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Site ID (Document ID):	NCD003167780
Document Name (DocType):	Preliminary Assessment/Site Inspection (PA/SI)
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NCDENR

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF WASTE MANAGEMENT

JAMES B. HUNT JR.
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SECRETARY

WILLIAM L. MEYER
DIRECTOR

May 31, 2000

Ms. Jennifer Wendel, RPM
US EPA Region IV Waste Division
Atlanta Federal Building
61 Forsyth St., 11th Floor
Atlanta, GA 30303-3104

Subject: Site Re-Assessment Report (SRR)
Sprague Aluminum (aka Sprague Electric Co.)
NCD 003 167 780
Lansing, Ashe Co., NC

Dear Ms. Wendel:

As part of this Site Re-Assessment Report, the April 19, 1990 FIT Report, the September 6, 1991 Site Inspection (SI) Report (Ref. 7), and the October 21, 1992 Site Inspection Prioritization (SIP) Report (Ref. 6) were reviewed. All of these reports recommended further action under CERCLA. These reports referred to the site as Sprague Electric Co., but CERCLIS now lists the site as "Sprague Aluminum". The site is located in Ashe County, in the mountainous northwestern corner of North Carolina. Site coordinates are latitude 36° 28' 48" N and longitude 81° 30' 10" W (Ref. 4).

The Sprague Aluminum site lies on a bend of the North Fork of the New River, and three sides of the facility are on the banks of this "Outstanding Resource" river. Past leachate problems with the wastewater treatment lagoons caused pH problems and high aluminum in the river (Ref. 5). The Wetland Inventory Map shows an HRS-qualified wetlands along the river downgradient from the lagoons (Figure 1). The river is a healthy fishery (Ref. 4). An onsite, 900'-deep well (Figure 2) serving 450 workers has not shown contamination (Refs. 3, 5). Shallow groundwater under the site has shown a pH as low as 3.63 and contamination with aluminum, cadmium, and chromium (Ref. 3).

The active site has been used for the manufacture of aluminum-based capacitors since 1954 (Refs. 6, 7). The facility was operated under the name of Sprague Electric from 1954 until around 1991. Sprague Electric's manufacturing process included acid etching of aluminum. United Chemi-con purchased the facility (but not the lagoons) sometime around 1991 and currently operates the facility (Refs. 6, 7). United Chemi-con discontinued the aluminum etching process; etched aluminum is now purchased (Ref 5). The approximately 12.5-acre parcel holding the former lagoons will be discussed below.

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United Chemi-con and the American Annuity Group, successor-in-interest to Sprague Electric, submitted a Comprehensive Site Assessment to the NC DENR Winston Salem Regional Office (WSRO) in April 1999. At least 14 monitoring wells have been installed on the United Chemi-con property (Figure 3). Sources on the United Chemi-con property include soil in the old etching area containing high levels of aluminum; soil in the tank area containing cyanide and manganese; soil in the drum storage area containing cadmium, DDE, manganese, nickel and zinc, a contaminant dike area showing chlorinated solvents and a metal debris and ash fill area. A Remediation Action has not yet been approved (Ref. 1).

United Chemi-con did not purchase or ever use part of the original Sprague Electric property -- the 12.5-acre "evaporation/wastewater treatment" lagoon property, now owned by American Annuity Group, successor-in-interest to Sprague Electric. The evaporation lagoon property borders the North Fork of the New River and is the most eastern and downstream source area on the site (Figures 2 & 3). Access to the pond property is limited by a 6'- high chain link fence (Ref. 4) . The lagoons were never operated under a permit (Ref. 3).

During the operation of the lagoons, aluminum oxide waste was placed in these settling lagoons. This aluminum oxide waste was periodically mined and resold (Refs. 6, 7). Water from the lagoons was not directly discharged into the river, but either "evaporated" or "percolated" to groundwater (Ref. 4). Because the area has an average annual precipitation of 49 inches and a mean annual lake evaporation rate of 33 inches (Refs. 6, 7), yielding a net annual precipitation of 16 inches, discharge to groundwater from the lagoons is likely to have occurred.

Under the supervision of WSRO, the lagoons were closed around 1995. WSRO did not require a formal closure plan. Approximately 2.2 million gallons of pond water were discharged through one of United Chemi-con's NPDES-permitted outfalls to the river, under a special one-time NPDES permit. Pond sediments were tested and found to contain levels of contaminants below hazardous waste levels and were left in place. The ponds were then backfilled (Refs. 2, 3, 4). Groundwater downgradient from the lagoons has not been sampled. The April 1999 Comprehensive Site Assessment did not include the lagoon property, and no additional actions or studies are planned for the lagoon property.

A review of the pond sludge data and background data, and a comparison of these levels with the Inactive Hazardous Sites Soil Remediation Goals (Ref. 2) indicates that sludge may remain that threatens groundwater and surface water. In some instances, background samples were not analyzed for contaminants detected in the pond sludge samples. Dimethylformamide (DMF), a chemical used by the facility for many years, does not appear on SCDM or the typical target compound lists for organic analyses.

Based on a review of the SI and subsequent SIP, as well as interviews with WSRO officials and a review of maps and data obtained on this site subsequent to these reports, NC Superfund Section concurs with the recommendations for further action under CERCLA. The site poses a potential threat to the food chain and the environment and is recommended for an Expanded Site Inspection (ESI).

Because the United Chemi-con property is being addressed by the current owners, the ESI should be conducted on the lagoon property in order to characterize the source, to determine if groundwater under the former lagoons is contaminated, and to determine if this source is releasing or has a potential to release contaminants to the surface water fishery and/or wetlands, either via the overland route or the groundwater-to-surface water pathway. Due to the topography of the region, background soil, surface water and sediment sample locations should be carefully chosen so that they are well upgradient of the site access road and drainage ditches as well as upgradient from the most upstream point where groundwater-to-surface water discharge could occur. The Comprehensive Site Assessment should be reviewed prior to completion of the study plan.

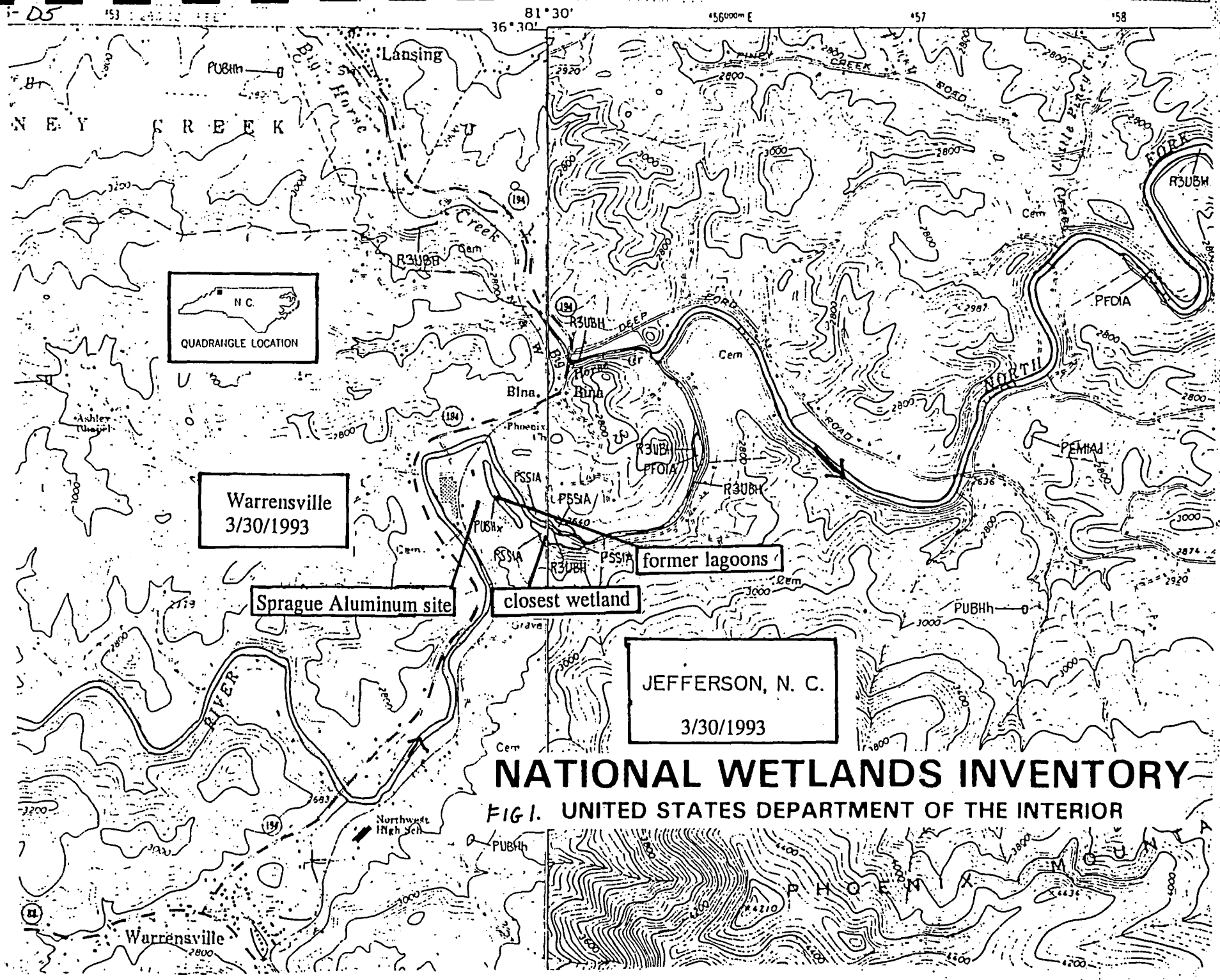
If you have any questions, please contact me at (919) 733-2801 ext. 318.

