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NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT



December 30, 1999

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Ms. Jennifer Wendel
NC Site Management Section Chief
EPA Region IV Waste Division
61 Forsyth Street, SW 11th Floor
Atlanta, Georgia 30303

RE: Expanded Site Inspection Report
Carolina Power and Light Sutton Steam Electric Site
NCD 000 830 646
Wilmington, New Hanover County, North Carolina

Dear Ms. Wendel:

This letter confirms the transmittal of the attached Expanded Site Inspection (ESI) Report by the North Carolina Superfund Section for Carolina Power and Light (CP&L) Sutton Steam Electric Plant Site, NCD 000 830 646, Wilmington, New Hanover County, North Carolina.

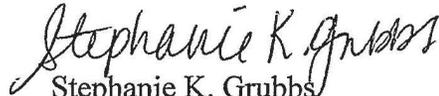
The CP&L Sutton Plant has been in operation since 1954, furnishing electricity for approximately 750,000 homes by using a coal-fired generating process. The waste stream of concern within this process is the fly ash that is produced from the burning of the coal. This fly ash is pumped to an active fly ash pond on the CP&L property. Prior to the use of the active lined pond, the inactive 68-acre pond and an area adjacent to the plant (the old dumping area) were both used for disposal. The size and quantity of fly ash within the old dumping area are unknown. During their respective operations, both the inactive and active fly ash ponds overflow into Lake Sutton that is adjacent to the plant and supplies water for the combustion and cooling processes. Lake Sutton is approximately 1,100 acres and frequently discharges into the Cape Fear River in accordance with a NPDES permit. There have been no Notices of Violation (NOVs) of this permit with the Department of Environment and Natural Resource, and therefore, no observed release has occurred within the Cape Fear River.

Ms. Wendel
December 30, 1999
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Within a 1-mile radius of the site, numerous drinking water wells, including a community well, have been impacted with site contaminants. Inorganic compounds have been detected within several wells. The monitoring wells on and around the CP&L property have also been impacted.

Therefore, because of the number of drinking water wells that are contaminated and the potential for further release of contaminants to groundwater, the Carolina Power and Light Sutton Steam Plant should be considered for further federal action under CERCLA. If you have any questions, please contact me at (919) 733-2801 ext. 315.

Sincerely,



Stephanie K. Grubbs
Hydrogeologist
Special Remediation Branch
NC Superfund Section

enclosure

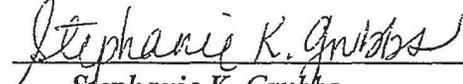
Expanded Site Inspection

*Carolina Power & Light
Sutton Steam Electric Plant
NCD 000 830 646
Wilmington, New Hanover County, North Carolina
Reference No. 0402580*

December 1999

*Superfund Section
Division of Waste Management
North Carolina Department of Environment
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Prepared by:


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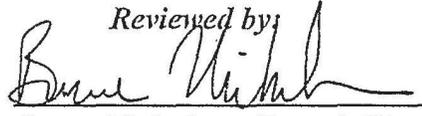

Bruce Nicholson, Branch Head
Bruce Nicholson, Branch Head
Special Remediation Branch

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Executive Summary

The Carolina Power and Light (CP&L) Sutton Steam Electric Plant is located in Wilmington, New Hanover County, North Carolina. The CP&L Sutton Plant has been in operation since 1954. The plant furnishes electricity for approximately 750,000 homes by using a coal-fired generating process. A maximum of approximately 90,000 tons of coal are stored on site and 5,000 tons of coal are burned a day to produce an estimated 700 megawatts of power. The coal is initially crushed and blown to the boiler units for combustion. The combustion process produces heat which is used to convert water to steam. This steam is used to turn the turbines, which run the generators that produce electricity. The waste stream of concern within this process is the fly ash that is produced from the burning of the coal. This fly ash is pumped to an active fly ash pond on the CP&L property. This active fly ash pond is approximately 74 acres and has been active since 1985. Prior to 1985, the inactive pond, 68 acres in size, was in use since the late 1950s. Prior to the 1950s, an area adjacent to the plant was used for disposing the fly ash. The size and quantity of fly ash within the old dumping area are unknown. Both the inactive pond and the old dumping area are unlined. During their respective operations, both the inactive and active fly ash ponds overflow into Lake Sutton that is adjacent to the plant and supplies water for the combustion and cooling processes. The lake is also stocked and is a fishery open to the public. Lake Sutton is approximately 1,100 acres and frequently discharges into the Cape Fear River in accordance with a NPDES permit. The brackish Cape Fear River is a fishery and is used for recreational and commercial fishing. The immediate vicinity of Cape Fear River is surrounded by wetlands, as is the majority of the 15-mile surface water pathway. Although the surface water pathway has many environmental targets, no observed release was documented within the surface water or sediments of the Cape Fear River during the 1999 ESI.

Within a 1-mile radius of the site, there are several drinking water wells. The New Hanover community well system, which consists of two wells is located approximately 0.25 mile from the Sutton Plant. Approximately 42 to 45 homes and 20 businesses use the well water from these wells. Several other business within the 1-mile radius of the Sutton Plant use groundwater for drinking. The Maola Dairy distribution center adjacent to the community wells uses groundwater for plant activities and for housekeeping activities, but the employees stated that they do not drink the water. Another business directly behind the fly ash lagoons, Ezzell Trucking Company, uses groundwater for drinking and plant operations. The owners of the company also rents a trailer that is located behind the office. Apparently, only one person rents and resides in the trailer owned by Mr. Ezzell and approximately 15 workers are employed at Ezzell Trucking. An observed release to groundwater has been documented within the community wells, the Maola well, the Ezzel well and the monitoring wells on site. The samples collected during the ESI indicated releases of several inorganics. No organics were detected within the groundwater samples. Beryllium at 0.62J ug/l, vanadium at 1.5J ug/l, and iron at 270 ug/l were detected within the New Hanover Community well. Approximately 300 people use this well for drinking water. The Ezzell Trucking Co. drinking water well contained iron (410 ug/l), selenium (5.8 ug/l), and thallium (4.2J ug/l) at concentrations greater than three times background. Only iron in was above the NC 2L Groundwater Standards. Fifteen workers at

Ezzell Trucking Co. and one resident use the Ezzell well for drinking water. The Maola drinking water well contained copper, but the levels were below the NC 2L Groundwater Standards. The workers at the Maola plant do not use the water for drinking, only housekeeping activities. Several monitoring wells contained inorganic compounds, arsenic, iron, lead, chromium, thallium, and beryllium, were detected three times above background.

