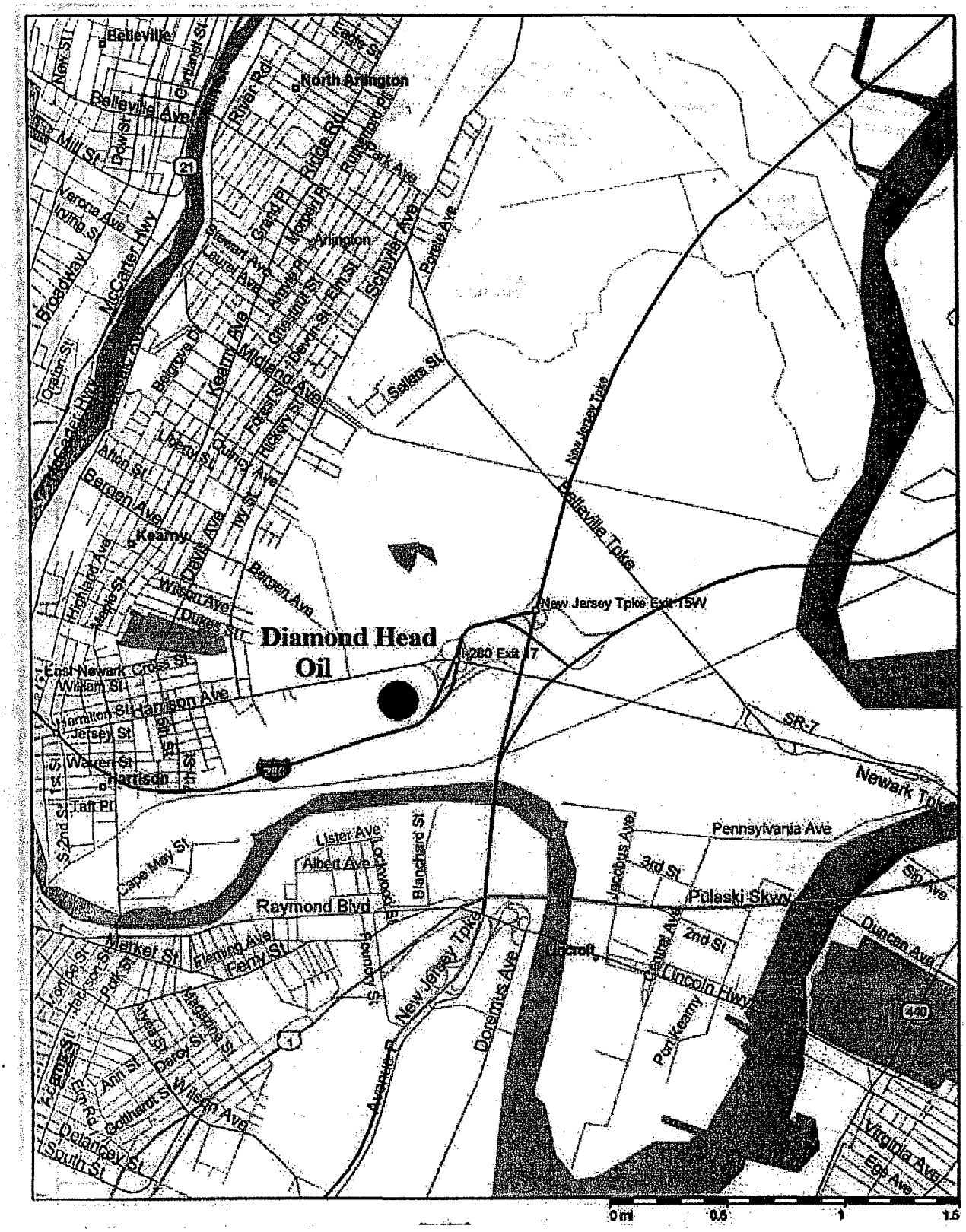

Figure 1 - Diamond Head Oil, general site location.

