APPENDIX A

RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVES SELECTION

LCP-HOLTRACHEM SUPERFUND ALTERNATIVE SITE
RIEGELWOOD, COLUMBUS COUNTY, NORTH CAROLINA
OPERABLE UNIT 1

SEMS ID#: NCD991278631

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

SEPTEMBER 2017

PART 1: DECLARATION

1.0 SITE NAME AND LOCATION

The LCP-Holtrachem Superfund Alternative Site (Holtrachem) is located near John Riegel Road in Riegelwood, Columbus County, North Carolina. Honeywell International Inc. (Honeywell) is a Potentially Responsible Party (PRP) that currently owns the site property. The site's identification number in the Superfund Enterprise Management System (SEMS)[1] is NCD991278631. The site consists of only one Operable Unit (OU).

2.0 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) selects the remedial action to address the contamination and risks posed by the site. The remedy is selected in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP). EPA based its decision on the Administrative Record for the site. The State of North Carolina concurs with the selected remedy.

3.0 ASSESSMENT OF THE SITE

The response actions selected in this ROD are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

4.0 DESCRIPTION OF SELECTED REMEDY

The remedial action selected in this ROD addresses contamination that poses unacceptable risks to human health and ecological receptors at the site. The wastes and contaminated media that poses unacceptable risks include soil, sediment, surface water, mercury wastes and Wastewater Treatment Solids (WWTS). The primary contaminants of concern are mercury and polychlorinated biphenyls (PCBs).

The selected remedy includes the following primary components:

- Treatment of mercury waste and contaminated soil, considered to be PTW, located beneath the former mercury cell building and former retort pad via In-Situ Stabilization (ISS)
- Capping of the areas treated by ISS in a manner that meets Resource Conservation and Recovery Act (RCRA) Subtitle C landfill final cover applicable or relevant and appropriate requirements (ARARs)
- Excavation of approximately 15,400 cubic yards (yd^3) of contaminated soil and sediment
- Capping approximately 1.7 acres of contaminated soil with a geosynthetic liner and vegetative cover

[1] In 2014, EPA replaced the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) database with SEMS. https://www.epa.gov/superfund/superfund-data-and-reports

- Construction, operation, closure, maintenance and monitoring of an on-site disposal unit that meets Toxic Substances Control Act (TSCA) chemical waste landfill ARARs in Title 40 Code of Federal Regulations (CFR) § 761.75
- Closure of the underground storm water conveyance system by cleaning and/or sealing off and solidifying the pipes/inlets in place using flowable grout
- Disposal of stockpiled WWTS, solids removed from the storm water conveyance system, and excavated contaminated soil and sediment that are not RCRA hazardous wastes in the constructed on-site TSCA disposal unit
- Treatment and/or disposal of RCRA hazardous wastes including soil that is considered RCRA characteristic waste or contains RCRA listed waste, if generated, at an off-site permitted RCRA treatment/disposal facility
- Decommissioning of the storm water treatment system and restoration of the site to natural drainage following completion of remedial action
- Disposal or recycling of demolition debris from the stormwater treatment system and other potentially dismantled structures. Disposition will be determined based on testing of the debris to determine if it is RCRA hazardous wastes.
- Monitoring and maintenance of the closed RCRA units (former surface impoundments) in accordance with RCRA ARARs for post-closure care of a hazardous waste surface impoundment
- Groundwater monitoring in accordance with ARARs to confirm TSCA disposal unit and closed RCRA units' integrity
- Engineering Controls (ECs) in the form of fencing, warning signs and erosion control measures to control sedimentation from stormwater runoff
- Implementation of Institutional Controls (ICs) in the form of a restrictive covenant and/or Notice of Contaminated Site in accordance with North Carolina statute
- Five-Year Reviews (FYRs)

5.0 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, EPA will conduct statutory FYRs beginning within five years after initiation of the remedial action to ensure that the remedy is protective of human health and the environment.

6.0 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information is located in the Administrative Record file for this site.

Item	Section Number
Chemicals of concern and their respective concentrations.	Section 5.6
Baseline risk represented by the chemicals of concern.	Section 7.0
Cleanup levels established for chemicals of concern and their basis	Section 12.4
How source materials constituting principal threats are addressed.	Section 11.0 and Section 12.0
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD.	Section 6.0
Potential land and groundwater use that will be available at the site because of the Selected Remedy.	Section 12.4
Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.	Section 9.3.3 and Section 12.3
Key factors that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision).	Section 12.1 and Section 13.0

7.0 AUTHORIZING SIGNATURE

This ROD documents the selection of the remedy for the LCP-Holtrachem Superfund Alternative Site. The EPA selected this remedy with concurrence from the North Carolina Department of Environmental Quality (NCDEQ).

Franklin E. Hill, Director
Superfund Division
U.S. Environmental Protection Agency, Region 4

9/29/17
Date

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- Table A-3: Action-Specific ARARs and TBCs

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ACRONYMS AND ABBREVIATIONS

2L	Title 15A North Carolina Administrative Code Subchapter 2L Groundwater Standards (I5A NCAC 2L Standard)
ACM	asbestos-containing material
AMECFW	AMEC Foster Wheeler Environment & Infrastructure, Inc.
AOC	Administrative Order on Consent
App. Gamma	Approximate Gamma
AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirements
AST	above ground storage tank
AUF	area use factor
BAF	bioaccumulation factor
BERA	Baseline Ecological Risk Assessment
BG	background
BPT	Bleach Plant
CBP	Cell Building Pad
CCC	criterion continuous concentration
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
Cheb	Chebyshev Minimum Variance Unbiased Estimate of Upper Confidence Limit
Cheb-m	Chebyshev (mean, standard deviation) Uper Confidence Limit
cm/s	centimeter per second
COC	Chemical of Concern
COPC	Chemical of Potential Concern
COPEC	contaminant of potential ecological concern
CSF	cancer slope factor
CSM	Conceptual Site Model
CTA	CTA Environmental, Inc.
CTE	central tendency exposure
DDT	dichloro-diphenyltrichloroethane
DPT	direct push technology
DQO	data quality objective
DWQ	Division of Water Quality
EC	Engineering Control
ECBPA	East Cell Building Pad Area
EE/CA	Engineering Evaluation / Cost Analysis
EPA	U.S. Environmental Protection Agency
EPC	Exposure Point Concentration
EPDM	ethylene propylene diene-monomer
ERRB	Emergency Response and Removal Branch
ESI/RA	Expanded Site Inspection and Removal Assessment
ESP	Engineered Stockpile

ESV	ecological screening value
FEMA	Federal Emergency Management Agency
FIL	Fill Area
FS	Feasibility Study
ft^2	square feet
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
ft/yr	feet per year
FYR	Five-Year Review
GPS	Global Positioning System
HCl	hydrochloric acid
HDPE	high density polyethylene
HEAST	Human Effects Assessment Summary Tables
Hg	mercury
HHRA	Human Health Risk Assessment
HI	hazard index
Honeywell	Honeywell International Inc.
HQ	hazard quotient
IC	Institutional Control
iESI/RA	Integrated Expanded Site Inspection / Removal Assessment
IP	International Paper
IRIS	Integrated Risk Information System
ISS	In-Situ Stabilization
IVMP	Inspection and Vapor Monitoring Plan
K_{ow}	octanol: water distribution coefficient
LC50	50 percent mortality
LCP	Linden Chemicals & Plastics, Inc.
LEL	lower effects level
LLTW	Low Level Threat Waste
LOAEL	Lowest Observed Adverse Effects Level
LOEC	lowest observed effect concentration
LTTD	low temperature thermal destruction
MCL	Maximum Contaminant Level
MESS	Mercury Elimination Sewer System
mg/kg	milligram per kilogram
mg/L	milligram per liter
MNAF	mercury not accounted for
MW	monitoring well
N/A	not applicable
NAVD 88	North American Vertical Datum of 1988
NAWQC	National Ambient Water Quality Criteria
NC	North Carolina
NCBPA	North Cell Building Pad Area

NCDENR	North Carolina Department of Environment and Natural Resources
NCDEQ	North Carolina Department of Environmental Quality
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Contingency Plan
ng/L	nanogram per liter
NGVD 29	National Geodetic Vertical Datum of 1929
NOAEL	No Observed Adverse Effects Level
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NRB	North Retention Basin
NRWQC	National Recommended Water Quality Criteria
NUS	NUS Corporation
O&M	Operation and Maintenance
OA	Office Area
ONP	Old North Pond
OPA	Old Parking Area
OSC	On-Scene Coordinator
OSD	Old Salt Dock area
OSHA	Occupational Safety and Health Administration
OSP	Old South Pond
OU	Operable Unit
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
pg/L	picograms per liter
POC	point of compliance
POLREP	pollution report
PPBV	parts per billion volume
ppm	part per million
PPRTV	Provisional Peer-Reviewed Threshold Value
PRG	preliminary remediation goal
PRD	Products Area
Premier	Premier Environmental Services, Inc.
PRP	Potentially Responsible Party
PTW	Principal Threat Waste
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RAL	Removal Action Level
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RET	Retort area
RfD	reference dose
RI	Remedial Investigation