For purposes of site prioritization relative to other sites, the groundwater pathway appears to be of great enough concern to consider further effort under CERCLA. The site priority is in large part due to the fact that the groundwater is the source of drinking water for the New Hanover County community wells, businesses and homes within the immediate vicinity of the CP&L property. Because of the number of people drinking from wells that contain site-related contaminants (albeit at low levels), the Carolina Power and Light Sutton Steam Electric Plant site must be considered for further federal action under CERCLA. It is important to note however that groundwater standards have not been exceeded in any sample except for iron in the Ezzell well. The Superfund Section may or may not recommend that the affected wells be closed pending health evaluations of these wells by the NC Occupational and Environmental Epidemiology Section.

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), and a cooperative agreement with the United States Environmental Protection Agency (US EPA), Waste Management Division, Region IV, the North Carolina Superfund Section conducted an Expanded Site Inspection (ESI) at the Carolina Power and Light (CP&L), Sutton Steam Electric Plant in Wilmington, New Hanover County, North Carolina. The purpose of the ESI was to obtain the data necessary to assess the threat posed by the site to human health and the environment and to complete a Hazard Ranking System (HRS) score for the site to determine the need for further action under CERCLA/SARA or other authority. This investigation included reviewing existing files and sample data, conducting surface and subsurface soil sampling, surface water and sediment sampling from the surface water pathway, groundwater sampling, and potential source sampling under EPA Contract Laboratory Program (CLP) protocol, and collecting additional data needed to document HRS factors.

2.0 SITE DESCRIPTION

2.1 Location

The CP&L Sutton Steam Electric Plant site (site), NCD 000 830 646, is located approximately 4 miles northwest of the City of Wilmington, along the east bank of the Cape Fear River, approximately 3,000 feet downstream of the confluence with Indian Creek. The site coordinates are 34° 17'39" north latitude and 77° 59'12" west longitude (Reference 3, Figure 1). The property is owned by CP&L and the immediate vicinity of the site is rural, but within the 4-mile target radius along Highway 421 the area is mainly industrial. The 1,200-acre tract of land is located on State Road 1394 and is bordered by the Cape Fear River (Figure 2, Reference 4).

2.2 Site Description and Regulatory History

The CP&L Sutton Plant has been in operation since 1954 (Reference 5). The plant furnishes electricity for approximately 750,000 homes by using a coal-fired generating process (Reference 5). A maximum of approximately 90,000 tons of coal are stored on site and 5,000 tons of coal are burned a day to produce an estimated 700 megawatts of power (Reference 5). Fly ash is a by-product of coal incineration and historically has been disposed of into lined and unlined diked ponds located on site. The active fly ash pond is approximately 74 acres and has been active since 1985 (Reference 6). Prior to 1985, the inactive pond, 68 acres in size, was in use since the late 1950s (Reference 6). Prior to the 1950s, an area adjacent to the plant was used for disposing the fly ash (Reference 6). The size and quantity of fly ash within the old dumping area are unknown. Both the inactive pond and the old dumping area are unlined (Reference 6). In 1972, a large cooling lake, Lake Sutton, was constructed to provide cooling water for the coal generation facility (Reference 6). The water for the lake is supplied by the Cape Fear River (Reference 6). The lake is diked with stone and soil barriers, which was designed to maximize the path length and residence time in the lake and to maximize the cooling efficiency. A concrete canal system connects the ends of the cooling lake to the coal generation plant. During their respective operations, both the inactive and active fly ash ponds overflow into Lake Sutton that is adjacent to the plant and supplies water for the combustion and cooling processes (Reference 6).

Since the 1970s, CP&L had been discharging into the Cape Fear River and Lake Sutton under a National Pollutant Discharge Elimination System (NPDES) permits (Reference 7). The permits regulate and require frequent monitoring for flow, temperature, total residual chlorine,