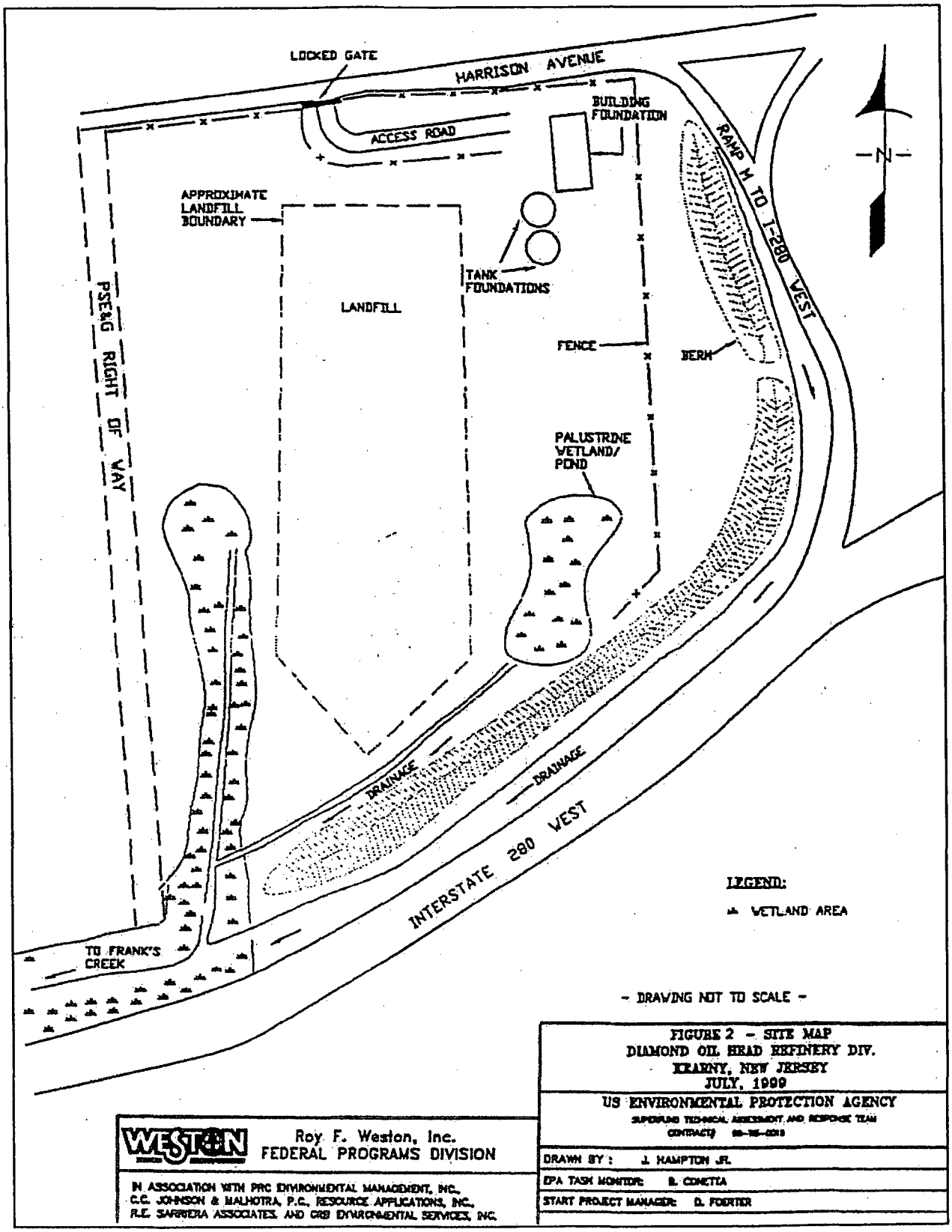

Figure 2 - Diamond Head Oil, on-site detail.