Sincerely,

Jeanette Stanley
Environmental Chemist
NC Superfund Section

Dan LaMontagne, Head
Site Evaluation & Removal Branch
NC Superfund Section

Enclosures



NATIONAL WETLANDS INVENTORY

FIG 1. UNITED STATES DEPARTMENT OF THE INTERIOR

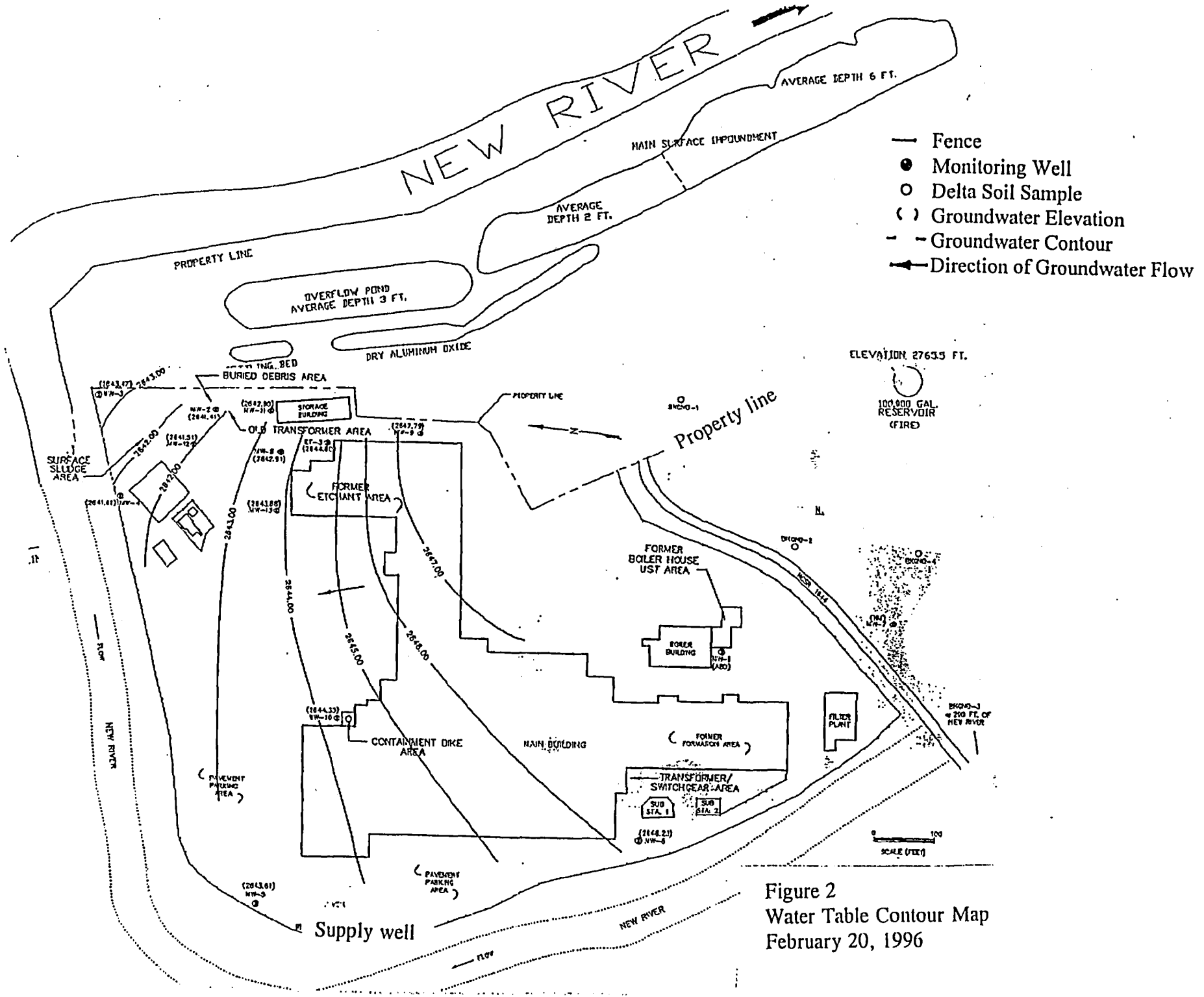
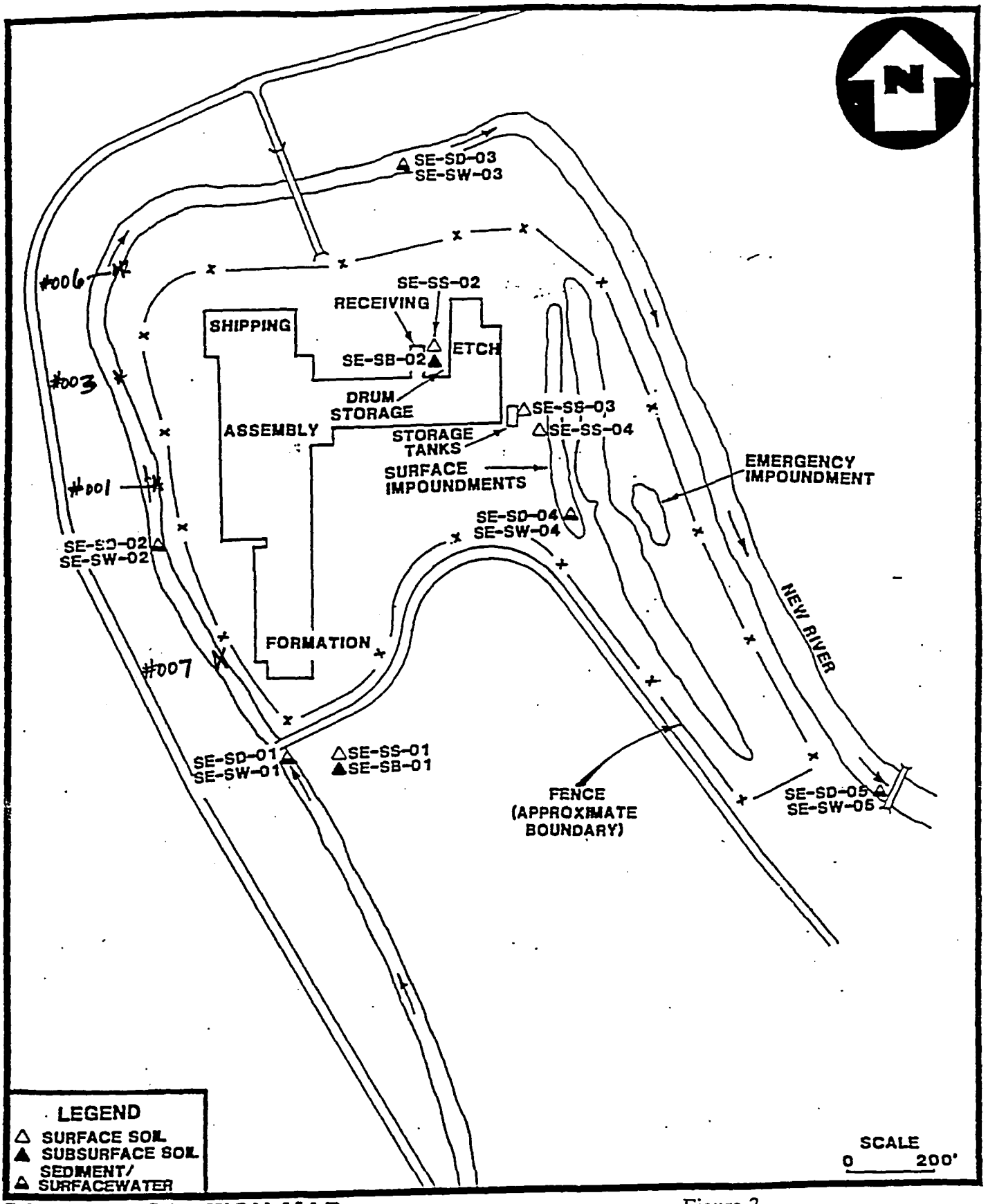


Figure 2
Water Table Contour Map
February 20, 1996



SAMPLE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

Figure 3.
Site Inspection Sample Location and NPDES Outfall Locations

NUS CORPORATION

List of References

1. Stanley, Jeanette, Environmental Chemist, NC Superfund Section, Memo, May 24, 2000.
2. Stanley, Jeanette, Environmental Chemist, NC Superfund Section, Memo, Dec. 27, 1996.
3. Stanley, Jeanette, Environmental Chemist, NC Superfund Section, Memo, Dec. 5, 1996.
4. Stanley, Jeanette, Environmental Chemist, NC Superfund Section, Memo, Dec. 27, 1995.
5. Stanley, Jeanette, Environmental Chemist, NC Superfund Section, Memo, July 7, 1995.
6. B&V Waste Science and Technology Group, Site Inspection Prioritization, Oct. 21, 1992.
7. Halliburton NUS Environmental Corporation, Site Inspection, Sept. 6, 1991.

Ref. 1

MEMO

DATE: May 24, 2000
TO: File
FROM: Jeanette Stanley
Environmental Chemist
NC Superfund Section
SITE: Sprague Aluminum (aka Sprague Electric Co.)
NCD 003 167 780
Lansing, Ashe County, NC

Today, I talked with Donald Geddes, Winston-Salem Regional Office (WSRO) (336) 771-4600. He reported that the consultant to United Chemi-con and American Annuity had submitted the Comprehensive Site Assessment (CSA) to WSRO in April 1999. Mr. Geddes reported that this is similar to a Remedial Investigation conducted under Superfund. A Remedial Action Plan has not yet been approved for the site. This CSA was conducted on the portion of the site purchased by United Chemi-con. United Chemi-con continues to operate the facility.

No additional studies have been conducted on the former lagoon property. Mr. Geddes reported that the former lagoon ownership and status has remained unchanged since the lagoons were closed.

Ref. 2

MEMO

DATE: December 27, 1996

TO: File

FROM: Jeanette Stanley, Environmental Chemist, NC Superfund Section

SITE: Sprague Aluminum Company
NCD 003 167 780
Lansing, Ashe County, NC

I have again reviewed the Sprague Aluminum Company data from previous reports. The United Chemi-con facility is in operation and is being regulated by the NC Division of Water Quality. The adjacent old pond property is still owned by the Sprague company and is the only portion of the property that would be a CERCLA concern.

The old ponds have been drained. The sludges were tested, determined to not be hazardous waste and left in place. The ponds were then backfilled. I have reviewed the data from the pond sludges to determine if there are any remaining CERCLA concerns on the drained pond property.

The attached table shows the level of metals found in the sludges and these numbers are compared to the soil remediation goals for these metals found in the March 1996 "Inactive Hazardous Sites Program Guidelines for Responsible Party Voluntary Site Remedial Action". These soil remediation goals shown in the table are required clean up levels for both scenarios -- when groundwater has been contaminated and when it has not. Since these ponds have been backfilled, there is no longer a soil exposure risk.

There is no groundwater data for the groundwater under the ponds. However, since the operating facility previously conducted the activities that resulted in the deposition of the wastes into the ponds, it is appropriate to assume that if contaminants are found in the groundwater under the ponds, they are likely to be the same contaminants found under the operating facility. Chromium, cadmium, and barium were detected in the groundwater under the operating facility. The levels of these contaminants in the pond sludge are above the Soil Remediation Goal (20 x groundwater quality standard), but none of these contaminants were found in the pond sludge at levels three times background. Background samples taken during the Site Inspection Prioritization (SIP) also show levels of chromium and barium at or above the levels of the background taken during the sludge investigation. The SIP background samples did not show any cadmium.

Other metals found in the pond sludge slightly above the soil remediation goal if groundwater contamination is found (copper, nickel, and silver) were not tested for in the background sample. Manganese was significantly higher than the soil remediation goal if groundwater contamination is found, but the background sample was also not tested for manganese. Background samples taken during the Site Inspection Prioritization (SIP) show levels of manganese, copper, and nickel at or above the levels of these metals found in the background taken for the sludge investigation. The SIP background samples were not tested for silver. None of the metals detected in the pond sludges are above Soil Remediation Goals if the groundwater is not contaminated.

Sprague Aluminum: Pond Sludge Samples and Comparison with Soil Remediation Goals

	Highest level found in six samples	Average of six samples (mg/kg)	BKG level (mg/kg)	20 x GW Quality Standard (SRG if GW is contaminated) (ppm)	SRG if no GW contamination (mg/kg)	Is average greater than 3 x BKG and greater than 20 x GW Quality Standard?	Is average above SRG if no GW contamination?
Antimony	0.82	0.37	NA	---	6.2	No	No
Arsenic	1.82	0.41	<1.3	1	4.6	No	No
Barium	87.56	31	NA	40	none	No	No
Boron	602	229	NA	---	none	No GW Quality Standard	No
Cadmium	1.34	0.29	2.2	0.1	7.8	Not 3 x BKG*	No
Chromium	33.42	10.7	80	1	15,600 (Cr III) 78 (Cr VI)	Not 3 x BKG*	No
Copper	52	29.2	NA	20	620	BKG not tested for copper*	No
Lead	4.68	1.5	7.5	0.3	400	Not 3 x BKG*	No
Manganese	82.82	35.44	NA	1	none	BKG not tested for manganese*	No
Mercury	0.07	0.02	<0.065	0.022	4.6	No	No
Nickel	34.8	7.7	NA	2	320	BKG not tested for nickel*	No
Selenium	2.36	0.8	<1.3	1	78	No	No
Silver	1.54	0.54	<2.6	0.36	78	Yes	No
Vanadium	31.2	12.7	NA	---	140	No GW Quality Standard	No
Zinc	13.5	9.16	NA	40.2	4600	No	No

NA = Not analyzed; SRG = Soil Remediation Goal; GW = Groundwater; BKG = Background

* These contaminants are above the 20 x GW Quality Standard (SRG if there is GW contamination); however, either background levels were above the level detected in the sludge or the background sample was not analyzed for the metal. None of the metals in the average of the sludge sample were above the SRG if there is not groundwater contamination.