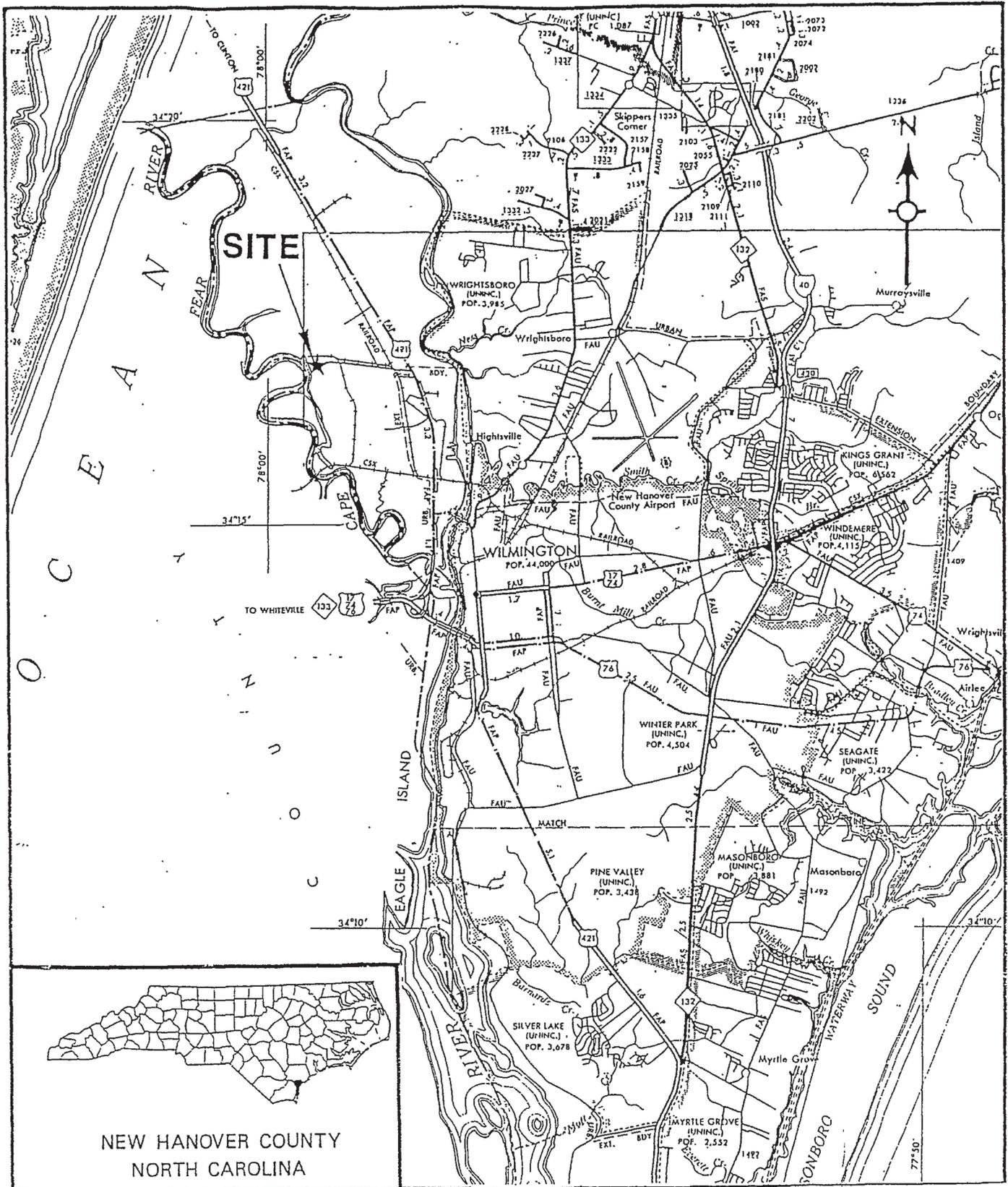


Figure No: 2	Title: Map of the Carolina Power & Light Property and the Surrounding Area		
North Carolina Division of Waste Management	Date: December 1999	Drawn By: S.Grubbs	
	Superfund Section	Site Name: CP&L Sutton Steam Electric	NCD 000 830 646

total copper, total selenium, total arsenic, total iron, total nitrogen, total phosphorus, acute toxicity, and pH in both the lake and the river (Reference 7).

During the 1992 Site Screening Phase II Report, the drum storage area at the plant was under investigation (Reference 8). This area contained ten 55-gallon drums that reportedly contained various petroleum lubricating oils and degreasing products (Reference 8). The drums were stored in concrete containment basin and no spills were observed around the drums (Reference 8). During the 1999 ESI, no spills or evidence of spills were observed in the drum storage location (Reference 6). The area was not of concern during this investigation. In addition to the drum storage area, two 11-million gallon above-ground storage tanks (ASTs) are located in the southern portion of the property adjacent to the plant and coal piles (Reference 6). CP&L currently leases these tanks to International Paper for storing various papermaking liquors. The ASTs stores various paper liquors, a liquid used in the paper industry, that CP&L leases out the space to International Paper (Reference 6). Both ASTs are surrounded by a dike to contain any spills (Reference 6). A pipe system extends from the ASTs to a pier, located along the Cape Fear River, which is used to transfer the liquor products from barges (Reference 6).

There is some history of groundwater contamination associated with the ponds. There are 12 well locations, each location has 2 permanent 2-inch PVC monitoring wells located on site (Figure 3, Reference 6). In 1984 The Division of Water Quality in Wilmington required these wells due to exceedances the NC Groundwater 2L Standards (Reference 9). In September 1987, CP&L received Notice of Non-Compliance due to exceedances of "the total dissolved solids limit and exceedances of the chloride concentration standard in monitoring wells at the plant (References 37). Corporate neighbor, KoSa (formerly Cape Industries) has sued CP&L over groundwater contamination issues (Reference 10). The Sutton plant has two on-site wells that supply water for plant operations but are not used for drinking. The closest drinking water wells are three New Hanover County wells and the establishments along Fredrickson Road, approximately 1/4 mile away from the site (Reference 4, Figure 1).

2.3 Operational History and Waste Characteristics

The CP&L Sutton Plant has been in operation since 1954 (Reference 5). The plant furnishes electricity for approximately 750,000 homes by using a coal-fired generating process (Reference 5). Coal is delivered to the plant by rail car and is stored on site. The coal is initially crushed and blown to the boiler units for combustion (Reference 5). The combustion process produces heat which is used to convert water to steam. This steam is used to turn the turbines which run the generators that produce electricity (Reference 5). The waste stream of concern within this process is the fly ash that is produced from the burning of the coal. Once the coal is burned most of the ash settles within the bottom of the furnace area, high pressure water is used to push the water from the furnace to the pipes that pump the water and the ash to the active fly ash pond on the property (Reference 6). The coal particles and ash that are airborne within the furnace flow out through ducts to be captured by the electrostatic precipitator (ESP) (Reference 5). The positively charged coal particles and ash are attracted to the negatively charged plates within the ESP. Once particles have accumulated, the ash is knocked off the plates and pumped away using high pressure water. This fly ash is also pumped to the active fly ash pond (Reference 6). The active pond wastewater then discharges directly to the Cape Fear River via a pipe and is then diluted by opening up the lake discharge pipe and flushing both the active pond wastewater and the lake water into the river simultaneously (Reference 6). This process had recently changed since the sampling event in July 1999. Previously, the active fly ash pond discharged into Sutton lake, which diluted the waste (Reference 6). The lake currents circulated the waste and water to the outfall and eventually discharged into the Cape Fear River. This

process was credited with causing the fish within the lake to have elevated tissue levels of selenium potentially affecting their reproduction (Reference 11). Therefore, to reduce selenium levels in the lake, the NC Division of Water Quality (DWQ) re-issued the NPDES permit to directly discharge the ash pond waste into the river (Reference 12). Both the lake and the river are fisheries and are monitored the NC Division of Marine Fisheries (Reference 12).

3.0 WASTE/SOURCE SAMPLING

3.1 Sample Locations

The Sutton Plant burns approximately 5,000 tons of coal a day to generate electricity (Reference 5). The main contaminant of concern is the fly and bottom ash that was disposed of into unlined lagoons on the CP&L property. Both the inactive pond and the former disposal area are unlined. Ashes differ in characteristics depending upon the chemical composition of the coal being burned, the extent to which the coal is prepared before it is burned, and the operating conditions of the boiler (Reference 13). But generally, more than 95 percent of ash is made up of silicon, aluminum, iron, and calcium in their oxide forms, with magnesium, potassium, sodium, and titanium representing the remaining major constituents (Reference 13). Potential trace constituents include antimony, arsenic, barium, cadmium, chromium, lead, mercury, selenium, strontium, zinc, and other metals (Reference 13). The plants inactive fly ash pond contains approximately 500,000 cubic yards of ash and a surface area of 68 acres at an elevation of 15.5 feet (Ref. 8). The old disposal area has an unknown quantity and size. The current active pond has a one foot thick clay liner that was constructed in 1985 (Reference 14). This pond can hold approximately 2,158,000 cubic yards and is 74 acres. The active fly ash pond is lined and is regulated under the NPDES permit issued by the DWQ and is, therefore, not under consideration during this investigation(Reference 14).

Source sampling of the inactive fly ash pond and the old dump area were completed during the investigation. Surface soil and subsurface soil samples were collected at each location. Three locations were sampled within each of the two source areas. Background soil samples, surface and subsurface, were collected near the entrance to the CP&L property.

