

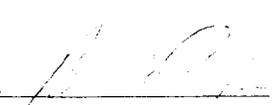
Superfund Records Center
SITE: CEC - Plymouth Harbor
BREAK: 8.3
GROSS: 35021

SECOND FIVE-YEAR REVIEW

**CANNONS ENGINEERING CORPORATION (CEC)
PLYMOUTH HARBOR SUPERFUND SITE
PLYMOUTH, MASSACHUSETTS**

**PREPARED BY:
THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY**

**REGION I
BOSTON, MASSACHUSETTS**



Ms. Patricia L. Meaney, Director
Office of Site Remediation and Restoration

7/29/98
Date

I. PURPOSE

Pursuant to Section 121© of the Comprehensive Environmental Response, Compensation and Liability Act, (CERCLA) and Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), a periodic review (no less than every five years) of the remedial action(s) is required for sites where hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use or unrestricted exposure following the completion of all remedial actions at the site. The purpose of such a review is to determine the continued adequacy of the remedial action(s) implemented to provide protection of human health and the environment.

The five-year review is required at the Cannons Engineering Corporation-Plymouth Harbor Site (CEC-Plymouth Site or the Site) because the protectiveness finding made in the April 6, 1989, Endangerment Assessment was predicted upon continued industrial/commercial use of the property. The last five year review for the site was completed in December 1992.

A deed restriction has been placed on the property which requires that for any contemplated use inconsistent with an industrial/commercial use scenario, a new risk assessment must be completed to determine if contaminant levels remaining on the Site would be protective of human health.

II. SITE HISTORY AND RESPONSE ACTIONS

The CEC-Plymouth Site is located in an industrial park known as Cordage Park in the Town of Plymouth, Massachusetts, as shown in Attachment 1. Part of Cordage Park has been converted to a retail complex but industrial uses predominate near the waterfront and directly adjacent to the Site. It was observed that there are many inactive and abandoned buildings in close proximity to the Plymouth Site. The CEC-Plymouth Site is one of four separate but related sites which form the Cannons Engineering Corporation Superfund Sites.

The CEC-Plymouth Site consists of approximately 2.5 acres and is bordered on the northeast perimeter by Plymouth Harbor and on the southeast perimeter by a tidal stream. As shown in Attachment 2, the Site previously contained three above ground storage tanks, each surrounded by an earthen berm measuring six to eight feet in height. The tanks were originally used for the storage of no. 6 fuel oil and bunker C oil until 1974 when this practice was discontinued. In 1975, the Cannons Engineering Corporation (CEC) leased the tanks for storage of waste oils and liquid hazardous substances, utilizing the gross storage capacity of tanks no. 1 and no. 2. Tank no. 3 was never utilized by CEC, though it was being prepared for similar use. In 1979, CEC was licensed by the Commonwealth of Massachusetts to store wastes at its Plymouth Facility. The Commonwealth shutdown the CEC Site in 1980 and approximately 500,000 gallons of liquid hazardous substances stored in tanks no. 1 and no. 2 were abandoned at the Plymouth facility.

The CEC-Plymouth Site was proposed for listing on the National Priority List (NPL) in December 1982, and the NPL Site listing was finalized in September 1983. A consent agreement between EPA and Salt Water Trust, the Site owner, was entered into in August 1983 which required the Trust to drain and clean one of the two tanks containing waste. In January 1984, an EPA contractor drained and cleaned the second tank, tank no. 2, completing the stored liquids' removal. Both tanks were steam cleaned after emptying.

In early 1984, the EPA initiated a Remedial Investigation (RI) at the CEC-Plymouth Site. Field studies evaluated soil, groundwater, and air media on-site, and surface water and sediments off-site. The principal contaminants detected in the various media, with the exception of air, were polynuclear aromatic hydrocarbons (PAHs), pesticides, and lead. In general, the highest concentrations of PAHs, pesticides and lead were detected in shallow soil samples taken within the bermed areas, from depths ranging from ground level to six feet below ground level.

As part of the RI, a qualitative risk assessment was conducted. The risk assessment evaluated both health and environmental impacts from contaminants present at the Site. Based on data gathered during the RI, the critical contaminants of concern were determined to be PAHs, lead, and pesticides. All pathways of exposure were evaluated. The risk assessment concluded that the greatest potential risk at the Site was direct contact with or incidental ingestion of on-site contaminated soils.