RLS	registered land surveyors
RME	reasonable maximum exposure
ROD	Record of Decision
RP	Roberts Pond
RSL	Regional Screening Value
RYD	Rail Yard Area
SARA	Superfund Amendments and Reauthorization Act
SCBPA	South Cell Building Pad Area
SEMS	Superfund Enterprise Management System
Site	LCP-Holtrachem Superfund Site
SLERA	Screening-Level Ecological Risk Assessment
SMCL	Secondary Maximum Contaminant Level
SPLP	synthetic precipitation leaching procedure
SRB	South Retention Basin
SS	Sewer System
SVOC	semi-volatile organic compound
SW	surface water
SWDS	Solid Waste Disposal Site
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TBC	to be considered
TCDD	Tetrachlorodibenzo-p-Dioxin
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEF	toxicity equivalent factor
TEQ	toxicity equivalent quotient
TIAS	Time Integrated Air Sampling
TIMVS	time-integrated mercury vapor sampling
TOC	total organic carbon
TRV	Toxicity Reference Value
TSCA	Toxic Substances Control Act
TSS	total suspended solid
UCL	upper confidence limit
UNPA	Upland Non-Process Area
UPA	Upland Process Area
URL	Uniform Resource Locator
US	United States
USGS	United States Geological Survey
µg/L	microgram per liter
$\mu g/m^3$	microgram per cubic meter
VI	vapor intrusion
VOC	volatile organic compound
WBA	Wooded Bottomland Area

WCBPA	West Cell Building Pad Area
Weston	Weston Solutions, Inc.
WHO	World Health Organization
WOE	weight of evidence
WWT	Wastewater Treatment
WWTS	Wastewater Treatment Solids
yd^3	cubic yard

PART 2: THE DECISION SUMMARY

The EPA prepared this ROD using information from documents in the Administrative Record, websites, and EPA guidance documents.

1.0 SITE NAME, LOCATION AND DESCRIPTION

The LCP-Holtrachem site (the site) is located at 636 John L. Riegel Road in Riegelwood, Columbus County, North Carolina. Riegelwood is about 20 miles west-northwest of Wilmington, North Carolina. The site consists of about 24.4 acres. The International Paper (IP) Riegelwood Mill facility surrounds the site on three sides and the Cape Fear River borders the fourth side. IP is an industrial pulp and paper manufacturing facility that opened in 1951 and occupies about 1,300 acres surrounding the site. The Cape Fear River is approximately 200 miles long and flows to the Atlantic Ocean. Near the site, the tidally influenced Cape Fear River is over 300 feet wide and up to 26 feet deep. **Figure 1** illustrates the general location of the site. **Figure 2** is an aerial view of the site and surrounding properties. **Figure 3** shows the property boundaries for the site and IP.

The site's identification number in the SEMS is NCD991278631. EPA is the lead agency for the site and the NCDEQ[2] is the support agency. The PRP, Honeywell, plans to implement the selected remedy with EPA and NCDEQ oversight.

In 1963, Allied Chemical Corporation developed the Holtrachem site as an industrial chlor-alkali manufacturing facility. Property ownership changed several times until the plant closed in November 2000. During operations, the facility produced various chemicals using a mercury electrolytic cell process. These chemicals included caustic liquid (sodium hydroxide), liquid chlorine, hydrogen gas, liquid bleach (sodium hypochlorite), and hydrochloric acid. The primary contaminants at the site are mercury and the polychlorinated biphenyl (PCB) known as Aroclor 1268. Both of these are hazardous to human health and the environment and were components of the mercury electrolytic cell process.

[2] On September 18, 2015, the North Carolina Department of Environment and Natural Resources (NCDENR)'s name changed to the North Carolina Department of Environmental Quality (NCDEQ). http://portal.ncdenr.org/web/guest/denr-blog/-/blogs/denr-has-a-new-name-n-c-dept-of-environmental-quality?_33_redirect=%2Fweb%2Fguest%2Fdenr-blog

Figure 1: General Site Location

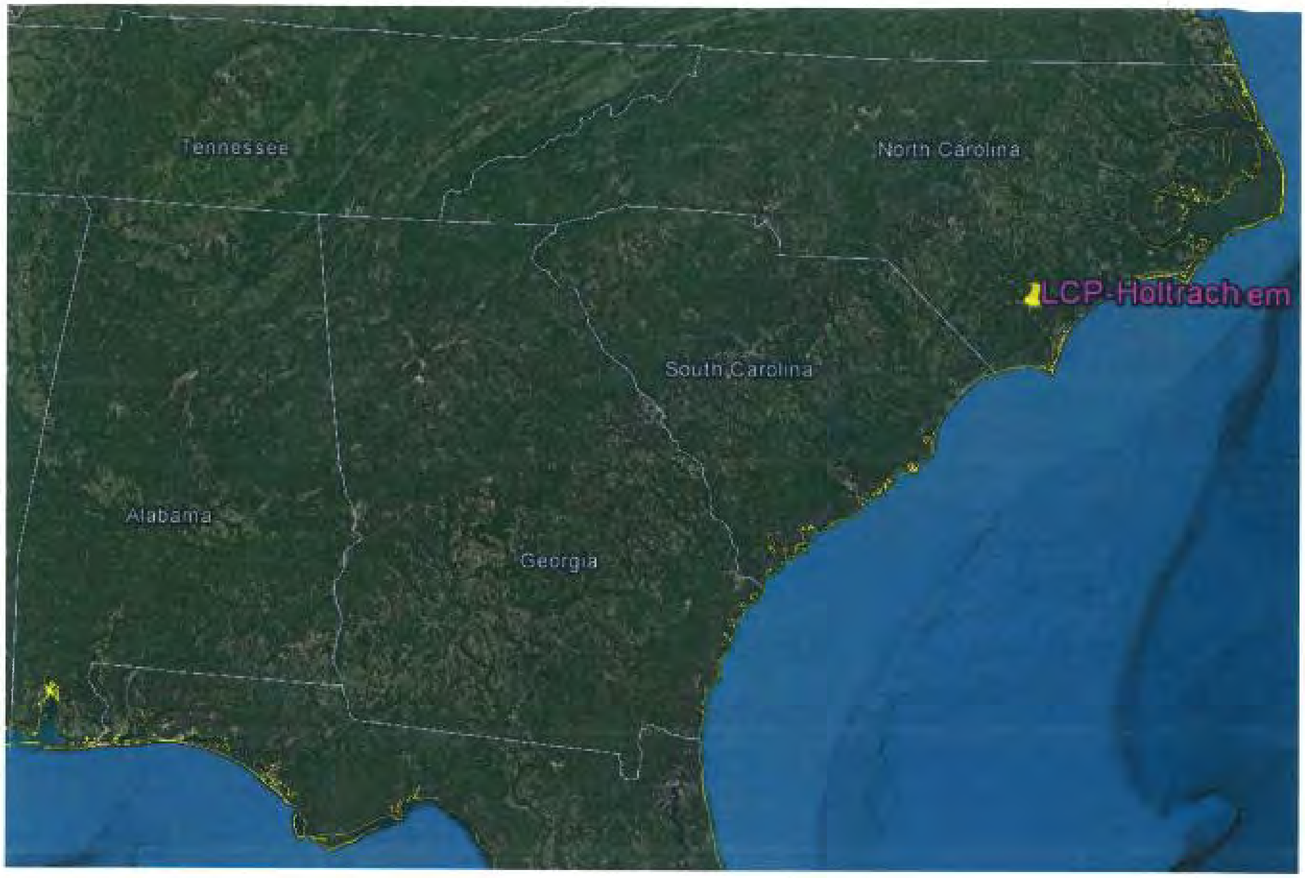
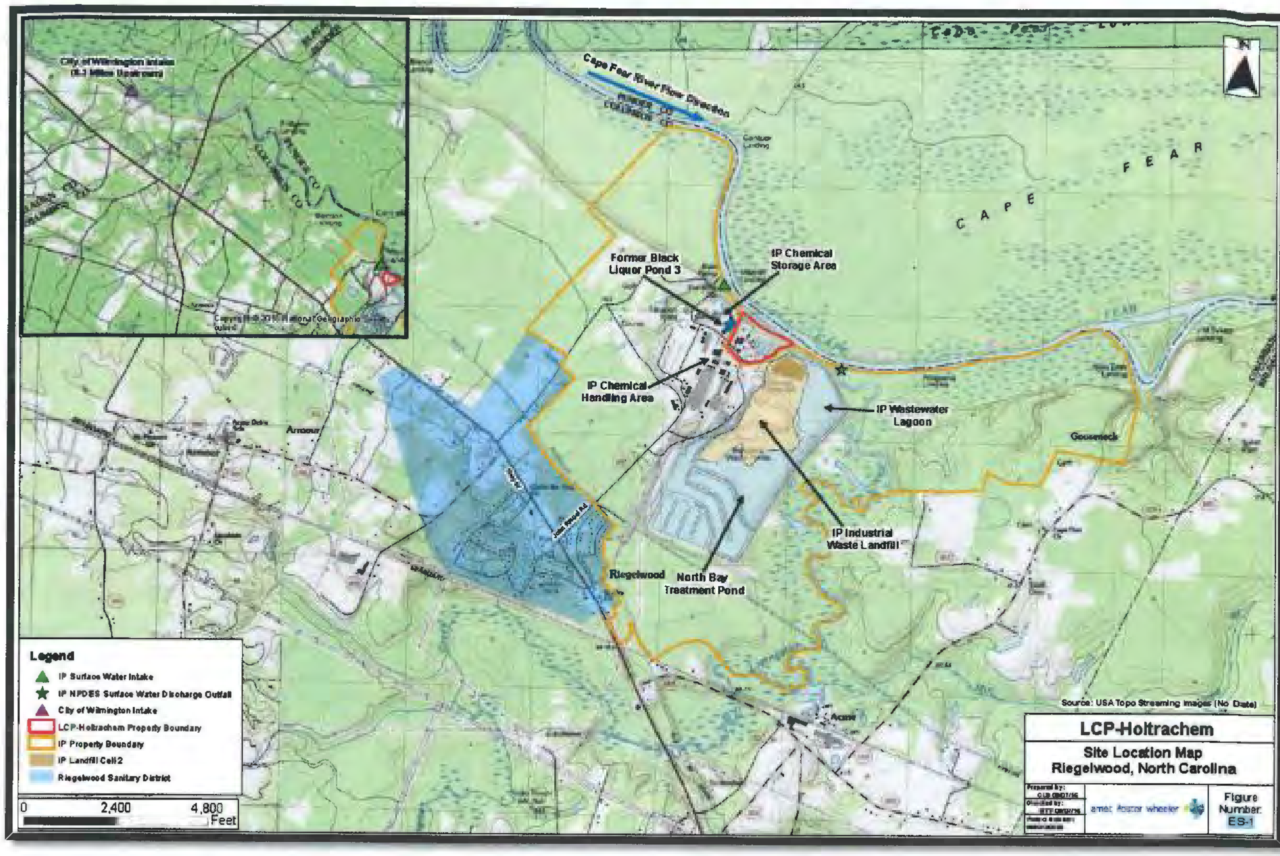