Ref. 3

MEMO

DATE: December 5, 1996

TO: File

FROM: Jeanette Stanley
Environmental Chemist
NC Superfund Section

SITE: Sprague Aluminum Company
NCD 003 167 780
Lansing, Ashe County, NC

I have reviewed recent information on the Sprague Aluminum site. I have communicated with Donald Geddes of the Winston-Salem Regional Office (WSRO). He has provided maps and additional information. I have combined these in order to show the operating United Chemi-con facility and the old lagoons on the same map. This map and a map showing the approximate outfall locations are attached.

GROUNDWATER

The attached map shows the 14 monitoring wells on the United Chemi-con facility. There are no monitoring wells between the old lagoons and the river. There is groundwater contamination on the United Chemi-con site.

- In 1995, wells ET-3 and MW-8 (in the vicinity of the old etching area) contained aluminum at levels ranging from 6,200 ug/L to 51,000 ug/L and had a pH around 3.

- In 1993, these wells also contained levels of barium, cadmium and chromium above the NC DEM's action levels. No volatile or semivolatile compounds above groundwater standards have been detected in the groundwater. I have not reviewed all of the data to determine if all groundwater samples have been non-detect for all organic compounds.

- United Chemi-con is still in the assessment phase of the groundwater contamination. WSRO will be requiring remediation of this contaminated groundwater on the United Chemi-con site.

- There is a water supply well on the northwest corner of the property, near the New River. It serves 450 people and is 900' deep. It is tested per NC Public Water Supply requirements. No contaminants above drinking water standards have been detected.

- The WSRO has requested that United Chemi-con conduct a survey of other drinking water wells within 1/4 mile of the facility but this survey has not yet been received. WSRO will be investigating the liklihood of contamination of these wells and/or proof from United Chemi-con that these wells will not be contaminated.

SURFACE WATER

- In May 1996, the Winston-Salem Regional Office requested sampling in the New River to determine if any contaminants are discharging to the River. This sampling has not yet been conducted.

- There are four NPDES-permitted outfalls from the facility into the New River. The approximate locations are marked on the attached map. One permitted outfall has no limits for copper although monitoring for copper was required monthly for one year. Copper in the outfall was 37 ug/L in the first sample. A surface water sample (taken during the SIP in the vicinity of this outfall) was 29 ug/L.

LAGOONS

- The lagoons have not been used since 1992. They were pumped out and backfilled in within the past year. Prior to backfilling, sludges were tested and found to not be a hazardous waste. Lagoon sludges contained arsenic (0 - 1.82 ppm), mercury (0.005 - 0.07 ppm), and selenium (2.36 ppm) at levels more than three times background. Lead, cadmium, and chromium levels were all lower than the background sample. Sludges were also tested for antimony (0 - 0.82 ppm), boron (0 - 602 ppm), copper (12 - 52 ppm), nickel (1.7 - 34.8 ppm), silver (0.01 - 1.54 ppm), vanadium (4.3 - 17.7 ppm), and zinc (5.4 - 13.5 ppm), but the background sample was not tested for these inorganics. The lagoons also contain aluminum. These sludge samples did not contain volatile or semivolatile organic compounds.

- The lagoons were neither built nor operated under a NC permit. A RCRA permit was not required for their operation.

- Neither groundwater under the lagoons nor between the lagoons and the river has been tested for contamination. There are no monitoring wells in these areas. There are monitoring wells between the facility and the lagoons.

OTHER SOURCES

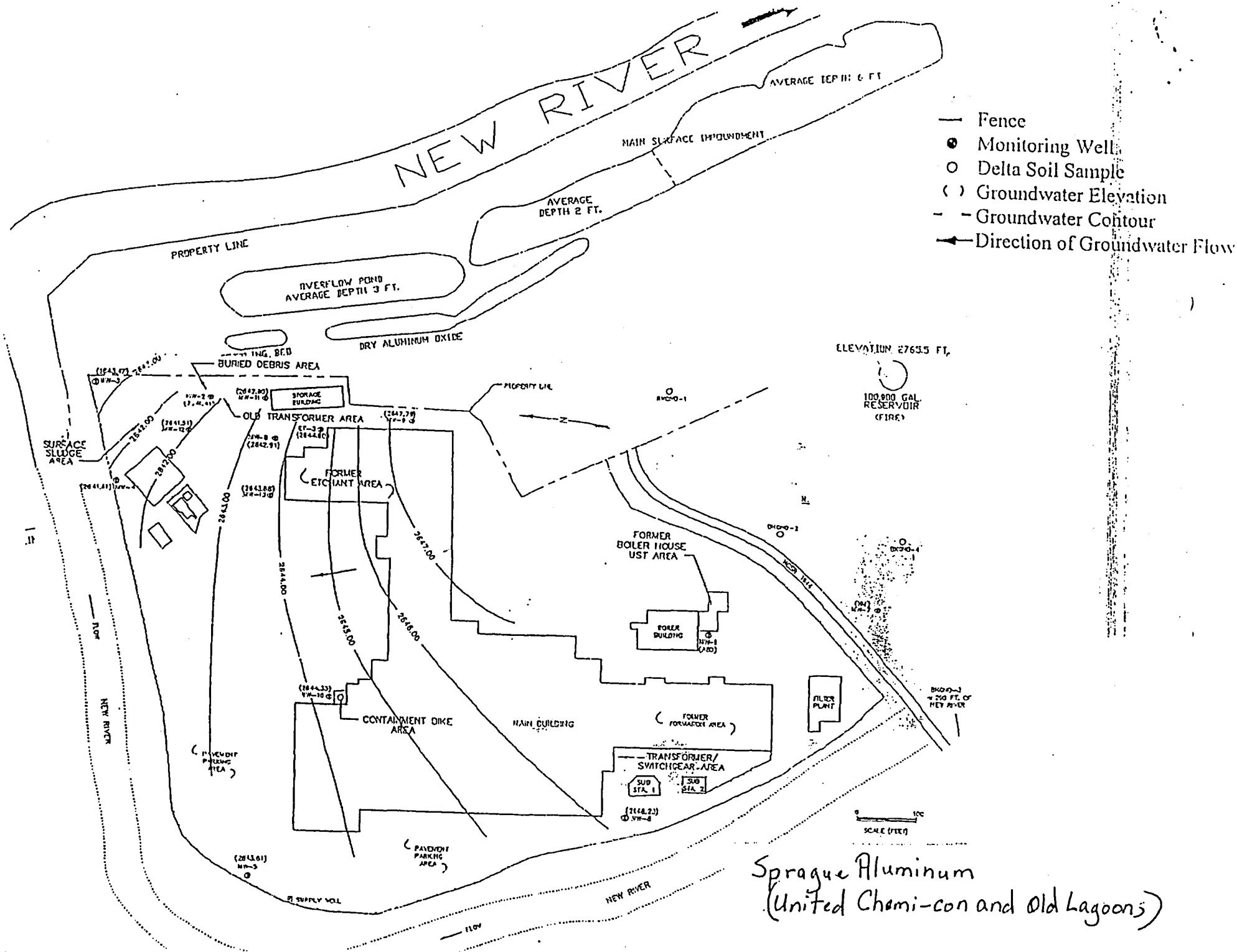
Other sources consist of contaminated soil. About 800 square feet of surface soil is in the tank area and it contains cyanaide and manganese. About 2,200 square feet of contaminated surface soil in the drum storage area contains cadmium, DDE, manganese, nickel and zinc.

VIOLATIONS

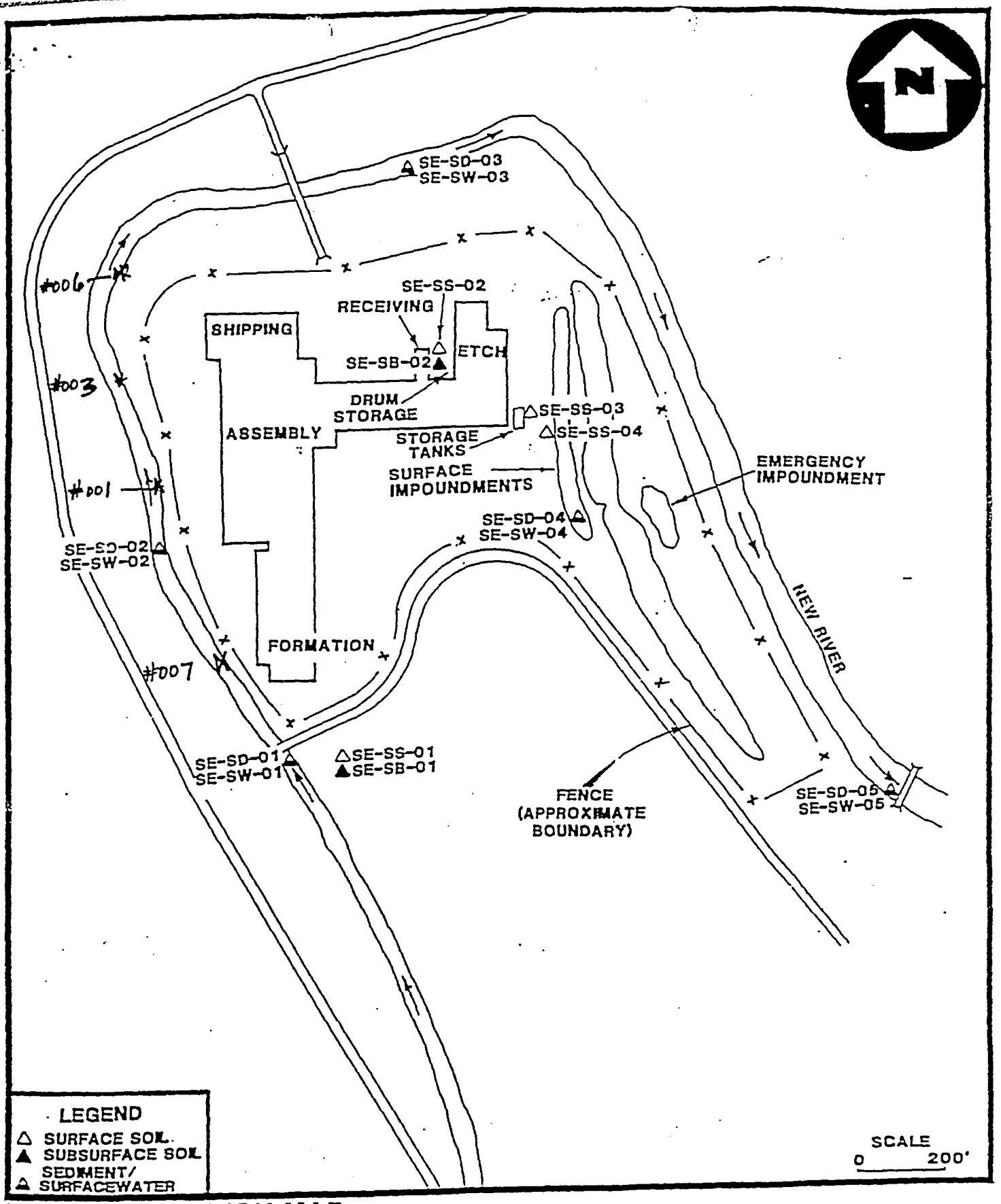
- A March 16, 1994 NOV issued by the NC DEM Water Quality Section stated that the facility was spreading residuals from the drying beds on the grounds or stored. The facility was ordered to take residuals to a landfill. Sampling of outfall #001 was in violation because the facility was doing grab samples instead of composite samples. Outfall #001 (non-contact, boiler, A/C, and assembled product rinse discharge) was required to be monitored for cadmium, chromium, copper, lead, nickel, silver, and zinc monthly for one year. Some copper (29 ug/L) and zinc (44 ug/L) were detected in one sample. Seven semivolatile and volatile organics plus seven unidentified peaks were detected in outfall #001, including 290 ug/L dimethylformamide and 6.9 ug/L tetrachloroethylene. Outfall #006 showed 16 unidentified volatile and semivolatile peaks and 1.9 ug/L 1,2-dichlorobenzene.