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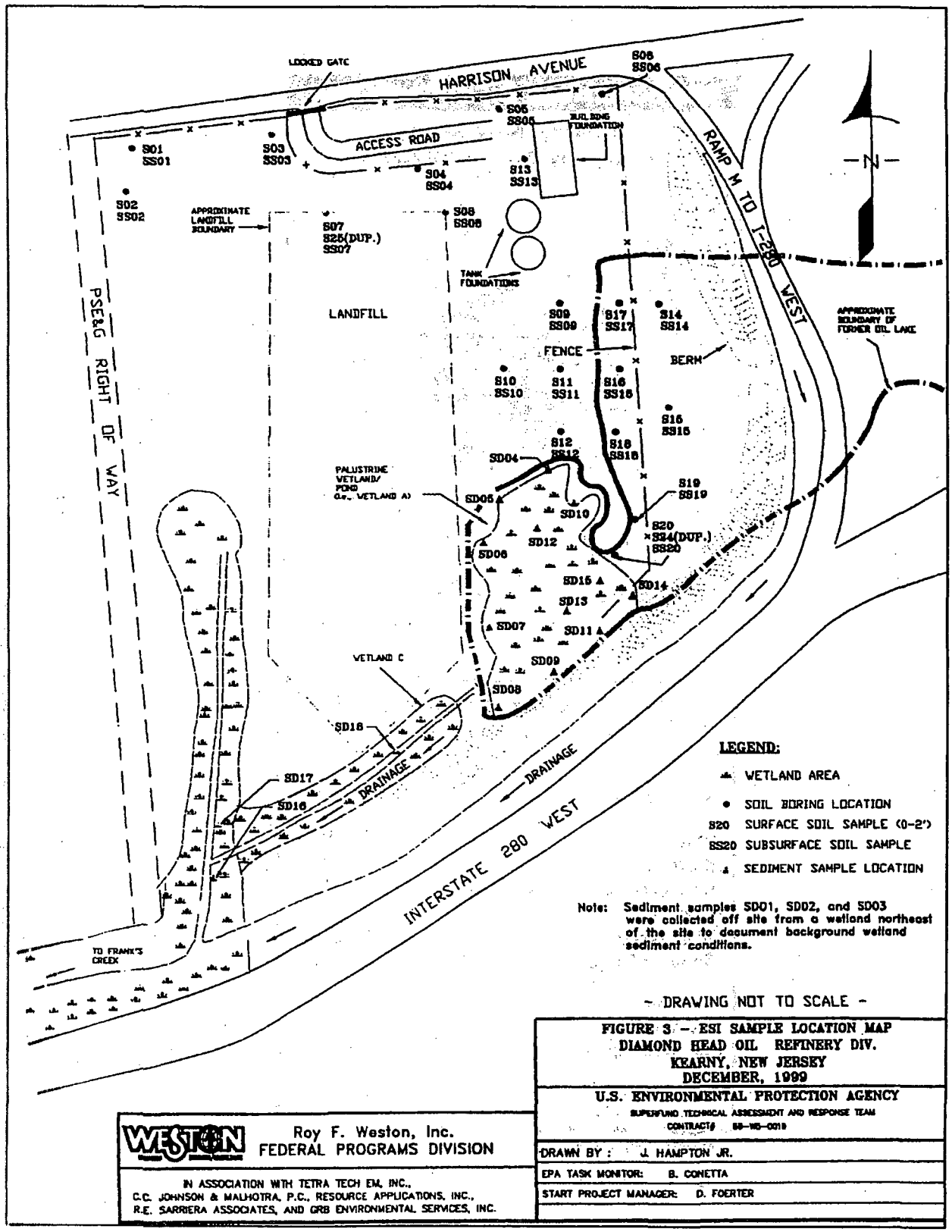
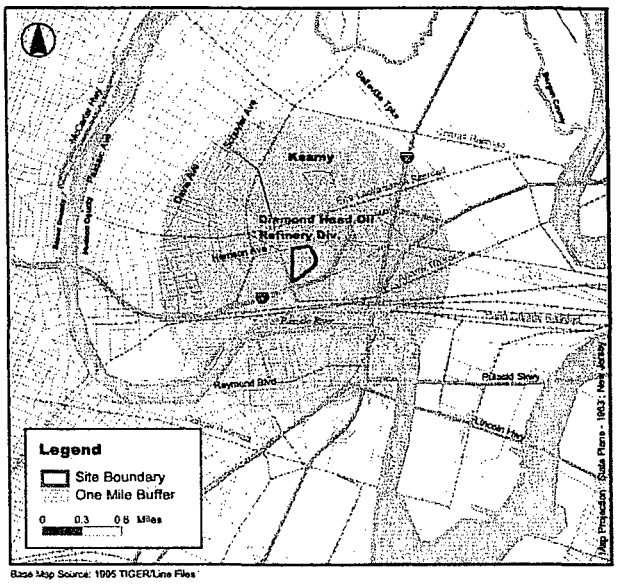