3.2 Analytical Results

Analytical results from the surface and sub-surface soil samples collected by the NC Superfund Section during the ESI in July 1999, indicate the presence of the following contaminants (with their maximum concentrations in parenthesis): antimony (2.3J mg/kg), arsenic (92J mg/kg), barium (540J mg/kg), beryllium (6.3J mg/kg), cadmium (1.2J mg/kg), chromium (64J mg/kg), cobalt (18 mg/kg), copper (180J mg/kg), iron (16,000J mg/kg), lead (51J mg/kg), magnesium (1,400J mg/kg), manganese (85J mg/kg), nickel (93J mg/kg), potassium (3,200J mg/kg), selenium (95J mg/kg), silver (1.0J mg/kg), thallium (1.3J mg/kg), vanadium (170J mg/kg), zinc (560J mg/kg), toluene (5J ug/kg), naphthalene (240J ug/kg), dibenzofuran (64J ug/kg), fluoranthene (100J ug/kg), 2-methyl naphthalene (390J ug/kg), pyrene (76J ug/kg), and phenanthrene (180J ug/kg). Table 1 shows concentrations of each of the analytes present and the location for all the source samples collected by the Superfund Section in 1999. Figure 4 shows all the sample locations taken during the same sampling event in 1999.

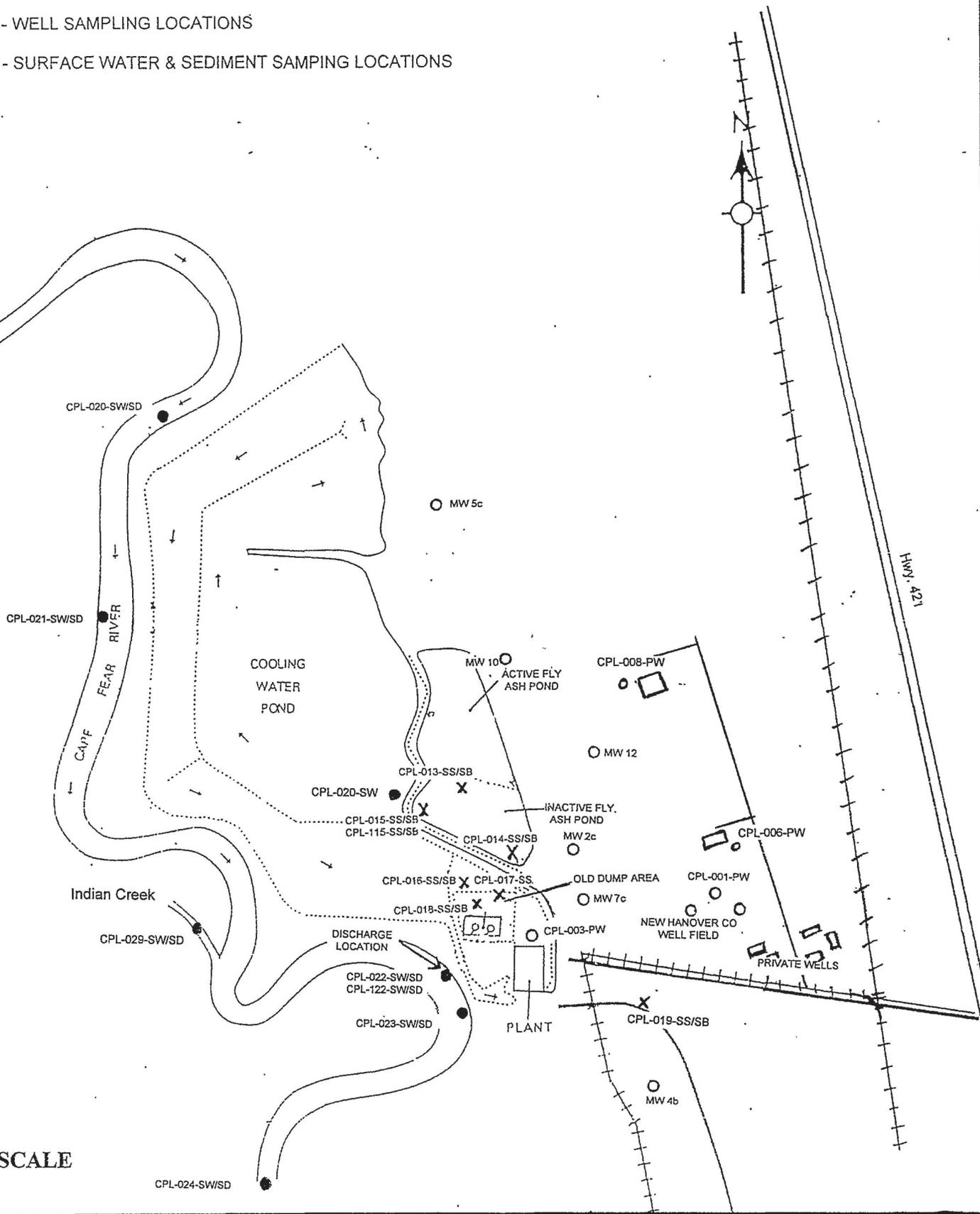
3.3 Conclusions

As shown above, the majority of the data analyzed from the laboratory was estimated values or "J"d" data (Appendix). Upon review the data were found to be usable where

X - SOIL SAMPLING LOCATIONS (SURFACE & SUBSURFACE)

O - WELL SAMPLING LOCATIONS

● - SURFACE WATER & SEDIMENT SAMPLING LOCATIONS



NOT TO SCALE

Figure No: 4	Title: Sampling Location Map from the 1999 ESI Sampling Event		
North Carolina Division of Waste Management Superfund Section	Date: December 1999		Drawn By: S.Grubbs
	Site Name: CP&L Sutton Steam Electric		NCD 000 830 646

