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The Budd Metal Company Site

Proposed Plan of Remedial Action

July, 1996

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch

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BUDD METAL COMPANY SITE
PROPOSED PLAN

1. INTRODUCTION

In March, 1995, the Department of Natural Resources and Environmental Control (DNREC or Department) under the authority granted by the Hazardous Substance Cleanup Act (7 Del. C., Ch. 91) reached an agreement with the current owner of the Budd Metal Company site, Issac Buddavitch (the Potentially Responsible Party (PRP)) to perform a Remedial Investigation/Feasibility Study (RI/FS) of the soil and groundwater at the Budd Metal Company site (hereinafter "the site").

The site is located in a low lying industrial area southeast of the city limits of the City of Wilmington, Delaware. The RI/FS was conducted consistent with the Delaware Regulations Governing Hazardous Substance Cleanup (HSCA), Delaware Standard Operating Procedures (SOP) for Chemical Analytical Programs (CAP), the Guidance Document and other Departmental policies or procedures.

The overall purpose of the RI/FS process is to determine the nature and extent of surface and subsurface contamination at the site, identify potential sources of contamination, evaluate risks to the public and environment associated with identified contamination, and perform a feasibility study that will identify, evaluate and recommend a remedial action, if required, that will be protective of public health, welfare and the environment.

This document is the Department's Proposed Plan of Remedial Action for the site. It is based on the results of the RI/FS for the site. This Proposed Plan is issued under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA) and the Regulations Governing Hazardous Substance Cleanup (the Regulations). It presents the Department's assessment of the potential unacceptable health and environmental risks posed by the site.

Section 2 presents a summary of the background and history of the site. Section 3 discusses the remedial investigation objectives for the site. Section 4 provides a description of the remedial investigation results. Section 5 presents a discussion of the remedial action objectives, a review of applicable local, state and federal regulations, and a discussion of the areas of concern. Section 6 presents a detailed analysis of remedial alternatives, including identification of and rationale for selection of alternatives and description of alternatives.

The Proposed Plan of Remedial Action also includes a comparison of the remedial alternatives with respect to the following criteria: protection of public health; welfare and the environment; compliance with applicable laws and regulations; community acceptance; compliance monitoring requirements; permanence; technical practicality; restoration time frame; reduction of toxicity, mobility and volume of contamination, long-term effectiveness; short-term effectiveness, capital and operation and maintenance cost.

The Department will provide public notice and opportunity to comment on the Proposed Plan in accordance with Section 12 of the Regulations. At the conclusion of the comment period, the Department, after review and consideration of the comments received, shall issue a final plan of remedial action which shall designate the remedial action. The Proposed Plan, the comments received from the public, responses to the comments and the Final Plan will constitute the "Remedial Decision Record".

2. SITE DESCRIPTION AND OPERATIONAL HISTORY

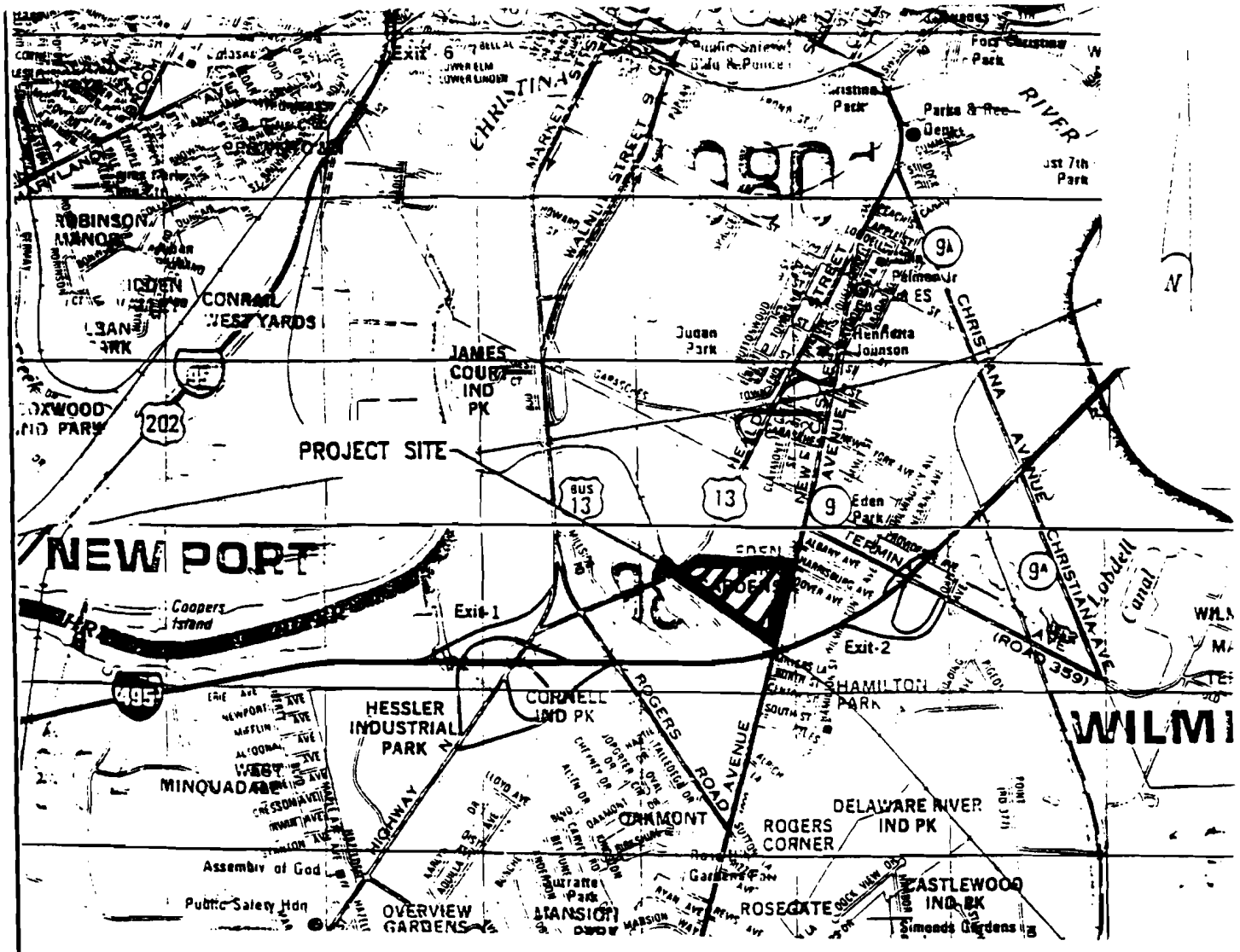
The Budd Metal Company site is located in a low lying industrial area southeast of the city limits of the City of Wilmington, Delaware. The site is situated between South Heald Street and New Castle Avenue, approximately 4,000 feet southeast of the Christina River (See Figure 1). The approximately 12 acre site was previously used as a metal fabricating facility which included an office building; a fabrication building/warehouse, a shipping and handling warehouse building, a warehouse, a garage, and other smaller support buildings (See Figure 2).

The Budd Metal Company owned and operated a facility at the location from the mid 1950's until 1986. Initially, the facility was used for the storage and wholesale/retail distribution of nails. As the business expanded, the facility ultimately became used for the fabrication and wholesale/retail distribution of steel products for the construction industry and various industrial plants in the region. Pre-manufactured steel components such as beams, channels, and angles were welded or punched at the facility to form building components according to specifications under contract. This work was conducted in one half of the Fabrication Division building in an area approximately 100' x 350'. The other half of the fabrication building was used to store steel for industrial clients who needed to maintain relatively small inventories at plant sites. Steel products were also stored outside on the facility grounds.

