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Northwest Chemical Co.  
Wilmington, NC

Environmental Excellence

June 8, 2001

Mr. McKenzie Mallary  
U. S. Environmental Protection Agency, Region 4  
North Superfund Branch, 11<sup>th</sup> FLR  
61 Forsyth St  
Atlanta, GA 30303



Re: Aerial Photographic Site Analysis  
Koch Sulfur Products Company - Wilmington Plant

Dear Ken:

During our meeting on April 4, 2001, Koch Sulfur Products Company (Koch) presented the results of its aerial photographic site analysis. Enclosed is a copy of the analysis. The report is marked draft, but it is considered final. Only minor changes were required for the final report, thereby eliminating the need to reissue the report and remove the word "Draft".

Please contact me at (316) 828-2146 if you have any.

Sincerely,

Frank R. Van Ryn  
Project Manager  
Koch Industries, Inc.

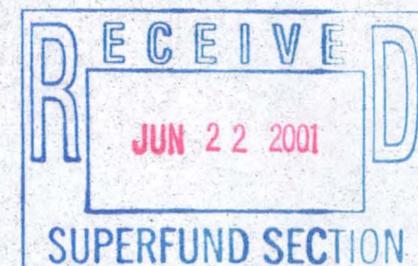
Enclosure

cc w/enc: J. Stanley, NC DENR ✓

# Aerial Photographic Site Analysis Koch Sulfur Products Company Wilmington, North Carolina

*Draft Report*

*January 5, 2001*



*Prepared by:*  
Mary Sitton  
Imagery Analyst, CMS  
Environmental Research, Inc.  
5267 John Marshall Highway, Suite C  
Linden, Virginia 22642

*Prepared for:*  
Koch Industries  
P.O. Box 2256  
Wichita, Kansas 67201-2256

**AERIAL PHOTOGRAPHIC SITE ANALYSIS  
KOCH SULFUR PRODUCTS COMPANY  
WILMINGTON, NC**

**DRAFT REPORT**

**January 5, 2001**

**Prepared by:  
Mary Sitton  
Imagery Analyst, CMS  
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Linden, VA 22642**

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## APPENDIX

### Aerial Photographs with Analysis Overlays

October 29, 1944

April 19, 1949

June 4, 1956

November 15, 1960

March 18, 1966

May 8, 1969

May 3, 1981

## INTRODUCTION

An aerial photograph analysis of the Koch Sulfur Products Company was performed for Koch Industries, Inc. to support an ongoing environmental investigation of the site. The analysis was conducted to document potential contamination sources, drainage pathways, and changes in site activity. The site is located along the Cape Fear River near Wilmington, North Carolina.

Eighteen dates of aerial photography were acquired to represent the period from 1938 to 1993.<sup>1</sup> Six dates of black-and-white and one date of color aerial photography were selected for inclusion in this report based on significant findings and optimal scale and resolution.

## METHODOLOGY

A search of government and commercial sources was undertaken to obtain aerial photography spanning the period 1938 to 1993. The analysis was performed by viewing illuminated transparencies of aerial photography through a zoom stereoscope. Stereoscopic viewing creates a 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 identified on aerial photography. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst, as well as background information from collateral sources are critical factors employed in the photographic analysis.

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<sup>1</sup>All aerial photography and associated collateral data acquired for the preparation of the analysis are listed in References section of this report.

Photographic enlargements prints covering the site were reproduced to illustrate the findings from the analysis. The analyst's findings are annotated on overlays mounted to the enlargement prints with additional comments and/or descriptions included in the accompanying text. Significant features identified in the analysis will be annotated until they are no longer visible unless otherwise specified. A fold-out legend is included at the back of the report to define the abbreviations and symbols annotated on the overlays. Due to factors inherent in the photographic printing process, the 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 given feature. "Probable" is used when incrementally more characteristics are discernible. No qualifying terms are used when the characteristics of a signature allow for definite feature identification.

AERIAL PHOTOGRAPH ANALYSIS  
KOCH PLANT  
WILMINGTON, NORTH CAROLINA

October 29, 1944

NOTE: Railcars (RC), railroads, access roads, buildings (B), the water tower (WT), docks and drainage features will be annotated on overlays to the enlargement prints; however, will only be discussed if associated with a significant feature or activity.

A large fill area (FA) is located in the northern portion of the site where numerous ditches were visible in 1938. Access roads and a possible (POSS) pipeline lead west from the plant to an excavation (EX) area. Three buildings are located south of the excavation. A large pond, a fill area and a smaller excavated area are visible southeast of the three buildings. An excavated pond has been filled at the southwest corner of the site since 1938. A probable (PROB) linear impoundment (IM) containing liquid is located at the northern end of the two large buildings onsite. Staining (ST) and/or dark-toned (DK) material (M) is noted west of the probable impoundment. Probable staining and large mounds of dark-toned material (probable coal) are visible in the south end of the plant. A pipeline was visible in 1938 between the dock and an open storage (OS) area to the south. Three horizontal tanks (HT) are visible south of the open storage area. A dredge line (DL) is visible leading from a barge to a probable pump and discharge point (DP) at the southeastern end of the site. Dredge spoils (not annotated) are visible at the discharge point.