Concurrent with the RI, a Feasibility Study (FS) was prepared in accordance with the CERCLA and the NCP. The FS developed and evaluated ten remedial alternatives which would address the potential risks presented in the RI. The remedial alternatives considered in the RI included: a no action alternative; several cap alternatives, including RCRA approved caps and soil caps; and several excavation alternatives, including off-site disposal and off-site treatment.

In June 1985, the FS was finalized, and the EPA's Regional Administrator issued a Record of Decision (ROD) for the Site in September 1985. The ROD specified the following actions:

1. Dismantling and disposal of the three storage tanks and associated piping at an appropriate offsite facility.
2. Supplemental sampling to confirm the pattern of contamination identified in the RI, and to characterize the contaminant distribution located beneath the storage tanks. Supplemental samples were to be taken from soils under the dismantled tanks, surface and subsurface soil locations outside the tank berms, five on-site groundwater monitoring wells, and surface water and sediments located in the tidal seep.
3. Preparation of a Site-specific Floodplain Assessment.

The plan for future action set forth in the 1985 ROD indicated that data generated from the supplemental sampling and Floodplain Assessment would be evaluated to assess the need for further remedial action at the Site and/or an amended ROD.

As required by the ROD, a supplemental sampling program was conducted subsequent to the tank dismantling by the EPA in Fall 1987. The supplemental sampling program confirmed almost all of the contaminant characterization of the RI. Following implementation of the ROD and evaluation of the sampling data, however, the EPA, in consultation with the Commonwealth, determined that the only necessary further response action at the Site was a removal of an area of stained soils.

Pursuant to a Consent Decree, in September 1988, a removal of the stained soils identified adjacent to tank no. 1, was conducted by the Potentially Responsible Parties (PRPs). In addition, the top 6 to 12 inches of soil from the interior of each of the three bermed areas where the tanks were previously located were excavated and disposed of along with the stained soils. Following the soil excavation, additional soil samples were collected to further characterize the soils in the excavated areas. Once all the samples were collected, the excavation was backfilled with clean fill and covered with additional 6 to 12 inches of clean fill.

Using the contaminant concentrations known to exist at the Site following the remedial and removal actions, a supplemental Endangerment Assessment was completed by the EPA in April 1989. Current and future use exposure scenarios were developed which considered existing demographics, land use, and local zoning. Based on the results of the Endangerment Assessment, it was determined that the use of the Site for commercial or industrial purposes did not present a current or future threat to human health or the environment. To assure that the remedy remains protective of public health and the environment, institutional controls, in the form of deed restrictions were implemented. The deed restrictions, will assure consistency with the Endangerment Assessment where acceptable risks are based on future commercial/industrial development of the property only.

III. SCOPE AND NATURE OF FIVE-YEAR REVIEW

The EPA guidance (OSWER Directive 9355.7-02) developed for five-year reviews provides for three levels of review based on site-specific considerations, including the nature of the response action, the status of on-site response activities, proximity to populated areas and sensitive environmental areas, and the interval since the last review was conducted. Level I is the first level of evaluation for a five year review. The EPA's past experience has shown that a level I evaluation is a sufficient level for a five year review, in most cases. The only exception would occur when site specific circumstances suggest another level, either at the outset of the review or if findings during the course of the review indicate the need for further analysis. The five-year review conducted for the Plymouth Harbor Site was a Level I review. The review consisted of the following activities:

1. Site document review, including deed restrictions, the Record of Decision, Endangerment Assessment, etc.
2. Standards (ARARs) Review to determine if newly promulgated or modified requirements of Federal and State environmental laws are ARARs and if they call into question the protectiveness of the remedy.

3. Site visit.
4. Interviews with Site owner(s) and the Massachusetts Department of Environmental Protection (MADEP) personnel.
5. Review of remedy protectiveness.

IV. RESULTS AND RECOMMENDATIONS OF THE FIVE-YEAR REVIEW

A. Standards (ARARs) Review

The Plymouth Harbor Site Endangerment Assessment identified PAHs and lead as contaminants of concern. The only exposure scenario identified as presenting a potential threat to human health and the environment was that of direct contact and incidental ingestion of the Site soils. No ARARs concerning contaminant level in soils were identified in the RI/FS or during this five-year review.