**Table 1. Summary of the Surface and Subsurface Soil Sample Data
from July 1999 ESI Sampling Event.**

Sample Description	CPL-013-SS	CPL-013-SB	CPL-014-SS	CPL-014-SB	CPL-015-SS	CPL-015-SB	CPL-115-SS	CPL-115-SB	CPL-016-SS	CPL-016-SB	CPL-017-SS	CPL-018-SS	CPL-018-SB	CPL-019-SS	CPL-019-SB
	Inactive fly ash pond	Duplicate-Inactive fly ash pond	Duplicate-Inactive fly ash pond	Old fly ash dumping area	Background	Background									
Contaminant															
Antimony (mg/kg)	2.3J										1.0J				
Arsenic	92J	5.4J	24J		9.7J		9.8J		14J	8.2J	17J	12.00	2.60		
Barium	540J	110J	89J	7.0J	60J	6.0J	57J	7.2J	200J	140J	260J	140	30.00	1	1.20
Beryllium	6.3J	0.57J	0.85J		0.57J		0.62J		1.8J	1.1J	2.5J	1.70	0.28J		
Cadmium	1.2J			0.11J			0.15J	0.10J							
Chromium	64J	12J	16J	1.8J	5.4J	1.9J	4.9J	2.2J	8.3J	4.4J	9.7J	7.60	2.0J	0.69J	1.1J
Cobalt	18.00	2.2J	2.5J		2.6J	0.54J	2.60	0.60J	4.8J	2.8J	7.0J	4.7J	0.84J		
Copper	180J	12J	26J	4.0J	37J	2.3J	40J	2.7J	18J	10J	23J	15.00	3.4J	1.1J	1.2J
Iron	16000J	3800J	2400J	460J	910J	830J	870J	1100J	5600J	3800J	4900J	4,500	1,600	60	440
Lead	51J	2.3J	5.2J	0.83J	2.5J	1.3J	2.1J	1.8J	6.5J	4.3J	9.4J	6.60	2	1	1.10
Magnesium	1400J	310J	320J		87J	180J	82J	290J	390J	260J	420J	620.00	290	15.00	21
Manganese	85J	16J	14J	1.8J	7.0J	8.8J	6.8J	13J	46J	32J	56J	28	10.00	1.4J	1.6J
Mercury															
Nickel	93J	5.9J	6.3J	0.98J	7.1J	1.6J	7.7J	2.2J	10J	5.3J	14J	9.4J	2.3J		
Potassium	3200J	940J	950J	69J	230J	110J	200J	130J	950J	560J	960J	800.00	220.00	18	30.00
Selenium	95J	2.5J	1.3J		0.63J		0.51J		2.1J	1.3J	2.1J	1.7J			
silver	1.0J			0.31J											
Thallium												1.3J			
Vanadium	170J	14J	24J	2.8J	10J	5.6J	10J	7.4J	34J	13J	42J	23	5.5J	0.93J	1.6J
Zinc	560J	15J	15J	3.8J	14J	4.5J	14J	5.3J	12J	9.4J	14J	11	4.6J	1.4J	3.1J
Toluene (ug/kg)										4J	5J				
Naphthalene (ug/kg)	240J														
Dibenzofuran	64J														
Fluoranthene	100J														
2-methylnaphthalene	390J											50J			
Pyrene	76J														
Phenanthrene	180J														

J - Estimated value

Blank Space - Material was analyzed for but not detected.

Shaded Spaces- Indicate the compounds were significantly above background

See Appendix for the complete analytical data set.

contaminants with concentrations 10 times the background level were found (Reference 15). Elevated levels of heavy metals and organics were detected in the surface and subsurface soil samples from the inactive fly ash pond and the old fly ash dumping area. Source material remains on site and the CP&L representatives have stated that a portion of the ash may be recycled by the Department of Transportation for road construction (Reference 6). Contaminated soil left on site in the ponds may continue to release to the soil and groundwater pathways.

4.0 GROUNDWATER PATHWAY

4.1 Hydrogeology

New Hanover County is located within the Southern Coastal Plain Province. The land surface is a plain which gently slopes eastward toward the Atlantic Ocean at a rate less than 3 feet per mile (Reference 16). The water bearing zones within the area are commonly separated by clay confining layers (Reference 16).

Groundwater wells within the area are usually at a depth of 15-50 feet (References 6, 17, 18). The wells in the area obtain water from the surficial aquifer. The New Hanover County community wells are approximately 55 feet deep and the former CP&L drinking water well, now used for production only, and monitoring wells are at depths ranging between 35 and 55 feet (Reference 17, 19). In the New Hanover County area, the average annual rainfall is 50 inches per year (Reference 20). The average annual lake evaporation in the area is 42 inches per year, which yields a net precipitation of 8 inches per year (Reference 21).

4.2 Groundwater Targets

There are several drinking water wells within a 1-mile radius of the site (Reference 24, 38). The New Hanover community well system, which consists of two wells, is located approximately 0.25 miles from the Sutton Plant (Reference 38, Figure 1). According to the New Hanover County Engineering Department, approximately 42 to 45 homes and 20 businesses use the well water (Reference 19). Using the number of homes and multiplying those by 2.43 persons-per-household (the population density for New Hanover County in the 1990 US Census), an estimated number of people consuming water from the New Hanover County community wells is 105 people. The wells pump between 160,000 to 170,000 gallons per day (Reference 19). The wells serve homes and businesses 1 mile south of the wells. These residences were connected to these wells due to contaminated drinking water near the Flemington Landfill (Reference 19). The water from the two active wells is treated due to chlorine and high pH (Reference 19). Once the water is treated it is then sent to the distribution system and to the homes and businesses (Reference 19). Several other business within the 1 mile radius of the Sutton Plant use groundwater. The Maola Dairy distribution center adjacent to the community wells its own well for plant activities and for housekeeping activities, but the employees stated that they do not drink the water (Reference 17). Another business directly behind the fly ash lagoons, Ezzell Trucking Company, uses groundwater for drinking and plant operations. The owners of the company also rents a trailer that is located behind the office (Reference 17, 22). Apparently, only one person rents and resides in the trailer owned by Mr. Ezzell and approximately 15 workers are employed at Ezzell Trucking (Reference 17). The Ezzell well has a filter and this was by-passed for sampling (Reference 17, 22).

The City of Wilmington obtains its drinking water from a surface water intake located on the Cape Fear River, upstream of the paper plant (Reference 39). The intake location is near Kings Bluff, NC. The cities of Leland and Navassa both purchase their water from the

Brunswick County sanitary district, which obtains water from the same surface water intake as the City of Wilmington (Reference 39). The remainder of the houses shown on the USGS topographic map, not provided with municipal water, use private wells to supply drinking water. These remainder of the houses were counted and multiplied by 2.43 persons-per-household (the population density for New Hanover County in the 1990 US Census) (Reference 23). Table 3 shows the total population which received drinking water from private and community wells within a 4-mile radius of the site (Reference 24). No wellhead protection areas exist in North Carolina (Reference 25).

4.3 Sample Locations

A complete trip report of the ESI can be found in reference 18 of this report. The ESI groundwater samples include the New Hanover County Community well (CPL-001-PW), Maola drinking water well (CPL-006-PW), Ezzell Trucking drinking water well (CPL-008-PW), CP&L's former drinking water well (CPL-003-PW, currently used for production purposes only), and six monitoring wells on and around the CP&L property (CPL-002-MW, CPL-004-MW, CPL-005-MW, CPL-007-MW, CPL-010-MW, and CPL-012-MW) (Reference 18). All the monitoring wells are labeled on Figure 3 and Figure 4 is a map of all the sample locations for the ESI.