WSRO employees have stated that United Chemi-con is a little behind schedule but is generally cooperative and willing to clean up the site. WSRO is currently regulating the groundwater contamination and plans to order groundwater remediation. This groundwater contamination is the primary threat to human health. Even though 450 people use the onsite drinking water well, it is not contaminated.

Threats to the environment have been reduced by closing down the lagoons and backfilling these to prevent soil exposure and further migration of the contaminants to the river. While aluminum has been detected in the river, sampling conducted thus far in the river has not shown levels of highly bioaccumulative or ecotoxic contaminants that are more than three times background.



Sprague Aluminum
(United Chemi-con and Old Lagoons)



SAMPLE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 3

NUS CORPORATION

Ref. 4

MEMO

DATE: December 27, 1995

TO: File

FROM: Jeanette Stanley
Environmental Chemist
NC Superfund Section

SITE: Sprague Aluminum Company
NCD 003 167 780
Lansing, Ashe County, NC

On December 16, I spoke with George Smith, NC Division of Water Quality, Water Quality Section (910) 771-4600 about the pond property associated with the Sprague site. Since he is familiar with the property, I asked his professional opinion regarding any remaining environmental concerns about the ponds had not been addressed by draining the ponds, sampling the sediment and backfilling them. He said that he felt fairly confident about the cleanup. Mr. Smith said that the ponds did not discharge to the river, they were "evaporation" ponds and that the ponds did have an aerator at one time. He has some remaining concerns about the dimethylformamide (DMF) that was used by the facility, discharged by the facility to the river at one time and probably discharged to the ponds at an earlier date. Mr. Smith said that DMF is a toxic chemical.

I looked up the properties of DMF. It is toxic by skin absorption and is a strong irritant to skin and tissue. It is a moderate fire risk. It is miscible with water but not with chlorinated solvents. It is less dense than water. DMF is not listed in the Superfund Chemical Data Matrix. There is no groundwater or drinking water standard for DMF. Due to these properties and facts, it is my opinion that even if DMF was indeed discharged to the ponds, some was lost during aeration. Due to the properties of the chemical, it would not sink below the pond water and concentrate in the groundwater but would remain in solution.

Mr. Smith said that there is a small area on the pond property that appears to be wetlands, but he is not sure. He said he has been on the river down to a mile below the facility and he has not noted any areas that appear to be wetlands. The river banks are either cow pastures or steep slopes. He has conducted a macroinvertebrate study along the river and he said that the river is very healthy. He did not know of there ever being a fish kill along the river. He also said that the pond property is surrounded by a 6' high chain link fence. He is not sure if it is totally inaccessible, but it is overgrown and unattractive for any recreational use.

I asked him about who owns the property and if there were any funds available to pay for additional clean up if any was required. He said that the Sprague company has sold most of its assets and had paid for draining and backfilling the ponds but he did not believe there were additional funds available.

Ref. 5

MEMO

DATE: July 7, 1995

TO: File

FROM: Jeanette Stanley
Environmental Chemist
NC Superfund Section

Jeanette Stanley

SITE: Sprague ~~Electric~~ aluminum Company
NCD 003 167 780
Lansing, Ashe County, NC

I spoke with several people in the Winston-Salem regional office of NC DEM (910) 771-4600. In the Water Quality Section, I spoke with Steve Mauney, supervisor of Water Quality Section and Jim Johnston, Environmental Chemist. Mr. Johnston has worked with the regional office for about 10 years and provided the following information on the Sprague facility:

- The lagoons are no longer in use and are waiting to be closed down. Past leachate problems with the lagoons caused pH problems and high aluminum in the river. The lagoons were drained several years ago. Rainwater may have filled the lagoons again . The current status of the lagoons is not known. Mr. Johnston has not visited the property for about two years.

- There were a number of computer-generated Notices of Violations for NPDES violations served to the facility in the past. These violations were a permitting error on the part of NC DEM as limits were too low and unattainable. Violations were for Total Suspended Solids and Oil and Grease. Once permit limits were raised to attainable levels, there were no more violations.

- A Japanese firm has purchased the plant and is now operating it. They did not purchase the lagoon portion of the property. The facility quit etching operations three to five years ago. They now purchase etched material.

I spoke with Mr. Lee Spencer, Regional Engineer in the Public Water Supply Section. He said that the company name is now United Chemi-con. The contact point is Mr. Lesley D. Hovermale, 185 McNeil Rd., Lansing, NC 28643. Mr. Spencer said that the onsite well is 900' deep and is used for drinking water for the workers. The system ID # is 01-05-441. There are 450 workers using this well. All tests have been in compliance with drinking water standards. One recent test was elevated in fecal coliform, but four subsequent tests have passed. A recent application was submitted by the plant for a waiver for PCBs and pesticides and testing results allowed the facility to go to a less frequent testing schedule.

My call was then transferred to Ms. Sherri Knight, the Regional Groundwater Supervisor. I asked her if there were any on-site monitoring wells. She indicated that there were several and that there had definitely been a release of contamination to groundwater. Aluminum was very elevated in at least one monitoring well. Barium and chromium were above the 2L standards, but close to background levels. The filtered/unfiltered issue was being discussed in connection with this round of testing and she was unsure at this time if there was indeed an observed release of chromium to the groundwater. She said that there were several underground storage tanks (she thinks four) recently pulled on the site. She should have more information on the results in the near future. She said that the facility is cooperating and seems willing to clean up the site. The contact with the tank pulls has been Martha Waller with Parker, Poe, the legal counsel for the facility.

I called Mr. Paul Clark at Public Water Supply (919) 715-3217 and he FAXed the results of the most recent inorganic test results on the onsite drinking water well. These are attached.

áááááááááááááááááááááááááááááááááMacSoft VT #1ááááááááááááááááááááááááááááááááááááá

PROGRAM-W30RET01 INORGANIC CHEMICAL ANALYSIS FILE-W30HF001

PUBLIC WATER SYSTEM

Water System ID Number 0105441 LAB ID 37733 HYRDO ANALYTICAL LABORATORIES
Name of System UNITED CHEMI-CON
Type of Sample E (Regular=D; Check=C; Special-S)
Collected on: Date: 122194 Time: 0950 AM (AM/PM) Location Code: 375

CONTAM	NAME	METHOD	RESULTS	CONTAM	NAME	METHOD	RESULTS
1005	ARSENIC	000	0.0000 **	1045	SELENIUM	000	
1010	BARIUM	000	0.0000 **	1050	SILVER	000	
1015	CADMIUM	000	0.0000 **	1052	SODIUM	000	
1020	CHROMIUM	000	0.0000 **	1055	SULFATE	000	
1024	CYANIDE	000	0.0000 **	1074	ANTIMONY	000	
1025	FLUORIDE	000	0.0000 **	1075	BERYLLIUM	000	
1028	IRON	000	0.0000 **	1085	THALLIUM	000	
1030	LEAD	000	0.0000 **	1925	PH	000	
1032	MANGANESE	000	0.0000 **	0000		000	
1035	MERCURY	000	0.0000 **	0000		000	
1036	NICKEL	000	0.0000 **	0000		000	
1040	NITRATE	109	0.1300 **	0000		000	
1041	NITRITE	109 <	0.0100 **	0000		000	

Date Received 010695 Date Reported 122994 Date Analyzed 122894
Laboratory Number 021837 Reported By W30 Comment FORMATION/L.D.A.
PRESS ENTER FOR NEXT RECORD; PF13 FOR UNSAT REASON 2;
PF14 FOR UNSAT REASON3; OR PRESS PF16 TO EXIT

Jeanette Stanley, 7/7/95

There is no record of inorganic monitoring for this system. This is a non-transient non-community water. They have until the end of 1995 to conduct inorganic monitoring.

Paul

TO: J. Stanley
FAX: 733-4811
FROM: P. CLARK
FAX: 715-2207

PS: Nitrate monitoring is separate from inorganic

Ref. 6

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

RECEIVED
MAY 17 1993
SUPERFUND SECTION

4WD-WPB

MAY 13 1993

Ms. Pat DeRosa
CERCLA Branch
North Carolina Department of Environment,
Health and Natural Resources
P.O. Box 27687
Raleigh, North Carolina 27611-7687

Dear Ms. DeRosa:

Enclosed please find a copy of the Final Site Inspection Prioritization (SIP) Report for the Sprague Electric Company site in Lansing, Ashe County, North Carolina (NCD003167780). This report was prepared for EPA Region IV by Black & Veatch Waste Science and Technology Corp.

Based on a review of the report, it has been determined that the site warrants further action under federal authority. An observed release of heavy metals has been documented in the North Fork of the New River, which is classified as a fishery. Therefore, an Expanded Site Inspection (ESI) has been recommended on a low priority basis to assess the threat to the human food chain population.

If you should have any questions, please feel free to contact me at (404) 347-5065.

Sincerely yours,

Craig A. Benedikt

Craig A. Benedikt
EPA NC CERCLA Project Officer

Enclosure

Printed on Recycled Paper

DATE REPORT ACCEPTED 12/9/92
DISPOSITION ESI - Lower Priority
SAM SIGNATURE Craig A. Benedict

FINAL
SITE INSPECTION PRIORITIZATION

RECEIVED
RE MAY 17 1993
NOV 06 1992
SUPERFUND SECTION

Sprague Electric Company
Lansing, Ashe County, North Carolina

EPA ID № NCD003167780
WasteLAN № 02619

Prepared under
EPA Contract № 68-W9-0055

CERCLA

Prepared for
WASTE MANAGEMENT DIVISION
U.S. Environmental Protection Agency

Prepared by
B&V Waste Science and Technology Corp
BVWST Project № 52012.070

October 21, 1992

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Site Manager	Technical Reviewer	Project Manager

FINAL
SITE INSPECTION PRIORITIZATION
Sprague Electric Company
Lansing, Ashe County, North Carolina
NCD003167780
WasteLAN № 02619