Potential human health risks were calculated in the Endangerment Assessment based on concentrations of PAHs and lead representative of Site conditions and EPA acceptable risk values. Some of the variables used in the calculation for the carcinogenic risk for PAHs have changed since the ROD was issued. However, the risks associated with the PAH levels at the Site remain within the EPA acceptable risk range of 10^{-4} to 10^{-6} . Representative levels of lead in the soil remaining after the remedy was completed do not exceed the 400 mg/kg level which the EPA currently considers protective. Attachment 4 provides further discussion of these protectiveness findings.

Numerous changes and additions have been made to Federal and State drinking water quality standards since the Plymouth Harbor Site ROD was issued. These changes were considered as potential ARARs. Groundwater quality at the site, as established in the RI/FS and subsequent supplemental sampling events does not exceed any ARARs identified at the time of the ROD or any of these potential ARARs.

B. SITE VISIT

On March 26, 1998, the EPA and the MADEP visited the Plymouth Harbor Site specifically to determine if any changes had occurred at, or in the vicinity of, the Site which would bring the protectiveness of the remedy into question. Mr. Daniel Coughlin and Mr. Derrick Golden from the EPA and Mr. Harish Panchal from MADEP participated.

Generally, with the exception of increased vegetative growth, the Site property remains exactly as it was after the remedial action and removal were completed in 1987. There is a perimeter fence still in place which prevents access to the site. See attachment 3 for current site conditions. There was no indication of any consistent use or trespassing on the Site.

This five year review included the EPA and the MADEP visiting the Plymouth County Registry of Deeds. It was determined that the aforementioned deed restrictions were still in place and are recorded in Book # 1095, Page 249.

C. INTERVIEWS

On March 26, 1998, Daniel Coughlin, Derrick Golden and Harish Panchal interviewed Mr. Daniel Ward, Senior Vice President of CB Commercial/Whittier Partner's, LP to discuss the status of the Plymouth Harbor Site and future use of the Site along with the five-year review.

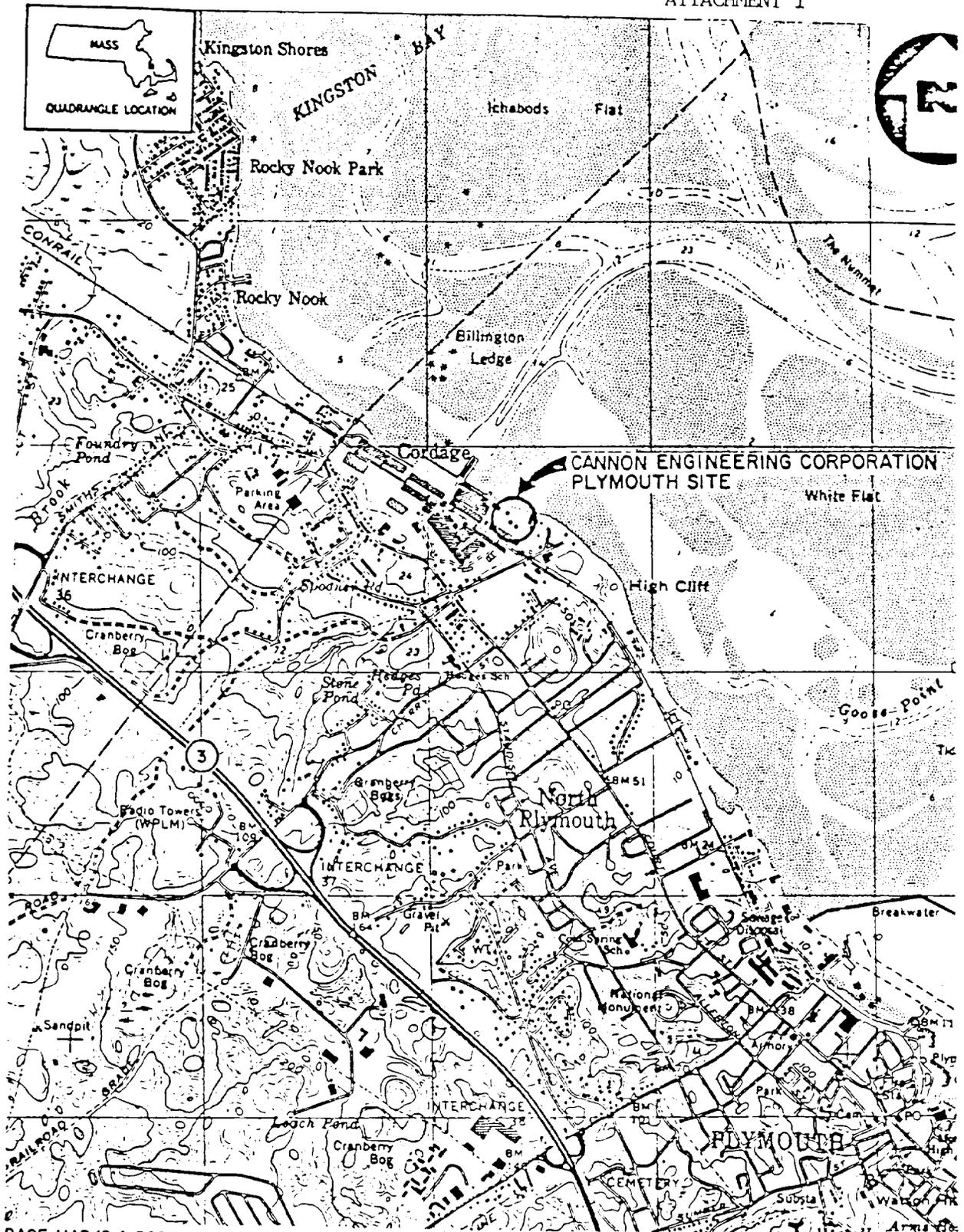
Mr. Ward indicated that a redevelopment consulting firm has been contracted to evaluate the Site for its future redevelopment potential. The EPA, MADEP and Mr. Ward discussed that the future reuse of the Site would have to be consistent with the aforementioned deed restrictions, ROD, Endangerment Assessment etc. Mr. Ward also indicated that the consulting firm would be in contact with the EPA and MADEP with regards to the Plymouth Site to ensure that any future Site redevelopment would be conducted in a manner that would still be protective of the public health and environment.