Figure 2: Site surrounded by International Paper and the Cape Fear River

Figure 3: Site Location Map with Property Boundaries



2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Ownership History

On August 15, 1963, Riegel Paper Corporation transferred 26.26 acres of their property to Allied Chemical Corporation, most of which consists of the current LCP-Holtrachem site. Prior to that, aerial photographs show the property as an undeveloped wooded area. In 1985, the facility transferred back approximately two acres to Federal Paperboard Company, Inc. (formerly Riegel Paper Corporation and now known as International Paper Riegelwood Mill). Therefore, the site property is currently about 24.4 acres.

Ownership of the site property changed numerous times. Owners included Allied Chemical Corporation, LCP Chemicals – North Carolina, Hanlin Group, Inc., Holtrachem Manufacturing Company, LLC, and currently Honeywell.

2.2 Operational History

The site consisted of a chlor-alkali manufacturing facility from 1963 until 2000. **Figure 4** illustrates an aerial view of a portion of the plant in about 1965. The facility produced various chemicals using a mercury electrolytic cell process. These chemicals included caustic liquid (sodium hydroxide), liquid chlorine, hydrogen gas, liquid bleach (sodium hypochlorite), and hydrochloric acid. The facility transferred most of the caustic, chlorine, bleach, and hydrogen that it produced to the adjacent IP plant by pipeline. The facility sold the remaining chlorine, caustic, and acid to other companies. These products were transported by railcars and tanker trucks for distribution. The mercury cell operation shut down in April 1999, and the entire plant closed in November 2000. The mercury cell and chlorine processes are illustrated in **Figure 5** and **Figure 6**, respectively.