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SITE ASSESSMENT

Final Site Inspection Prioritization

Sprague Electric Company

Lansing, Ashe County, North Carolina

NCD003167780

WasteLAN № 02619

1.0 Introduction

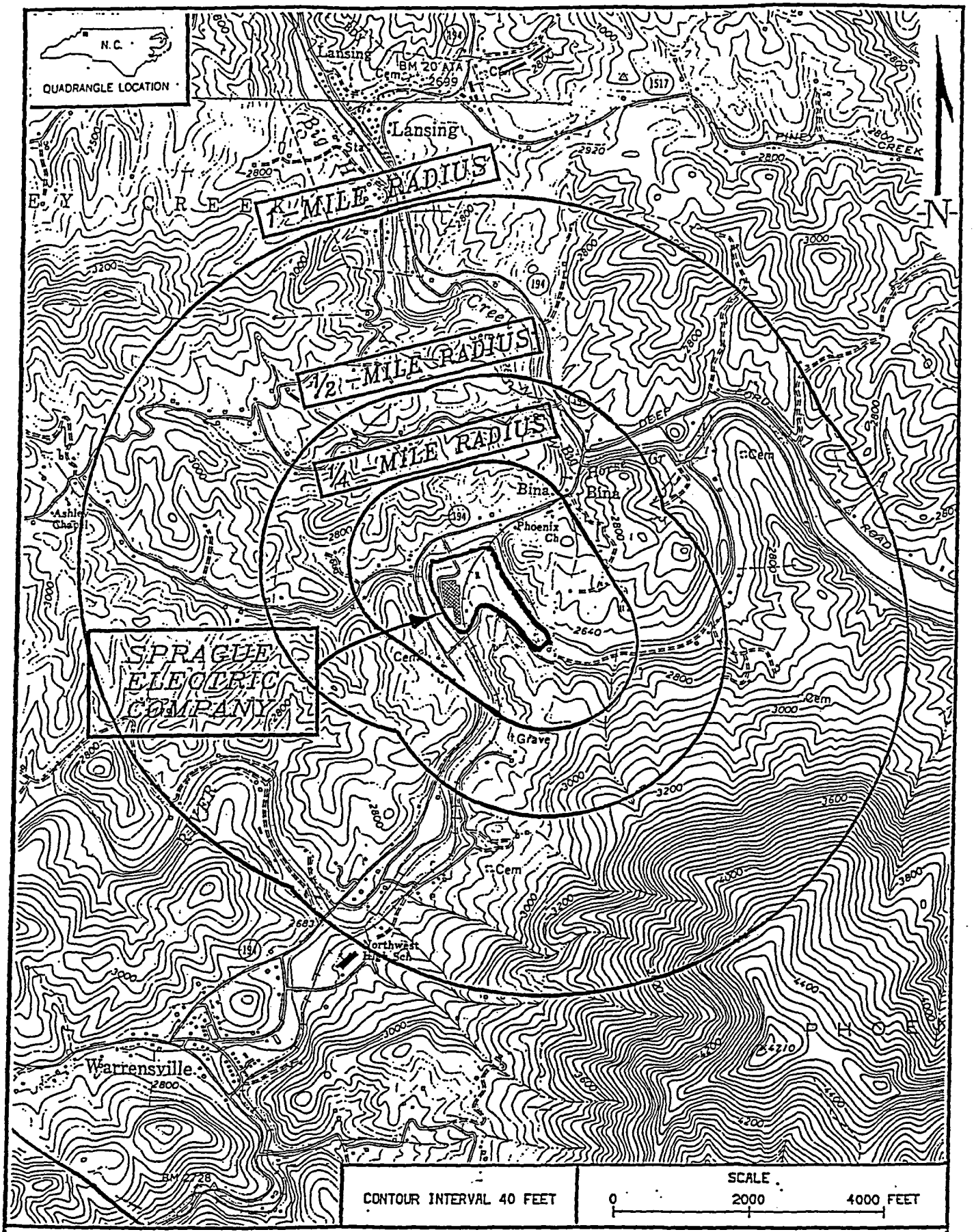
B&V Waste Science and Technology was tasked to conduct a Site Investigation Prioritization (SIP) for the Sprague Electric Company in Lansing, Ashe County, North Carolina. This study was performed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The SIP will update the Site Inspection conducted by the Halliburton NUS Environmental Corporation on September 6, 1991, which was performed prior to the implementation of the revised Hazard Ranking System. Sources of information used in this evaluation include EPA CERCLA file material, as well as documentation generated during a target survey. The SIP will quantify the threats posed by the site and provide sufficient documentation in order to decide on the appropriate future course of action.

2.0 Site Description and History

The Sprague Electric Company, located in Lansing, Ashe County, North Carolina, occupies approximately 60 acres of land located off of Highway 194 approximately 1.25 miles south of Lansing (Figure 1). The facility has been in operation since 1953 and is the only known industry that has ever occupied the site (Refs. 1, p. 3; 2, 3).

The only known operation conducted at the facility involved the manufacture of aluminum electrolytic capacitors. The manufacturing process used involves the etching of aluminum foil in an electrochemical bath. Aluminum oxides formed in the process are recovered from a wastewater treatment system. Waste dimethylformamide (DMF) was also used in the process (Refs. 2, 3). Available information



BASE MAP IS A PORTION OF THE USGS 7.5 MINUTE QUADRANGLES, WARRENSVILLE N.C. 1966 & JEFFERSON N.C. 1968.

BLUE RIDGE SCIENCE AND TECHNOLOGY CORP.

SITE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 1

indicates that wastes were handled in essentially the same manner since operations commenced (Ref. 3).

On November 17, 1980, Sprague Electric Company filed a RCRA Part A Hazardous Waste Permit Application for treatment of wastes. According to the application, the facilities operations resulted in a discharge to U.S. waters. In addition, 250,000,000 pounds of corrosive waste (D002) were treated per year at the facility (Ref. 4). According to a letter to the U.S. Environmental Protection Agency (USEPA) at the time of filing, Sprague Electric Company officials were in doubt as to whether or not the Lansing plant was a waste treatment, storage, or disposal facility under the Resource Conservation and Recovery Act, and that the application was submitted as a precaution in case this location was such a facility (Ref. 5). Sprague Electric Company was advised by the USEPA on December 16, 1981 that they acknowledged receipt of Sprague's request for withdrawal of their application under RCRA (Ref. 6). On March 4, 1982, the North Carolina Solid and Hazardous Waste Management Branch (NCHWMB) accepted Sprague's request for deletion as a treatment, storage, or disposal facility of hazardous waste under RCRA (Ref. 7). On July 1, 1983, Sprague was also deleted as a large quantity generator of hazardous waste under RCRA (Ref. 8). According to a March 13, 1984 letter, Sprague was advised by NCHWMB that their interim status was formally terminated. This was in response to a November 14, 1983, letter in which Sprague advised the NCHWBM that a Part B application for the facility would not be filed (Ref. 9). The facility is currently listed by RCRA as a small-quantity generator (Ref. 10).

The facility has been actively engaged in the manufacturing of aluminum electrolytic capacitors (Refs. 2, 3). Raw materials used in the production process include aluminum foil, nitric acid, tartaric acid, sodium hydroxide, calcium hydroxide, sodium chloride, sulfuric acid, and dimethylformamide (DMF) (Refs. 2, 3). A wastewater treatment lagoon system was formerly operated on site to allow for the settling and treatment of aluminum oxide wastewaters (Ref. 1, p. 6). Aluminum oxides were formed from a manufacturing process involving the etching of aluminum foil in an electrochemical bath. They were then recovered from the wastewater treatment system by filtering and settling in the lagoon, and then mined and sold (Refs. 2, 3).

Wastewater from this system was not allowed to be discharged to the New River but rather depended upon evaporation and percolation to remove the wastewater (Ref. 11). These lagoons are therefore believed to be unlined and the treatment process has been discontinued (Ref. 1). Non-contact boiler water and wastewater from the sewage treatment plant was discharged into the New River. Both discharges were NPDES permitted (Ref. 11). Waste dimethylformamide (DMF) used in the process is shipped off-site in drums (Ref. 2). Available information indicates that wastes have been handled in essentially the same manner since operations commenced (Ref. 1, p. 6; 3).

The facilities at the Sprague Electric site consist of the main facility building, housing office and warehouse space, assembly and etching operations, and shipping and receiving areas. Adjacent to the facility are paved access roads and parking areas. Areas further away from the facility are grassed and/or landscaped (Ref. 1, p. 6). A wastewater treatment lagoon system, located east of the facility and adjacent to the New River, is no longer in operation (Refs. 1, p. 6; 2, 3; Figure 2). A drum storage area, a tank storage area, and a sewage treatment plant also exist on site (Refs. 1, p. 6; 12, Figure 2). The tank storage area contains two sulfuric acid and two nitric acid storage tanks (Refs. 1, p. 6; 12). Three industrial wells also exist onsite; however, only one of them is currently in use (Refs. 1, p. 6; 12). The facility is enclosed within a 6-foot-high chain-link fence, and access to the property is restricted to a main entrance gate located along the facility's south side (Ref. 12). The site layout is detailed in Figure 2. The surrounding area is primarily a sparsely populated residential and agricultural district. The geographical coordinates are 36°28'48" North Latitude and 81°30'10" West Longitude (Ref. 13). The site is at 2760 feet above mean sea level (amsl)(Ref. 13).

The average annual precipitation for Lansing is 49 inches, and the mean annual lake pan evaporation is 33 inches, yielding a net annual precipitation of 16 inches (Ref. 14, pp. 13, 63). The 2-year, 24-hour rainfall for the area is 2.9 inches (Ref. 15).

The Site Inspection (SI) being updated was completed by the Halliburton NUS Environmental Corporation, on September 6, 1991. During the SI, sixteen surface

soil, subsurface soil, sediment, and surface water samples were collected to determine if contamination was present onsite (Figure 3). Cyanide, calcium, manganese, sodium, and zinc are a few contaminants of concern that can be attributed to the site. Sample results are presented in Tables 1, 2, 3, and 4 (Ref. 1).

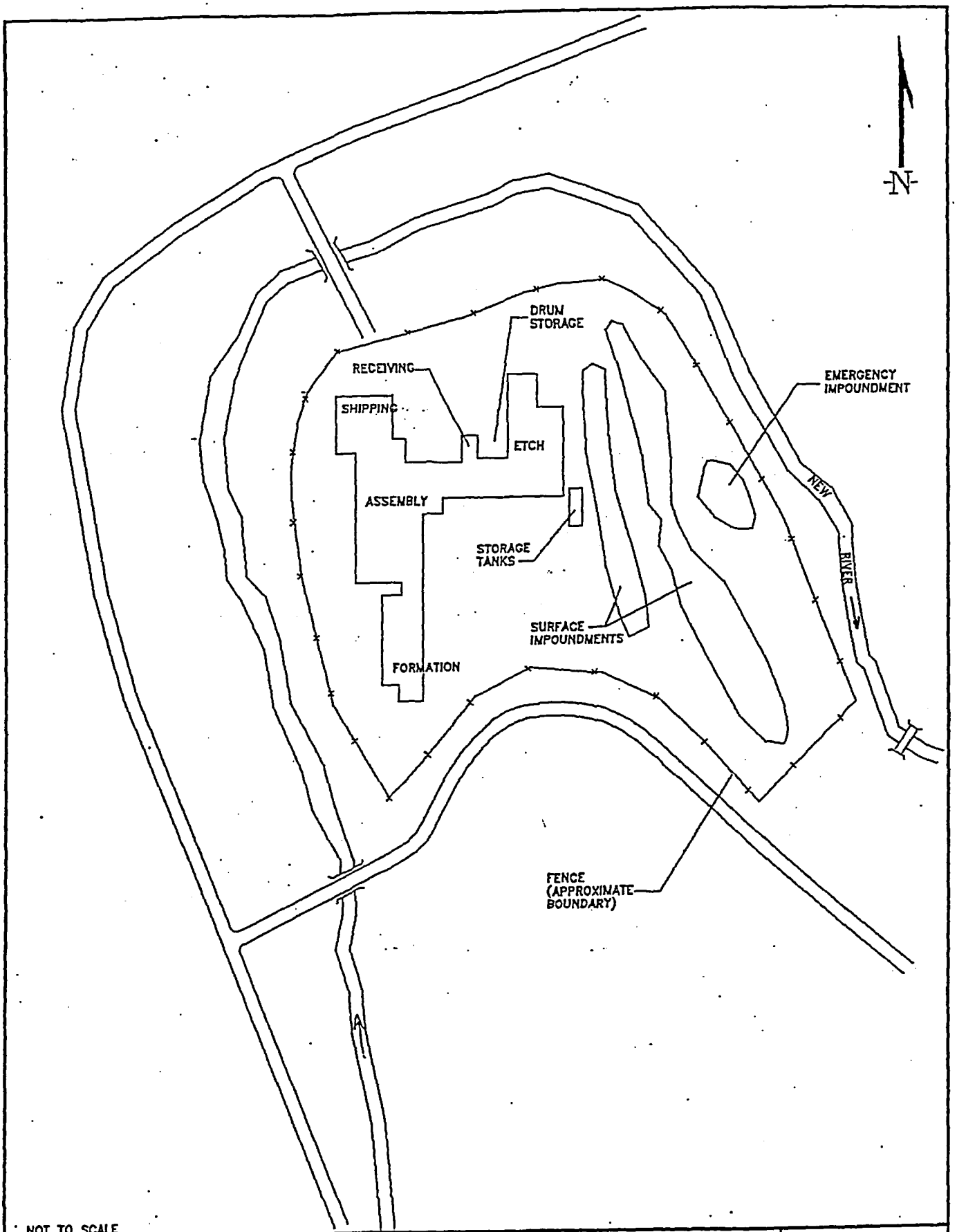
3.0 Groundwater Pathway

3.1 Hydrogeologic Setting

The Sprague Electric Company is located in the Blue Ridge Physiographic Province. This region is characterized by a thick layer of residual soil and weathered rock overlying fractured crystalline and metamorphosed sedimentary and metamorphosed granitic rocks (Refs. 16, 17). Locally, the area of the site is underlain by residual soils ranging from 25 to 36 feet thick. The residuum is underlain by blue and white metamorphosed granite rocks of the Late Proterozoic Era (Ref. 18).