D. REMEDY PROTECTIVENESS

This five year review did not reveal any conditions that would affect the protectiveness of the remedy.

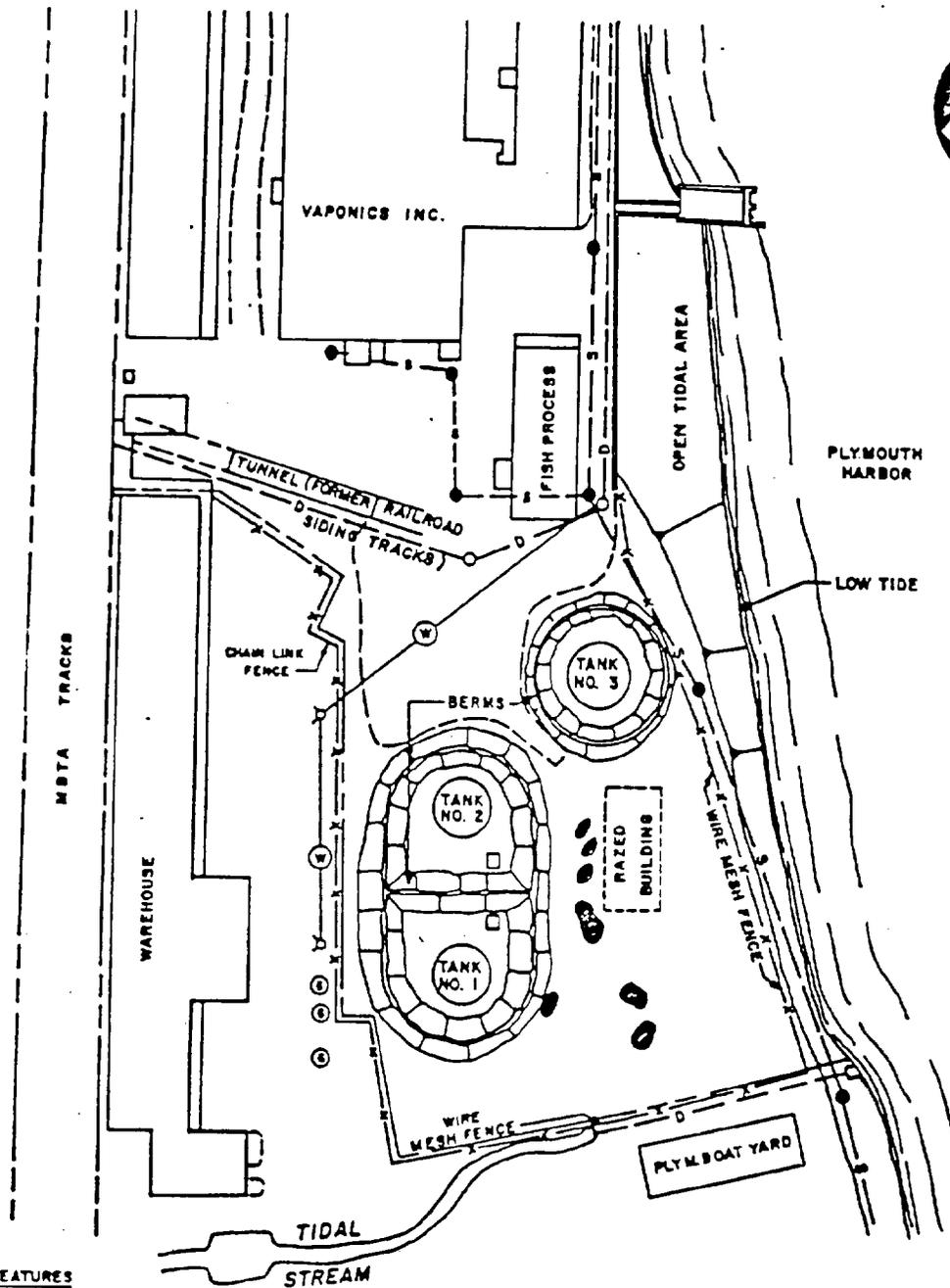
Based on the evaluations conducted during the five-year review, the EPA has determined that the remedy implemented at the Plymouth Harbor Site is still protective of human health and the environment, provided that the property is developed for commercial/industrial uses and the current deed restrictions pertaining to the use of the property remain in place.