Figure 4: Site Aerial Photograph - circa 1965

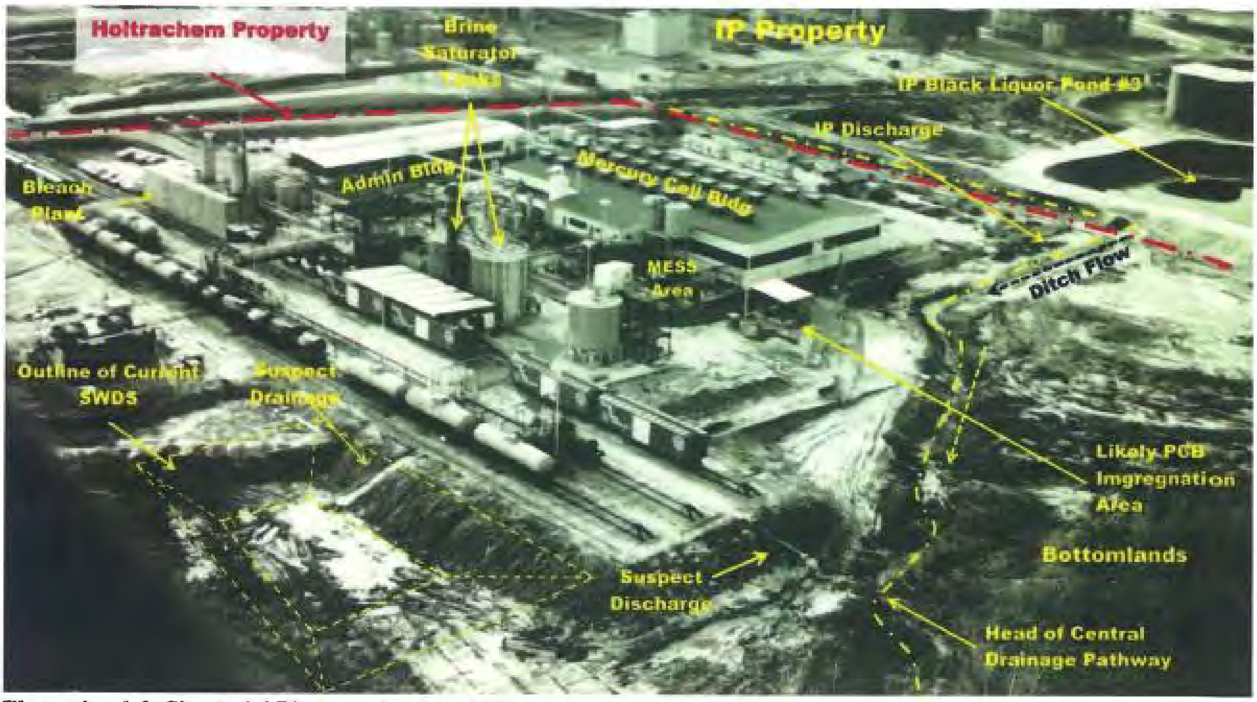


Illustration 1-3: Site Aerial Photograph - circa 1965

Figure 5: Mercury Cell Process

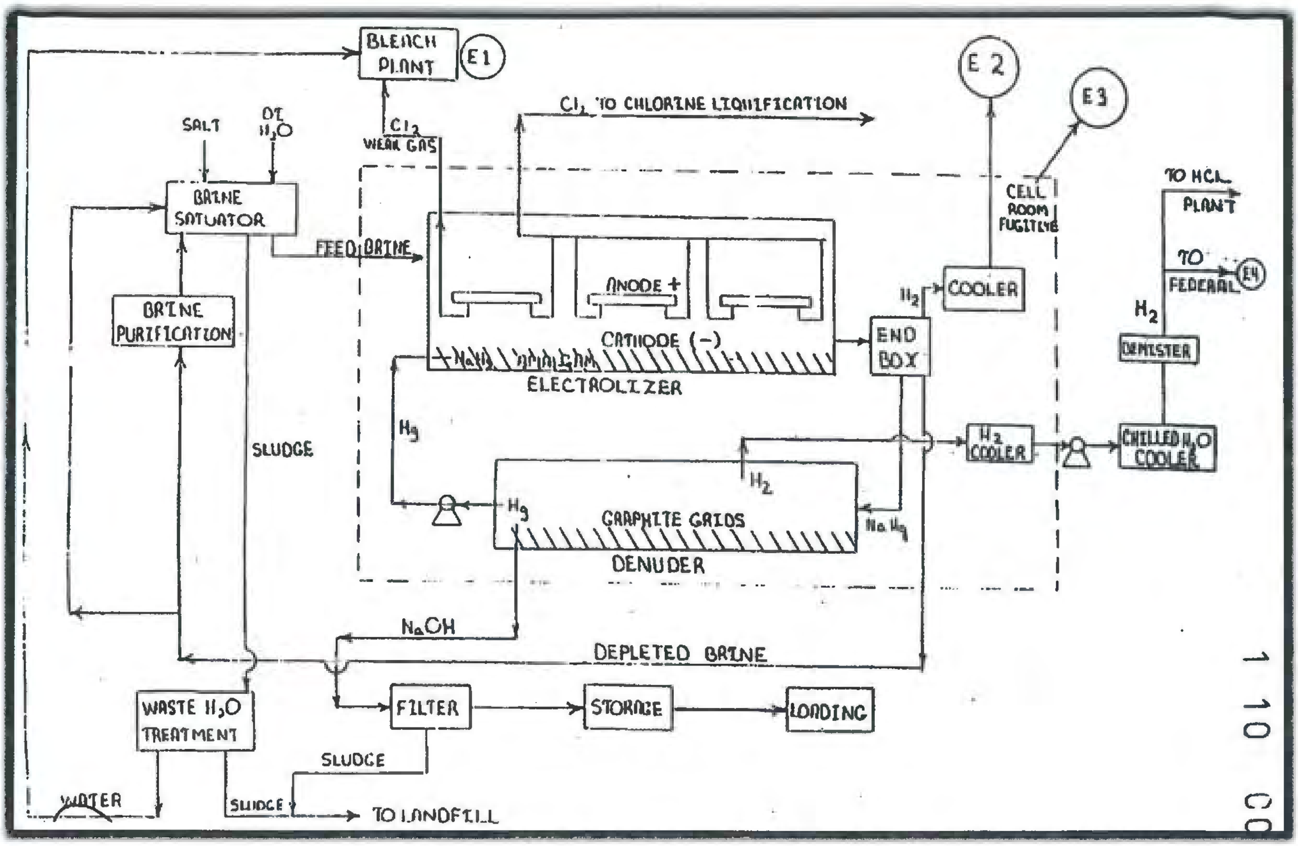
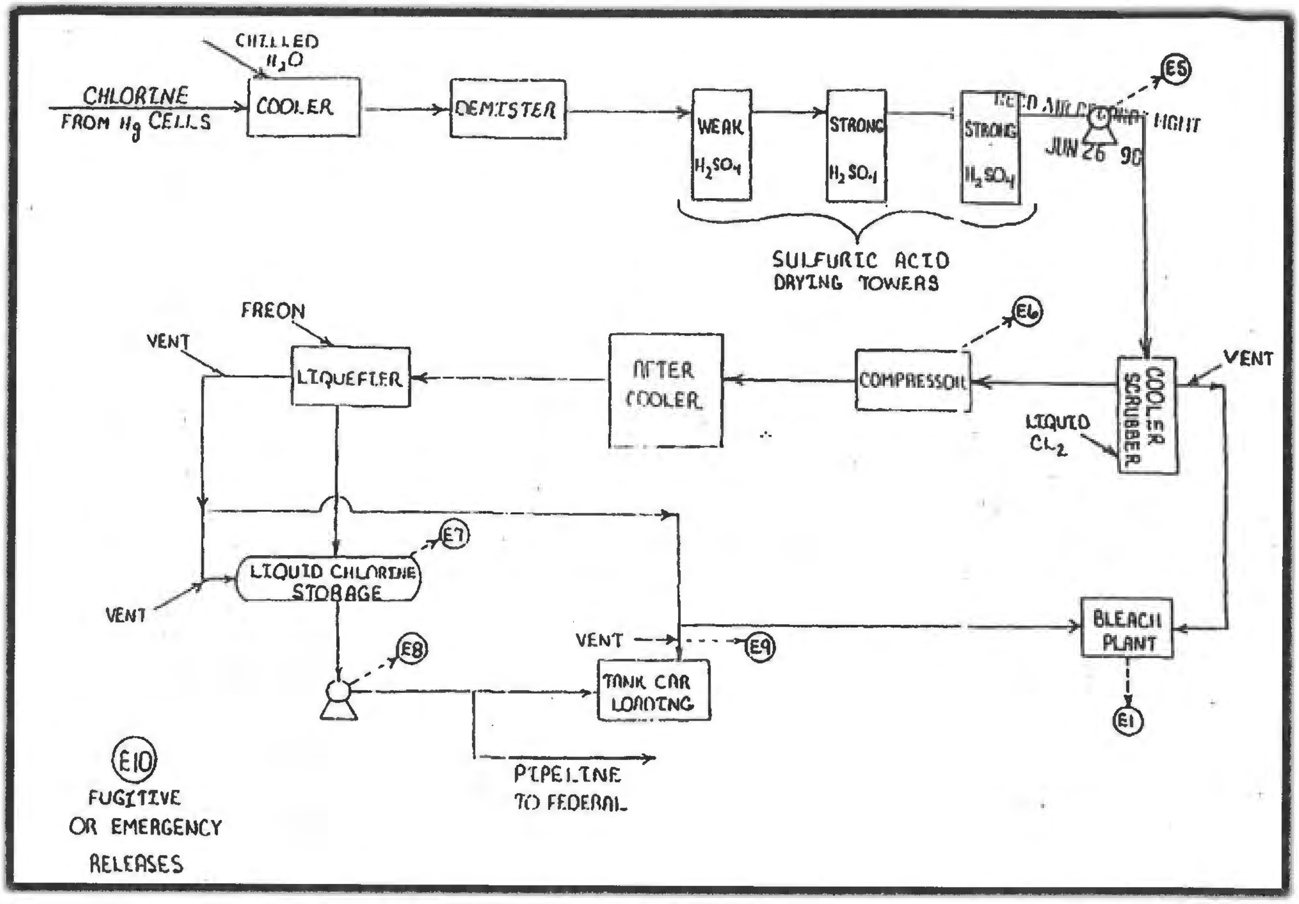


Figure 6: Chlorine Plant Process



2.3 Investigations, Actions and Violations under Authorities Other than CERCLA

While in operation, environmental evaluations at the facility focused on compliance with RCRA and the Occupational Safety and Health Administration (OSHA) regulations. Corrective action activities also occurred pursuant to the RCRA operating permit issued by NCDENR. A summary of the primary evaluations, actions and cited violations follow.

2.3.1 OSHA

In 1996, OSHA fined the facility $31,854 for an inadequate health and safety program. In December 1998, OSHA fined the facility $873,000, for failure to correct problems noted in 1996. OSHA reduced the fine to $100,000 after the plant's operator said the problems had been corrected.

2.3.2 RCRA

The facility operated under a RCRA Hazardous Waste permit. NCDENR issued permit number NCD991278631 to the facility on December 29, 1989. The permit became effective on June 28, 1991. The permit was modified on May 2, 1994, due to a change in the facility's ownership and operational control. In January 2002, after the facility ceased operations, NCDEQ RCRA Program referred the site to the Superfund program for further evaluation and remedial action under CERCLA.

2.3.2.1 Closed Surface Impoundments

Former facility operations included the creation and use of four surface impoundments: Solid Waste Disposal Site (SWDS), Roberts Pond, North Pond, and South Pond. The facility used these impoundments to treat and contain wastes generated during plant processes.

The SWDS, also known as the Allied Vault, received wastes including graphite anodes, stems, sludge, fly ash, concrete, sodium chloride, activated carbon, filter aid media, and mercury sludge generated from 1963 to 1980. The bottom liner of the SWDS included two feet of clay overlain by a polyvinyl chloride (PVC) liner overlain by another two feet of clay. The top cover of the SWDS consisted of a four-foot thick layer consisting of clay, marl, and asphalt. In 1985, the facility closed the SWDS with approximately 3,700 yd^3 of solidified wastes in place and capped with an asphalt cover graded to promote runoff toward the wooded bottomland area.

The Old South Pond was an ethylene propylene diene-monomer (EPDM) rubber lined surface impoundment that held about 1.06 million gallons of process wastewater and sludge. The Old North Pond had a PVC liner and functioned as an overflow basin with a capacity of 1.71 million gallons. These ponds received mercury-contaminated brine processing wastewater and sludge.

In the early 1970s, the facility constructed Roberts Pond. It was originally unlined and received mercury-contaminated wastes from the brine processing. In 1979, the facility installed a rubber liner. Site drawings from the late 1970s indicate a second pond (the old salt brine pit), to the west of Roberts Pond, was used to contain overflow from Roberts Pond. This second pond was reportedly backfilled and the area later used for salt storage prior to the construction of the membrane building.

In the 1980s, the facility closed Roberts Pond, the Old North Pond and the Old South Pond. Closure involved removal of materials from Roberts Pond and the Old North Pond, stabilization of the material with fly ash and dry cement, and placement into the Old South Pond. The PVC liners from Roberts Pond and the Old North Pond were sealed together, placed over the stabilized sludge, then bonded to the EPDM base liner and anchored in a trench. A compacted clay cap was then placed over the PVC liner to complete the closure of the South Pond.

Neither Roberts Pond nor the Old North Pond received official clean closure status under RCRA. The facility conducted groundwater monitoring for compliance purposes in general accordance with the post-closure care provisions set forth in the Hazardous Waste Management Part B Permit Application and the Hazardous Waste Management Permit, which became effective June 28, 1991.

2.3.2.2 RCRA Hazardous Waste

The facility operations generated four hazardous wastes identified as D009, F003, F005, and K106.

D009 is a solid waste that exhibits the characteristic of toxicity due to hazardous concentrations of mercury as defined in 40 CFR §261.24. The facility used a retort thermal reclamation process for mercury-contaminated solids. The residual ash created in this process was classified as D009 hazardous waste.

F003 and F005 are hazardous wastes from non-specific sources. They are defined in 40 CFR §261.31 as follows:

- <u>F003:</u> *The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent nonhalogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.*
- <u>F005:</u> *The following spent nonhalogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.*

K106 is a hazardous waste from a specific source. It is defined in 40 CFR §261.32 as, "*Wastewater treatment sludge from the mercury cell process in chlorine production.*" The facility generates K106 hazardous waste through its wastewater pretreatment system called the Mercury Elimination Sewer System (MESS). Wastewater is initially treated through the MESS to adjust pH, then sodium sulfide is added to form a mercury sulfide precipitate in a settling tank/clarifier. The settled mercury sulfide sludge is pumped to a filter press. The filter cake is stored and subsequently shipped off-site as a hazardous waste (K106).

2.3.2.3 RCRA Violations and Corrective Actions

A review of historical records indicated that between 1989 and 2001, there were five documented RCRA violations at the facility. These include:

- December 1989 – NCDENR issued a Notice of Violation (NOV) for
  - failure to use the correct hazardous waste code of K106 for disposal of the wastewater treatment sludge from the mercury cell process, and
  - failure to provide proper documentation of disposal.
- February 1996 – NCDENR issued a NOV for violations noted in a January 1995 inspection. The violations included:
  - a waste pile at the MESS,
  - unlabeled waste,
  - mercury waste accumulation of greater than 90 days,
  - leaking wastewater treatment tank,
  - employee training out of compliance, and
  - uncovered vat and floor sweepings at the MESS, which were unlabeled and not dated.
- May 2000 – NCDENR issued an Order for
  - failure to demonstrate clean closure equivalency of Robert's Pond and
  - plans to construct a building over Robert's Pond without agency approval.
- September 2000 – NCDENR required maintenance of the cap on the retort pad and removal of nearby debris.
- October 2001 – NCDENR issued an Imminent Hazard NOV for
  - failure to characterize waste,
  - failure to properly contain waste, and
  - accumulation of waste for greater than 90 days.