April 19, 1949

The fill area located in the northern end of the site has expanded since 1944. Scattered debris (DB) is visible adjacent to the access road located south of the fill area. The possible pipeline and excavation to the west remain. A probable well and a smaller excavation are visible south of the large excavation. The excavation seen south of the pond in 1944 has been filled. A new building is located east of the pond.

1949 - continued

The probable impoundment with liquid remains at the northeastern end of the site. A probable loading rack (LR) and light-toned (LT) material are visible along the shoreline east of the plant. Probable staining is visible in several areas at the southeastern end of the site. Light-toned material and three horizontal tanks are visible further south. A large fill area is located where dredge material was being deposited in 1944. Dark-toned material and/or staining is located west of the fill area.

June 4, 1956

The fill area to the north is beginning to revegetate (REV). The possible pipeline and excavation to the west remain. A small excavation is located south of the access road. A new ditch leading to the Cape Fear River has been constructed to apparently drain the wetland area located adjacent to the possible pipeline. Probable open burning (OB) of material and dark-toned material is visible north of the new ditch. A large amount of light-toned material is located north of a large building that has been modified since 1949. The probable impoundment seen in this area in 1944 and 1949 is no longer visible. Large amounts of light-toned material are noted along the shoreline east of the plant. Staining and a process area (PA) containing tanks and other structures are visible in the south end of the plant. Probable staining is noted east of the process area. A large amount of light-toned material is noted south of the probable staining. The fill area located further south has been graded (GR). The fill area located south of the pond has revegetated.

November 15, 1960

A disposal area (DA) containing multi-toned material is located in the northern end of the site. Dark-toned material and staining is visible near the disposal area. The excavation and possible pipeline remain to the west. Another probable well has been

1960 - continued

constructed west of the pond. Light-toned material remains at the northeastern end of the site and along the shoreline. Light-toned erosion of material is visible leading into the Cape Fear River. The large building onsite has again been modified since 1956. A large vertical tank (VT) or silo is visible at the southeast corner of the modified building. A probable loading rack is located on top of the tank. Probable staining and light-toned material remain in the southern portion of the plant.

March 18, 1966

The disposal area located within the northern end of the site remains. Another disposal area is located to the south where dark-toned material and staining were noted in 1960. A probable outfall (OF) of light-toned material is noted within the ditch to the east. A large portion of the excavation located in the western portion of the site is beginning to revegetate. The northeastern section of this excavation remains active. Light-toned material and erosion material remain at the northern end of the plant and along the shoreline. Drainage can be seen leading from the process area toward the Cape Fear River. Probable staining and light-toned material remain further south. Probable staining, staining and liquid are located west of the process area. A rectangular object (RO) is located near a drainage ditch northeast of the process area. A large area of liquid (LQ) and an earthen berm are located at the far south end of the site. Light-toned material is visible along the edge of the revegetated fill area located south of the pond. A new rail line has been constructed leading through the western portion of the site.

A large impoundment with liquid is located at the facility north of the Koch Plant. A large breach and erosion rills leading to the Cape Fear River are visible east of this impoundment.

May 8, 1969

The disposal area within the northern end of the site remains. The majority of this disposal area is revegetated by 1970. Only a small amount of debris possibly containing drums remains within the disposal area by 1972. Debris is also visible within the ditch to the east. A section of the ditch further east contains fill material. Light-toned material was noted within this portion of the ditch in 1968. A significant amount of liquid and staining was visible surrounding a cylindrical object just southeast of the disposal area in March 1969. The excavation to the west remains. A new probable well feature has been constructed west of the excavation since 1966. Excavation activity expanded to the south in 1972. Light-toned material remains in the northeastern portion of the site. A large smoke plume (SP) is visible west of the light-toned material. Liquid and staining are noted near the process area. A dark-toned drainage channel was noted leading from the process area to the west in 1968. Pools of liquid are located south of an oval-shaped access road in the south end of the site. Multi-colored (MC) and gray mounds of material were located east of the access road in 1968.

May 3, 1981

Due to the changes onsite, the location of the disposal area, ditch and the dredge spoil area have been transferred to the 198~~6~~<sup>1</sup> photographic overlay.

The disposal area is no longer visible. Possible equipment (EQ), an open storage and staining are visible near the former disposal area. A large section of a building has been removed (BR) between 1972 and 1981. The majority of the excavation noted in the western portion of the site has been filled and has revegetated. A smaller excavation containing dark-toned material and possible liquid is located within the revegetated area. Dark-toned objects (O) are located along the shoreline in the eastern portion of the site. Dark-toned material and staining are visible near four horizontal tanks located east of the production area. Two vertical tanks and seven horizontal tanks are visible further south.

1980 - continued

Staining, liquid and multi-colored materials are noted south of the horizontal tanks. Large amounts of white and yellow fine-textured material are also located in this area.

A large new building has been constructed north of the site. Two new impoundments have been constructed at the facility located further north. A significant amount of light-toned material has been added east of the impoundments at the northernmost facility.