The Sprague Electric Company is located in the Piedmont Blue Ridge groundwater region. The aquifer used in the area is the metamorphosed granite aquifer system (Ref. 18). Two wells drilled in the city of Warrensville, 1.5 miles south of the facility, were 80 and 130 feet deep. The 80-foot deep well reached water at 70 and 75 feet below land surface (bls). The 130-foot deep well reached water at 50 feet bls (Ref. 18). Water levels in the immediate area of the facility are less than 25 feet bls because of its proximity to the New River. The direction of groundwater flow in the local area is north toward the North Fork of the New River (Ref. 13).

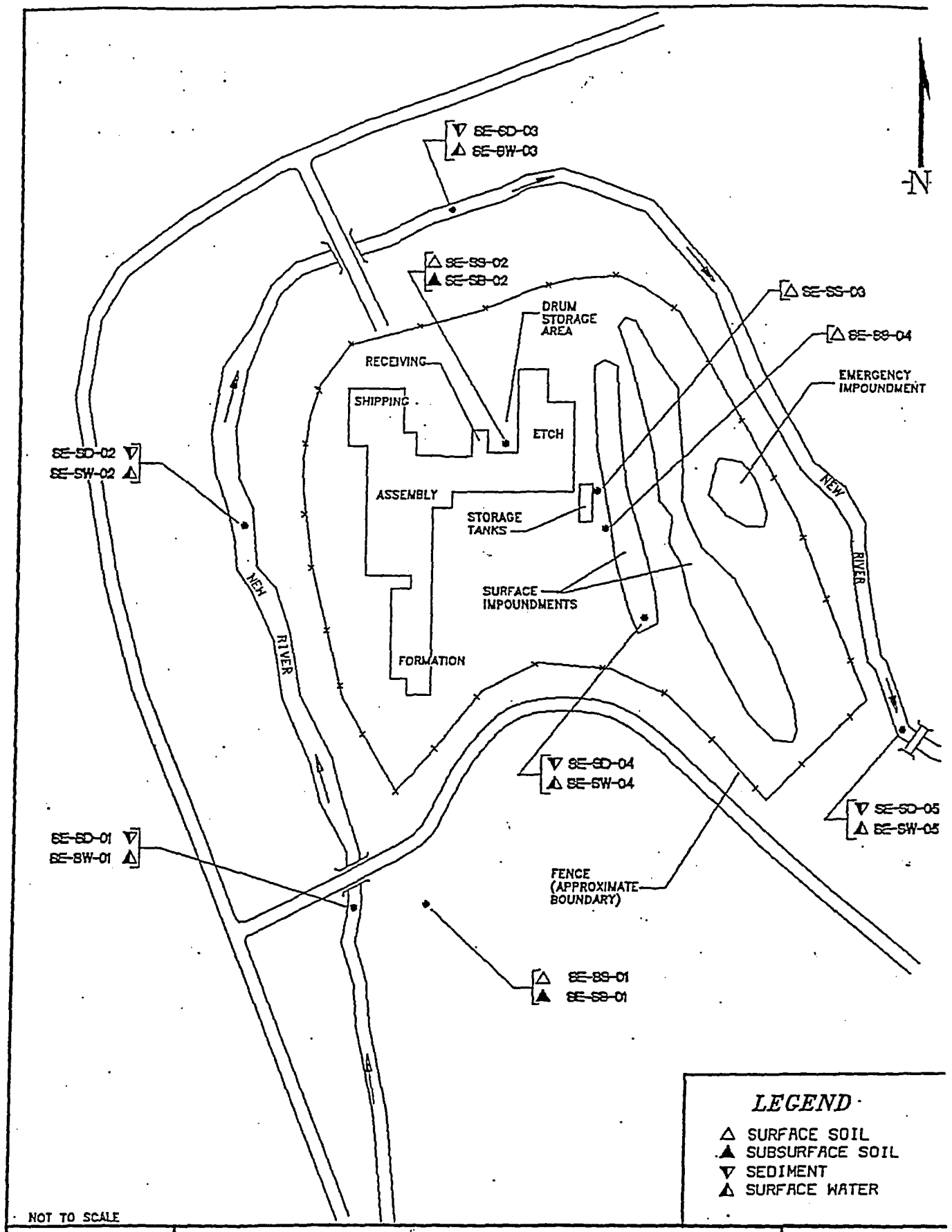
Groundwater flows along the fractures in the bedrock and in the intergranular pore spaces of the residual soils. Some igneous dikes are found in the Piedmont region, but these have few fractures and contain little water (Ref. 19). Fractured granite typically has a hydraulic conductivity 1.0×10^{-2} to 1.0×10^{-6} cm/s (Ref. 20). The residual soils and bedrock are hydraulically interconnected (Ref. 17). The porosity and the hydraulic conductivity of the soil decreases as depth increases (Ref. 19). The unsaturated zone of the residual soils represents the layer of lowest hydraulic



NOT TO SCALE

SITE LAYOUT MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 2



SAMPLE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 3

Table 1
Surface Soil Samples
Quantified Analytical Data
Sprague Electric Company
Lansing, Ashe County, North Carolina

Parameters	SE–SS–01 (mg/kg)	SE–SS–02 (mg/kg)	SE–SS–03 (mg/kg)	SE–SS–04 (mg/kg)
Inorganic Compounds and/or Elements	Background	Drum Storage Area	Storage Tank Area	Near Surface Impoundments
Cadmium	1.1U	2.4	–	–
Lead	13J	33J	14J	40J
Manganese	590U	650	1,300	700
Mercury	0.13U	0.40J	–	–
Nickel	35	190	35	38
Zinc	76	260	68	86
Cyanide	0.66U	–	0.86	0.89
Pesticide/PCB Compounds	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
4,4'–DDE (P,P'–DDE)	22U	51	–	–

– Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated Value
U Material was analyzed for but not detected. The number given is the MQL.
▒ 3 times background or greater than or equal to MQL, CRDL, or CRQL.

Table 2
Subsurface Soil Samples
Quantified Analytical Data
Sprague Electric Company
Lansing, Ashe County, North Carolina

Inorganic Elements	SE-SB-01 (mg/kg)	SE-SB-02 (mg/kg)
	Background	Drum Storage Area
Beryllium	0.53U	1.6

U Material was analyzed for but not detected. The number given is the MQL.
3 times background or greater than or equal to MQL, CRDL, or CRQL.

Table 3
Surface Water Samples
Quantified Analytical Data
Sprague Electric Company
Lansing, Ashe County, North Carolina

Inorganic Elements	SE–SW–01 (ug/l)	SE–SW–02 (ug/l)	SE–SW–03 (ug/l)	SE–SW–04 (ug/l)	SE–SW–05 (ug/l)
	Background	New River West of Site	New River North of Site	Surface Impoundment	Downstream of Site
Barium	20U	–	18	–	28
Calcium	3,500	3,300	4,500	11,000	4,500
Copper	4U	29	–	–	–
Iron	190U	–	–	–	800
Manganese	20U	–	–	120	100
Potassium	1,100U	–	1,300	–	1,600
Sodium	2,500U	13,000	–	47,000	3,400
Zinc	6U	43	–	–	–

– Material analyzed for but not detected above minimum quantitation limit (MQL).
U Material was analyzed for but not detected. The number given is the MQL.
▒ 3 times background or greater than or equal to MQL, CRDL, or CRQL.

Table 4
Sediment Samples
Quantified Analytical Data
Sprague Electric Company
Lansing, Ashe County, North Carolina

Inorganic Compounds and/or Elements	SS-SD-01 (mg/kg)	SS-SD-04 (mg/kg)
	Background	Surface Impoundment
Aluminum	37,000	290,000
Mercury	0.18U	0.80J
Sodium	360U	9,100
Cyanide	0.91U	1.7

– Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated Value
U Material was analyzed for but not detected. The number given is the MQL.
▒ 3 times background or greater than or equal to MQL, CRDL, or CRQL.

conductivity. Soils of this type have been shown to have hydraulic conductivities that range between 1×10^{-3} cm/sec and 1×10^{-5} cm/sec (Ref. 20).

3.2 Groundwater Targets

Residents in the 4-mile radius of the Sprague Electric site obtain potable water from two municipal systems and from private wells. The Lansing Water System serves 65 connections from two wells located approximately 1.5 miles north of the facility (Ref. 21, p. 5, 6). These wells serve approximately 161 people within the Lansing corporate boundary (Refs. 21, p. 5, 6; 23). There are no known private wells in the Lansing city limits (Refs. 13, 21, p. 5, 6).

The Jefferson Water Department well system serves 535 connections in the Jefferson area. There are seven wells in this system. Only one of these wells, however, is situated within the 4-mile radius and is located 3.9 miles southeast of the facility. The portion of the Jefferson wellfield within 4 miles of the site provides potable water to approximately 190 people (Refs. 13, 21, p. 6-8; 23). Wells in the Jefferson Water System may potentially serve more than the listed number of persons because the entire system is blended. Although it is probable that there are some private wells located within the Jefferson Water Department service area, all residences have access to municipal water (Ref. 21, p. 6-8).

Residences not served by municipal systems are assumed to obtain their potable water from private wells. Based on estimates made from available topographic maps in conjunction with municipal water service data, approximately 2,617 persons within 4 miles of the facility are served by private wells. The closest of these lies approximately 500 feet west of the facility (Refs. 13, 21, p. 5-8).

4.0 Surface Water Pathway

Surface water run-off from the site migrates north, east, and west into the North Fork of the New River located adjacent to the facility. The 15-mile surface water pathway expires in the New River. The average flow for the North Fork of the New River is 259 cfs (Ref. 23). There are no surface water intakes used for potable purposes along the surface water migration pathway (Ref. 13, 24).

Sensitive environments found within a 4-mile radius of the site include the ranges of several federally endangered and threatened species, or species whose status is under review. These are the Bog turtle and the Riffle beetle (Ref. 25). Recreational fishing occurs in the North Fork of the New River (Ref. 26). In addition, no wetlands were identified along the surface water pathway, nor within a 0.5 mile radius of the site (Ref. 13).