Figure 3. Diamond Head Oil Refinery Div. , Surface Soil and Sediment Sample Locations.

Diamond Head Oil Refinery Div.

Kearny, New Jersey

EPA Facility ID No. NJD092226000



Base Map Source: 1995 TIGER/Line Files

Demographic Statistics Within One Mile of Site*	
Total Population	11396
White	9655
Black	588
American Indian, Eskimo, Aleut	17
Asian or Pacific Islander	475
Other Race	661
Hispanic Origin	2810
Children Aged 6 and Younger	999
Adults Aged 65 and Older	1793
Females Aged 15 - 44	2574
Total Housing Units	4311

Demographics Statistics Source: 1990 US Census
*Calculated using an area-proportion spatial analysis technique

Figure 4. Demographics

Tables

800026

Table 1. Sediment samples collected from on-site wetland/pond area (SD04-SD15), and the wetland areas extending along the southern perimeter (SD16-SD18) of the site with contaminant concentrations higher than comparison values or NJDEP soil cleanup criteria. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs and metals. Units in mg/kg or ppm. Sampling locations are marked in Figure 3 (USEPA, 2000).

Compounds	Maximum Concentration Detected	Comparison Values or Soil Cleanup Criteria and Sources	Sampling Locations Above Comparison Values or Soil Cleanup Criteria
Benzo(a)anthracene	36	7.8-RBC	SD16
Benzo(b)fluoranthene	21	7.8-RBC	SD16
Benzo(a)pyrene	31	0.1-CREG	SD07-SD18
Indeno(1,2,3-cd)pyrene	18	7.8-RBC	SD16
Dibenzo(a,h)anthracene	7.6	0.78-RBC	SD13, SD16, SD17
Heptachlor epoxide	0.19	0.08-CREG	SD05, SD10, SD18
Dieldrin	0.059	0.04-CREG	SD05
Aroclor-1242	13	2.9-RBC	SD05, SD10, SD12, SD18
Aroclor-1260	3.3	2.9-RBC	SD05, SD10, SD18
Aluminum	8630	4000-Intermediate EMEG (pica)	SD04, SD05, SD08, SD09, SD11, SD13-SD18
Antimony	16.4	0.8-RMEG (pica)	SD04, SD05, SD07-SD09, SD11-SD18
Arsenic	37.7	0.5-CREG	SD04-SD18
Barium	3370	100-RMEG (pica)	SD04-SD18
Cadmium	26.1	0.4-Chronic EMEG (pica)	SD04-SD18
Chromium	658	6-EMEG (pica)	SD04-SD18
Lead	84300	600-DEP Soil Cleanup Criteria	SD04-SD06,SD08-SD17
Manganese	449	100-RMEG (pica)	SD04, SD05, SD07-SD09, SD11-SD18
Nickel	136	40-RMEG (pica)	SD05, SD08, SD09, SD11, SD13, SD16, SD17
Thallium	7.2	2-DEP Soil Cleanup Criteria	SD04, SD09, SD11, SD12
Vanadium	41.7	6-Intermediate EMEG (pica)	SD04-SD18
Zinc	17700	600-RMEG (pica)	SD4, SD5, SD8, SD10, SD18

RBC-USEPA Region III Risk-Based Concentration
CREG-Cancer Risk Evaluation Guide for $1x10^{-6}$ Excess Cancer Risk
EMEG-ATSDR Environmental Media Evaluation Guide
RMEG-Reference Dose Media Evaluation Guide

Table 2. Samples collected from on-site soils for metal analysis which exceeded comparison values or NJDEP soil clean-up criteria. Units in mg/kg or ppm. A total of 20 boring locations throughout the site of surface and sub-surface soil samples (S01-S20 and SS01-SS20) were analyzed. The sampling locations are marked in Figure 3 (USEPA, 2000).