Table 2. Population Using Groundwater as a Source of Potable Water Within 4 Miles of the Carolina Power and Light Sutton Steam Plant Site.

Distance Ring (miles)	Population served by Private Supply Wells	Population served by Community Wells	Cumulative Population using Groundwater
0.00 - 0.25	0	0	0
0.25 - 0.50	1	0	1
0.50 - 1.00	0	300	300
1.00 - 2.00	0	0	0
2.00 - 3.00	0	4,050	4,050
3.00 - 4.00	2,076	781	2,857
TOTAL			7,208

4.4 Analytical Results

Groundwater analytical results for the samples collected during the ESI are shown in Table 3, and they indicate releases of several inorganics. No organics were detected within the groundwater samples. Beryllium at 0.62J ug/l and iron at 270 ug/l were detected within the New Hanover Community well, CPL-001-PW (Reference 41). The iron level is below NC 2L Groundwater Standards. There is no NC 2L Standard for beryllium, although the federal maximum concentration limit is 4 ug/l (Reference 2, 26). The Ezzell Trucking drinking water well contained iron (410 ug/l), selenium (5.8 ug/l), and thallium (4.2J ug/l) at concentrations three times background. Iron is the only contaminant above the NC 2L Groundwater Standards, while selenium is below the NC 2L standard of 50 ug/l. The Maola drinking water well contained

**Table 3. Summary of the Groundwater Sample Data
from July 1999 Sampling Event.**
Water Concentrations in ug/kg

Sample Description	CPL-001-PW	CPL-002-MW	CPL-003-PW	CPL-004-MW	CPL-005-MW	CPL-006-PW	CPL-007-MW	CPL-008-PW	CPL-010-MW	CPL-012-MW	NC 2L Standard
	New Hanover County Community Well	CP&L MW #2c	CP&L Supply Wells	CP&L MW #4b	CP&L MW #5c Background well	Maola's Private Drinking Water Well	CP&L MW #7c	Ezzel Trucking's Private Drinking Water Well	CP&L MW #10	CP&L MW #12	
Contaminant											
Arsenic		83.0									50
Barium	18.0	55.0	29.0	40.0	79.0	74.0	82.0	30.0	130.0	29.0	2000
Beryllium	0.62J								0.41J		
Chromium											50
Cobalt					13J			4.4J	12J	6.6J	
Copper			11J			10J		3.9J			1000
Iron	270.0	2300.0		75.0	57.0		63.0	410.0	23J	620.0	300
Lead			42.0								15
Magnesium	440.0	5500.0	420.0	1000.0	3300.0	1600.0	6900.0	5700.0	3500.0	8200.0	
Manganese	16J	58J		49J	1900J	72J	570J	380J	340J	460J	50
Nickel											100
Selenium								5.8			50
Silver											18
Thallium		3.7J		4.8J			5J	4.2J	6J		
Vanadium	1.5J										
Zinc			7.5J	18J	8J	11J		19J	6.3J	10J	2100

K - Actual value is known to be less than value given.

Blank Space - Material was analyzed for but not detected.

Shaded Spaces- Indicate the compounds were significantly above background

copper but the levels were below the 2L NC Groundwater Standards (Reference 26). Table 3 is a summary of the groundwater results and Figure 3 and 4 shows the sampling locations for the wells. See the Appendix for the complete data set for the 1999 ESI investigation. Figure 3 contains a map of all the monitoring wells and reference 27 contains all the groundwater data from 1990 to present from these wells.

4.5 Conclusions

Groundwater within the immediate vicinity of the site is being used for drinking water. Several inorganic compounds were detected within both drinking and monitoring wells surrounding the site. The New Hanover County community well is very important with regard to human health. This well serves approximately 300 people south of the community well location and are served this water due to the fact that their private drinking water wells are contaminated. The groundwater pathway is of concern due to the number of groundwater well users within the area and the large source areas still on site.

5.0 SURFACE WATER PATHWAY

5.1 Hydrologic Setting

The site lies within the 100-year flood plain of the Cape Fear River (Reference 28). The probable point of entry (PPE) is where CP&L discharges waste via a pipe directly into the Cape Fear River. The entire 15-mile surface water pathway target distance limit (TDL) is on Cape Fear River. The estimated flow rate for the Cape Fear River is 10,581 cubic feet per second (cfs) at the CP&L property, the flow rate increases as downstream after the confluence of the Northeast Cape Fear River and the Brunswick River to 13,140 cfs (Reference 29).

5.2 Surface Water Targets

Figure 5 is a map of the 15-mile surface water pathway. The site borders the Cape Fear River and waste from the fly ash lagoons is discharged directly into the river. The Cape Fear River is a major fishery, both commercially and recreationally (Reference 30). It is classified under the Classifications and Water Quality Standards Assigned to the Waters of the Cape Fear River Basin by the Division of Environmental Management as a Class C (fresh) or SC (tidal) waters (Reference 31). Waters in these classes must be protected as "aquatic life propagation and survival, fishing, wildlife, and secondary recreation and agriculture" (Reference 31). Fish monitoring by CP&L occurs within Lake Sutton and within the Cape Fear River as dictated by the NPDES permit (Reference 12).

The Cape Fear River is also lined by wetlands for a majority of the 15-mile surface water pathway. Approximately 30 miles of wetland frontage line the Cape Fear River (Reference 32). The Cape Fear is also home to several threatened and endangered plant and animal species. See Figure 1 for locations of the threatened and endangered species and Reference 33 for a list of these species.

5.3 Sample Locations

A trip report summary for the 1999 ESI can be found in References 18. Samples were collected at the PPE or at the effluent discharge location. Sample CPL-022-SW/SD and duplicate sample CPL-122-SW/SD were collected at the PPE. Samples were also collected at downstream of the PPE. Sample CPL-023-SW/SD and CPL-024-SW/SD were collected