2.3.3 Water Quality History

From 1963 to 1978, spill containment and storm water management appear to be minimal at the site. The first documented release of hazardous substances to the adjacent Cape Fear river was in August 1978. This event involved a spill of approximately 400 gallons of brine solution that flowed into the river. The concentration of mercury in the brine solution was 3.6 milligrams per liter (mg/L).

Afterwards, the facility constructed a water management system that would prevent discharges to surface waters. By 1979, the facility had begun transferring wastewater collected by the water management system to IP's wastewater treatment system. Initially, the transfer was via an open ditch. In October 1989, a NCDENR inspection noted that water transference was by pipe instead of the open ditch.

In November 1993, a NCDENR inspection found mercury at a concentration of 0.035 mg/L in IP's discharge water. By 1999, mercury was a compliance issue for IP. Holtrachem and IP reached an agreement for reducing mercury contributions from products supplied by Holtrachem, and these provisions were included in IP's National Pollutant Discharge Elimination System (NPDES) Permit.

In April 1999, approximately 1,800 gallons of wastewater was unintentionally released. The concentrations of mercury in soil samples ranged from 1.96 to 13.7 milligrams per kilogram (mg/kg). The facility shut down the mercury cell operation two days later.

In May 1999, approximately 18,000 gallons of wastewater spilled from a storm water retention basin. The concentration of mercury in the water was 0.34 mg/L.

In September 1999, Hurricane Floyd caused a release of about 2.2 million gallons of storm water to the Cape Fear River. This event released about 5 pounds of mercury over a 19-hour period.

In October 1999, NCDENR issued a NOV and Assessment of Civil Penalty to the facility based on a review of the July 1999 discharge monitoring report. The violation was for exceeding permitted monthly average effluent limits for settleable solids.

2.3.4 Air Quality History

Air emissions history prior to 1979 is not documented. Beginning in the 1980s, Holtrachem operated under an air permit and provided annual air emissions inventory.

2.4 CERCLA Investigations and Actions

2.4.1 CERCLA Investigations

The "Discovery" date listed in SEMS is November 1, 1979. Two dates are currently in SEMS for Preliminary Assessments (PA): August 1, 1982 and November 2, 1987. The PA form located in the references of the integrated Expanded Site Inspection/Removal Assessment (iESI/RA) report is dated September 11, 1987.

On January 11, 2002, NCDENR sent a referral letter to EPA's Emergency Response and Removal Branch (ERRB). An EPA On-Scene Coordinator (OSC) visited the site on January 30, 2002, and February 20, 2002. In April 2002, EPA's contractor Weston Solutions, Inc. (Weston) conducted an iESI/RA in conjunction with NCDENR. Based on the findings of these inspections, EPA authorized a removal action.

In June 2004, Honeywell initiated an Engineering Evaluation/Cost Analysis (EE/CA) study with EPA oversight. Honeywell's contractors collected samples of air, surface water, groundwater, sediment, soil and biota. After Honeywell submitted the draft EE/CA report, EPA determined that it would be more appropriate to address the remaining contamination under remedial instead of removal authority. In September 2009, EPA converted the project from an EE/CA into a Remedial Investigation/Feasibility Study (RI/FS). EPA approved the Remedial Investigation (RI) report on July 29, 2014.

2.4.2 CERCLA Emergency Responses and Removal Actions

Two CERCLA emergency responses and two CERCLA removal actions have occurred. These include:

- 1999: Hurricane Floyd Emergency Response
- 2003-2004: Removal Action #1
- 2003: Hurricane Isabel Emergency Response
- 2008-2009: Removal Action #2 (IP Removal Action)

The PRP's contractors participated in all of these events. EPA provided contractor support during the two emergency responses and provided oversight activities during all events. A brief summary of each event is described in Sections 2.4.2.1 – 2.4.2.4.

2.4.2.1 Hurricane Floyd Emergency Response (1999)

In September 1999, Hurricane Floyd inundated the site with an estimated 24-inches of rain. The associated flooding caused a release of contaminated water from a storm water retention basin. The release flowed over land into the adjacent Cape Fear River. EPA and the Federal Emergency Management Agency (FEMA) responded. EPA personnel and contractors assisted facility personnel in sand-bagging to raise the berm height of the storm water collection basin and pumping water to IP.

2.4.2.2 Removal Action #1 (2002-2004)

In July 2002, EPA signed an Enforcement Action Memorandum for a time-critical removal action. EPA and Honeywell entered into an Administrative Order on Consent (AOC) for this removal action. The removal action began in January 2003. EPA issued the Final Pollution Report (POLREP) in October

2004, marking the completion of the removal action. During the removal action, workers dismantled the former mercury cell building and associated piping, encapsulated mercury-contaminated debris prior to off-site shipment/disposal, and collected over 34,000 pounds of mercury for reclamation/reuse. Workers also dismantled/disposed of other RCRA hazardous waste and non-hazardous waste/debris associated with some of the former facility operations. Southern Metal Recycling accepted over 1.5 million pounds of scrap metal, copper, aluminum, brass, titanium and stainless steel from the site for recycling. **Table 1** summarizes of the types of waste, disposition and quantities that were transported off-site associated with the removal action through March 2008.

Table 1: Removal Action #1 Waste Disposal Summary as of March 10, 2008

Disposition	Facility	Waste Stream	Quantity Shipped Off-site	
Reuse	Goldsmith Evanston, IL	Reclaimed Elemental Mercury (for Reuse)	34,447	pounds
Recycling	Southern Metals Recycling Wilmington, NC	Scrap Metal	1,317,529	pounds
		Scrap Copper	183,177	pounds
		Scrap Aluminum	20,250	pounds
		Scrap Stainless Steel	14,650	pounds
		Scrap Titanium	4,280	pounds
		Scrap Brass	1,232	pounds
Hazardous Waste	Waste Management Emelle Treatment Facility Emelle, AL	Saturator Salt	1,008,180	pounds
		Hazardous - Variance Debris	761,972	pounds
		Hazardous - Macro (including hazardous asbestos-containing material (ACM))	99	boxes
		Non-Regulated Material - Directly Landfilled	80	boxes
		Hazardous - Micro	47	boxes
	EQ - Michigan Disposal Waste Treatment Belleville, MI	D009 - Wastewater Filter Cake	24	boxes
Non-Hazardous Waste	Anson Waste Management Facility Polkton, NC	Non-Hazardous ACM	22,040	pounds
	Sampson Co. Disposal Facility Roseboro, NC	Non-Hazardous Construction Debris	676,260	pounds

Notes:

ACM = asbestos-containing material

boxes = box sizes ranged from 20 to 30 yd^3

2.4.2.3 Hurricane Isabel Emergency Response (2003)

In September 2003, EPA signed an Emergency Response Action Memorandum to assist the facility with preparations for and responding to potential impacts from Hurricane Isabel. Activities included stabilization of tarps on roll-off boxes, movement of hazardous substance drums into warehouses, and strapping down loose items. Hurricane Isabel passed through the area on September 17, 2003. The PRP's contractor handled all water and reported that only minor damage occurred to the cell building metal sheeting. EPA contractors demobilized from the site on September 19, 2003.

2.4.2.4 Removal Action #2 (2008-2009)

In the early 2000s, IP planned to expand their landfill capacity by taking out of service one of their former wastewater treatment lagoons. **Figure 7** shows the lagoon that historically accepted wastewaters from the Holtrachem facility.

Figure 7: Google Earth photo from February 1993 with descriptions added

In September 2005, IP contracted with Premier Environmental Services, Inc. (Premier) to characterize the Landfill Cell No. 2 area. IP shared the results with EPA. The findings led to EPA issuing an Enforcement Action Memorandum and entering into an AOC with Honeywell and IP for the removal of WWTS containing PCBs. PCB concentrations equal to or greater than 50 mg/kg (or 50 ppm) are regulated for disposal as TSCA PCB waste and must be managed in accordance with TSCA regulations at 40 CFR 761 *et. seq*.