Also, the EPA and the MADEP should review any reports and or plans for site redevelopment that will be generated to ensue that the future reuse of the Plymouth Site remains protective of the public health and environment.



BASE MAP IS A PORTION OF THE U.S.G.S. PLYMOUTH, MA QUADRANGLE (7.5 MINUTE SERIES, 1977, CONTOUR INTERVAL

LOCATION MAP
CANNON ENGINEERING CORPORATION
PLYMOUTH SITE, PLYMOUTH, MA
 SCALE: 1" = 2000'



KEY TO EXISTING FEATURES

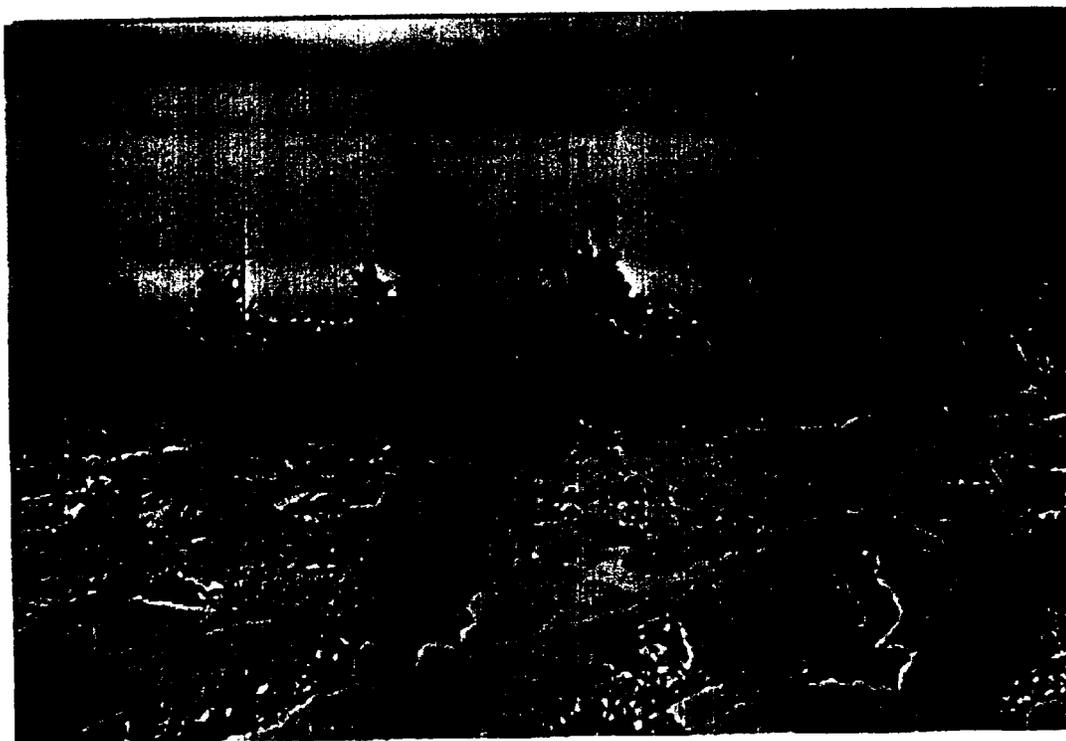
- STAINED SOIL AREA
- HYDRANT
- GAS TANK
- WATER LINE
- PROPERTY LINE
- DRAIN
- SEWER
- FENCE
- STORM MANHOLE
- SEWER MANHOLE