Painting of steel components was not performed on a routine basis. Occasionally when a primer coat was needed painting would be performed. However, if more involved painting was required the steel components were sent off-site.

Steel was brought into the site by rail car and taken out by rail car or by truck. Steel was loaded and transported within the site by diesel cranes. The cranes and trucks that were owned and operated by the company were serviced on-site in the service garage (See Figure 2).

The facility had no formal discharge areas, and no waste handling areas such as ponds, piles or treatment systems.



NOTE:

THIS LOCATION SKETCH IS ADAPTED FROM "ADC'S STREET MAP OF NEW CASTLE COUNTY, DELAWARE," PREPARED BY ADC OF ALEXANDRIA, INC., MAPS NO, 8 AND 13, AND DATED 1992.

SITE LOCATION SKETCH

BUDD METAL COMPANY

WILMINGTON

NEW CASTLE COUNTY, DELAWARE

DUFFIELD ASSOCIATES, INC

CONSULTANTS IN THE GEOSCIENCE

WILMINGTON, DELAWARE ELKTON, MARYLAN

Drawn: DSH	Chk'd:	Date:	28 SEPTEMBER 19
Scale:	1" =2000'	W.O.:	1451.EI
File No:	A-1451EI-1		FIGURE 1

© DUFFIELD ASSOCIATES

2.1. Wetlands

The National Wetlands Inventory Map (Wilmington South, DEL-NJ, 4/81) indicates that there is a designated wetlands area located to the west and south of the site. The western wetland area is designated as P EM5/OW (Palustrine-emergent-narrow-leaved persistent/open water (unknown bottom). The southern portion of the wetlands area, which also extends across South Heald Street to the south of the site, is designated as POWZh (Palustrine-open water-intermittently exposed/permanent-diked/impounded). The southern wetlands are approximately 400 feet away from the site at the closest point. South Heald Street separates the site from the western wetlands and appears to block direct drainage to this wetland.

2.2. Hydrogeologic Setting

The site is situated within the Atlantic Coastal Plain province, approximately 1 mile south of the fall line. The Coastal Plain is a wedge shaped accumulation of unconsolidated sediments, deposited on a sloping shelf or "basement" bedrock.

Based on regional geologic mapping by the Delaware Geological Survey (DGS), Coastal Plain stratigraphy in the vicinity of the Budd Metal Company site is anticipated to consist of three (3) major geologic units: the Cretaceous-age Potomac Formation, the overlying Pleistocene age Columbia Formation and recent deposits associated with the nearby Christina and Delaware Rivers. Disturbed and miscellaneous fills deposited during the industrial history of the area are present near the surface at the site.

The lower formation, the Potomac, is reported as typically consisting of varicolored silt and clay deposits but does contain interbedded sand stratta. Because of the complex fluvial depositional history of the Potomac Formation, the vertical and horizontal distribution of sand strata within the formation is highly variable. As such, their location and extent are not well defined.

The overlying Columbia Formation is reported as typically consisting of gravely, fine and medium-grained sands with some interbedded silts and clays. The groundwater table or unconfined aquifer is typically located in the Columbia Formation.

The recent deposits typically consist of soft, silty clay marsh and river sediments deposited in valleys eroded into older Pleistocene and Cretaceous strata. Depending on the depth of erosion, these deposits can completely or partially cut of the older formations.

DNREC records indicate that neither the Columbia nor Potomac Formations are directly utilized as a local potable groundwater supply in the vicinity of the Budd Metal Company site.

Surface topography is relatively flat, and portions of the site have been observed to contain ponded surface water after storm events. Drainage swales are located on the southeastern and western portions of the site.

2.3. Previous Environmental Investigations

Several investigations were performed at the site during the period from 1988 to 1993. During these investigations, site soils, groundwater and surface water were sampled and analyzed for heavy metals, volatile organic compounds (VOCs), semi-volatile organic compounds, polychlorinated bi-phenlys (PCBs), pesticides, polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). The results of these studies indicated that lead in the site soils is the primary constituent of environmental concern. The maximum reported concentration of lead which was found in the site soils by these studies was 57,000 milligrams per kilogram (mg/kg). Petroleum hydrocarbons, polychlorinated bi-phenyls (PCB's) and polynuclear aromatic hydrocarbon (PAH) compounds have been detected at elevated levels at the site, but in confined areas. Petroleum hydrocarbons were detected in the sediments of a drainage swale that extends across the southeastern portion of the property, adjacent to the former Shipping & Handling Warehouse. In addition, PCBs and elevated TPH levels were detected around a former transformer area, after the transformer had been vandalized in 1991. A summarization of the investigative reports is presented below and are available for review as part of the Administrative Record for the site. The Administrative Record is located at 715 Grantham Lane, New Castle, Delaware. The report summary is as follows:

- Phase I Environmental Assessment, April, 1989
- Phase II Preliminary Environmental Assessment, July, 1989
- Removal and Disposal of Asbestos and Disposal of Transformer Cooling Oil Contaminated Soil, September, 1990
- Budd Metal Property Environmental Assessment, September, 1991
- Budd Metal Property RI/FS Phase I, February, 1992
- Budd Metal Property Groundwater Evaluation, March, 1993

3. REMEDIAL INVESTIGATION OBJECTIVES

The objectives of the RI were to verify the results of previous studies that had been performed at the site, to obtain information about areas of the site that may have not been fully characterized (particularly the eastern portion of the site) and to use this information to identify areas of the site that would require remediation.

The sampling for the RI phase of the RI/FS Work Plan was completed on April 7, 1995. During this phase, 53 test pits were excavated. Soil samples were collected from the upper and lower levels of the test pits, and two surface sediment samples were collected from the on-site drainage swale. One-hundred and eleven soil samples, including duplicate and matrix spike samples, were submitted to Lancaster Laboratories, Inc. (LLI) for analyses of lead content (SW-846 7421). Additionally, 32 soil samples, including spike and spike duplicate samples, were submitted to LLI for analysis of TPH by Gas Chromatography - Flame Ionization Detector (TPH by GC-FID). PCBs by SW-846 8080, and PAH compounds by SW-846 8270A analyses.

The laboratory analytical results were submitted to the Department in a letter report dated May 5, 1995. The results for lead, PCBs and TPH are summarized in Table 1. Table 2 lists the results of analysis for PAH compounds.

A site survey was performed by Vandemark & Lynch, Inc. on April 18, 1995. The purpose of the survey was to locate the test pits and the previously installed monitor wells, and to provide a one-foot interval topography of the site. A copy of the site plan is included in this sites Administrative Record.

4. REMEDIAL INVESTIGATION RESULTS

The data generated during the RI confirmed the findings of previous studies of the site. Specifically, the data confirmed that elevated levels of lead are present in the uppermost levels of the fill soils in the western portion of the site. Petroleum hydrocarbons, PCBs and PAH compounds are also present sporadically in areas with elevated lead levels. Elevated levels of petroleum hydrocarbons and PCBs are present in the area of the former transformers, and petroleum hydrocarbons are present at elevated levels in the sediments in the drainage swale. In addition, elevated levels of lead and PAHs were detected in an area of the eastern portion of the site.

The analytical results and survey drawings were reviewed and interpreted to determine the extent of soils that are affected by elevated levels of substances of potential concern. This information was used to delineate the areas that are anticipated to require remediation.