5.0 Air and Soil Exposure Pathways

The Sprague Electric Company is comprised of the main facility building, housing office and warehouse space, assembly and etching operations, as well as shipping and receiving areas. Areas adjacent to the facility are paved access roads and parking areas, while areas further away from the facility are comprised of grassy areas. Additionally, a wastewater treatment lagoon system located east of the facility and adjacent to the New River was constructed to allow for the settling of aluminum oxides. This system is no longer in operation. A drum storage area, a tank storage area, and a sewage treatment plant also exist on site (Refs. 1, 2, 3, 12).

The population within the 4 mile radius of the site is 3,985. The populations within 0-0.25, 0.25-0.5, 0.5-1, 1-2, 2-3, and 3-4 mile radii of the site are 35, 40, 129, 194, 2,106, and 1,481, respectively (Refs. 12, 22, 27). The nearest residence is 300 feet west of the property (Ref. 13). The closest school is 1 mile south-southwest of the site (Ref. 13). Presently, the closest individuals are 525 onsite workers (Ref. 28).

The facility is enclosed within a 6-foot-high chain-link fence, and access to the property is restricted to a main entrance gate located along the facility's south side (Ref. 12).

As mentioned previously, the federally listed endangered and threatened species that are known to inhabit Ashe County include the Bog turtle, Bewick's wren, Regal fritillary, Riffle beetle, Glade spurge, Spreading avens, Mountain bluet, Heller's blazing star, Gray's lily, Carolina saxifrage, and the Virginia spiraea. Additionally, the state listed endangered and threatened species include the Cooper's hawk, Warbling vireo, Rock gnome lichen, Bob rose, Cone-shaped sedge, Robin runaway, Fringed gentian, and the Roseroot (Ref. 25).

6.0 Conclusion

The Sprague Electric Company site was evaluated to assess the threat posed to human health and the environment and to determine the need for additional investigation. From the information gathered in the study of the Sprague Electric Company, further action is recommended. The surface water pathway is the primary concern due to actual contamination of the North Fork of the New River. The North Fork of the New River is documented as a fishery. The groundwater pathway is also a concern at the site due to the number of groundwater users in the area. In addition, the soil exposure pathway is of concern due to the presence of contaminants at or near surface level, and because the ranges of several federally endangered species are found within 4 miles of the site.

8. O.W. Strickland, Head, North Carolina Soild and Hazardous Waste Management Branch, letter to Edward A. Stone, Sprague Electric Company, July 1, 1983. Subject: Notification of facility status change.

9. O.W. Strickland, Head, North Carolina Soild and Hazardous Waste Management Branch, letter to Edward A. Stone, Sprague Electric Company, March 13, 1984. Subject: Sprague Electric Company.

10. North Carolina Department of Human Resources, Solid and Hazardous Waste Management, Alphabetical List of Hazardous Waste Facilities, August 10, 1989. Subject: Sprague Electric Company.

11. Jack Hardin, Sprague Electric Company, Lansing, North Carolina, telephone conversation with Eric Corbin, Halliburton NUS Environmental Corporation, March 14, 1991. Subject: Wastewater discharges.

12. NUS Corporation Field Logbook No. F4-2661 for Sprague Electric Company, TDD No. F4-9010-25. Documentation of Phase II Screening Site Inspection, December 11-12, 1990.

13. U.S. Geological Survey (USGS), 7.5 minute series Topographic Quadrangle Maps of North Carolina: Warrensville 1966, Jefferson 1968, Park 1959 (Photorevised 1978), Grassy Creek 1966 (Photorevised 1978), Scale 1:24,000.

14. U.S. Department of Commerce, Climatic Atlas of the United States, June 1968 (Reprinted 1983).

15. U.S. Department of Commerce, Rainfall Frequency Atlas of the United States, Technical Paper Number 40 (Washington, D.C.: GPO, 1961).

16. Oscar E. Meinzer, The Occurrence of Groundwater in the United States. U. S. Geological Survey Water Supply Paper Nº 489, (Washington, D. C.: GPO, 1023).

17. Linda Aller, et al., DRASTIC: A Standardized System for Evaluating Ground-Water Pollution Using Hydrogeologic Settings. EPA-600/2-87-035 (Ada, Oklahoma: EPA, April 1987), pp. 251, 252.

18. Mrs. Ray Taylor, Taylor Well Drilling, telephone conversation with Brant McCanless, NUS Corporation, March 12, 1990. Subject: Geology and groundwater levels in the Warrensville, North Carolina area.

19. Charles C. Daniel, III and N. Bonar Sharpless, Groundwater Supply Potential and Procedures for Well-Site Selection Upper Cape Fear River Basin, (North Carolina Department of Natural Resources and Community Development, Raleigh, North Carolina, October 1983), pp. 10, 12-15.

20. R. Allen Freeze and John A. Cherry, Groundwater (Englewood Cliffs, N. J.: Prentice-Hall, Inc. 1979), p. 29.

21. NUS Corporation Field Logbook Nº F4-9998 for Sprague Electric Company, TDD Nº F4-9001-132. Documentation of facility reconnaissance, February 12, 1990.

22. U.S. Department of Commerce, Proof Copy of table generated for 1990, Table 6, CPH-1: Summary Population and Housing Characteristics, issued by Bureau of Census, (April 1991).

23. Mike Scoville, North Carolina Environmental Resources, telephone conversation with Victor Blix, B&V Waste Science and Technology Corp., July 20, 1992. Subject: Stream gauge information.

24. Halliburton NUS Enviromental Corporation Project Note, North Carolina Surface Water Intakes, July 11, 1990. Subject: Ashe County, North Carolina.

25. North Carolina Natural Heritage Program Element List for Ashe County, June 30, 1989, p. 2.

26. Sonny Williams, Game Warden, Ashe County, North Carolina, telephone conversation with Eric Corbin, NUS Corporation, March 14, 1990. Subject: Recreational uses of the New River.

27. U.S. Environmental Protection Agency, Graphical Exposure Modeling System (GEMS) Data Base. Compiled from U.S. Bureau of the Census data (1983).

28. Sandy Gambill, Ashe County Chamber of Commerce, telephone conversation with Victor Blix, B&V Waste Science and Technology Corp., July 9, 1992. Subject: Number of employees working onsite.

Ref. 1

R-586-9-1-3

FINAL REPORT

SITE INSPECTION
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA
EPA ID NO.: NCD003167780

Prepared Under
TDD No. F4-9010-25
Contract No. 68-01-7346

Revision 0

FOR THE

WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 6, 1991

CERCLA

HALLIBURTON NUS ENVIRONMENTAL CORPORATION
SUPERFUND DIVISION

Prepared By	Reviewed By	Approved By
Eric Corbin Project Manager		Phil Blackwell Regional Project Manager

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EXECUTIVE SUMMARY

The Sprague Electric Company facility is situated on a tract of land located off of Highway 194 approximately 1.25 miles south of Lansing, Ashe County, North Carolina. The facility began operations at this location in 1953 and has been actively engaged in the manufacturing of aluminum electrolytic capacitors.

The manufacturing process utilized involved the etching of aluminum foil in an electrochemical bath resulting in the formation of aluminum oxide wastes which were recovered from a wastewater treatment system and then sold. Raw materials utilized in the production process include aluminum foil, nitric acid, tartaric acid, sodium hydroxide, calcium hydroxide, sodium chloride, sulfuric acid, and dimethylformamide.

The facility is located in the Blue Ridge physiographic province and Piedmont Blue Ridge groundwater region. The region is characterized by a thick layer of residual soil and weathered rock overlying fractured crystalline and metamorphosed sedimentary rocks. Geologically, the area of the electric company is underlain by residual soils ranging from 25 to 36 feet thick with the residuum being underlain by blue and white metamorphosed granite rocks of the Late Proterozoic era. The aquifer used in the area is the unconfined crystalline rock aquifer system. Water levels in the immediate area of the facility are less than 25 feet below land surface because of its proximity to the New River.

The surface water pathway was determined to be of concern for this facility. Because the facility is surrounded by the New River on three sides, surface water runoff leaving the facility via various onsite drainage routes enters the river directly. Additionally, wastewater from the sewage treatment plant and non-contact boiler water are discharged into the New River. Water from the aluminum oxide treatment lagoon system was never discharged to the river, but rather either percolated into the ground or evaporated. Due to the lagoons' proximity to the river, percolation into the river may have occurred. This process has now been discontinued. The river is utilized for recreational swimming, fishing, and boating. The groundwater pathway is also of concern. All totaled, 600 municipal customers and 800 private residences (2.89 x 1,400 = 4,046 people) utilize groundwater for potable purposes within a 4-mile site radius and would be at potential risk if contamination to groundwater occurs. Due to restricted site access, the air pathway is of least concern; however, onsite employees could be potentially exposed to organic and inorganic contaminants detected in onsite surface soil samples.

Sixteen environmental samples were collected during the field investigation associated with this study. No site-related organic contaminants were detected in the onsite samples. Surface and subsurface soil samples collected from near the drum storage area and storage tank area contained a total of five metals at elevated levels. A sediment sample collected from a surface impoundment contained elevated levels of three different metals. Results from the analysis of surface water samples collected downstream of the facility and from one of the facility's surface impoundments revealed the presence of six inorganic substances at elevated levels.

The predominant heavy metals detected throughout the samples were mercury and zinc. Metals such as aluminum, beryllium, copper, iron, lead, nickel, and manganese were also reported at many times the background level. These and other impurities can be removed from aluminum in the etching bath process. Sample results also indicated the presence of mercury. Mercury is utilized in electrical applications.

Based on the analysis of possible migration pathways, the results of the sampling investigation, and the information obtained from the references, FIT 4 recommends that this site be evaluated using the HRS (effective March 14, 1991).

1.0 INTRODUCTION

The HALLIBURTON NUS Environmental Corporation Region 4 Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA), Waste Management Division to conduct a Site Inspection (SI) at the Sprague Electric Company facility in Lansing, Ashe County, North Carolina. The investigation was performed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). The task was performed to satisfy the requirements stated in Technical Directive Document (TDD) number F4-9010-25. The field investigation was conducted December 11-12, 1990.

1.1 OBJECTIVES

The objectives of this inspection were to determine the nature of contaminants present at the site and to determine if a release of these substances has occurred or may occur. Further, this inspection sought to determine the possible pathways by which contamination could migrate from the site and the populations and environments it would potentially affect. Through these objectives, a recommendation was made regarding future activities at the site.

1.2 SCOPE OF WORK

The objectives were achieved through the completion of a number of specific tasks. These activities were to:

- Obtain and review relevant background materials.
- Obtain information on local water systems.
- Determine location of and distance to nearest potable well.
- Evaluate potentially affected populations and environments associated with the groundwater, surface water, air, and soil exposure pathways.

- Develop a site sketch.
- Collect environmental samples.

