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Site Analysis
Koppers Chemical
Newport, Delaware

Volume 1

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NOTICE

This document has undergone a technical and quality control/assurance review and approval by personnel of the EPA/ORD Environmental Monitoring Systems Laboratory at Las Vegas (EMSL-LV), and is for internal Agency use and distribution only.

ABSTRACT

This report presents an analysis of aerial photography of the Koppers Chemical site, located in Newport, Delaware. The site was analyzed to assist the Environmental Protection Agency's (EPA) Region 3 in its assessment of potential contamination sources at the Koppers Chemical site.

Collateral information supplied by EPA Region 3 states that the Koppers Chemical site was operated as a wood treatment facility from 1929 to 1971. In 1971 the site was sold to the E. I. Du Pont de Nemours Company. At that time, Du Pont reportedly removed all processing equipment associated with wood treatment operations. The property reportedly remained unused until 1974. From 1974 to 1977, a temporary municipal sewage/sludge treatment facility was operated at the site. This facility has since been dismantled, and the site is reportedly inactive at this time.

Site findings include a large lumber storage area, dark-toned staining, disposal areas, fill areas, areas of disturbed ground, impoundments, catchment basins, pits, refuse, tanks, ground scars, a probable incinerator, a pipeline, excavations, mounded materials and a vehicle and equipment storage area.

Hydric soils information obtained from the New Castle County Soil Survey, and wetlands delineated on National Wetlands Inventory Maps have been annotated for the area within a 1-kilometer (0.6-mile) radius of the site.

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this analysis at the request of the Superfund Support Section of EPA Region 3 in Philadelphia, Pennsylvania, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period between 1937 and 1988, and this report was completed in October 1991.

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INTRODUCTION

An analysis of aerial photography was performed on the Koppers Chemical site, located approximately 1.6 kilometers (1 mile) southwest of central Newport, Delaware. The site comprises 128 hectares (316 acres). The U.S. Environmental Protection Agency's (EPA) Region 3 requested this analysis in order to assess potential contamination sources onsite.

Figure 1 shows the site location, keyed to a photocopy of a mosaic of two U.S. Geological Survey (USGS) 1:24,000-scale topographic maps. Site boundaries or areas used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data supplied by EPA Region 3 and do not necessarily denote legal property lines or ownership.

Figure 2 shows the location of hydric soils from the county Soil Survey and National Wetlands Inventory Maps for the area within a 1-kilometer (0.6-mile) radius of the site.

Aerial photography of Koppers Chemical was obtained to represent the period from 1928 to 1988.[1] Black and white photography from 1937, 1946, 1948, 1953, 1954, 1959, 1961, 1965, 1968, 1973, and 1977; and color infrared photography from 1975, 1981, 1983, and 1988 were used for this analysis. Photography from 1946, 1953, 1954, 1965, 1975, 1981, and 1983 was analyzed but not reproduced for this report due to the poor resolution of the photography and/or the lack of significant features, activities, and/or change. Any significant changes noted in those years will be annotated on the following year of photography reproduced in the report.

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[1]A complete listing of maps, photography and publications used in this report is provided in the References section.

Collateral information supplied by EPA Region 3 states that the site was operated as a wood treatment facility from 1929 to 1971.[1] In 1971 the site was sold to the E. I. Du Pont de Nemours Company, which owns the property adjacent to and east of Koppers Chemical (this site has been previously analyzed; see TS-PIC-90142). In 1971, Du Pont demolished and cleared out all processing equipment associated with wood treatment operations. The Koppers property reportedly remained unused from 1971 to 1974, when a temporary municipal sewage/sludge treatment facility was constructed within the Koppers Chemical site. This facility was shut down in 1977 and dismantled after 1988.

Based on this photographic analysis, the Koppers Chemical site was found to contain a large lumber storage area which was active from 1937 to 1968. During this period, dark-toned staining was visible throughout the lumber storage area, which also contained tanks, ground scars, and a probable incinerator. The lumber storage area was inactive in 1973. A new building (the temporary waste storage area*) and a pipeline became visible within the inactive and revegetated lumber storage area in 1975. The building and pipeline remained in 1988, the last year of analysis.

The remaining portions of the Koppers Chemical site (outside the lumber storage area) contained fill areas, disturbed ground areas, impoundments, catchment basins, pits, disposal areas, refuse, excavations, staining, standing liquid and various unidentifiable materials during the period of analysis. By 1988, the adjacent Du Pont-Newport site had evidently expanded its operations onto the Koppers Chemical site with the addition of a vehicle and equipment storage area. A disturbed ground area visible in 1988 was tentatively identified as the "old fire pond" mentioned by collateral sources.

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[1]Collateral information provided by EPA Region 3. Throughout the remainder of this report, an asterisk (*) will be used to note collateral information provided by EPA Region 3.

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this analysis at the request of the Superfund Support Section of EPA Region 3 in Philadelphia, Pennsylvania, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period from 1937 to 1988, and this report was completed in October 1991.

METHODOLOGY

A search of government and commercial sources was undertaken to obtain the best available aerial photography of the site spanning the desired time frame. The photography and other sources of information used in this report are listed in the References section.

The analysis was performed by viewing backlit transparencies of aerial photography through stereoscopes. Stereoscopic viewing creates a perceived three-dimensional effect which, when combined with viewing at various magnifications, enables the analyst to identify signatures associated with different features and environmental conditions. The term "signature" refers to a combination of visible characteristics (such as color, tone, shadow, texture, size, shape, pattern, and association) which permit a specific object or condition to be recognized on aerial photography.

Photographic prints were made from those years of aerial photographic coverage that reveal significant information about the site. The analyst's findings are annotated on overlays to prints and/or base maps and described in the accompanying text. Site boundaries or areas used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data supplied by EPA Region 3 and do not necessarily denote legal property lines or ownership.

Due to factors inherent in the photographic printing process, prints do not exhibit the level of detail that is visible in the original aerial photography. Therefore, some features identified from the aerial photography may not be clearly discernible, or even visible, on the photographic prints presented in this report.

Color infrared film has been reproduced for the 1988 photography (Figure 8). Normal color film records reflected energy in the blue, green, and red portions of the electromagnetic spectrum. Color infrared film differs in that it is sensitive not only to reflected blue, green, and red energy,

but also to reflected energy in the infrared portions of the electromagnetic spectrum; however, the blue energy is filtered out and only the green, red, and infrared energy is recorded. When color infrared film is processed, it displays "false" colors that do not correspond with the true colors of the features photographed. For example, features that are highly reflective in the infrared portion of the spectrum, such as healthy green vegetation, appear red to magenta on color infrared film. The false color displayed by a feature is produced in accordance with the proportions of infrared, green, and red energy it reflects. These proportions are referred to as the feature's "spectral reflectance characteristics." To interpret the true color of a particular feature accurately from color infrared film, a knowledge of the spectral reflectance characteristics of that feature is required. This information is not readily available for the majority of features identified in this report. Therefore, unless otherwise indicated, no attempt is made to interpret the true colors of features identified on the color infrared film analyzed for this report.

Wetlands symbols are included on an overlay to the 1988 photography in an effort to denote wetlands within a 1-kilometer radius of the site. Placement of symbols is based on the presence of soils series that are listed as hydric by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS) publication Hydric Soils of the United States, and/or by the use of the National Wetland Inventory (NWI) map of the area published by the U.S. Fish and Wildlife Service (FWS). The USDA SCS definition of hydric soil is as follows: "A hydric soil is a soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part."

Designations of open water systems such as lakes, ponds, and rivers in the USDA SCS or NWI publications are not annotated with wetlands symbols in this analysis. Wetlands which have been tilled for agriculture, or areas which have been filled since the

publication of the Soil Survey and/or NWI map are not designated with wetlands symbols. Soil series are established by using SCS county soil surveys and/or information from state soil scientists. This annotation of wetlands by wetlands symbols is not meant to include all possible wetlands surrounding the site or to delineate jurisdictional upland/wetland boundaries. The utility of this effort lies in designating the most probable locations of wetlands within the study area.

The terms "possible" and "probable" are used to indicate the degree of certainty of signature identification. "Possible" is used when only a few characteristics are discernible or these characteristics are not unique to a signature. "Probable" is used when incrementally more characteristics are discernible. No qualifying terms are used when the characteristics of a signature allow for a definite feature identification.

AERIAL PHOTO SITE ANALYSIS

Within this analysis, an attempt has been made to discuss only significant features visible on the available photography. Significant features are those found to have details and potential significance beyond the mere annotation of feature type and location. Significant features include features with the highest potential for large-scale impact on the site or its vicinity as well as those features categorized as potentially significant in collateral data.

Drainage Analysis

A drainage analysis was performed for the first year of analysis (Figure 3). Drainage in the vicinity of the site is tidally influenced. Onsite drainage consists of several man-made drainage channels which lead from the lumber storage area to the wetlands and on to Hershey Run, White Clay Creek and the Christina River. With the exception of additional man-made channels (probably for insect control) which appeared within the wetlands in 1968, no major changes were found on subsequent years of photography concerning the drainage channels visible in 1937. Additional onsite drainage channels were annotated on successive years of analysis; they will be annotated but not discussed.

Lumber Storage Area

The Koppers Chemical site contained a large lumber storage area which was active from 1937 to 1968 (Figures 2 through 6). During its period of operation the lumber storage area consistently exhibited dark-toned staining. This staining was pervasive throughout the lumber storage area during its period of operation and was therefore not annotated. In 1973, the lumber storage area was closed down (Figure 7). Five large areas of disturbed ground and a large amount of staining were visible in 1973 within the northwestern portion of the cleared and partially revegetated lumber storage yard. Between 1973 and 1988 (Figures 7 through 9), the inactive lumber storage area gradually revegetated. The northern and northeastern boundaries of the lumber storage area were cleared in 1977. These cleared areas

contained numerous pools of standing liquid (probably rain water) at that time.

Incinerator

A probable incinerator* was visible within the central portion of the lumber storage yard from 1959 to 1968 (Figures 5 and 6). Smoke (not annotated) was visible above the probable incinerator in 1959.

Impoundments

Three impoundments (IM1, IM2 and IM3) were visible within the Koppers Chemical site boundary during the period of analysis. IM1 consisted of a large semi-rectangular impoundment containing dark-toned liquid which was visible throughout the period of analysis (Figures 3 through 9). A berm encircled IM1 from 1946 to 1988. IM1 contained dark-toned liquid throughout the period of analysis. IM1 was connected to Hershey Run by a small man-made drainage channel which first appeared in 1948 (Figure 4). The pattern seen within Hershey Run in 1960 (not annotated) suggested a recent outflow of liquid from IM1 from this drainage channel. The drainage channel which connected IM1 with Hershey Run was completely covered by light-toned material from the nearby fill area in 1977, which also partially filled IM1.

IM2 consisted of a thin rectangular basin or tank which was visible from 1946 to 1968, apparently submerged within an area of ground just south of the two sets of vertical tanks seen in the northwest corner of the lumber storage yard. In 1946, a grid or grating covered IM2. A different grid or grating covering IM2 was visible in 1954. Dark-toned liquid was consistently visible within IM2 from 1946 to 1968, the last year IM2 was visible.

IM3 consisted of a small circular impoundment which was visible next to IM1 from 1965 to 1975. IM3 contained dark-toned liquid throughout its existence. In 1977, IM3 was completely filled.

Catchment Basins

Three catchment basins (CB1, CB2 and CB3) were visible within the site boundary along the path of the south central drainage channel during the period of analysis (Figures 3 through 9). CB1 and CB2 were composed of U-shaped berms (not annotated) that formed each individual basin. CB1 was present throughout the history of the site (from 1937 to 1977) and consistently contained dark-toned liquid.

The berm which made up CB2 was in poor condition in 1937 and contained a definite breach in 1946. CB2 continued to deteriorate until 1968, when it was no longer intact (and was thereafter no longer annotated). CB2 contained dark-toned liquid throughout its history.

CB3 consisted of a consistently filled, berm-enclosed (not annotated) basin located south of CB1 and CB2. CB3 contained dark-toned liquid throughout the period of analysis.

Tanks

A row of five large vertical tanks (VT) were visible in the northwest corner of the lumber storage area from 1937 to 1968 (Figures 2 through 5). The largest (also the westernmost) tank within this group was an open vertical tank which consistently contained dark-toned liquid. A sixth tank was added (under construction in 1948) on the west side of the aforementioned open vertical tank. Standing liquid was visible near these tanks in 1959 (Figure 4). Ground scars appeared near these tanks in 1937, 1948 and 1968. The ground scar seen in 1948 was probably due to the construction of the sixth tank. The ground scars visible in 1937 and 1968, which stand out over the overall dark-toned staining noted within the lumber storage yard, suggest that liquid may have been discharged from these tanks.

An additional line of five small vertical tanks was visible (immediately south of the set of six tanks just discussed) from 1946 to 1968 (Figures 4 through 6). A third row of five vertical tanks was definitely seen within the northern portion of the lumber storage yard in 1961; these tanks may have been present

between 1937 and 1968, but poor photographic quality did not allow positive confirmation. Several isolated vertical and horizontal tanks were also present within the site during the period of analysis. No significant activity was associated with them; they will be annotated but not discussed.

Excavations, Fill Areas, and Pits

A probable fill area composed of light-toned material was visible in the northwest corner of the site (alongside Hershey Run) in 1948 in the same location where either a mound of light-toned material or possible refuse was seen in 1946 (Figure 3). A mound of dark- and light-toned material was visible within the partially revegetated fill area from 1954 to 1959. The area was completely revegetated by 1965.

An excavated area found southwest of the lumber storage yard in 1937 was filled in 1946 (Figure 3). This fill area contained light-toned material, dark-toned material and standing liquid in 1946. This particular fill area remained visible in 1948, when probable dark-toned liquid was seen in the adjacent drainage channel (annotated). In 1954, this fill area was revegetated.

A large, graded probable fill area became visible in 1946 along the shore of White Clay Creek. This fill area was revegetated in 1959 (Figure 4). However, a small pile of light-toned material was visible within the southern fill area in 1961 (Figure 4).

A possible pit was noted within the northern portion of the lumber storage area in 1959 (Figure 4).

A positively identified pit was also visible along the southern border of the lumber storage yard in 1961 (Figure 4) and 1965 (Figure 5). In 1965 this pit contained possible dark-toned staining. In 1968, the area containing the pit and the surrounding area was extensively excavated, to the point where the pit itself was no longer visible (Figure 5). In 1973 this excavation was filled and covered by light-toned material (not annotated). In 1977, the fill area was revegetated (Figure 7).

Disposal Areas and Refuse

Refuse was disposed on open ground within the southern portion of the site from 1959 to 1968 (Figures 4 and 5). All such areas containing refuse were revegetated by 1973 (Figure 6).

A large area of disturbed ground was seen in the southern portion of the site in 1954 (Figure 4). The western half of this disturbed ground area was revegetated in 1959, at which time a disposal area occupied the eastern half. This disposal area contained a central mound of unidentifiable dark- and light-toned refuse surrounded by smaller piles of similar refuse. By 1961 the entire disposal area and the surrounding areas had revegetated (not annotated). However, probable refuse was again visible here in 1965 (Figure 5). The disposal area had revegetated by 1968 and was inactive during the remainder of the period of analysis.

Three additional disposal areas consisting of mixed light- and dark-toned probable refuse were also visible within the south central portion of the site in 1965 and 1968 (Figure 5). In addition, a small pile of possible refuse and a small pile of probable refuse (located within a disturbed ground area) were visible south of the lumber storage yard in 1968.

Temporary Waste Storage Area

The temporary waste storage building* (and associated underground pipeline*) was seen within the inactive lumber storage area from 1975 to 1988 (Figures 8 and 9). A culvert was visible at the end of the pipeline in 1975. A large cleared area was seen west of the temporary waste storage building in 1975. An area of possible dark-toned staining, an area of dark-toned staining, and a small ground scarred area which contained staining were visible near the temporary waste storage building. No other significant activity associated with the temporary waste storage area was noted during the remainder of the period of analysis.

Du Pont Use of the Koppers Chemical Site

In 1988 (Figure 9), the adjacent Du Pont-Newport site expanded onto what was formerly part of the Koppers Chemical site. This expansion is indicated by a dashed line, which encloses the northeast corner of the Koppers Chemical site. Activity within this area consists solely of a vehicle and equipment storage area. No significant activity was identified within this area in 1988.

The Old Fire Pond

According to collateral data, a "fire pond," used to hold water (presumably runoff from the site) that was reportedly used for fire prevention, was present in the southwestern portion of the site.* An intensely ground scarred area seen in 1988 is probably the fire pond mentioned in collateral data. There is no film evidence to corroborate that this fire pond was used to contain significant amounts of liquid for any amount of time. The fire pond (or disturbed ground area), however, is located at nearly the exact location of a probable fill area seen in 1946 and 1948 and a pool of standing liquid visible in 1937.

Miscellaneous Features

Within this report, small isolated stains, pools of standing liquid, debris, cleared areas, disturbed ground, ground scars, mounds of light- and dark- toned material, excavations, and areas of possible refuse are annotated but will not be discussed as significant findings.

REFERENCES

AERIAL PHOTOGRAPHY

Date	Agency	Mission Code	Agency Frame #	Orig. Scale	EPIC Frame #
July 8, 1937	NARS[1]	AHQ	16:16-18	1:20,000	31181-31183
March 12, 1946	NOS[2]	46D	2029-2031	1:16,000	31301-31303
May 2, 1948	NOS	48J	698-700	1:24,000	31298-31300
May 28, 1953	NOS	53J	0914	1:24,000	31505
July 12, 1954	ASCS[3]	AHQ	1N:28-30	1:20,000	18153,31227, 31228
March 19, 1959	NOS	59W	3316-3318	1:29,500	31295-31297
September 26, 1961	ASCS	AHQ	1AA:152-154,176,177	1:20,000	31222-31226
March 14, 1965	USGS[4]	VBEM	1:78-80	1:24,000	3083:866,867; 31254
ay 6, 1968	ASCS	AHQ	2JJ:72-74	1:20,000	31220,31221, 18148
May 6, 1973	NOS	73E	8667,8668	1:30,000	31292,31293
November 16, 1975	EPA[5]	75/092	1479,1480	1:22,200	75/092:1479, 1480
June 4, 1977	NOS	77B	5534,5535	1:30,000	31290,31291
June 18, 1981	USFS[6]	81/110	921,922	1:32,500	81/110:921,922

[1]National Archives and Records Administration

[2]National Ocean Survey, U.S. Department of Commerce

[3]Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture

[4]U.S. Geological Survey, U.S. Department of the Interior

[5]Environmental Protection Agency

[6]U.S. Forest Service, U.S. Department of Agriculture

REFERENCES (cont.)

AERIAL PHOTOGRAPHY

Date	Agency	Mission Code	Agency Frame #	Orig. Scale	EPIC Frame #
June 23, 1983	USFS	83/046	879,880	1:32,500	83/046:879,880
June 6, 1988	USGS	NAPP	1325:28-30	1:40,000	31243-31245
June 12, 1988	USFS	88/088	919,920	1:32,500	88/088:919,920

MAPS

Source	Name	Scale	Date
USGS	Newark East, DE	1:24,000	1987
USGS	Wilmington South, DE-NJ	1:24,000	1985
NWI[1]	Newark East, DE	1:24,000	1975
NWI	Wilmington South, DE - NJ	1:24,000	1981

PUBLICATIONS

Carlson, C.L. 1991. Site Analysis, Du Pont-Newport Site, Newport, Delaware. U.S. Environmental Protection Agency, Report #TS-PIC-90142.

Lavoie, O.L., and E.D. Matthews. 1966. Soil Survey of New Castle County, Delaware. U.S. Department of Agriculture, Soil Conservation Service and the Delaware Agricultural Experiment Station.

U.S. Department of Agriculture, Soil Conservation Service. 1987. Hydric Soils of the United States.

[1]National Wetlands Inventory, U.S. Fish and Wildlife Service, U.S. Department of the Interior