5 REMEDIAL ACTION OBJECTIVES

A. CURRENT AND POTENTIAL LAND USE

According to the New Castle County Planning Department, the Budd Metal site is comprised of two parcels that are zoned M-2, Manufacturing. There is no rezoning activity planned in the area in the near future.

TABLE I: SUMMARY OF LABORATORY ANALYSIS OF SOIL SAMPLES
BUDD METALS REMEDIAL INVESTIGATION

Sample	Lead	PCBs	TPH	Notes
BMS-1	969.0	1.0	290.0	GC Fingerprint indicates the presence of lubricating oils (10W40).
BMS-1	87.0	ND	50.0	GC Fingerprint indicates the presence of coal tar oil.
BMS-2	2,070.0			
BMS-2	58.1			
BMS-3	456.0	ND	200.0	GC Fingerprint indicates a pattern similar to that of 10W40 motor oil.
BMS-3	1,390.0	ND	47.0	GC Fingerprint indicates a pattern similar to that of coal tar oil.
BMS-4	16.0			
BMS-4	20.7			
BMS-5	25.5			
BMS-5	37.3			
BMS-6	315.0			
BMS-6	51.8			
BMS-7	846.0			
BMS-7	450.0			
BMS-8	481.0			
BMS-8	1,150.0			
BMS-9	244.0			
BMS-10	1,020.0			
BMS-10	54.0			
BMS-11	2,120.0			
BMS-11	479.0			
BMS-12	3,960.0			
BMS-12	114.0			
BMS-13	1,030.0			
BMS-13	101.0			
BMS-14	1,350.0			
BMS-14	101.0			
BMS-15	3,150.0			

Blanks in the TPH and PCBs columns indicate that the samples were not analyzed for these parameters

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site", dated Revised March, 1996, and should be viewed in the context of that report.

TABLE I: SUMMARY OF LABORATORY ANALYSIS OF SOIL SAMPLES
BUDD METALS REMEDIAL INVESTIGATION

Sample	Lead	PCBs	TPH	Notes
BMS-15	48.2			
BMS-16	3,890.0			
BMS-16	39.4			
BMS-17	3,760.0			
BMS-17	21.5			
BMS-18	4,570.0			
BMS-18	106.0			
BMS-19	3,410.0			
BMS-19	95.0			
BMS-20	4,170.0			
BMS-20	50.9			
BMS-21	3,230.0			
BMS-21	852.0			
BMS-22	6,570.0			
BMS-22	3,650.0			
BMS-23	3,550.0			
BMS-23	121.0			
BMS-24	119.0			
BMS-24	85.1			
BMS-25	3,080.0			
BMS-25	54.6			
BMS-26	1,860.0			
BMS-26	1,400.0			
BMS-27	3,450.0			
BMS-27	2,850.0			
BMS-28	7,240.0			
BMS-28	1,830.0			
BMS-29	167.0			
BMS-30	150.0			
BMS-31	210.0			

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site", dated Revised March, 1996, and should be viewed in the context of that report.

TABLE I: SUMMARY OF LABORATORY ANALYSIS OF SOIL SAMPLES
BUDD METALS REMEDIAL INVESTIGATION

Sample	Lead	PCBs	TPH	Notes
BMS-32	588.0			
BMS-32	7,250.0			
BMS-33	1,970.0	.8	500.0	GC Fingerprint indicates a mixture of lubricating oils.
BMS-33	1,120.0	.6	400.0	GC Fingerprint indicates a mixture of heavier weight lubricating oils.
BMS-34	1,550.0			
BMS-34	306.0			
BMS-35	174.0	ND	90.0	GC Fingerprint indicates the presence of a mixture of lubricating oils.
BMS-35	18.5	ND	32.0	GC Fingerprint indicates the presence of weathered #2 Fuel Oil.
BMS-36	1,030.0			
BMS-36	30.2			
BMS-37	215.0			
BMS-37	83.8			
BMS-38	1,000.0	0.21 J	120.0	GC Fingerprint indicates the presence of 10W40 motor oil.
BMS-38	21.8	ND	60.0	GC Fingerprint indicates #6 fuel oil.
BMS-39	80.3			
BMS-39	9.2			
BMS-40	207.0			
BMS-41	51.5			
BMS-42	89.1	ND	860.0	GC Fingerprint indicates lubricating oil, heavier weight than 10W40.
BMS-43	195.0			
BMS-44	202.0	ND	170.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-45	220.0			
BMS-45	8.0			
BMS-46	229.0	ND	90.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-46	2,020.0	9.3	1,600.0	GC Fingerprint indicates lubricating oil.
BMS-47	4,840.0			
BMS-47	1,220.0			
BMS-48	910.0	.6	360.0	GC Fingerprint indicates a mixture of lubricating oils and coal tar oil.
BMS-48	1,820.0	.7	700.0	GC Fingerprint indicates lubricating oil.

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site", dated Revised March, 1996, and should be viewed in the context of that report.

TABLE I: SUMMARY OF LABORATORY ANALYSIS OF SOIL SAMPLES
BUDD METALS REMEDIAL INVESTIGATION

Sample	Lead	PCBs	TPH	Notes
BMS-49	188.0	ND	110.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-49	295.0	ND	240.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-50	304.0			
BMS-50	1,860.0			
BMS-51	180.0	ND	190.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-51	688.0	ND	400.0	GC Fingerprint indicates lubricating oil mixed with coal tar oil.
BMS-52	106.0	ND	180.0	GC Fingerprint indicates a mixture of lubricating oils.
BMS-52	130.0	0.24 J	5,000.0	GC Fingerprint indicates mineral oil (transformer / insulator).
BMS-53	68.5	ND	NP	GC Fingerprint indicates non petroleum organic material.
BMS-53	157.0	0.14 J	10,000.0	GC Fingerprint indicates mineral oil (transformer / insulator).
BMSS-1	514.0	ND	360.0	GC Fingerprint indicates lubricating oil heavier than 10W40 mixed with extremely weathered fuel oil.
BMSS-2	375.0	ND	1,100.0	GC Fingerprint indicates lubricating oil heavier than 10W40 mixed with coal tar oil

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site", dated Revised March, 1996, and should be viewed in the context of that report.

TABLE 2: SUMMARY OF LABORATORY ANALYSIS FOR BASE-NEUTRAL COMPOUNDS IN SOILS
BUDD METALS REMEDIAL INVESTIGATION

(all concentrations in mg/kg)