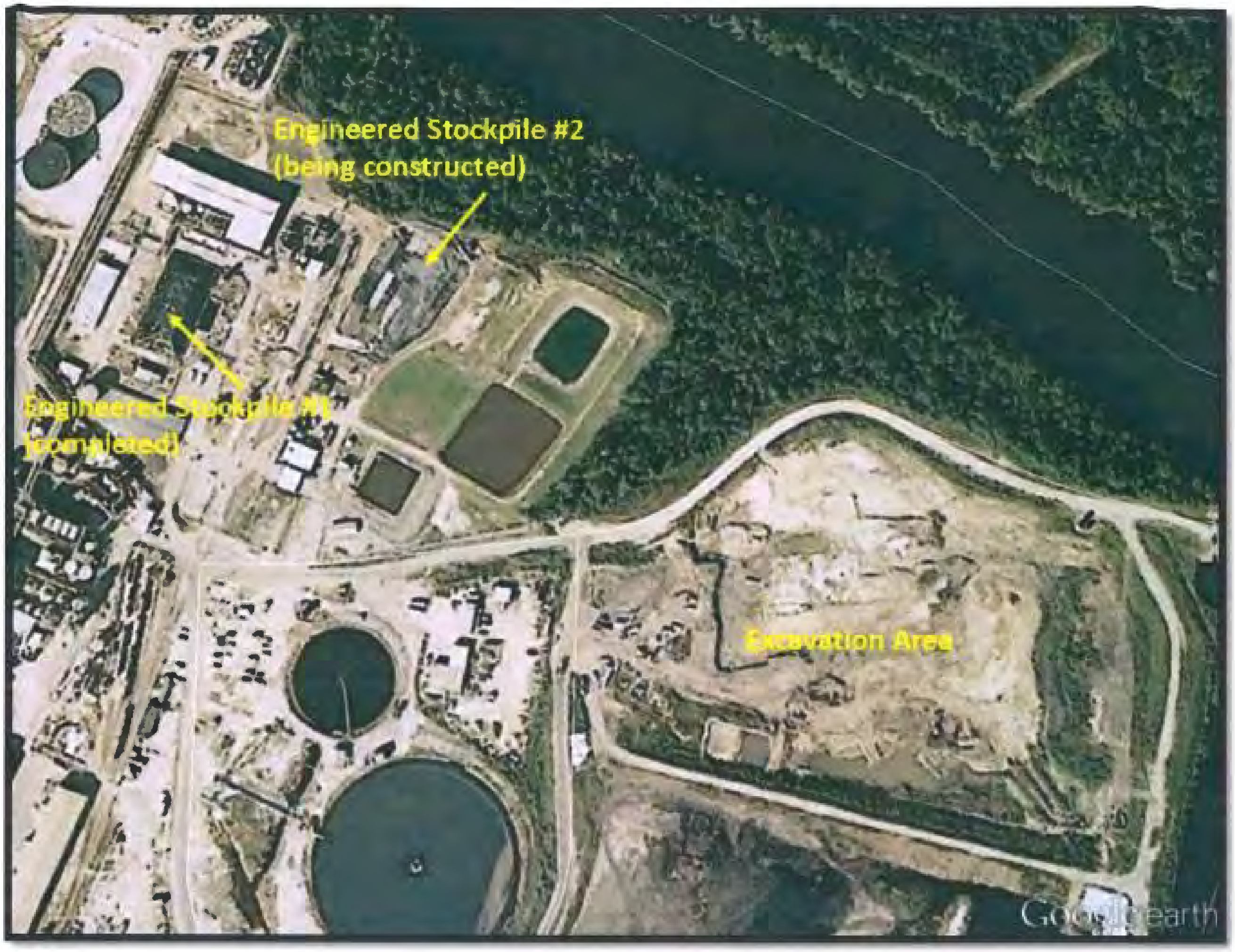
During 2008-2009, contractors performed the following activities:

- Construction of two engineered stockpiles on the Holtrachem property.
- Excavation and transportation of WWTS containing Aroclor 1268 at concentrations equal to or greater than 50 mg/kg from IP Landfill Cell No. 2 to the engineered stockpiles.
- Excavation and transportation of WWTS containing Aroclor 1268 at concentrations less than 50 mg/kg from IP Landfill Cell No. 2 to IP Landfill Cell No. 1.
- Removal of piping that reportedly transported wastewater from the Holtrachem facility to Landfill Cell No. 2 and associated impacted soil containing Aroclor 1268.
- Management of wastewater generated during the removal activities, including chemical treatment (using a flocculant and coagulant) prior to collection of water in two settling ponds; bag filtration; carbon filtration; and routine sampling to ensure that Aroclor 1268 concentrations were less than 3 micrograms per liter (μg/L) prior to discharge to IP's wastewater treatment system.
- Collection of confirmation samples to confirm achievement of cleanup goals.
- Collection of samples at a rate of approximately one per 1,000 yd^3 of material placed in the engineered stockpiles. An off-site laboratory analyzed the 19 samples for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), metals, pesticides and dioxins.

Approximately 22,500 yd^3 of WWTS containing Aroclor 1268 at concentrations equal to or greater than 50 mg/kg were excavated and transported from IP Cell No. 2 and placed in the engineered stockpiles. Approximately 70,500 yd^3 of WWTS containing Aroclor 1268 at concentrations less than 50 mg/kg were excavated and transported from IP Cell No. 2 to IP Landfill Cell No. 1. More than 6.5 million gallons of water was pre-treated and discharged to IP's wastewater treatment system during the removal activities. **Figure 8** is a Google Earth aerial photograph from October 2008 that shows the removal action work in progress.

Honeywell's consultant incorporated weekly inspections of the engineered stockpiles into the pre-existing Post Removal Site Control Plan. Typically, wastes with concentrations of PCBs greater than or equal to 50 mg/kg are regulated for disposal as TSCA PCB waste and are disposed of in a TSCA chemical waste landfill. The engineered stockpiles were planned as temporary storage. The disposition of this waste material is included as part of the remedy selected in this ROD.

Figure 8: Google Earth aerial photo during the WWTS removal action (October 2008)



2.4.3 CERCLA Enforcement Actions

In April 2002, EPA sent a General Notice Letter to Honeywell. To date, EPA and Honeywell have entered into the four administrative orders listed in **Table 2**. IP is also a party in one of them. The PRPs have paid oversight bills in a timely manner. Informal discussions with Honeywell indicate that they will agree to implement the remedy selected in this ROD.

Table 2: List of Administrative Orders

Acronym	Title	Docket #	Parties Involved	Effective Date
AOC 1	Administrative Order on Consent for Removal Action	CER-04-2002-3771	EPA Honeywell International Inc.	7/1/2002
AOC 2	Administrative Order on Consent for Removal Action	CER-04-2004-3781	EPA Honeywell International Inc.	7/8/2004
AOC 3	Administrative Settlement Agreement and Order on Consent for Removal Action	CERCLA-04-2008-3769	EPA Honeywell International Inc. International Paper Company	5/20/2008
AOC 4	Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study	CERCLA-04-2009-3980	EPA Honeywell International Inc.	9/15/2009

3.0 COMMUNITY PARTICIPATION

In accordance with Section 300.430(f)(3) of the NCP, the EPA performed community participation activities related to selecting the cleanup action described in this ROD. EPA updated the Administrative Record (AR) for the site by adding documents that EPA used in selecting the cleanup plan. These documents include, among others, the Community Involvement Plan, RI Report, Ecological Risk Assessment, Baseline Human Health Risk Assessment, Feasibility Study (FS) and Proposed Plan.

EPA maintains the AR file at the EPA Region 4 office and at the East Columbus Public Library. EPA published a notice of the availability of these documents in the Star News on August 15, 2016. EPA held a public comment period from August 15, 2016 to September 14, 2016. In addition, EPA hosted a public meeting on August 23, 2016, at Riegelwood Community Center, in Riegelwood, NC to present the Proposed Plan to community members. At this meeting, representatives from EPA, NCDEQ, Honeywell and AMEC Foster Wheeler Environment & Infrastructure, Inc. (AMECFW) answered questions about the site and the remedial alternatives. A transcript of the meeting and EPA's response to comments received during the public comment period is included in this ROD in Part 3, the Responsiveness Summary. EPA did not receive any written comments from community members on the Proposed Plan.

Just prior to the start of the public meeting, NCDEQ verbally informed EPA and the PRP that some of their approved language changes on the draft FS were not included in the July 2015 version. The PRP's consultant acknowledged the oversight and submitted a revised FS on September 7, 2016. EPA and NCDEQ have approved the September 2016 FS and EPA has added it to the AR.

4.0 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

Under EPA oversight, the PRPs previously conducted two removal actions at the site. The first removal action addressed the immediate threats of spilled and containerized wastes. As described in Section 2.4.2, Honeywell's contractors dismantled the former cell building and associated structures and transported wastes to off-site disposal facilities. In the second removal action, the PRPs contractors excavated WWTS from the adjacent IP property and transported WWTS that contained concentrations of Aroclor 1268 above 50 mg/kg to the site. The WWTS is sealed inside two engineered stockpiles.