STORAGE CAPACITIES OF EXISTING TANKS

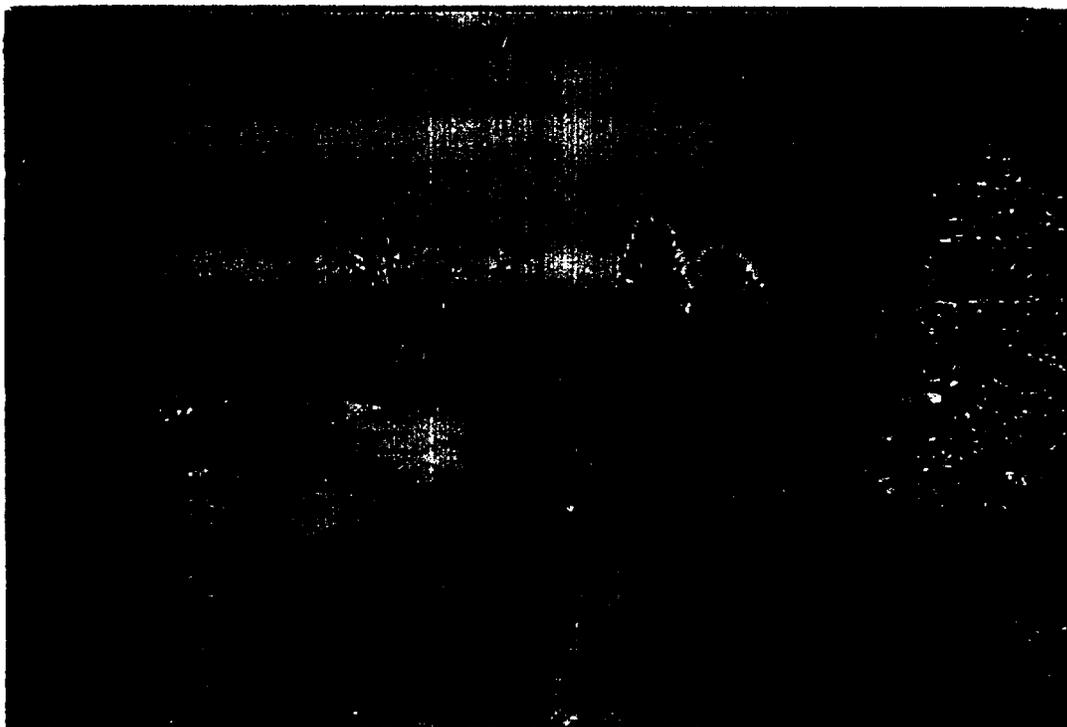
- TANK NO. 1 (SOUTH)
250,000 GALLONS
- TANK NO. 2 (CENTRAL)
250,000 GALLONS
- TANK NO. 3 (NORTH)
500,000 GALLONS

SITE MAP
CANNON ENGINEERING CORPORATION
PLYMOUTH SITE, PLYMOUTH, MA
 NOT TO SCALE











Memo

To: Derrick Golden, RPM
MA Superfund Section
From: Sarah Levinson, Risk Assessment Support
Superfund Support Section
Date: May 21, 1998
Subject: Addendum to Cannons-Plymouth 5-yr Review Comment Memo

After speaking with you earlier this week, you stated that you would like a risk computation using the original data collected at Cannons-Plymouth from the mid 80's in support of the close-out report. As mentioned to you, the data reflected post-removal composite soil sampling data that has since been covered over with several inches to a feet or more of "clean fill". I expressed my concern that this data, now 15 years old, is likely to have very little bearing on current risk to a trespasser or occupational worker who may come in contact with surface soils at the Cannons-Plymouth site.