**Table 4. Summary of the Surface Water & Sediment Sample Data
from July 1999 Sampling Event.**

Water Concentrations in ug/kg and Sediment Concentrations in mg/kg

Sample Description	CPL-020-SW	CPL-020-SD	CPL-021-SW	CPL-021-SD	CPL-022-SW	CPL-022-SD	CPL-122-SW	CPL-122-SD	CPL-023-SW	CPL-023-SD	CPL-024-SW	CPL-024-SD	CPL-025-SW	CPL-029-SW	CPL-029-SD
	Farthest upstream background sample	Farthest upstream background sample	Upstream background on Cape Fear River	Upstream background on Cape Fear River	PPE Sample	PPE Sample	Duplicate of PPE Sample	Duplicate of PPE Sample	Approximately 0.1 mile downstream of PPE	Approximately 0.1 mile downstream of PPE	Downstream of PPE	Downstream of PPE	Lake Sutton sample	Attribution sample from Indian Creek	Attribution sample from Indian Creek
Contaminant															
Arsenic						6.6J		11.0							
Barium	30.0	36.0	28.0	130.0	24.0	120.0	25.0	130.0	26.0	120.0	27.0	120.0	79.0	26.0	200.0
Beryllium		0.26J		0.96J		1.6J		1.6J		0.84J		1.4J			
Chromium		7.6		28.0		49.0		48.0		22.0		38.0			41.0
Cobalt		7.6J		23J		35J		36.0		11J		32J			30.0
Copper	4.1J	4.3J	4.3J	18.0	5.0J	27.0	4.2J	28.0	4.3J	21.0	4.8J	24.0		6.4J	28.0
Iron	1,200.0	5,400.0	740.0	20,000.0	730.0	37,000.0	790.0	38,000.0	770.0	18,000.0	870.0	30,000.0	59.0	1,100.0	33,000.0
Lead		6.8		20.0		32.0		34.0		13.0		29.0			30.0
Magnesium	2,100.0	570.0	2,300.0	1,800.0	2,000.0	5,500.0		5,500.0	2,100.0	2,000.0	2,200.0	4,300.0	6,700.0	1,800.0	2,900.0
Manganese	140J	290.0	76J	530.0	62J	1,300.0	67J	1,400.0	70J	180.0	79J	1,300.0	560J	94J	990.0
Nickel		4.2J	3.3J	13J		24J		24J		9J		20J			22J
Selenium				2.3J						1.0J					
Silver						1.5J									
Thallium	4.5J							4.8J	4.4J		3.9J		3.7J		3.1J
Vanadium	7.3J	16J	5.9J	54.0	5.3J	100.0	5.7J	100.0	6.0J	64.0	6.4J	81.0		5.0J	92.0
Zinc	11J	25.0	20.0	100.0	10J	140.0	16J	140.0	13J	41.0	11J	120.0		15J	140.0

K - Actual value is known to be less than value given.

Blank Space - Material was analyzed for but not detected.

Shaded Spaces- Indicate the compounds were significantly above background

approximately 500 and 1000 feet, respectively, downstream of the PPE. An attribution sample, CPL-029-SW/SD was collected before the confluence of Indian Creek and the Cape Fear River. Upstream on Indian Creek is International Paper, a pulp and paper manufacturer. Two background samples were collected on the Cape Fear River due to the tidal influence of the river (Reference 34). Contaminants that are discharged into the river may be found upstream due to the high tidal influence of the rivers within the Cape Fear River Basin. River stage of the Cape Fear River was affected by ocean tides possibly as far as 50 to 75 miles upstream of Wilmington (Reference 34). The background samples were taken upstream of the PPE but downstream of International Paper. Figure 4 shows sample locations for the 1999 ESI sampling event.

5.4 Analytical Results

Table 4 is a summary of the surface water and sediment sample data for the 1999 ESI. Several inorganic compounds were detected within the sediments of the Cape Fear River. Although all of the contaminants found are either not three times the background (not an observed release), contaminants were also detected within the attribution samples, and/or contaminants are permissible due to the NPDES permit. A complete set of analytical data can be found in the Appendix of this report.

5.5 Conclusions

The analytical results from the surface water and sediment samples collected by the NC Superfund Section do not indicate an unregulated or unpermitted release to the surface water pathway. This pathway is not of concern in this investigation.

6.0 SOIL EXPOSURE AND AIR PATHWAY

6.1 Physical Conditions

The soil types located in the vicinity of the site are considered to be a Urban Land soils (Reference 40). The Urban Land designation is used for areas where the original soil has been extensively altered by development, thus changing or destroying the natural characteristics of the soil (Reference 40). The other soils on the site include Lakeland sand, Kureb sand, and Dorovan soils (Reference 40). The Lakeland sand and the Kureb sand are very well drained, while the Dorovan soils are poorly drained and are found in extensively flooded areas (Reference 40). The Lakeland Sand appear to be the soil type within the areas of the old fly ash pond. The Lakeland sand has very low organic matter, rapid permeability, low available water capacity, and the shrink-swell potential is low (Reference 40).

6.2 Soil and Air Targets

The areas of concern, the old and inactive fly ash ponds, are several hundreds of feet from the main plant and worker exposure is at a minimum. The site is fenced, although hunters have been known to trespass on the property during hunting season (Reference 6). The closest residence is the renter and workers at the Ezzel trucking company, approximately 0.25 mile from the CP&L property (Reference 4). No daycare facilities are located within 0.25 miles of the site. As shown in Table 6, according to Center for Geographic Information Analysis (CGIA), an estimated 11,610 people live within the four-mile target radius of the site (Reference 35).

The 7.5 USGS maps of Leland, Castle Hayne, Winnabow, and Wilmington were reviewed by NC Superfund personnel at the North Carolina Heritage Program for sensitive

environments. Numerous threatened and endangered plant and animal species are located within the 4-mile radius of the site (Figure 1 and Reference 33). Refer to Figure 1 for a complete list of the plants and animals and their locations within the 4-mile target distance radius.

6.3 Soil Sample Locations

Several surface and subsurface soil samples were collected by NC Superfund Section personnel during the 1999 ESI sampling event. Figure 4 shows the location for all the samples obtained by the NC Superfund Section. The object of these soil samples was to assess the surface and subsurface constituents of the fly ash lagoons. The samples were collected in the old fly ash dumping area and in the inactive fly ash pond. Three locations were sampled in the inactive fly ash pond, with both surface and subsurface soils collected in each location (Reference 18). Three locations were also sampled in the old fly ash dumping area (Reference 18). In two of these locations, surface and subsurface soils were collected and in the third location only a surface soil sample was collected (Reference 18). The background surface and subsurface soil samples were collected near the entrance to the CP&L property away from the ash ponds, the coal piles, and the power plant itself (Reference 18). Table 1 is a summary of the soil sampling during the ESI and a complete data set is located in the Appendix of this report.