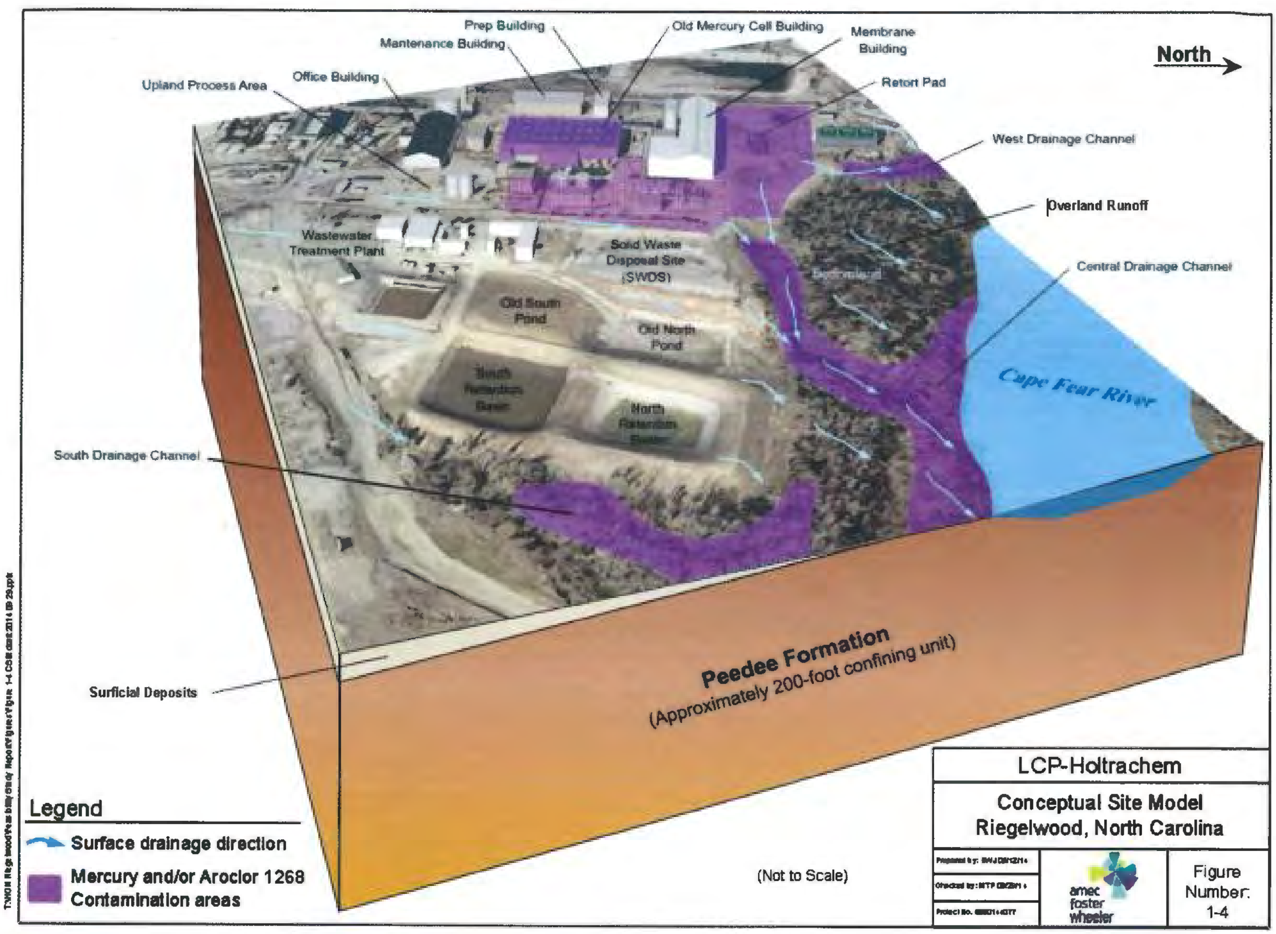
EPA is selecting the final remedy for the site and the remedial action is under one OU. The remedial action selected in this ROD addresses the following contaminated media and wastes: soil, sediment, surface water, former RCRA units, mercury wastes and the on-site stored WWTS. The response actions for the selected remedy include a variety of components that are described in **Sections 9.1.3** and **9.1.9**. Groundwater contamination is limited to the uppermost aquifer unit, which has insufficient yield for drinking water use. Based on multiple criteria, the aquifer is characterized as an EPA Class III, Subclass IIIA, not suitable as a potential source of drinking water and of limited beneficial use per "Guidelines for Ground-Water Classification Under the EPA Groundwater Protection Strategy", and the human health and ecological pathways for exposure to contaminated groundwater are incomplete. Data indicates that detected constituents in groundwater are not migrating and are not causing detriment to human health or the environment.

5.0 SITE CHARACTERISTICS

5.1 Conceptual Site Model

The Conceptual Site Model (CSM) is illustrated in **Figure 9**. Historical manufacturing operations resulted in the release of contaminants into the environment. The primary sources of contamination are from the historical mercury cell operations, retort operations, Aroclor 1268 graphite impregnation operations, spills and leaks. These operations and releases resulted in contaminated soil, sediment and surface water by overland flow (i.e., stormwater runoff) and atmospheric deposition.

Figure 9: Conceptual Site Model



5.2 Site Overview

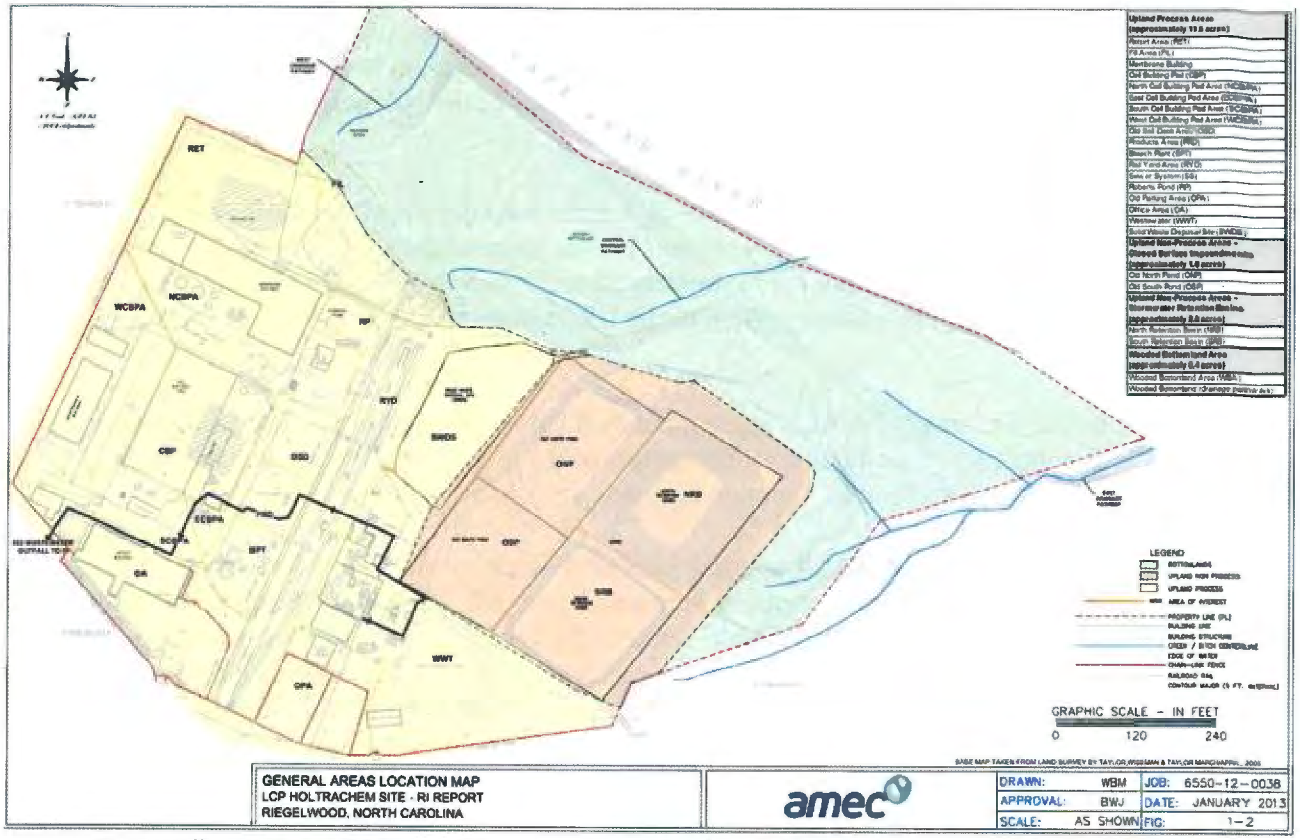
The site is approximately 24.4 acres. It is surrounded by IP on all sides, except where the site borders the Cape Fear River. The site is generally lower in elevation than the adjacent IP property (in some areas by 10 to 15 feet). The site was divided into three areas for purposes of the risk assessments. The areas are illustrated in **Figure 10**.

The Upland Process Area (UPA) is approximately 11.8 acres and consists of the former process and operational areas, and the wastewater treatment area. The majority of the UPA is relatively flat with ground surface elevations ranging from approximately 35 to 36 feet using the North American Vertical Datum of 1988 (NAVD 88). The eastern portion of the UPA slopes to the east with elevations ranging from 29 to 35 feet.

The Upland Non-Process Area (UNPA) is approximately 4.2 acres located in the east central portion of the site. This area contains two surface impoundments referred to as the Old North Pond and the Old South Pond, and two (north and south) retention basins surrounded by grassed areas.

The Wooded Bottomland Area (WBA) is approximately 8.4 acres located along the northern and eastern boundaries of the site. It consists of 7.3 acres of delineated wetlands, which are illustrated in **Figure 11**. This area is located within an alluvial floodplain between the Cape Fear River and the industrialized portions of the site. In general, the land slopes to the northeast, as the western half of the bottomland forest is higher than the eastern half with elevations ranging from 10 to 30 feet. The forest canopy is moderately dense. Trees, limbs, and persistent herbaceous plants that remain visible throughout the year dominate this area. The understory is thick on the western half with briars and more upland vegetation. The understory on the eastern half is less dense and contains lower-lying vegetation, including some that is more typical of wet environments. The bottomlands also consist of three primary drainage ditches: one to the west, one in the center bisecting the forest, and one to the south. A portion of the bottomlands is located within a 100-year floodplain zone, which is colored in blue in **Figure 12**.

Figure 10: General Area Location Map



Note: yellow is Upland Process Area, orange is Upland Non-Process Area, and green is Wooded Bottomland Area.