In proceeding with the risk computation, I noted that the slope factor for benzo(a)pyrene has decreased, [presently 7.3 , formerly 11.5 (mg/kg-day)⁻¹] and we now have estimated potencies for 6 carcinogenic PAHs enabling a better cancer risk approximation than that originally performed in which all carcinogenic PAHs were assumed to have equivalent potency to benzo(a)pyrene. However, the data collected in the mid-80's in which total carcinogenic PAH concentration is reported without specific data on the constituents, does not enable a risk assessor to take advantage of the "new" slope factors for each of six carcinogenic PAHs. Consequently, the risk assessment that follows, still must assume that all carcinogenic PAHs are of equivalent potency to benzo(a)pyrene when in fact many of them are now believed to be much lesser in potency. The net result will likely overstate the estimated risk attributed to PAHs.

Secondly, as of 1997, a new dermal risk assessment guidance has been issued which updates the presumed dermal absorption factor for benzo(a)pyrene. The value used in the original evaluation assumed only 5% absorption through the dermal route whereas as now the default value is 13%. The new dermal risk assessment guidance, " Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual Supplemental Guidance, Dermal Risk Assessment, Interim Guidance" (12/97) also updates the soil deposition factor and exposed surface area default values for a child and an adult. Formerly, the risk computation had assumed a soil deposition rate of 0.5 mg/cm² for both a child and an adult while now the new default (central tendency) values are 0.3 and 0.03 mg/cm²-event for a child and an adult respectively. Exposed surface area values have also been updated as per the new dermal risk assessment guidance. The new central tendency

default surface areas for the child and adult are 2,900 cm² and 5,700 cm² which corresponds to exposure to the head, hands, forearms, and lower legs of the adult and the same plus feet for the child. These assumptions regarding exposed surface area represent considerable increases, particularly for the adult. Unlike the original risk assessment, no adjustment was made to the amount of the total surface area that was actually exposed.

Since the nature of the exposure included a future trespasser (older child) and an adult worker, both evaluations are presented for incidental ingestion and dermal exposure. The evaluation is for exposure to carcinogenic PAHs only.

Incidental Soil Ingestion Exposure Assumptions:

- older child/trespasser soil ingestion rate: 100 mg/event
- adult soil ingestion rate: 50 mg/event
- older child/trespasser exposure frequency: 50 events/yr
- adult exposure frequency: 60 events/yr
- duration: 10 yrs (both trespasser and adult)
- body weight older child/trespasser: 30 kg
- body weight adult: 70 kg
- exposed carcinogenic PAH concentration: 53 mg/kg (highest composite)

Older Child/Trespasser Soil Ingestion Cancer Risk for cPAHs =

$$\frac{7.3 \text{ (mg/kg-day)}^{-1} \times 53 \text{ mg cPAHs/kg soil} \times 100 \text{ mg/day} \times 10^{-6} \text{ kg soil/mg soil} \times 50 \text{ events/yr} \times 10 \text{ yr}}{30 \text{ kg} \times 365 \text{ days/yr} \times 70 \text{ yr}}$$

Older Child/Trespasser Soil Ingestion Cancer Risk for cPAHs = 2.5×10^{-5}

Adult Worker Soil Ingestion Cancer Risk for cPAHs =

$$\frac{7.3 \text{ (mg/kg-day)}^{-1} \times 53 \text{ mg cPAHs/kg soil} \times 50 \text{ mg/day} \times 10^{-6} \text{ kg soil/mg soil} \times 60 \text{ events/yr} \times 10 \text{ yr}}{70 \text{ kg} \times 365 \text{ days/yr} \times 70 \text{ yr}}$$

Adult Worker Ingestion Cancer Risk for cPAHs = 6.5×10^{-6}

Dermal Exposure Assumptions:

older child/trespasser exposed surface area: 2,900 cm²
 adult exposed surface area: 5,700 cm²
 dermal absorption cPAHs : 0.13
 older child soil deposition rate: 0.3 mg/day
 adult soil deposition rate: 0.03 mg/day
 older child/trespasser exposure frequency: 50 events/yr
 adult exposure frequency: 60 events/yr
 duration: 10 yrs (both trespasser and adult)
 body weight older child/trespasser: 30 kg
 body weight adult: 70 kg
 exposed carcinogenic PAH concentration: 53 mg/kg (highest composite)