Compounds	Maximum Concentration Detected	Comparison Values or Soil Cleanup Criteria and Sources	Sampling Locations Above Comparison Values or Soil Cleanup Criteria
Aluminum	19700	4000-Intermediate EMEG (pica)	SS01-04, SS06, SS07, SS09-SS13, SS15-SS20, S01-S14, S16, S17, S19
Antimony	20.3	0.8-RMEG (pica)	SS01, SS02, SS04-07, SS09-SS20, S01-S14, S17, S19
Arsenic	19.1	0.5-CREG	SS01-SS20, S01-S20
Barium	2930	100-RMEG (pica)	SS01-SS03, SS05, SS07, SS08, SS11-SS15, SS17-SS20, S01-S04, S06-S08, S10-S14, S16, S17, S19, S20
Cadmium	16.3	0.4-Chronic EMEG (pica)	SS02, SS06, SS07,SS12, SS13, SS18-SS20, S01-S04, S06-S08, S14, S18-S20
Chromium	3610	6-EMEG (pica)	SS01-SS20, S01-S20
Lead	23500	600-DEP Soil Cleanup Criteria	SS03, SS12-SS14, SS28-SS20, S01, S06-S08, S12, S14, S16-S20
Manganese	691	100-RMEG (pica)	SS01-SS20, S01-S14, S16-S20
Nickel	450	40-RMEG (pica)	SS01, SS02, SS04, SS06, SS07, SS09-SS13, SS16, SS18, SS19, S01, S02, S04-S13, S17, S19
Thallium	3.4	2-DEP Soil Cleanup Criteria	SS19
Vanadium	6770	6-Intermediate EMEG (pica)	SS01-SS20, S01-S14, S15-S20
Zinc	1720	600-RMEG (pica)	SS07, SS15, SS18, SS20, S01, S07, S08, S13, S19

CREG-Cancer Risk Evaluation Guide for $1x10^{-6}$ Excess Cancer Risk
EMEG-ATSDR Environmental Media Evaluation Guide
RMEG-Reference Dose Media Evaluation Guide

800028

Table 3. Samples collected from on-site monitoring wells for metal analysis which exceeded comparison values or remedial action level. Units in μg/L or ppb. A total of four monitoring wells throughout the site were analyzed (USEPA, 2000).

Compounds	Maximum Concentration Detected	Comparison Values or Remedial Action Level and Sources
Arsenic	26.3	0.02-CREG
Chromium	327	100-NJ MCL
Lead	200	15- USEPA Remedial Action Level
Manganese	570	500-RMEG (child)
Thallium	11.7	2-MCL
Vanadium	213	30-Intermediate EMEG (child)

CREG-Cancer Risk Evaluation Guide for $1x10^{-6}$ Excess Cancer Risk
EMEG-ATSDR Environmental Media Evaluation Guide
RMEG-Reference Dose Media Evaluation Guide
MCL-Maximum Contaminant Level

ATSDR Plain Language Glossary of Environmental Health Terms

Absorption: How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.

Acute Exposure: Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.

Additive Effect: A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

Adverse Health Effect: A change in body function or the structures of cells that can lead to disease or health problems.

Antagonistic Effect: A response to a mixture of chemicals or combination of substances that is **less** than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

ATSDR: The **A**gency for **T**oxic **S**ubstances and **D**isease **R**egistry. ATSDR is a federal health agency in Atlanta, Georgia that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.

Background Level: An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific environment.

Biota: Used in public health, things that humans would eat – including animals, fish and plants.

CAP: See **C**ommunity **A**ssistance **P**anel.

Cancer: A group of diseases which occur when cells in the body become abnormal and grow, or multiply, out of control.