	Industrial RBC	BMS-1	BMS-1	BMS-3	BMS-3	BMS-33	BMS-33	BMS-35	BMS-35	BMS-38	BMS-38	BMS-42	BMS-44	BMS-46	BMS-46	BMS-48	BMS-48	BMS-49
rameter		0-0.5	5.5	0-0.5	3.5-5.5	0-0.5	1.0	0-0.5	2.0	0-0.5	1.0	0-0.5	0-0.5	0-0.5	1.0-1.5	0-0.5	1.0-1.5	0-0.5
pthalene	41000.00	ND	ND	ND	0.69	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	ND	ND	ND
enaphthylene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
enaphthene	61000.00	ND	ND	ND	9.70	ND	0.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
orene	41000.00	ND	ND	ND	1.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
enanthrene	NS	1.10	0.80	0.39	1.60	0.37	2.00	ND	ND	0.49	ND	ND	ND	0.44	0.85	0.29	210 J	0.22
thracene	310000.00	0.31	ND	ND	0.41	ND	0.29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
oranthene	41000.00	1.90	0.81	1.00	2.10	0.48	2.00	ND	ND	0.98	0.22	ND	ND	0.66	1.00	0.57	0.30	0.62
rene	31000.00	2.00	0.81	0.99	2.00	0.67	2.60	ND	ND	0.92	200 J	ND	0.24	0.69	1.30	0.62	0.38	0.61
enzo[a]anthracene	3.90	1.10	0.39	0.58	0.72	0.33	1.00	ND	ND	0.59	ND	ND	ND	0.37	0.64	0.35	ND	0.36
rysene	390.00	0.94	0.37	0.57	0.78	0.36	1.00	ND	ND	0.64	ND	ND	ND	0.32	0.62	0.30	210 J	0.29
enzo[b]fluoranthene	3.90	1.60	0.40	0.76	0.70	0.49	1.60	ND	ND	0.86	ND	ND	ND	0.44	0.90	0.46	0.29	0.46
enzo[k]fluoranthene	39.00	0.52	ND	0.28	ND	ND	ND	ND	ND	0.25	ND	ND	ND	ND	0.27	ND	ND	ND
enzo[a] pyrene	0.39	0.91	0.28	0.53	0.46	0.28	0.90	ND	ND	0.50	ND	ND	ND	0.28	0.56	0.29	0.23	0.28
deno[1,2,3-cd]pyrene	3.90	0.69	ND	0.38	ND	ND	0.59	ND	ND	0.37	ND	ND	ND	ND	0.39	ND	ND	ND
ibenz[ah]anthracene	0.39	ND	ND	0.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
enzo [ghi] perylene	NS	0.63	ND	0.54	0.32	ND	0.56	ND	ND	0.34	ND	ND	ND	ND	0.43	ND	0.37	ND

RBC Industrial - EPA Region III Risk Based Concentration Level for Industrial Sites, March 7, 1995
ND - Not Detected

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site" dated revised March, 1996, and should be viewed in the context of that report.

TABLE 2: SUMMARY OF LABORATORY ANALYSIS FOR BASE-NEUTRAL COMPOUNDS IN SOILS
BUDD METALS REMEDIAL INVESTIGATION

(all concentrations in mg/kg)

	Industrial RBC	BMS-49	BMS-51	BMS-51	BMS-52	BMS-52	BMS-53	BMS-53	SS-1	SS-2
rameter		1.5-2.0	0-0.5	2.0	0-0.5	1.0	0-0.5	1.0-1.5	0-0.5	0-0.5
pthalene	41000.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
enaphthylene	NS	0.37	ND	ND	ND	0.53	ND	0.49	ND	ND
enaphthene	61000.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
orene	41000.00	0.21	ND	ND	ND	ND	ND	ND	ND	ND
enanthrene	NS	1.20	0.26	1.50	ND	1.60	ND	1.50	0.44	1.10
thracene	310000.00	0.33	ND	0.33	ND	ND	ND	ND	ND	ND
oranthene	41000.00	1.40	0.51	2.00	ND	0.70	ND	1.00	0.63	2.10
ene	31000.00	1.80	0.61	2.80	ND	0.34	ND	0.41	0.64	2.00
nzo[a]anthracene	3.90	0.97	0.34	1.20	ND	0.22	ND	0.29	ND	1.00
rysene	390.00	0.97	0.30	1.20	ND	0.23	ND	0.31	0.57	1.40
nzo[b]fluoranthene	3.90	1.50	0.48	1.80	ND	0.31	ND	0.52	1.00	2.60
nzo[k]fluoranthene	39.00	0.39	ND	0.52	ND	ND	ND	ND	ND	0.89
nzo[a] pyrene	0.39	0.91	0.31	1.10	ND	200 J	ND	0.26	0.46	1.60
eno[1,2,3-cd]pyrene	3.90	0.52	0.23	0.64	ND	ND	ND	ND	0.63	1.90
enz[ah]anthracene	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND
nzo [ghi] perylene	NS	0.46	0.22	1.30	ND	ND	ND	ND	0.84	1.70

RBC Industrial - EPA Region III Risk Based Concentration Level for Industrial Sites, March 7, 1995
ND - Not Detected

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company Site" dated revised March, 1996, and should be viewed in the context of that report.

B. RESOURCE USE

Pursuant to the Delaware Regulations Governing Hazardous Substance Cleanup, April, 1995, the Department is required to evaluate the impact to natural resources from hazardous substance release. The natural resources evaluated included the groundwater, surface water/wetlands, soils, proximity to human populations, use of surrounding properties and potential off-site impacts. The following provides a discussion of the impacts to the natural resources from hazardous substance release at the Budd Metal site.

1. GROUND WATER

According to the DNREC, in correspondence to the consultant dated October 24, 1994 and November 8, 1995, "the groundwater table in the vicinity of the site is shallow and is not used for the production of drinking water, due to its poor transmissive quality and high iron content".

A review of the State of Delaware Geologic Survey Bulletin No. 6 Volume 1, "The Water Resources of Northern Delaware", indicated that groundwater in the upper, middle and lower aquifers in the region around the site is high in iron content.

The consultant performed a search of the Delaware Water Use Data Systems (DWUDS) by the Delaware Division of Water Resources in December, 1995, for the area surrounding the site. The results of this search indicated a total of seventeen (17) wells at three (3) sites surrounding the Budd Metal site. All of these wells were indicated as monitor or observation wells.

With the exception of barium and TPH, none of the compounds detected during the four prior documented ground water sampling events has been encountered on a consistent basis. Of the sporadically detected compounds, only chloromethane was detected on one occasion at concentrations that are slightly above those recommended under the EPA primary drinking water standards for drinking water, or the EPA Region III RBCs for tap water. As noted, ground water in the area is not used as a drinking water source.

2. WETLANDS

A wetlands evaluation was performed at the site on June 28, 1995 by Duffield Associates' wetland scientists. Personnel from the Philadelphia District Army Corps of Engineers reviewed the evaluation and performed a jurisdictional determination on July 14, 1995. This jurisdictional delineation identified approximately 1/20 of an acre of jurisdictional

wetlands, located on the southern portion of the site. The identified wetlands area flanks the railroad spur that leads to the Shipping Warehouse. During this evaluation, an area of designated tidal wetlands was identified approximately 100 yards to the west of the site, on the western side of Heald Street. The topography of the site and lack of drainage, combined with the fact that Heald Street is elevated with respect to the site, are believed to prevent the migration of sediments from the site to the off-site wetlands.

3. SOILS

The ground surface at the site is partially covered by buildings and pavements (approximately 35% coverage). The remainder of the site surface is bare soil or sparsely covered with vegetation. A fill layer, with a depth ranging from 1 to 6 feet, has been documented over most of the site. This layer is exposed at the surface throughout the western half of the property. The fill is a black, coarse material, which includes sand, silt, coal fragments, metal fragments, plastic, glass, slag, bricks, and rubber. The depth of the fill layer is generally 1 to 3 feet over most of the site. In the southwestern corner of the site, along Heald Street, this layer extends down from the surface down to 5 to 6 feet. Blue-gray, orange and brown silt and fine recent sand deposits underlie the fill layer.

Portions of the fill layer have been determined to contain elevated concentrations of lead. Smaller, isolated areas of the fill layer have also been found to contain elevated levels of PAH compounds, TPH, and PCBs. Petroleum hydrocarbon and PCB levels are particularly elevated around the area of the former vandalized transformers, located immediately north of the Shipping and Handling Warehouse.

