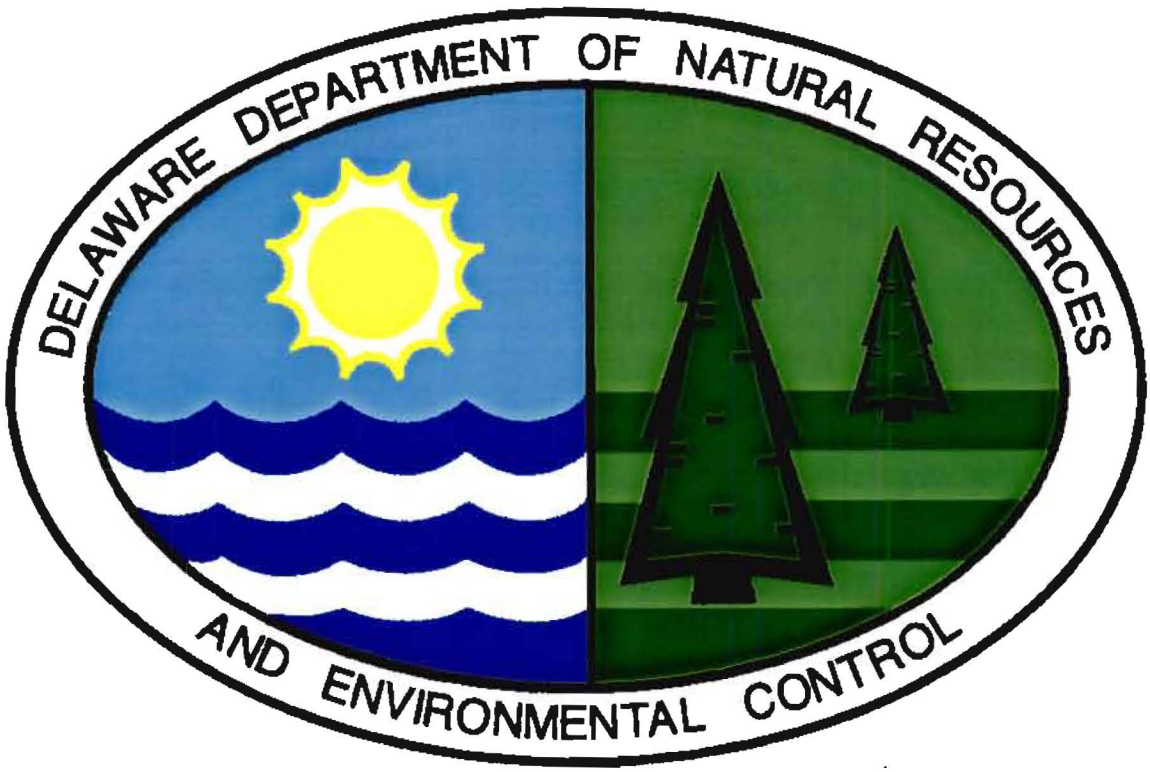
PROPOSED PLAN OF REMEDIAL ACTION

Former Amoco Polymer Plant Site
Operable Unit 1 (OU-1)

New Castle, Delaware

DE-084



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Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch

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1.0 INTRODUCTION

The Former Amoco Polymer Plant Site Operable Unit-1 (OU-1) is located on 950 River Road in New Castle, Delaware (Figure 1). The site is bordered by Army Creek to the north, Grantham Lane to the south, River Road to the east, and two Federal Superfund Sites, Army Creek Landfill and Delaware Sand And Gravel, to the west. In order to assess the need for environmental remediation at the site, BP Amoco Corporation (BP Amoco) entered into the Department of Natural Resources and Environmental Control's, (Department's or DNREC's) Voluntary Cleanup Program (VCP) in 1996 under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91. Through a VCP Agreement, BP Amoco agreed to investigate the potential risks posed to public health, welfare and the environment at the site. BP Amoco contracted with RMT, Inc. (RMT) to perform a remedial investigation (RI) of the site.

The site was divided into two (2) Operable Units (OUs) for the purposes of performing a remedy. OU-1 consists of the upland portion of the Former Amoco Polymer Plant Site and OU-2 consists of the Army Creek Marsh parcel (Lot 6B, see Figure 1).

The purpose of the RI was to: 1) understand the nature and extent of any soil, sediment and/or groundwater contamination at the site, and to 2) evaluate risks to public health, welfare and the environment associated with any identified contamination. BP Amoco agreed to perform, if necessary, a feasibility study (FS) that would identify and recommend a remedial action, if required by the Department. BP Amoco desires to obtain a Certification of Completion of Remedy from the Department upon completion of all required tasks.

This document is the Department's proposed plan of remedial action (proposed plan) for the OU-1 portion of the site. It is based on the results of the RI performed at the site. This proposed plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents the Department's assessment of the potential health and environmental risks posed by OU-1.

As described in Section 12 of the Regulations, the Department will provide notice to the public and an opportunity for the public to comment on the proposed plan. At the comment period's conclusion, the Department will review and consider all of the comments received and then will issue a final plan of remedial action (final plan). The final plan shall designate the selected remedial alternative for OU-1. All investigations of the site, the proposed plan, the comments received from the public, Department responses to those comments, and the final plan will constitute the remedial decision record.

Section 2.0 presents a summary of the site description, site history and previous investigations of the site. Section 3.0 provides a description of the investigation results. Section 4.0 presents a discussion of the remedial action objectives (RAOs). Section 5.0 presents the proposed plan of remedial action for OU-1. Section 6.0 discusses public participation requirements.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Setting

The Former Amoco Polymer Plant Site is located at 950 River Road and is bordered by Army Creek to the north Grantham Lane to the south, River Road to the east, and two Superfund environmental sites (Army Creek Landfill and Delaware Sand and Gravel) to the west (see Figure 1). The site consists of approximately 68 ± acres and consists of the following tax parcels numbers: Lot 7 Tax ID # 100360008, Lot 8 Tax ID # 1003600004, Lot 9 Tax ID # 1003500065, Roadbed Tax ID # 1003500066, Lot 10 Tax ID # 1003500064, Lot 11 Tax ID # 1003500009, and 950 River Road Tax ID # 10003500058. The site currently includes buildings, paved parking lots, foundations and pillars from remnants of the old polymer facility and open space.

2.2 Site and Project History

BP Amoco and Avisun Inc. previously utilized the site as a polypropylene manufacturing facility from 1961 to 1980. In October 1980, an explosion at the plant ended operations at the polypropylene plant. The remnants of the buildings were demolished and asbestos containing material were placed in the Amoco Asbestos Landfill (see Figure1). Prior to the polypropylene operations, OU-1 and OU-2 were maintained as open land. In 1984, BP Amoco donated the facility to the State of Delaware. In 1985, the State of Delaware sold the facility to Dureco Inc. Dureco Inc. currently owns the Site and the OU-1 portion of the site is proposed for future redevelopment. In November 1996, BP Amoco entered into a VCP Agreement with DNREC to conduct the RI.

3.0 Investigation Results

In 1984 and 1985, a preliminary assessment and site inspection (PA/SI) of the OU-1 was conducted for United States Environmental Protection Agency (USEPA). Total metals were detected in the groundwater as part of the PA/SI. In 1986, the USEPA determined that no further action was required. The OU-1 and OU-2 were deferred by the USEPA to the State of Delaware with the completion of the SI in 1986. In 1990, the HSCA was enacted, and OU-1 and OU-2 were included as HSCA sites.

In 1995, a prospective purchaser conducted an environmental investigation without DNREC oversight on OU-1. The investigation was performed to sell part of OU-1. Soils were collected and sampled from thirteen (13) soil borings. The actual depth of sample collection is unknown. In addition, groundwater samples were collected from twelve (12) existing monitoring wells on the site. The analytical results from the investigation could not be verified because the supporting documentation was unavailable for DNREC review. The information provided from the investigation suggested that hazardous substance releases were present.

In November 1998, BP Amoco conducted a Phase I RI on OU-1 and OU-2 to identify and characterize potential releases of hazardous substances, and to evaluate human and ecological risk. To supplement the Phase I RI, a Phase II RI was conducted in May 2001 in order to further delineate the nature and extent of contamination at OU-1 and OU-2. The Phase II RI was conducted to complete the environmental investigation at the site. BP Amoco's Phase I and II RIs consisted approximately of sixty-nine (69) direct push locations with groundwater samples collected from ten (10) of them, thirty-three (33) test pit locations, seventeen (17) hand auger locations, and twelve (12) monitoring wells (see Plate 1). Surface and subsurface soil samples were collected at each direct push and test pit location and analyzed for semivolatiles organics (SVOCs), pesticides/polychlorinated biphenyls (PCBs), volatile organics compounds (VOCs), Target Analyte List (TAL), metals, titanium, cyanide, mirex, kepone, photomirex and dechlorane Plus.

In addition to the Phase I and Phase II RIs conducted by BP Amoco, Dureco conducted an RI in September 1998 of a soil pile placed on the site from the adjacent Harry Wood Landfill. The soil was evaluated for ecological and human heath risk.

Following the completion of the RIs, a formal risk assessment and focused feasibility study was performed.

3.1 Soil Results

The following tables represent potential chemicals of concern from the RIs and the area(s) on the site. OU-1 is separated into different lots because of the site geology and the proximity to the ecological receptor, Army Creek Marsh. Therefore, the remedial goals from each lot vary. The Lots 6A, 7, 9, 10, and 11 and the roadbeds are restricted non-critical water resource areas. Lots 6D, 6C and the Former Amoco Asbestos Landfill are considered restricted critical water resource areas. Lots 6A, 6D, 7, 9, roadbeds and the Amoco Asbestos Landfill contained no VOCs, SVOCs, TAL metals, titanium, cyanide, mirex, kepone, photomirex above Uniformed Risk Based Standard (URS) values. Dechlorane Plus does not have a URS value, but concentrations detected in these areas will not affect human health or the environment based on ecological information associated with the product. The tables below summarize the analytical results from each lot. The highest analytical result is identified after each lot location. The results of the investigations indicate that the OU-1 and OU-2 contain elevated concentrations in soil that exceed the URS values for restricted use.

Lot 10 (HA-02)

Compound	Analytical Results (mg/kg)	URS Non-Critical Water Resource Area (mg/kg)
Hexavalent Chromium	54.1	35

Vanadium	5,200	1,400

Lot 11 (HA-12)

Compound	Analytical Results (mg/kg)	URS Restricted Non-Critical Water Resource Area (mg/kg)
Arsenic	121	11
Lead	1,690	1,000

Lot 6B (Mirex Soil Pile)

Compound	Analytical Results (mg/kg)	URS -Restricted Critical Water Resource Area (mg/kg)
Mirex	39	0.7

Lot 6C (DP-49)

Compound	Analytical Results (mg/kg)	URS-restricted Critical Water Resource Area (mg/kg)
C11-C22 Aromatics	474	200
Alkyl/nonyl Phenols-Igepal	>100	10*
Mirex	3.6	.7
Arsenic	14	11

*Remedial action goal established by the Department

3.2 Groundwater Results

Shallow groundwater results of the RI indicate that the MW-10 is contaminated with VOC's, arsenic and antimony that exceed the DNREC groundwater URS and the MCLs (See table below) .

Groundwater (MW-10)

Compound	Analytical Result (mg/l)	Uniform Risk Based Standard (URS)-Restricted Use Non-Critical Water Resource Area (mg/l)	Maximum Contaminant Level (MCL) if applicable (mg/l)
1,1-Dichloroethene	0.025	0.007	0.007
1,1,1-Trichloroethane	0.470	0.200	0.200
Antimony	0.040	0.006	0.006
Arsenic	0.016	0.050	0.010

There are no known uses of local groundwater as a drinking water source in the area, however, the lower and upper aquifers are somewhat connected due to the absence of a significant clay layer between the aquifers on the northern portion of the site (Lot 6C and 6D). The groundwater results are located in areas where the clay layer exists. Groundwater loading values were calculated to evaluate the possible groundwater discharge to the Army Creek and Marsh. Loading values for any organic or inorganic analyte detected in groundwater during both RIs were calculated based upon the approximate measured ground water flow rate at the site and its relation to the Army Creek and Marsh . Based on these calculations, it was determined that their would be no exceedances of Delaware's Surface Water Quality Standards from the natural discharge of site groundwater into Army Creek Marsh and Creek.

3.3 Results and Relative Risk

Based upon the data evaluated for OU-1 and OU-2, exposure to shallow soils in Lots 10 and 11 in a small confined area would exceed 1X10-5 and would present a risk for future workers. The mirex soil pile on Lot 6B has an estimated cumulative increased cancer risk that would exceed 1X10E-5, which is considered unacceptable under the Regulations. In addition, the subsurface soils in Lot 6C do not present an unacceptable risk at this time unless the soils are exposed. An environmental risk assessment was conducted on the Army Creek Marsh, (OU-2), and those sediments and the mirex pile will be addressed in a separate OU-2 proposed plan.

4.0 REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment.

Qualitative objectives describe, in general terms, what the ultimate result of the remedial action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the OU-1:

- Control potential human and ecological exposure (dermal, inhalation and ingestion) to impacted site soils; and
- Control potential human exposure and ecological exposure (ingestion and inhalation) to impacted site groundwater.

These objectives are consistent with the current and proposed use of the site as a non-residential use in an urban setting, state regulations governing water supply, and worker health and safety.

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the qualitative objectives, the quantitative objectives will be to ensure that future site users, such as site workers, construction workers, visitors, and trespassers, do not come in contact with soils that contain elevated levels of contaminants above the established restricted use URS values.

Based on the qualitative objectives, the quantitative objectives are:

1. Prevent human and ecological exposure to soils and groundwater contaminated by chemicals that would result in a carcinogenic risk exceeding 1X10E-5 or a Hazard Index of 1.0, or lead concentrations exceeding 1,000 mg/kg;

The compounds detected in the groundwater are antimony, arsenic and VOCs. There are no known users of local groundwater as a primary drinking water source in the area and no use of groundwater at OU-1. The groundwater flow direction is to the north and groundwater generally discharges to Army Creek Marsh. BP Amoco conducted a groundwater evaluation on OU-1 at the request of DNREC as part of the RIs. Mass loading calculations, using a worst-case scenario, indicate that site related concentrations reaching the Army Creek Marsh would be well below the applicable "Surface Water Quality Criteria for the Protection of Aquatic Life." This additional groundwater investigation was only designed to determine if there was any unacceptable impact on the marsh, based solely on releases of hazardous substances from groundwater on OU-1. The additional groundwater investigation did not evaluate the cumulative effect of releases from any potential off-site sources.

Based on this information, the contaminant concentrations in the groundwater do not pose a current risk to human health or the environment. The shallow groundwater (MW-10) does pose an unacceptable risk as a drinking water source. The shallow groundwater is currently not a drinking water source. In any event, because the site is not located within the boundaries of a Groundwater Management Zone (GMZ), a GMZ must be established so that the use of shallow groundwater is prevented, as well as to prevent use of the deep wells (the Former Amoco

production wells) which may cause migration of off-site contaminant plumes from the nearby Army Creek Landfill and Delaware Sand and Gravel Superfund sites.

5.0 PROPOSED PLAN OF REMEDIAL ACTION

As stated in Section 3.0 of this proposed plan, soils in specific areas at the site contain elevated levels of contaminants. The OU-1 is proposed for commercial development; however, the final design of the property has not yet been determined. The proposed plan for the OU-1 calls for the following:

1. Remove and disposal the upper first foot of soil from Lot 10 and 11 in areas defined in Figure 2. Take confirmation samples after removal to demonstrate compliance with the URS values for restricted use.
2. Placement of a deed restriction on the property limiting the property to restricted land use (non-residential uses) and prohibiting any digging, trenching or excavation activities on a portion of Lot- 6C (See Figure 1) without prior approval of the Department.
3. Placement of a Groundwater Management Zone (GMZ) and associated deed restriction at OU-1 to prevent future use of the groundwater beneath the site without prior approval of DNREC. The groundwater will be evaluated as part of a five-year groundwater review. MW-10 will be retested for volatile organics and TAL metals. If the analytical results from MW-10 fall below groundwater MCL levels, then the GMZ will be reevaluated. All remaining monitoring wells can be abandoned.
4. Development of an Operations and Maintenance (O&M) Plan for the Former Amoco Asbestos Landfill to insure future maintenance of the existing cap, fence and cover at the location. For additional protective measures, the Amoco Asbestos Landfill could be paved.

6.0 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
391 Lukens Drive
New Castle, Delaware 19720-2774
Attn: Robert M. Schulte

The public comment period for this proposed plan begins on, Tuesday, May 28, 2002, and ends at the close of business (4:30 p.m.) on Thursday, Monday, June 17, 2002. If a request is

received, a public hearing will be held on the proposed plan. The meeting time and place will be announced, if said hearing is requested.

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John Blevins, Division of Air and
Waste Management, Director

Figure 1 PROJECT LOCATION MAP

MAP

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