Dermal Risk for Older Child/Trespasser to cPAHs:

$$\frac{7.3 \text{ (mg/kg-day)}^{-1} \times 53 \text{ mg/kg} \times 2900 \text{ cm}^2/\text{day} \times 0.3 \text{ mg soil/day} \times 10^{-6} \text{ kg/mg} \times 50 \text{ events/yr} \times 10 \text{ yr} \times 0.13}{30 \text{ kg} \times 365 \text{ days/yr} \times 70 \text{ yr}}$$

Dermal Risk for Older Child/Trespasser to cPAHs = 2.9×10^{-5}

Dermal Risk for Adult Exposure to cPAHs =

$$\frac{7.3 \text{ (mg/kg-day)}^{-1} \times 53 \text{ mg/kg} \times 5700 \text{ cm}^2/\text{day} \times 0.03 \text{ mg soil/day} \times 10^{-6} \text{ kg/mg} \times 60 \text{ events/yr} \times 10 \text{ yr} \times 0.13}{70 \text{ kg} \times 365 \text{ days/yr} \times 70 \text{ yr}}$$

Dermal Risk for Adult Exposure to cPAHs = 2.9×10^{-6}

Combined risk for child/trespasser's exposure to cPAHs (ingestion + dermal) = 6×10^{-5}

Combined risk for adult's exposure to cPAHs (ingestion + dermal) = 1×10^{-5}

With regard to the significance of the residual lead concentrations (highest composite reported as 192 ppm), EPA now uses several models to predict blood lead levels and seeks to protect 95% of the exposed population from blood lead levels in excess of 10 ug/dl. EPA OSWER also issued a directive in 1994 in which 400 ppm lead in soil was advocated as a residential screening level - if concentrations were below 400 ppm, then no further study is warranted. Based on this EPA directive and experience running EPA child and adult lead exposure models, 192 ppm lead in soil does not pose a significant public health hazard.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F.K. FEDERAL BUILDING, BOSTON, MA 02203-2211

MEMORANDUM

DATE: July 28, 1998

SUBJ: Protectiveness Finding for the Plymouth Harbor Second Five-Year Review

FROM: Daniel Coughlin, Chief, MA Superfund Section, Office of Site Remediation and Restoration

TO: File

The purpose of this memo is to present the rationale for the "protectiveness" finding for the Plymouth Harbor Site 5-year review.

No cleanup levels were developed for the Plymouth site, rather an Endangerment Assessment (EA) was developed based on the concentrations of contaminants of concern (PAH's and lead) remaining at the site after the remedial action and a removal action were completed. Current and future use scenarios were developed and risks calculated based on these scenarios. The levels of PAH's and lead remaining at the site were found to be protective.

Current Use Scenario

The Endangerment Assessment (EA) assumed dermal contact and incidental ingestion would occur with shallow soils by individuals living or working nearby the site who would occasionally traverse or play on the site. The EA assumed that children would access the site 50 times per year for a period of 10 years and adults 24 times per year also for 10 years. The soil concentrations used for risk calculations were 2 mg/kg for carcinogenic PAH's and 53 mg/kg for lead.

Future Use Scenario

The future use scenario in the 1989 Endangerment Assessment (EA) assumed dermal contact and incidental ingestion with both surface and subsurface soils based on a commercial/industrial setting. The EA assumed that children may access the site as in the previous scenario and that adults would have contact 60 times per year for 10 years. The soil concentrations used for risk calculations were 49 mg/kg for carcinogenic PAH's and 192 mg/kg for lead.

Lead

Based on information provided by the regional risk assessment support person (Attachment 4) it was determined that the 192 mg/kg level of lead in Site soils is currently below the EPA's residential screening level of 400 mg/kg.

Re-evaluation

In May of 1998, Ms. Sarah Levinson of the risk assessment support group, re-calculated the risk calculations that were originally done in the 1989 Endangerment Assessment. (See attachment 4)

The combined risk for child/trespasser's exposure to cPAHs for ingestion and dermal exposure is 6.0×10^{-5} . The combined risk for adult's exposure to cPAHs was determined to be 1.0×10^{-5} .

Protectiveness of Current Contaminant Levels

Based on the above analysis the levels of the contaminants of concern (PAHs and Lead) remaining at the site, after remediation, still remain protective of human health.