C. PROXIMITY TO HUMAN POPULATIONS

Potential receptors of the substances of concern present at the Budd Metal site include:

- Site employees
- Trespassers

1. USE OF SURROUNDING PROPERTIES

The properties adjacent to the northern boundary of the Budd Metals Site are occupied by Material Supply Inc., and Blacktop Products, Co. These properties contain piles of bituminous concrete materials and apparently derelict trucks and tractor trailers. A fleet of operating trucks and a refueling station are also located on these properties. Contractors Supply

Co., a sand and gravel supply company, is located across South Heald Street to the west of the site. The southern edge of the property is bordered by the Wilmington and Northern Railroad. A construction storage yard owned by James Julian, Inc. is located on the southern side of these railroad tracks. This property contains large stockpiles of sand, gravel and construction materials, along with associated equipment for moving, hauling and storing these materials. DuPont Stationers is located to the southeast of the site. There are several small one-story masonry block buildings located along New Castle Avenue, adjacent to the eastern site access road. Some of these buildings contain small retail stores such as a grocery store and liquor store. Eden Park Gardens, a residential neighborhood, is located further to the east and northeast of the site, across New Castle Avenue. At the closest location to impacted areas of the site, the Eden Park Garden homes are approximately 300 feet away and are located at a higher elevation.

2. POTENTIAL OFF-SITE IMPACTS

The topography of the site is generally flat and drainage is poor. During numerous site visits, surface water runoff has been observed to accumulate and is retained on-site as opposed to running off to surrounding sites. As a result, substances of potential environmental concern should be confined to the site and should not have migrated to adjoining properties by way of stormwater erosion and transport. Ground water monitoring results have indicated that ground water quality has not been impacted by the metals, PAH and PCB compounds that are present in the site soils. As such, off-site migration of these substances is not likely to have occurred by this route of migration.

D. SPECIFIC ENVIRONMENTAL ISSUES

The following are specific environmental issues that are considered applicable pursuant to HSCA as a result of site related activities:

- Samples from the fill layer, throughout the site, exceed the EPA guidance level for industrial soils of 1,000 mg/kg for lead. DNREC has required that soils above this level undergo some form of remediation. The Department has agreed that it is acceptable to leave soils below this level in place, given the industrial use setting at this site.

- Samples from isolated areas of the fill layer exceed EPA Region III Risk Based Concentrations (RBC's) for PCBs, and selected PAHs, for industrial soils.

- Samples from isolated areas of the fill layer exceed 1,000 mg/Kg for TPH, the clean-up level agreed to by the Respondent and DNREC during their August 28, 1995 meeting at Duffield Associates' office. This level is based on typical DNREC guidelines for petroleum releases associated with leaking underground storage tank sites situated similarly to the Budd Metal Site.

E. QUALITATIVE OBJECTIVES

The process of developing remedial action objectives for a site is accomplished in two steps. First, based upon the factors described above, qualitative objectives are established. Following the establishment of the qualitative objectives, quantitative objectives are then established. In developing qualitative objectives, the focus is to determine the desired outcome of the remediation process.

Qualitative objectives may specifically identify the prospective use of the facility and be developed in consideration of each of the key facility characteristics (public health, welfare and the environment).

1. PROSPECTIVE USE OF THE FACILITY

The site is currently being leased by Greggo & Ferrara Inc., the prospective buyers of the property. Greggo & Ferrara, Inc., are to perform the remedial action at the site on behalf of the owner, Mr. Issac Buddovitch as part of the agreement of sale. Greggo & Ferrara are sub-leasing the Fabrication Division Metal Warehouse building to Magnus Recycling, Inc., a tire recycling company. Greggo & Ferrara presently anticipate using the remaining portions of the site for similar recycling and waste reduction operations.

As mentioned previously, the site is zoned as M-2, Manufacturing. According to the New Castle County Planning Department, there are no plans for rezoning in the area in the immediate future.

2. FACILITY CHARACTERISTICS

a) Risks to Public Health and Welfare

Substances of concern at the site are not believed to impinge on surrounding properties or nearby residences. Topography at the site is relatively flat and drainage is poor. Stormwater generally accumulates and is retained on-site, as opposed to running off to surrounding sites. In the recent past, trespassers used the facility

buildings for shelter. Site soils could pose a threat to humans if they are disturbed (i.e., through dusts generated during construction or excavation activities). Since Magnus Recycling has started operations in the former Fabrication Division Warehouse, site security has improved, and trespassers have not been able to make use of the buildings.

The DNREC VCP Guidance Document provides the Department with the option to allow a party to use EPA Region III RBC levels as clean-up levels. For the Budd Metal site, the Department and the PRP agreed to utilize the RBC levels in lieu of performing a risk assessment (RA). Remediating site contaminants in conformance with EPA Region III RBC's will result in site conditions that are protective of human health, welfare and the environment now and in the future, based on the projected use of the property.

b) Environment

Soils and sediments in the on-site jurisdictional wetlands do not appear to have been impacted by site activities. Vegetation and indigenous wildlife have been observed to be present during numerous site visits. Off-site surface waters should not be impacted by the site conditions, as storm water run-off collects and is dissipated on-site.

Recent and past evaluations indicate that the ground water table underlying the site has not been impacted by the following constituents, specifically lead, PCBs and polynuclear aromatic compounds. TPH compounds have been detected in MW-2 during previous groundwater investigations and in more recently installed monitor well MW-6. Both wells are in close proximity to the former service garage. During the test pit excavations, a low permeability silt layer was observed below the fill layer throughout the site. This layer appears to have restricted the downward migration of substances of environmental concern. In addition, evaluations indicate that the most elevated levels of lead appear to be confined to near surface soils and decrease as depth increases over the majority of the site. The results of ground water analyses (summarized in the RI/FS Work Plan) show no elevated levels of these constituents, with the exception of TPH compounds observed in MW-2 and MW-6.

The results of the RI and prior evaluations indicate that the site does not impinge on surrounding sites or ecological receptors. The lead bearing soils at the site have been shown to fail the TCLP lead criteria, which designates them as "hazardous" from a regulatory standpoint. By regulation, soils that do not meet the TCLP criteria must be treated to mitigate leaching potential.

F. QUANTITATIVE OBJECTIVES

Quantitative objectives are to be based on the qualitative objectives to define specific levels of remedial action needed to achieve protection of public health, welfare and the environment. The following quantitative objectives are proposed for remediation of soils at the site.

- Remediation of soils containing lead in excess of 1,000 mg/kg for industrial use setting to reduce potential health risks and minimize the potential mobility of lead, by demonstrating that they will pass the TCLP criteria for lead of 5 mg/L. The 1,000 mg/kg standard is appropriate for the industrial use of the property.

- Remediation of petroleum hydrocarbons bearing soils from the former transformer area and the drainage swale located on the southeastern portion of the site to a level of less than 1,000 mg/kg.

- Remediation of PCB bearing soils in the area of the former transformer to levels below the EPA Region III Industrial RBCs of 0.74 mg/kg.

- **Groundwater** - Groundwater contamination (TPH) has been documented in the shallow, unconfined (Columbia) aquifer on site, particularly in the north/central portion of the site, near the service garage. Restriction of groundwater use in the unconfined aquifer in the vicinity of the service garage is required to eliminate the potential for adverse exposures to humans from consumption of contaminated groundwater. Therefore, DNREC will establish a groundwater management zone (GMZ) for the site (see Figure 3 for this GMZ). DNREC has determined that TPH levels in groundwater, in exceedence of 10ppm, shall constitute as free product. Should the elevated levels of TPH in the groundwater, in the vicinity of the service garage, decrease to less than 1ppm following 2 years of successive monitoring, then DNREC shall eliminate the GMZ from the site. Should the level of TPH in the groundwater in the vicinity of the service garage exceed 10ppm following 2 successive monitoring years, then DNREC shall require remediation be undertaken for the groundwater.

6. DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

6.1 Introduction

The objective of the detailed analysis of remedial alternatives is to present the relative advantages and disadvantages of contaminant management approaches for the site (DNREC HSCA Guidance, October, 1994). This is accomplished by evaluating each remedial alternative against the following criteria:

- Protection of public health, welfare and the environment;
- Compliance with applicable laws and regulations;
- Community acceptance;
- Compliance monitoring requirements;
- Permanence;
- Technical practicality;
- Technical feasibility
- Restoration time frame;
- Reduction of toxicity, mobility and volume of contamination;
- Long-term effectiveness; and
- Short-term effectiveness.

Capital equipment and operation and maintenance costs were also considered in the evaluation of each alternative.

6.2 Identification of and Rationale for Selection of Alternatives

A feasibility study was conducted to compare and evaluate potential remedial actions that could be taken at the site based on the apparent risks identified during the RI and previous investigations. The candidate remedial actions were considered based on their ability to reduce the risks to human health as determined in the remedial action objectives (RAOs).

The options presented in the RI/IA/FS Work Plan for remediation of site soils were as follows:

- No action if the soils are determined to represent no or low risks to human health and the environment in a commercial/industrial setting and are not a potential source for degrading ground water quality;

- Thermal Treatment at Clean Earth of New Castle, Delaware, or On-site Bioremediation for soils near the transformer area whose environmental constituent of concern is TPH only;

- Covering all or a portion of the site using a minimum 12 inch thick soil, a standard pavement section, or a combination of the two, if the soils represent a potential threat to human healthy by way of direct contact, but do not exhibit the toxicity characteristic as defined by the Resource Conservation and Recovery Act (RCRA) under 40 CFR 261;

- Stabilization and removal of soils on portions of the site where it is determined that substances of concern, specifically lead, represent a potential threat to human health. Soils with elevated lead concentrations where the TCLP lead concentration exceeds the regulatory level of 5.0 mg/L would be targeted for this remedial option. Soils would be stabilized, sampled to verify the effectiveness of the remedial stabilization, and hauled off-site to an DNREC approved solid waste landfill.

- Stabilization in place and covering of soils on portions of the site where it is determined that substances of concern, specifically lead, represent a potential threat to human health and the environment. Soils where the TCLP analytic results for soil samples indicate lead concentrations exceed the regulatory level of 5.0 mg/L would be targeted for this remedial option. Soils with elevated TCLP lead concentrations would be stabilized, sampled to verify the effectiveness of the remedial stabilization, replaced and recompacted in-situ, and covered as described above.

- Removal of PCB soils located around the former transformer for disposal at a secure hazardous waste landfill facility.

- On-site Bioremediation for soils in the drainage swale where the environmental constituent of concern is TPH.

With the exception of the "No Action" alternative, these options were selected for consideration because they involve proven technologies using materials and equipment that are readily available to the potential purchaser of the site who has volunteered to perform the remedial action at the site. The cost effectiveness of these technologies would allow implementation of a remedial action that would be acceptable to this potential purchaser.

The No Action alternative shall not be considered further since certain site soils have been shown to contain lead, PCBs, PAHs and TPH in excess levels that exceed the relevant EPA Region III RBCs and of state and federal cleanup standards for Lead and TPH. In addition, certain lead bearing soils also fail to pass the TCLP criteria of 5 mg/L. A no action option would not be effective in meeting HSCA cleanup levels.

6.3 Analysis of Alternatives

A further, detailed evaluation of the remaining options was performed based on:

1. Overall protection of human health and the environment
2. Compliance with all applicable local, state and federal laws and regulations
3. Community acceptance
4. Monitoring of the success of the option
5. Use of a permanent remedy to the extent practicable
6. Technical Practicability
7. Technical Feasibility
8. Implementability
9. Reasonable restoration time frame
10. Reduction of toxicity, mobility or volume
11. Short-term effectiveness
12. Long-term effectiveness
13. Cost effectiveness

An alternative screening matrix is presented in Table 3. As a result of an evaluation using the screening matrix, the following proposed remedial options remain:

- **Bioremediation** - Bioremediation of site for soils whose constituent of concern is petroleum hydrocarbons only.

- **Stabilization/Removal** - Stabilization and/or removal of PCB bearing soils from the area of the former transformers and hauling off-site for treatment or disposal.

- **Stabilization/Covering** - Stabilization and/or covering of soils with elevated lead levels. PAH compounds, PCBs and petroleum hydrocarbons found at elevated levels in these soils would be incorporated into the stabilized matrix and covered as well, taking them out of the zone of human contact and minimizing their potential exposure to environmental receptors.

6.3.1 Overall Protection of Human Health and the Environment

The three options under consideration (Bioremediation, Stabilization/Removal and Stabilization/Covering) are protective of human health and the environment in that they reduce and/or restrict the mobility of the identified contaminants when applied to the appropriate site conditions. The Budd Metal facility and surrounding sites are industrial in nature and the likely and preferred uses of the site are industrial. Remediation that includes covering lead containing soils after they have been stabilized is viable in this situation as it reduces potential mobility and potential human contact with the affected soils.

TABLE 3:
BUDD METAL COMPANY SITE
FEASIBILITY STUDY ALTERNATIVE SCREENING MATRIX

Alternatives / Assessment Factors	Alternative 1 No Action	Alternative 2 Thermal Treatment	Alternative 2a Haul PCB soils off site for disposal	Alternative 2b Bioremediation on site	Alternative 3 Covering	Alternative 4 Stabilization and Removal	Alternative 5 Stabilization in place and covering
Short-term Effectiveness	None	Soils removed	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Soils removed from contact with ecological receptors	Soils taken out of zone of human contact	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Soils taken out of zone of human contact
Long-term Effectiveness	None	Soils removed	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Constituents degraded	Soils taken out of zone of human contact	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Soils taken out of zone of human contact
Reduction of Toxicity, Mobility or Volume	None	Soils removed	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Constituents degraded	Mobility affected as soils not exposed to infiltrating rain water.	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Toxicity and mobility reduced. Volume not affected
Implementability	Easily Implemented	Easily Implemented	Reasonably easy to implement, materials and equipment are readily available	Easily Implemented	Difficult to implement due to site grading	Reasonably easy to implement, materials and equipment are readily available	
Cost-Present Worth	$0	$99,000	$12,500	$10,000	unknown	$1,200,000	$800,000
Compliance with ARARs	Does not meet ARARs, in excess of RBCs	Meets RBCs	Meets RBCs	Meets RBCs	Does not meet RBCs or TCLP	Meets RBCs and TCLP requirements	Meets TCLP requirements, soils no longer considered hazardous
Overall Protection of Human Health and the Environment	Risk of human contact with lead or lead dusts.	Soils removed	Soils removed	Constituents degraded	Soils taken out of zone of human contact	Soils removed from site and turned into non-hazardous material with constructive reuse potential	Soils taken out of zone of human contact
State Acceptance	Not acceptable	Acceptable	Acceptable	Acceptable	Not acceptable, soils do not pass TCLP	Not acceptable to DSWA	Acceptable
Community Acceptance	To be addressed by public comment	To be addressed by public comment	To be addressed by public comment	To be addressed by public comment	To be addressed by public comment	To be addressed by public comment	To be addressed by public comment

Note: This table is part of a report titled "Remedial Investigation/Feasibility Study Results and Proposed Remedial Action for the Budd Metal Company site" dated Revised March, 1996, and should be viewed in the context of that report.

6.3.2 Compliance with Applicable Laws and Regulations

The consultant has reviewed and will incorporate the appropriate sections of the Regulations pertaining to the Hazardous Substance Cleanup Act (HSCA), the Resource Conservation and Recovery Act (RCRA) and the State of Delaware Solid Waste regulations into the design and execution of the chosen remedial options for the site. In addition, should additional underground storage tanks (USTs) be discovered during the excavation activities, they will be managed according to all applicable regulations concerning the closure and removal of USTs.

a) Wetlands

A wetlands delineation of the site has been performed and the U.S. Army Corps of Engineers ("Corps") has reviewed the findings. Regulated wetlands areas are present and have been delineated in the southeastern corner of the site. At the present time, excavation of these wetlands areas is not anticipated. However, the wetlands are in close proximity to petroleum hydrocarbon bearing sediments and may need to be disturbed. Therefore, an application for a Nationwide Permit 18 (NP-18) for disturbing less than 1/10 of an acre of wetlands that are adjacent to tidal wetlands was prepared and submitted and approved by the Corps. This permit satisfies regulatory requirements in the event that the wetlands must be disturbed to complete remedial objectives.

b) Sediment and Erosion Control

A sediment and erosion control plan and application will be required by the Division of Soil and Water Conservation prior to the initiation of earth disturbing work at the site. The application and plan will be submitted after the remedial design drawings have been completed and prior to the completion of the Remedial Design phase of the project.

c) Floodplains

The project site is located in a mapped 100-year floodplain associated with the Christina River. New Castle County regulations require New Castle County approval of all earth disturbing work located within 100-year floodplains. According to personnel at the New Castle County Planning Department, administrative approval of plans will be required since remedial activities will disturb floodplains soils and change site grades. Duffield Associates' experience suggests that the required approval is likely, given the proposed scope of remediation.

d) Air

At this time, it is proposed to store stabilant admixtures in a covered, roll-off container, and perform the mixing of soils and additives outdoors. Petroleum bearing soils undergoing bioremediation will be covered by plastic sheeting to minimize volatilization. However, volatilization is not anticipated to be a major concern with these soils, as the TPH compounds of concern are heavier range diesel and coal derivatives. Therefore, the need for an air discharge permit is not anticipated.

6.3.3 Community Acceptance

The community acceptance criteria considers the desired use of the property after remediation, historical issues related to the site and public concerns about remediation. The site is located in a primarily industrial/manufacturing area. This project has also received the support of State legislators as part of the Brownfields initiative program. The site has been vacant and unmaintained for many years. The remedial activities planned are part of a process to restore productive use of the property.

Community acceptance of the remedial alternatives shall be evaluated based upon comments received to this Proposed Plan.

6.3.4 Monitoring of the Success of the Option

All of the remedial alternatives require environmental sampling and analysis programs to monitor the success of the remediation and possible exposure pathways.

- Bioremediation - Sampling of the bioremediation stockpile will be performed periodically to monitor the progress of biodegradation. Other operation and maintenance (O&M) monitoring would include monitoring of the bioremediation stockpile.

- Stabilization/Removal- Sampling of the stabilized perimeters will be employed to determine the limits of any requisite excavation.

- Stabilization - Quality Control and analysis of mixtures, including TCLP analysis of the stabilized soils on a batch basis will help ensure stabilization goals are achieved. Engineering review and documentation of cover placement will be performed to monitor compliance with the remedial design. O&M monitoring of the stabilized lead bearing soils would not be feasible because they will be contained under a layer of

cover material. Removal of the cover material to gain access to the stabilized soils, could defeat the purpose of the cover layer.

These monitoring activities will provide ample data to assess the effectiveness of the various remedial activities.

Long-term post-remedial ground water monitoring requirements will be based on the results of the initial post-remedial ground water sampling event.

6.3.5 Use of a Permanent Remedy to the Extent Practicable

The intent of all alternatives is to provide permanent solutions to the contaminated soil and debris at the site.

- Bioremediation - Petroleum compounds will be permanently broken down through biodegradation where this technique is applied.

- Stabilization/Removal - Polychlorinated biphenyl's (PCBs)will either be removed from the site entirely in the area of the former transformer, or immobilized with the lead bearing soils (in areas where elevated PCB levels are concurrent with elevated lead levels).

- Stabilization - Stabilization of lead bearing soils will transform a characteristically hazardous material into a non-hazardous solid material.

6.3.6 Technical Practicability

The options listed above are technically practical.

6.3.7 Technical Feasibility

The technical feasibility criteria address: 1) the likelihood that the remedial alternative will meet performance specifications; 2) constructability and implementability; 3) reliability; 4) ease; and 5) availability of services, equipment, specialists and technologies.

- Bioremediation - Bioremediation of petroleum bearing soils is a proven technology that is commonly employed as a remediation option.

- Stabilization/Removal - Excavation of PCB bearing soils is also feasible as there are no impediments to excavation at the locations where PCBs have been encountered. The excavations will be shallow (less than four feet below the existing site surface).

- Stabilization - As part of the detailed evaluation of the feasibility of the stabilization option, further treatability studies were performed with the site soils to determine the effectiveness of various admixtures.

All of the proposed technologies are well known (services, equipment and specialists are readily available), and have been used at numerous sites and are constructable and reliable.

6.3.8 Implementability

The options listed above (Bioremediation, Excavation/Stabilization and Stabilization) are implementable. They can be implemented by employing typical construction equipment and materials that are readily obtainable.

6.3.9 Reasonable Restoration Time Frame

The restoration time frames for implementation are similar, with the exception of bioremediation.

- Stabilization/Removal & Stabilization - Assuming that the Stabilization/Removal or Stabilization options are to be considered for the site, it is estimated that restoration of the site can be accomplished in a three month time frame once remediation efforts have begun.

- Bioremediation - The bioremediation soil stockpile for treating TPH containing soils would probably remain on site for one to two years. It would be situated so that its presence does not interfere with future site operations.

6.3.10 Reduction of Toxicity, Mobility or Volume

The principal environmental risk associated with the site, the leaching of contaminants into the groundwater and the discharge into nearby wetlands, would be addressed with each alternative.

- Bioremediation - Bioremediation of petroleum bearing soils will reduce the toxicity, mobility and volume of affected soils. During this process, petroleum compounds will be broken down to components that are not an environmental concern.

- Stabilization/Removal - and hauling of PCB bearing soils from the area of the former transformers will remove the volume of affected soils and thereby eliminate the toxicity and mobility issues at the site. Disposal or treatment of PCB soils at a regulated hazardous waste facility will control long term mobility issues or destroy the PCBs, depending on the facility chosen.

- Stabilization - Stabilization of lead bearing soils will not reduce the volume of affected materials but will reduce the threat of lead mobility. When used in conjunction with covering, risks associated with toxicity will be reduced as the affected soils will be taken out of the zone of human contact.

6.3.11 Short Term Effectiveness

Short-term effectiveness addresses the protection of the community and the on-site workers during implementation of the remedial alternative, as well as environmental impacts anticipated. The community and on-site workers can be protected during the implementation of any of these alternatives. However, each alternative may cause some community concern, with regard to noise, dust generation and truck traffic during construction.

- Bioremediation - Petroleum compounds will be permanently broken down through biodegradation where this technique is applied.

- Stabilization -Over the short term, lead bearing soils will be excavated and put into a controlled environment as they are mixed with the stabilant material. This action will reduce the risk of exposure to human and ecological receptors through inadvertent disturbance or erosion of contaminated soils. Stabilization of lead bearing soils will transform a characteristically hazardous material into a non-hazardous solid matrix.

- Stabilization/Removal - PCBs will be either removed from the site entirely (from the area of the former transformer), or immobilized in a soil/stabilant matrix (in areas where elevated PCB levels are found concurrent with elevated lead levels).

The three remedial options are expected to be effective over both the short and long term.

6.3.12 Long Term Effectiveness

Long-term effectiveness addresses the risk associated with contamination left on-site, the type, degree and difficulties associated with long-term management and potential for failure of the selected alternative and associated risks with the failure.

- Bioremediation - For any type of bioremediation, if the TPH detected in the soil at the site consist primarily of very long chain hydrocarbons which biodegrade slowly, it may not be possible to reach the TPH remedial action objective of 1,000 ppm within a reasonable amount of time.

- Stabilization/Removal- The intent of this alternative is to remove all contaminated soil and debris. By removing the contaminated soil there should be no long term risk.

- Stabilization - Results of the TCLP tests performed on soil/stabilant mixtures during the previously described treatability studies indicate that Portland cement, at addition concentrations as low as 3 percent, reduces the mobility of lead in bearing soils will be effective in immobilizing lead over the long term. Covering of lead bearing soils that have not been treated should be effective over the long term, if deed restrictions are in place that will limit the types of earth work.

6.3.13 Cost Effectiveness

Costs analyses have been performed for all of the three remedial options under consideration, and all are considered to be cost effective. The results of the treatability studies have indicated that the stabilization option using Portland cement in a range 3 to 7 percent is deemed to be cost effective when considered in the context of the real estate transaction which is the impetus for this remedial effort. Bioremediation will incur minimal costs for labor and materials. The most significant cost associated with this option would be for monitoring (i.e., sampling and analytical costs).

6.4 Preferred Remedial Alternative

Based on the results of the feasibility study, the preferred plan of remedial action for the site would entail application of the options discussed in the previous section. A more specific description of how these options would actually be implemented at the site is presented below.

Soils from the former transformer area which indicate elevated levels of PCBs would be hauled off site to a secure hazardous waste landfill facility. Any remaining residual PCB containing soils (i.e. soils containing PCB levels below the EPA Region III RBC of 0.74 mg/kg) will be immobilized with the lead bearing soils. The results of the treatability studies indicated that PCBs were not detected in the leachate from either untreated or the treated samples.

Soils from the area containing elevated levels of petroleum hydrocarbons (located along the southeastern side of the former Shipping and Handling Warehouse) would be stockpiled on plastic sheeting and covered with plastic sheeting. The stockpile would be located on the paved area south of the Shipping and Handling Warehouse building. Soils would be periodically turned to provide aeration, and nutrients would be added as needed to enhance the biodegradation process.

Remediation of the lead bearing soils above 1,000 ppm at the site would entail excavating the soils and transporting them to an on-site treatment system where they would be mixed with Portland cement until they are determined to pass TCLP test for lead leaching. Once the soils are treated, they would be placed back into the excavation and covered with a minimum of 12" of clean soil, stone aggregate, or stone aggregate and hot mix, hot laid asphaltic concrete as is appropriate.

During previous investigations, site soils have been found to contain debris in the form of metal, bricks and miscellaneous materials. Therefore, soils would be run through a screening device prior to being transported to the treatment area. Debris would be stock-piled on-site and ultimately hauled to a state regulated solid waste recycling or disposal facility. All excavation areas would be backfilled with treated soil. All areas of exposed soil would be temporarily stabilized after backfilling using some form of mulch during the course of the project to reduce potential erosion, prior to placement of the cover layer.

The mixing of site soils with the stabilant can be accomplished using a rotomiller, "Pulvamixer", pugmill, or screw auger. The specific type of equipment to be used would be determined during the remedial design phase. After mixing, the soils would be placed back into the excavation. Replacement of soils would be done after the sample results for a particular batch of the stabilized soils are known and has been demonstrated to be in compliance with the RAOs. Suitable containment facilities will be built or provided to hold the treated soils while analytic results are pending. The containment system to be used will be specified during the remedial design phase.

It is anticipated that treatment activities will take place out of doors as opposed to using the on-site buildings. It is anticipated that soils will be treated on a daily batch basis and then stored temporarily on-site until the results of a TCLP test for a sample collected from the batch have been received. Once analytic results are known and RAO's have been satisfied, backfilling operations will start.

Plastic sheeting or some type of covering device (to be specified during the design phase) would be employed to minimize either the accumulation of precipitation in open excavations during storm events or contact between "clean" precipitation and exposed site soils.

Confirmatory sampling of soils would be performed in the field at the excavation perimeters. A lead level limit of 1,000 ppm has been determined for this project by the Department to be protective of human health and the environment in an industrial setting. Based on the results of the Remedial Investigation, the proposed limits of excavation have been determined to be approximately as shown in the site plan.

To date, no sampling of soils underneath the concrete pads in the central and western portions of the site has been performed. During the excavation of soils around the pad areas, soils would be sampled from underneath of the pads to evaluate them for the presence of lead. If the soils under the pad are found to contain lead in concentrations in excess of 1,000 mg/Kg, further analysis for lead will be performed using the TCLP method. Should soils from beneath the pad contain lead below the 1,000 mg/Kg level, or pass the TCLP test, the pad covered area would not be excavated.

Long-term post-remedial groundwater monitoring requirements will be based on the results of the initial post-remedial groundwater water sampling event. Groundwater contamination (TPH) has been documented in the shallow, unconfined (Columbia) aquifer on site, particularly in the north/central portion of th site, near the service garage. Restriction of groundwater use in the unconfined aquifer in the vicinity of the service garage is required to eliminate the potential for adverse exposures to humans from consumption of contaminated groundwater. Therefore, DNREC will establish a groundwater management zone (GMZ) for the site (see Figure 3 for this GMZ). DNREC has determined that TPH levels in groundwater, in exceedence of 10ppm, shall constitute as free product. Should the elevated levels of TPH in the groundwater, in the vicinity of the service garage, decrease to less than 1ppm following 2 years of successive monitoring, then DNREC shall eliminate the GMZ from the site. Should the level of TPH in the groundwater in the vicinity of the service garage exceed 10ppm following 2 successive monitoring years, then DNREC shall require remediation be undertaken for the groundwater.

7. PUBLIC PARTICIPATION

The Department actively solicits public comments or suggestions on the Proposed Plan and welcomes opportunities to answer questions. Please direct written comments to:

DNREC, Site Investigation and Restoration Branch
ATTN: Paul W. Will
715 Grantham Lane
New Castle, DE 19720

or call (302) 323-4540. The public comment period for this Proposed Plan of Remedial Action closes on August 5, 1996. If so requested, a public meeting will be held on the Proposed Plan. This meetings time ~~and~~ place would be announced if said meeting is requested.

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