Table 5: Population Estimate within 4-Miles of the CP&L Sutton Plant Site

Distance from the Site (miles)	Population per Ring	Cumulative Population
0.0 - 0.25 mi.	0	0
0.25 - 0.50 mi.	1	1
0.50 - 1.00 mi.	11	12
1.00 - 2.00 mi.	262	274
2.00 - 3.00 mi.	2,509	2,783
3.00 - 4.00 mi.	8,827	11,610

6.4 Analytical Results

Because the soils are the wastes in this investigation the soils data is largely discussed in Section 3 regarding waste source sampling. See Table 1 for a complete summary of the surface and subsurface soil data collected during the 1999 ESI. The Appendix contains all the analytical data for the 1999 ESI sampling event. The sources of most concern are the fly ash dumping area and the inactive fly ash pond. Analytical results indicate that surface soils from the inactive fly ash lagoon (CPL-013-SS) contain arsenic (92J mg/kg), barium (540J mg/kg), beryllium (6.3J mg/kg), cadmium (1.2J mg/kg), chromium (64J mg/kg), cobalt (18 mg/kg), iron (16,000J mg/kg), lead (51J mg/kg), magnesium (1,400J mg/kg), manganese (85J mg/kg), nickel (93J mg/kg), potassium (3,200J mg/kg), selenium (95J mg/kg), silver (1.0J mg/kg), vanadium (170J mg/kg), zinc (560J mg/kg), naphthalene (240J ug/kg), dibenzofuran (64J ug/kg), fluoranthene (100J ug/kg), 2-methyl naphthalene (390J ug/kg), pyrene (76J ug/kg), phenanthrene (180J ug/kg).

Subsurface soils (CPL-013-SB) from the inactive fly ash pond contain barium (110J mg/kg), beryllium (0.57J mg/kg), chromium (12J mg/kg), cobalt (2.2J mg/kg), copper (12J

mg/kg), magnesium (310J mg/kg), manganese (16J mg/kg), nickel (5.9J mg/kg), potassium (940J mg/kg), selenium (2.5J mg/kg), vanadium (14J mg/kg), and zinc (15J mg/kg).

Surface samples from the old fly ash dumping area contain (maximum values) of arsenic (17J mg/kg), barium (260J mg/kg), beryllium (2.5J mg/kg), chromium (9.7J mg/kg), cobalt (7.0J mg/kg), copper (23J mg/kg), iron (4900J mg/kg), lead (9.4J mg/kg), manganese (56J mg/kg), nickel (14J mg/kg), vanadium (42J mg/kg), zinc (14J mg/kg), toluene (5J ug/kg), and 2-methyl naphthalene (50J ug/kg).

The subsurface soil samples collected from the old dumping area contain (maximum values) of arsenic (8.2J mg/kg), barium (140J mg/kg), beryllium (1.1J mg/kg), chromium (4.4J mg/kg), cobalt (2.8J mg/kg), copper (10J mg/kg), iron (3,800J mg/kg), lead (4.3J mg/kg), magnesium (290 mg/kg), manganese (32J mg/kg), nickel (5.3J mg/kg), potassium (560J mg/kg), selenium (1.3J mg/kg), vanadium (13J mg/kg), zinc (9.4J mg/kg), toluene (4J ug/kg). As stated in Section 3.3, all data deemed valid was at least 10 times the background concentration.

From the surface soil sample results, levels of arsenic, beryllium, selenium, thallium, dibenzofuran, and 2-methyl naphthalene from the inactive fly ash pond are above the Soil Remediation Goals of NCDENR, Inactive Hazardous Sites Program, Guidelines for Assessment and Cleanup pursuant to N.C.G.S. 130A-310 (Reference 36).

6.5 Soil Exposure Pathway Conclusions

The analytical results indicates that an observed release of arsenic, barium, beryllium, cadmium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, vanadium, zinc, naphthalene, dibenzofuran, fluoranthene, 2-methyl naphthalene, pyrene, and phenanthrene in the surface soil samples on site. Although, site access is limited due to fencing of the property and "No Trespassing" signs posted, hunters and other trespassers have been able to access the property illegally (Reference 6).

7.0 SUMMARY AND CONCLUSIONS

For purposes of site prioritization relative to other sites, the groundwater pathway appears to be of great enough concern to consider further effort under CERCLA. The site priority is in large part due to the fact that the groundwater is the source of drinking water for the New Hanover County community wells, businesses and homes within the immediate vicinity of the CP&L property. Because of the number of people drinking from wells that contain site-related contaminants (albeit at low levels), the Carolina Power and Light Sutton Steam Electric Plant site must be considered for further federal action under CERCLA. It is important to note however that groundwater standards have not been exceeded in any sample except for iron in the Ezzell well. The Superfund Section may or may not recommend that the affected wells be closed pending health evaluations of these wells by the NC Occupational and Environmental Epidemiology Section.

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PHOTOGRAPH LOG
Carolina Power & Light Sutton Steam Electric Plant Site
Wilmington, New Hanover County, North Carolina

1. Photo of the drum storage area that was in question during the Screening Site Inspection in 1991.
2. Photo overlooking Lake Sutton from the CP&L tower. International Paper plant can be seen in the background of the photo along the Cape Fear River.
3. Photo of the two above ground storage tanks that are leased to International Paper to store black liquor.
4. Photo of the large fuel oil tanks owned and used by CP&L.
5. Photo of the Cape Fear River at the location of the intake for Lake Sutton.
- 6 & 7. Photo of sample location CPL-013-SS/SB at the tip of the inactive fly ash pond.
8. Photo of sample location CPL-015-SS/SB and the duplicate sample CPL-115-SS/SB within the inactive fly ash pond.
9. Photo of the sample location CPL-014-SS/SB within the inactive fly ash pond.
10. Photo of the New Hanover County Community well system off Frederickson Road. Sample CPL-001-PW was collected from these wells.
11. Photo of the CP&L Supply wells within the immediate vicinity of the plant.
12. Photo of Lake Sutton at the former discharge location for the inactive fly ash pond. Sample CPL-025-SW was collected at this location.
13. Photo of the sample location CPL-016-SS/SB in the old fly ash dumping area.
14. Photo of sample location CPL-016-SS/SB showing the high ash content of the sample within the old dumping area.
15. Photo of the background location CPL-019-SS/SB. Sample collected at the entrance of the CP&L property.
16. Photo of the discharge location for CP&L Lake Sutton, also the PPE for the 15-mile surface water pathway and sample location CPL-022-SW/SD and CPL-122-SW/SD.



Former lagoon located between parking lot and small building in background. View SE. 11-28-89.



Sample location 1. 8' well point installed in center of former lagoon area. View SE. 11-28-89.



Sample location 2. Background soil sample along fence south of lagoon. View E. 11-28-89.



















LEGEND

- CPBL WELLS
- ▲ CAPE INDUSTRIES WELLS
- NEW HANOVER COUNTY WELLS
- Proposed New CPBL Monitoring Wells

0 1000 2000

GRAPHIC SCALE 1"=1000'

NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR

CASTLE HARBOR, NC