Figure 11: Wetland Delineation Map

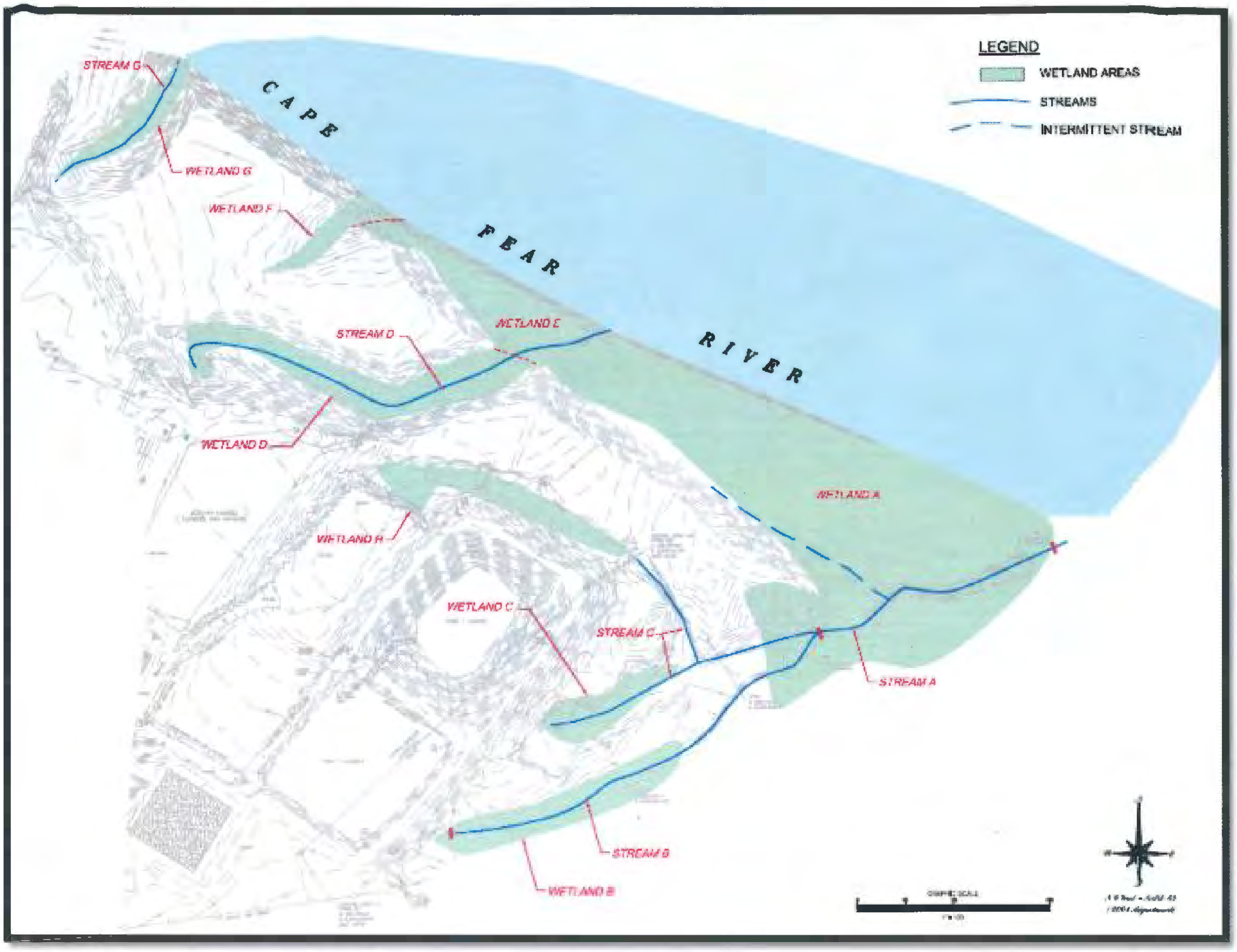


Figure 12: 100-year Flood Zone

5.3 Surface and Subsurface Features

5.3.1 Upland Process Area

The UPA currently contains perimeter fencing, several structures and buildings, nine above ground storage tanks (ASTs), several storm water collection basins connected to an underground piping system to capture storm water, paved and gravel roads, concrete foundations of former operational structures, a railroad spur, and a wastewater treatment system.

Access Structures

- Fencing – An eight-foot high chain link fence that runs from the northwest property boundary to the southeastern portion of the property controls access. Three access gates are part of the fencing. No fencing is present along the site and Cape Fear River boundary or the eastern wooded boundary between the site and IP.
- Railroad Spur – A railroad spur on-site is the terminus of an active railroad track that leaves the site in a southwestern direction.

Buildings

Five buildings remain at the site as described below and shown in **Figure 13**.

- Office Building – The office building is currently used for administration, laboratory and worker support activities. It is a single story, approximately 9,600 square foot brick and cinder block structure.
- Prep Building – The Prep Building is currently used for general material storage. It is a single story, approximately 2,100 square foot metal structure.
- Membrane Building – The Membrane Building is currently used for material storage (e.g. drums, sandbags, various equipment). It is a single story, approximately 15,300 square foot metal structure with a corrugated exterior.
- Reagent Building – The Reagent Building is currently used to store chemicals, drums from former assessment activities, and site equipment. It is a single story, approximately 2,400 square foot metal structure.
- Maintenance Building – The Maintenance Building is not in use. It is a single story, approximately 6,000 square foot brick and metal structure.

Figure 13: Buildings Remaining On-site

Partially Dismantled UPA Components

Six process components were partially dismantled. Partially dismantled remaining structures are shown in **Figure 14** and include:

- Cell Building Pad – The Cell Building Pad is an approximately 20,000 square foot (ft^2) concrete floor of the former Mercury Cell Building. Contractors dismantled and removed the mercury cell building during the 2002-2004 Removal Action. Engineered Stockpile #1, which contains approximately 6,700 yd^3 of WWTS, is currently on top of the pad.
- Cell Pit – The Cell Pit is immediately adjacent to the Cell Building Pad. It has an approximate capacity of 60,000 gallons.
- Retort Pad – The Retort Pad is an approximately 4,000 ft^2 concrete structure of the former mercury retort operation. A liner and clean backfill material currently cover it.
- Former Bleach area – The former bleach area consists of remnant concrete structures of that operation.
- Former Brine Tank area – The former brine tank area (also referred to as the Brine Saturators in the Old Salt Dock area) consists of remnant concrete pads.

UPA RCRA Units

- Roberts Pond – Roberts Pond was a former solid waste management unit (SWMU). It was closed under RCRA, but did not receive clean closure certification. About half of it is currently underneath the Membrane Building, and the other half is beneath a dirt and gravel drive.
- Solid Waste Disposal Site (SWDS) — The SWDS, also referred to as the Vault, has an asphalt cover. It is a RCRA unit that is currently beneath Engineered Stockpile #2.

Temporary Engineered Stockpiles (ESP)

WWTS from IP containing PCB-contaminated soils and sludge with concentrations greater than 50 mg/kg are enclosed in two engineered stockpiles. Both stockpiles consist of top and bottom high density polyethylene (HDPE) liners that are sealed together to fully encapsulate the WWTS.

- Stockpile #1 contains approximately 6,700 yd^3 of WWTS and covers the entire footprint of the Cell Building Pad.
- Stockpile #2 contains approximately 15,800 yd^3 of WWTS, concrete, and piping, and covers the entire footprint of the SWDS. This stockpile has a leachate extraction system consisting of three vertical de-watering pipes placed on the north end, the east side and the west side of the stockpile. The system was installed to remove fluid buildup from water drainage of the WWTS. Fluid buildup within this stockpile was pumped into 55-gallon drums.

Figure 14: Partially Dismantled Process Area

Stormwater/Wastewater Treatment Components

- Stormwater Collection System – The storm water collection system consists of a series of catch basins and concrete underground piping that directs surface water run-off within the UPA to the retention basins in the UNPA. The underground piping has deteriorated in many sections.
- MESS Head Area – The MESS Head area consists of a sub-grade sump, a 20,000-gallon tank and a filter press. Pre-treatment of mercury-contaminated wastewater, prior to discharge to final treatment, occurred in the MESS Head Area.
- Wastewater Treatment Plant – The wastewater treatment plant consists of a borohydride treatment system, ASTs and a treatment pool (referred to as the Econo Pool). Wastewater is treated and pumped to IP, where the treated effluent mixes with IP's wastewater for further treatment and discharge.
- IP Mill and Fire Protection Water – IP provides water to the site through underground piping. A transite pipe runs underground from the southwest corner of the site towards the east to the wastewater treatment plant. The underground piping for fire protection water is an 8-inch ductile iron pipe that generally loops the central portion of the UPA. Several fire hydrants associated with this system are present on site.
- ASTs are used for wastewater processing and storage. The AST identifier, their capacities and location are included in **Table 3.**

Table 3: Above Ground Storage Tanks

Identifier	Volume in gallons	Location
Collection Tank #1	9,000	Wastewater Treatment Area
Collection Tank #2	18,000	Wastewater Treatment Area
Collection Tank #3	20,000	Wastewater Treatment Area
Mess Head Tank	20,000	MESS Area
North Storm water	22,000	Bleach Plant Area
South Storm water	22,000	Bleach Plant Area
North Raven	20,000	Wastewater Treatment Area
South Raven	20,000	Wastewater Treatment Area
Econo Pool	250,000	Wastewater Treatment Area

5.3.2 Upland Non-Process Area

The UNPA contains two surface impoundments and two retention basins surrounded by grassed areas. The two surface impoundments, referred to as the Old North Pond and Old South Pond, are covered with soil/gravel and low-lying grass, respectively. The retention basins capture storm water in addition to wastewater. The south retention basin contains the initial effluent from the collection systems. Water from this basin is transferred to the Econo Pool for treatment. The north retention basin collects rainwater that falls into it, as well as serving as an overflow measure for the south retention basin.

Figure 15: Upland Non-Process Areas (with some UPA features also shown)