Carcinogen: Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See **C**omprehensive **E**nvironmental **R**esponse, **C**ompensation, and **L**iability **A**ct.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure Pathway: See **Exposure Pathway**.

Community Assistance Panel (CAP): A group of people from the community and health and environmental agencies who work together on issues and problems at hazardous waste sites.

Comparison Value: (CVs) Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): **CERCLA** was put into place in 1980. It is also known as **Superfund**. This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.

Concern: A belief or worry that chemicals in the environment might cause harm to people.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See **Environmental Contaminant.**

Delayed Health Effect: A disease or injury that happens as a result of exposures that may have occurred far in the past.

Dermal Contact: A chemical getting onto your skin. (see **Route of Exposure**).

Dose: The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as "amount of substance(s) per body weight per day".

Dose / Response: The relationship between the amount of exposure (dose) and the change in body function or health that result.

Duration: The amount of time (days, months, years) that a person is exposed to a chemical.

Environmental Contaminant: A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in **Background Level**, or what would be expected.

800031

Environmental Media: Usually refers to the air, water, and soil in which chemcials of interest are found. Sometimes refers to the plants and animals that are eaten by humans. **Environmental Media** is the second part of an **Exposure Pathway**.

U.S. Environmental Protection Agency (EPA): The federal agency that develops and enforces environmental laws to protect the environment and the public's health.

Epidemiology: The study of the different factors that determine how often, in how many people, and in which people will disease occur.

Exposure: Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see **Route of Exposure**.)

Exposure Assessment: The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

Exposure Pathway: A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

1. Source of Contamination,
2. Environmental Media and Transport Mechanism,
3. Point of Exposure,
4. Route of Exposure, and
5. Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

Frequency: How often a person is exposed to a chemical over time; for example, every day, once a week, twice a month.

Hazardous Waste: Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.

Health Effect: ATSDR deals only with **Adverse Health Effects** (see definition in this Glossary).

Indeterminate Public Health Hazard: The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.

Ingestion: Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See **Route of Exposure**).

Inhalation: Breathing. It is a way a chemical can enter your body (See **Route of Exposure**).

LOAEL: Lowest Observed Adverse Effect Level. The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.

Malignancy: See **Cancer**.

MRL: Minimal Risk Level. An estimate of daily human exposure – by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.

NPL: The National Priorities List. (Which is part of **Superfund**.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site.

NOAEL: No Observed Adverse Effect Level. The highest dose of a chemical in a study, or group of studies, that did not cause harmful health effects in people or animals.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: Public Health Assessment. A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.

Plume: A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney

800033

or contaminated underground water sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples: the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.

Population: A group of people living in a certain area; or the number of people in a certain area.

PRP: Potentially Responsible Party. A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.

Public Health Assessment(s): See **PHA**.

Public Health Hazard: The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health Hazard Criteria: PHA categories given to a site which tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

1. Urgent Public Health Hazard
2. Public Health Hazard
3. Indeterminate Public Health Hazard
4. No Apparent Public Health Hazard
5. No Public Health Hazard

Receptor Population: People who live or work in the path of one or more chemicals, and who could come into contact with them (See **Exposure Pathway**).

Reference Dose (RfD): An estimate, with safety factors (see **safety factor**) built in, of the daily, life-time exposure of human populations to a possible hazard that is <u>not</u> likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:
- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Safety Factor: Also called **Uncertainty Factor**. When scientists don't have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is not likely to cause harm to people.

SARA: The Superfund Amendments and Reauthorization Act in 1986 amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from chemical exposures at hazardous waste sites.

Sample Size: The number of people that are needed for a health study.

Sample: A small number of people chosen from a larger population (See **Population**).

Source (of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

Special Populations: People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics: A branch of the math process of collecting, looking at, and summarizing data or information.

Superfund Site: See **NPL**.

Survey: A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

Synergistic effect: A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effect of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

800035

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

Toxicology: The study of the harmful effects of chemicals on humans or animals.

Tumor: Abnormal growth of tissue or cells that have formed a lump or mass.

Uncertainty Factor: See **Safety Factor**.

Urgent Public Health Hazard: This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed.