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ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER
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SUBJECT: Transmittal of Interim Report Halby Chemical (TS-PIC-88016) Landfill, Fulton County, Indianna

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Attached please find one (1) copy of interim report Halby Chemical Company, Wilmington, Delaware (TS-PIC-88016). If you have any questions please contact Melissa Simpson at (703) 349-8975.

Attachment

cc: w/o attachment
Eugene P. Meier, AMD

TS-PIC-88016
October 1987

Site Analysis
Halby Chemical Company
Wilmington, Delaware

Interim Report

by
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Contract No. 68-03-3532

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NOTICE

As an interim product, this document has not gone through the complete EPIC quality assurance cycle. Any errors that are discovered during preparation of the final report will be corrected therein.

ABSTRACT

This aerial photographic analysis is being performed to evaluate general housekeeping practices at the Halby Chemical Company site, located at 600 Terminal Avenue in Wilmington, Delaware, on the southeast side of the city.

Historical aerial imagery of the Halby Chemical Company site was obtained to represent the period from 1937 to 1983. Analysis showed tanks present in every year that the chemical company was visible, from 1954 to 1983. A materials storage area, visible from 1962 on, contained numerous unidentifiable objects. An active landfill was onsite in 1973 and 1977.

Drainage from the tank storage and materials storage area was contained by a small drainage ditch, first seen in 1968, which emptied into a large lagoon onsite. The lagoon has been present since at least 1937 when it was much larger and surrounded by large areas of wetlands. No turbidity was evident in 1937. In 1942 and 1943 turbidity in the lagoon could not be determined because of the sun's reflection on the water. Turbidity was evident in the lagoon in 1962, 1968, 1973, and 1983.

A land use classification and drainage analysis was performed for the year 1977, and updated from 1983 photography. The Environmental Protection Agency's (EPA) 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 study at the request of EPA Region 3. This analysis covers the period between 1937 and 1983, and this interim report was completed in October 1987.

CONTENTS

FIGURES

INTRODUCTION

This analysis of historical aerial photography is being performed to evaluate general housekeeping practices at the approximately 6-hectare (14.7-acre) Halby Chemical Company site, located at 600 Terminal Avenue in Wilmington, Delaware, on the southeast side of the city. Figure 1 depicts the site location, keyed to a photo reproduction of a U.S. Geological Survey (USGS) 1:24,000 scale topographic quadrangle map. Site boundaries were provided in collateral data supplied by EPA Region 3; they do not necessarily denote legal property lines or ownership.

Halby Chemical owned and operated the site from the late 1940's until they sold it to Witco Chemical in the early 1970's. The site is currently owned by Brandywine Chemical, who bought it from Witco Chemical in 1977. The Halby Chemical and Witco Chemical Companies operated a wastewater lagoon from the late 1940's until August 1977. The lagoon, originally much larger until Highway 495 was constructed in 1968, is approximately 0.6 meter (2 feet) deep, covers 0.6 hectare (1.5 acres), and drains into the Christina River via the Lobdell Canal. Wastewater resulted from cooling water discharge and from the production of sulfur compounds. The wastewater consisted primarily of iron sulfides and alcohols after some amount of in-plant separation. The plant used carbon disulfide, ammonia, alkalis, acids, and alcohols to produce thiocyanates, sulfides, hydrosulfides, thioglycolates and thiodipropionates.[1]

Aerial imagery of the Halby Chemical Company site was obtained to represent the period from 1937 to 1983.[2] Historical black and white photography from 1937, 1942, 1943, 1954, 1962, 1968, and 1977; and color infrared imagery from 1973 and 1983 were used for this analysis. Because the imagery from 1937, 1942, and 1943 showed only grassland, the lagoon, and farm-related activity at the site, no prints were provided for these three years.

Analysis showed tanks present in every year that a chemical company was visible, from 1954 to 1977. A materials storage area, present from 1962 on, contained numerous unidentifiable objects. Drainage from the tank storage and materials storage area was contained by a small drainage ditch, first seen in 1968, which emptied into the wastewater lagoon onsite. Turbidity was evident in the lagoon in all years of coverage in which a chemical company was visible. An active landfill was onsite in 1973 and 1977.

A land use classification and drainage analysis was performed for the year 1977, and updated from 1983 photography.

The Environmental Protection Agency's (EPA) 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 study at the request of EPA Region 3. This analysis covers the period between 1937 and 1983, and this interim report was completed in October 1987.

[1]Collateral data provided by EPA Region 3.

[2]A complete listing of maps and photography used in this report can be found in the References section.

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 supplied by EPA Regional offices or were determined from the aerial photography 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.

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 or stronger characteristics of a signature are discernible. No qualifying terms are used when the characteristics of a signature allow for a definite feature identification.

LAND USE

Figure 2 depicts the various types of land uses within a radius of approximately 2 kilometers (1.2 miles) from the Halby Chemical Company site. The land use classification system used in this report was adapted from a U.S. Department of the Interior publication[1] on land use classification using remote sensor data. Minor modifications to this system were required to provide an accurate representation of land usage in the area.

The site is bordered by vacant urban land, forested wetlands, the Lobdell Canal, and commercial and industrial properties.

The analysis was performed from 1977 and 1983 aerial photography. Because imagery from 1983 covered only approximately three-fourths of the required area, the available land use information from 1983 imagery was keyed to the 1977 photo enlargement. The following categories are used in this analysis:

11 Residential
12 Commercial
13 Industrial
133 Industrial - Heavy - Chemical Related
135 Industrial - Tank Farms and Material Storage
14 Transportation/Communication
149 Transportation - Shipping
153 Power Substation
161 Mixed Urban - Commercial/Residential
162 Mixed Urban - Commercial/ Light Industrial
173 Vacant Urban Land
176 Landfills
18 Institutional/Government
19 Urban Recreational
43 Mixed Forest
511 Rivers/Streams/Creeks
512 Canals
53 Man-made Reservoirs and Impoundments
61 Forested Wetlands
62 Non-Forested Wetlands

[1]Anderson, James R. et al. 1976. A Land Use and Land Cover Classification System for Use with Remote Sensor Data. U.S. Department of the Interior, Geological Survey Professional Paper 964.

AUGUST 14, 1954 (FIGURE 3)

There are four buildings (B) onsite: two probable administration buildings, the large production building, and a smaller building adjacent to a tank storage area. A large pit (P) southwest of the administration buildings may be a remnant of a farmhouse previously located there. A possible pipeline or trench is visible on the north side of the production building. Fencing (not annotated) is visible on the west side of the production building.

In the tank storage area are three vertical tanks, four horizontal tanks and three large horizontal objects, possibly tanker trucks (TT). A railroad tank car (TC) is adjacent to the three possible trucks. A probable railroad tank car is located on the northeast side of the production building. Runoff channels are visible on the slope adjacent to this area.

The level of liquid in the lagoon (L) appears low, exposing a large area of bottom sediments.

JUNE 16, 1962 (FIGURE 4)

A long-quonset type building (semicircular arching roof) has been constructed southwest of the probable administration buildings (not annotated), where a pit was located in 1954. The production building (not annotated) has been enlarged. The possible pipeline seen on the north side of the production building in 1954 is no longer visible. A materials storage area on the northeast side of the production building contains unidentifiable objects of various shapes, sizes, and tones. Two towers have been added onto or replaced the smaller building southeast of the production building.

The tank storage area has more than tripled in size. There are 12 vertical tanks and 11 horizontal tanks and 1 possible horizontal tank. Two of the vertical tanks have probable pipelines; one set leads from the production building, and the other leads from one of the previously mentioned towers. Large stains (ST) are visible on the north side of the tank storage area. Five railroad tank cars (not annotated) are present onsite.

A fence (not annotated) encloses the production building, tank storage, and materials storage areas. This fence is present through at least 1977, and will not be further discussed.

At a disturbed area in the southeast corner of the site equipment (not annotated) is operating beside a dark-toned (DK) mound of material (MM). A pool of dark-toned standing liquid (SL) is also visible in this area.

The level of liquid in the lagoon is higher, covering the sediment area seen in 1954. Turbidity (not annotated) in the lagoon is indicated by lighter-toned areas.

MAY 6, 1968 (FIGURE 5)

There is a new and larger administration building with adjacent parking lots (not annotated) on its north and south sides. A small addition to the production building is under construction. A dark stain is evident beside the construction.

The materials storage area is nearly full of unidentifiable objects. A large stain (not annotated) also covers most of the storage area. A drainage ditch, containing dark-toned liquid, channels runoff from the materials storage area to the lagoon.

Thirteen horizontal tanks and sixteen vertical tanks are onsite. A possible trailer is located beside several horizontal tanks. Six railroad tank cars (not annotated) are present onsite.

A dark plume emanates from the shoreline nearest the chemical company. The drainage ditch from the materials storage area also empties into this area of the lagoon. Turbidity (not annotated) is evident in the lagoon.

APRIL 6, 1973 (FIGURE 6)

The administration building is unchanged. The quonset type building first seen in 1962 has been removed. A small addition to the production building, under construction in 1968, appears complete. A dark stain seen next to the construction in 1968 is no longer visible. The materials storage area contains numerous small unidentifiable objects. Runoff channels are visible between the materials storage area and the southern extent of the lagoon.

A landfill (LF) is now visible between the materials storage area and the lagoon. Vehicles/equipment (not annotated) are visible on the landfill.

At least sixteen vertical and four horizontal tanks are onsite. Three additional horizontal objects are probable tanks or tanker trucks. A short piece of probable pipeline connects the production building to two probable vertical tanks.

The water level in the lagoon is low, exposing some bottom sediments (not annotated). Turbidity remains evident in the lagoon. A plume still emanates from the shoreline nearest the chemical company and landfill.

MAY 15, 1977 (FIGURE 7)

The administration and production buildings remain as before. The paved parking lot formerly on the north side of the administration building has been removed and the ground appears uneven, scarred and bare; however, some parts of the disturbed area are beginning to revegetate.

Unidentifiable objects are visible in the materials storage area. Three probable horizontal tanks are also present. A probable dark liquid flow (annotated as channelized drainage) leads from the corner of the materials storage area to the lagoon. Two vehicles (not annotated) appear active in the vicinity of the landfill, which was first visible in 1973. A dark-toned area on the landfill surface may be low vegetation or dark-toned material.

At least fifteen vertical and four horizontal tanks are present onsite. Several other possible and probable tanks are located in areas where tanks are visible in both earlier and later years of imagery; however, image resolution is inadequate for positive identification of these features in this year. Two probable railroad tank cars (not annotated) are also onsite.

The water level in the lagoon is lower than in 1973. Some fill has been added to the northwest banks of the lagoon, apparently cutting it off from a channel which emptied directly into the lagoon in 1973. The channel could still enter the lagoon via underground pipes. Much less turbidity is evident in the lagoon than in the previous years of imagery. No plume is evident.

DRAINAGE

Soils on the Halby Chemical Company site are poorly drained and there is a seasonably high water table.[1] In general, suface drainage on the site flows northeast toward the low-lying area at the southeast tip of the lagoon.

Drainage at the northwest boundary of the site has been channeled, but there is no indication whether this channel flows beneath the landfilled areas to the northeast of the site, or into the Halby Chemical Company site lagoon. Drainage pipes allow the lagoon to flow into the Lobdell Canal. The Lobdell Canal, which is less than 1 kilometer (0.6 mile) long, drains into the Christina River, a tributary of the Delaware River.

[1]Soil Survey of New Castle County, Delaware. U.S. Department of Agriculture, October 1970.

JUNE 23, 1983 (FIGURE 8)
(Monoscopic Analysis Only)

The administration building and the production building appear unchanged.

A large portion of the site has been cleared and leveled, including the landfill present in 1973 and 1977 and the disturbed area present in 1977. The cleared ground is bare and shows numerous stains or wet areas (not annotated). Three parallel possible trenches (TR) are also visible in the cleared area; a vehicle (not annotated) is in one of the possible trenches. Six truck trailers are also parked in the cleared area. Two possible horizontal tanks are located in the materials storage area; no other materials or objects are apparent.

At least seven vertical and three horizontal tanks are visible, along with six possible vertical tanks. A probable tanker truck is located adjacent to the tank storage area.

The presence or absence of a fence surrounding the production building, tank storage, and/or materials storage areas cannot be determined.

The northwest portion of the lagoon has been filled. Numerous mounds of fill material (not annotated) are visible in the area. A channel running parallel to the north boundary of the site now flows openly into the lagoon. Filling of the lagoon has also occurred along its southwestern bank. The drainage channel from the tank storage area and the materials storage area to the lagoon is now wider and straighter. Turbidity is evident in the lagoon.

REFERENCES

AERIAL PHOTOGRAPHY

Date	Agency	Mission Code	Agency Frame #	Orig. Scale	EPIC Frame #
October 16, 1937	NARS[1]	AHQ-56	58-60	1:20,000	17882-17884
November 8, 1942	NARS	(16A)368	26-29	1:20,000	17856-17859
April 10, 1943	NARS	16-148	16-19	1:32,000	17867-17870
August 14, 1954	ASCS[2]	AHQ-2N	208-210	1:20,000	18162-18164
June 16, 1962	ASCS	AHQ-2AA	124-126	1:20,000	18159-18161
May 6, 1968	ASCS	AHQ-2JJ	46-48	1:20,000	18156-18158
April 6, 1973	NASA[3]	230	160-161	1:19,500	18239-18240
May 15, 1977	ASCS	177	145-147	1:40,000	18306-18308
June 23, 1983	USFS[4]	83/046	181	1:40,000	83/046:181

PUBLICATION

Soil Survey, New Castle County, Delaware, U.S. Department of Agriculture, October 1970.

MAP

Source	Name	Scale	Date
USGS[5]	Wilmington South, DE-NJ	1:24,000	1967

[1]National Archives and Records Administration

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

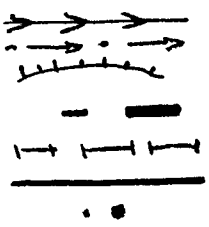
[3]National Aeronautics and Space Administration, Johnson Space Center, Houston, TX

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

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

LEGEND

B - Building
DK - Dark-Toned
L - Lagoon
LF - Landfill
MM - Mounded Material
P - Pit
SL - Standing Liquid
ST - Stain
T - Tank
TC - Tank Car
TT - Tanker Truck
TR - Trench



- Channelized Drainage
- Drainage
- Edge of Slope
- Horizontal Tank
- Pipeline
- Site Boundary
- Vertical Tank