## REFERENCES

### AERIAL PHOTOGRAPHY

<u>DATE</u>	<u>CODE</u>	<u>MISSION</u>		<u>FILM</u>	<u>SCALE</u>
		<u>ROLL</u>	<u>FRAMES</u>	<u>TYPE</u>	
04-04-38	AOQ	39	49, 50	B/W	1:20,000
10-29-44	16PS	4M751	163-165	B/W	1:22,000
02-29-48	48J	-	238, 239	B/W	1:24,000
04-19-49	AOQ	1F	43, 44	B/W	1:20,000
06-04-56	AOQ	6N	11, 12	B/W	1:20,000
11-11-56	56W	-	5359, 5351	B/W	1:40,000
11-15-60	60S	-	5043, 5044	B/W	1:36,000
10-27-65	65L	-	8215, 8216	B/W	1:30,000
03-18-66	AOQ	2GG	223, 224	B/W	1:20,000
09-15-68	68S(C)	-	7234, 7235	C	1:20,000
03-12-69	SWCG	1	53, 54	B/W	1:24,000
04-08-69	VCEE	1	82, 83	B/W	1:36,000
10-05-70	70L	37-32	8847, 8848	B/W	1:30,000
02-04-72	37129	172	136, 137	B/W	1:20,000
10-12-73	73C(C)	100-798	4617, 4618	CIR	1:30,000
05-03-81	81ZC	200-106	4657, 4658	C	1:40,000
09-19-84	84ZC	200-274	7893, 7894	C	1:40,000
02-03-93	NAPPW	6102	227, 228	B/W	1:40,000

### MAPS

<u>DATE</u>	<u>TITLE</u>	<u>SCALE/SOURCE</u>
1997	Castle Hayne, NC	1:24,000 USGS
1995	Figure 2, Plant Layout	1:2400 Koch
2000	Site Layout	1:2400 Arcadis



**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: October 29, 1944**  
**Frame No.: 164**  
**Source: NOS**  
**Approx. Scale: 1 inch = 285' feet**



FA

PROB  
IM

EX

B

PROB  
LR

NEW

B

B

B

RC

WT

PRO

EX

FA

RC

SHT

FA

DK M.  
ST

APPROX. S : 3,100

KOCH SULFUR

194

= 258

**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: April 19, 1949**  
**Frame No.: 44**  
**Source: NARA**  
**Approx. Scale: 1 inch = 260' feet**



EA  
REV



EX

LT M

B

B  
MODIFIED

EX

PROB.  
WELL

ROUTE  
421

FA  
REV

GR/F

KGPA SULFUR

6

E

**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: June 4, 1956**  
**Frame No.: 12**  
**Source: ASCS**  
**Approx. Scale: 1 inch = 254' feet**



KODI SULFUR

15, 1960

ROX

1000

**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: November 15, 1960**  
**Frame No.: 47**  
**Source: ASCS**  
**Approx. Scale: 1 inch = 256' feet**



**Koch Industries**

**Wilmington, North Carolina**

**Date Flown: March 18, 1966**

**Frame No.: 223**

**Source: ASCS**

**Approx. Scale: 1 inch = 277' feet**



**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: April 8, 1969**  
**Frame No.: 83**  
**Source: USGS**  
**Approx. Scale: 1 inch = 263' feet**



FUR

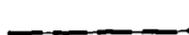
MAY 3, 1981

1"=286'

**Koch Industries**  
**Wilmington, North Carolina**  
**Date Flown: May 3, 1981**  
**Frame No.: 4657**  
**Source: NOS**  
**Approx. Scale: 1 inch = 288' feet**

# LEGEND OF SYMBOLS KOCH SULFUR, NC

B	-	BUILDING
BR	-	BUILDING REMOVED
CO	-	CYLINDRICAL OBJECT
DA	-	DISPOSAL AREA
DB	-	DEBRIS
DK	-	DARK-TONED
DL	-	DREDGE LINE
DP	-	DISCHARGE POINT
EQ	-	EQUIPMENT
EX	-	EXCAVATION
FA	-	FILL AREA
GR	-	GRADED AREA
HT	-	HORIZONTAL TANK
IM	-	IMPOUNDMENT
LQ	-	LIQUID
LR	-	LOADING RACK
LT	-	LIGHT-TONED
M	-	MATERIAL
MC	-	MULTI-COLORED
ML	-	MULTI-TONED
O	-	OBJECTS
OB	-	OPEN BURNING
PA	-	PROCESS AREA
POSS	-	POSSIBLE
PROB	-	PROBABLE
OF	-	OUTFALL
OS	-	OPEN STORAGE
RC	-	RAIL CAR
REV	-	REVEGETATING
RO	-	RECTANGULAR OBJECT
SP	-	SMOKE PLUME
ST	-	STAIN
VT	-	VERTICAL TANK
WT	-	WATER TOWER

	ACCESS ROAD
	BERM
	DRAINAGE
	DRAINAGE, DIRECTION INDETERMINANT
	EDGE OF SLOPE
	FEATURE BOUNDARY
	RAILROAD
	WETLAND