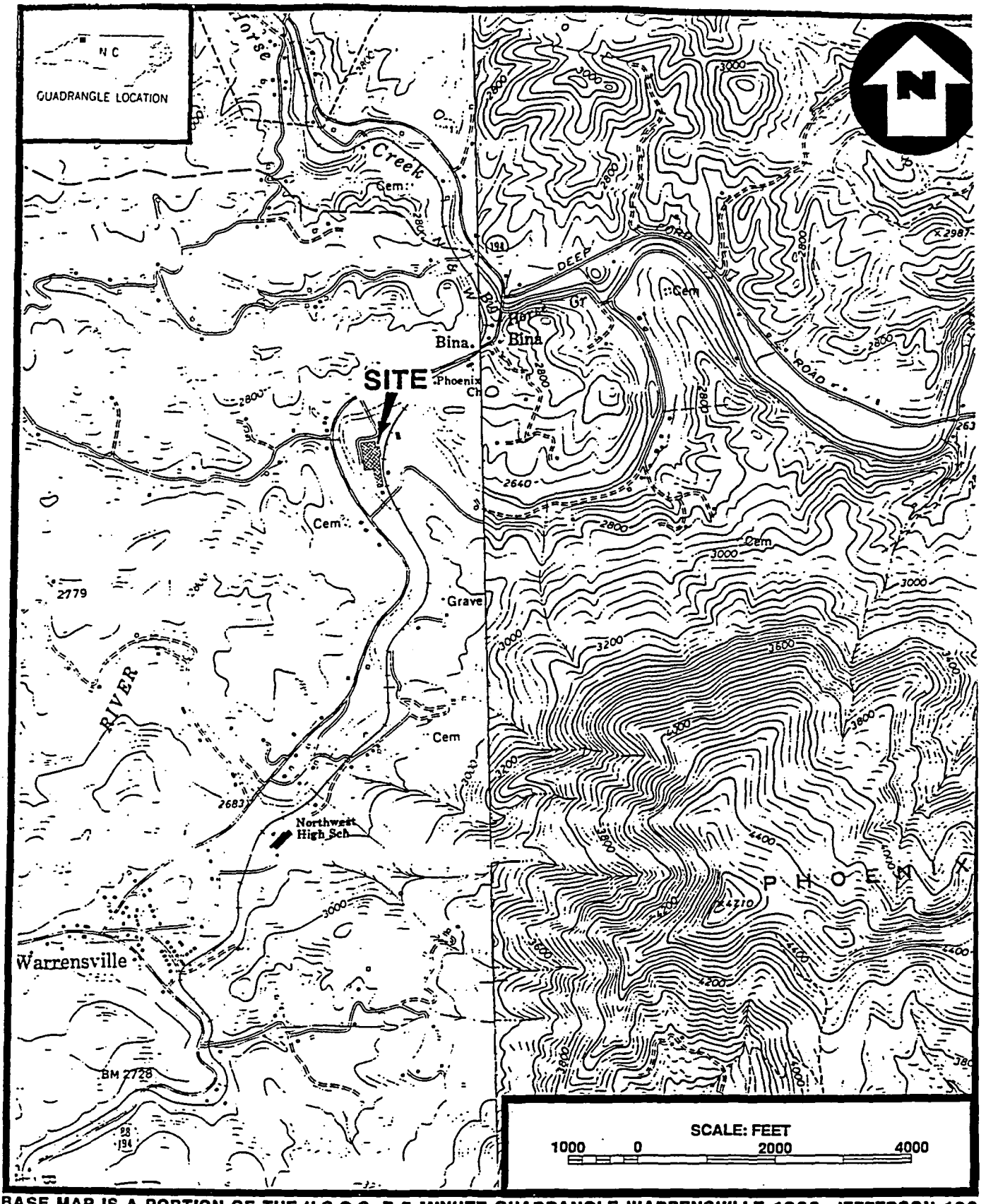
2.0 SITE CHARACTERIZATION

2.1 SITE HISTORY

The Sprague Electric Company facility is situated on a tract of land located off of Highway 194 approximately 1.25 miles south of Lansing, Ashe County, North Carolina (Ref. 1, Appendix A). The facility location is shown in Figure 1, and the facility layout is shown in Figure 2. The facility has been actively engaged in the manufacturing of aluminum electrolytic capacitors since 1953 and is the only known industry that has ever occupied the facility area (Refs. 1, 2).

The manufacturing process involves the etching of aluminum foil in an electrochemical bath. Aluminum oxides formed in the process are recovered from a wastewater treatment system. Waste dimethylformamide (DMF) was also used in the process (Refs. 1, 2). Available information indicates that wastes were handled in essentially the same manner since operations commenced (Ref. 2).

On November 17, 1980, Sprague Electric Company filed a RCRA Part A hazardous waste permit application for treatment of wastes. They reported that their facility conducted operations that resulted in a discharge to U.S. waters and that 250,000,000 pounds of corrosive waste (D002) were treated per year (Ref. 3). At the time of filing, Sprague Electric Company officials advised the U.S. Environmental Protection Agency that they were in doubt as to whether or not the Lansing plant was a waste treatment, storage, or disposal facility under the Resource Conservation and Recovery Act, and that the application was submitted as a precaution in case this location was such a facility (Ref. 4). On December 16, 1981, the USEPA advised Sprague Electric Company that they acknowledged receipt of Sprague's request for withdrawal of their permit application under RCRA (Ref. 5). On March 4, 1982, the North Carolina Solid and Hazardous Waste Management Branch (NCHWMB) granted Sprague's request for deletion as a treater, storer, or disposer of hazardous waste under RCRA (Ref. 6). On July 1, 1983, Sprague was also deleted as a large quantity generator of hazardous waste under RCRA (Ref. 7). On November 14, 1983, Sprague advised the NCHWBM that a Part B application for the facility would not be filed. On March 13, 1984, the NCHWMB advised Sprague that their interim status was formally terminated (Ref. 8). The facility is currently listed as a small-quantity generator (Ref. 9).

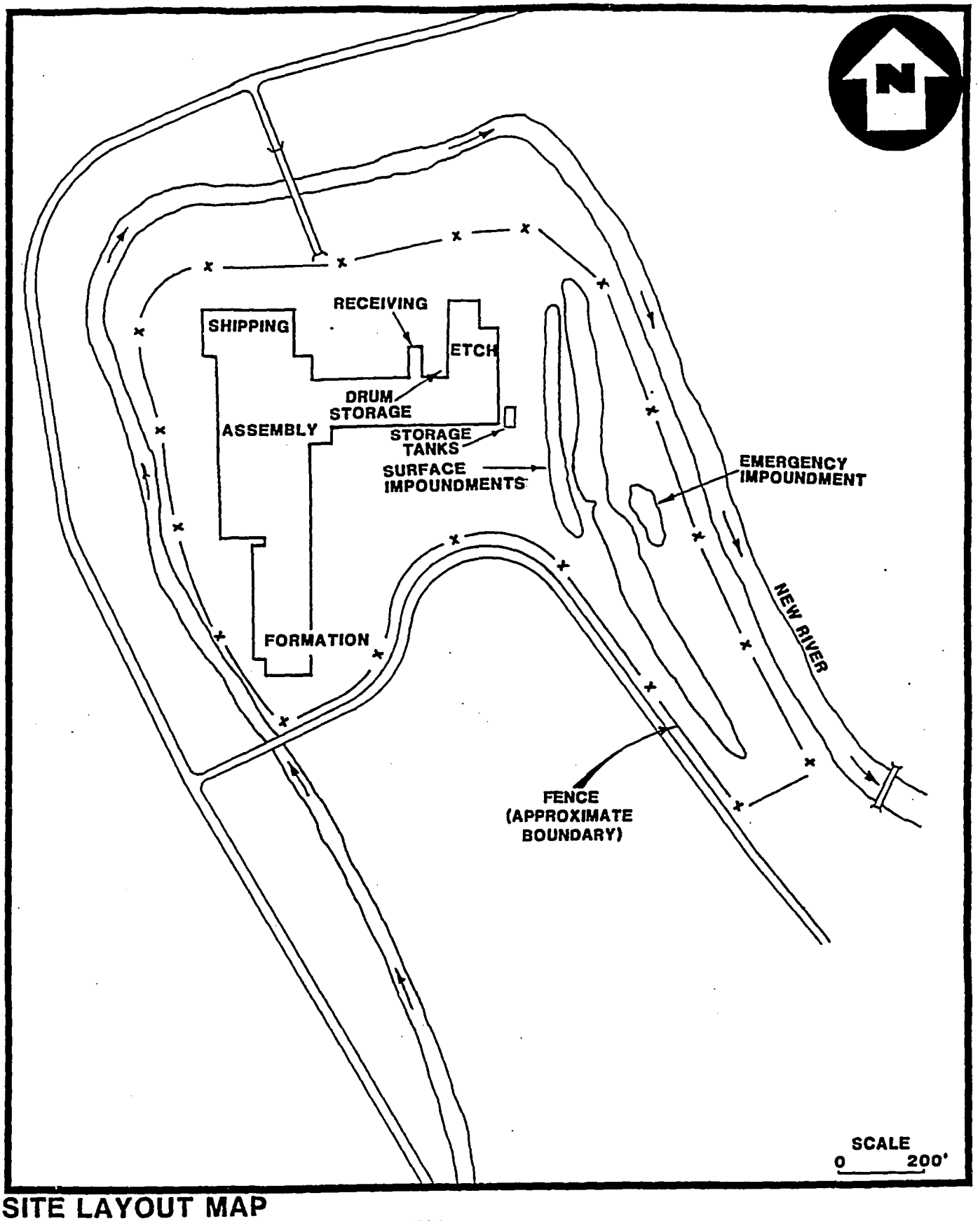


BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE WARRENSVILLE 1966, JEFFERSON 196 NORTH CAROLINA.

SITE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 1

NUS CORPORATION



SITE LAYOUT MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 2

NUS CORPORATION

2.2 SITE DESCRIPTION

2.2.1 Site Features

The currently active facility is situated on a 60-acre tract of property located adjacent to Highway 195 approximately 1.25 miles south of Lansing, North Carolina, in a rural section of Ashe County (Ref. 1, Appendix A). The facility is enclosed within a 6-foot-high chain-link fence, and access to the property is restricted to a main entrance gate located along the facility's south side (Ref. 10). The operation is comprised of the main facility building housing office and warehouse space, assembly and etching operations, as well as shipping and receiving areas (Ref. 10, Figure 2). Areas adjacent to the facility are paved access roads and parking areas, while areas further away from the facility are comprised of grassy areas (Ref. 10, Figure 2). Additionally, a wastewater treatment lagoon system located east of the facility and adjacent to the New River was constructed to allow for the settling of aluminum oxides (Refs. 1, 2, Figure 2). This system is no longer in operation (Ref. 10). A drum storage area, a tank storage area, and a sewage treatment plant also exist on site (Ref. 10, Figure 2). The tank storage area contains two sulfuric acid and two nitric acid storage tanks (Ref. 10). Three industrial wells also exist on site, however, only one of them is currently in use (Ref. 10).

2.2.2 Waste Characteristics

The facility, since inception, has been actively engaged in the manufacturing of aluminum electrolytic capacitors (Refs. 1, 2). Raw materials utilized in the production process include aluminum foil, nitric acid, tartaric acid, sodium hydroxide, calcium hydroxide, sodium chloride, sulfuric acid, and dimethylformamide (DMF) (Refs. 1, 2). A wastewater treatment lagoon system was formerly operated on site to allow for the settling and treatment of aluminum oxide wastewater (Refs. 1, 2, Figure 2). Aluminum oxides formed from a manufacturing process involving the etching of aluminum foil in an electrochemical bath were recovered from the wastewater treatment system by filtering and settling in the lagoon, then were mined and sold (Refs. 1, 2). Wastewater from this system was not allowed to be discharged to the New River but rather was allowed to percolate into the ground or evaporate (Ref. 11). These lagoons are therefore believed to be unlined and this treatment process has been discontinued. Wastewater from the sewage treatment plant and non-contact boiler water are discharged into the New River and are NPDES permitted (Ref. 11). Waste dimethylformamide (DMF) used in the process is stored in drums and shipped off site (Refs. 1, 2). A drum storage area also exists adjacent to the former etching building (Ref. 10). Available information indicates that wastes have been handled in essentially the same manner since operations commenced (Ref. 2).

3.0 REGIONAL POPULATIONS AND ENVIRONMENTS

3.1 POPULATION AND LAND USE

3.1.1 Demography

The Sprague Electric Company facility is located in a rural portion of Ashe County approximately 1.25 miles south of Lansing, North Carolina (Appendix A). Most of the population in the area consists of full-time residents. Population density increases most sharply near Lansing (Appendix A). The population within a 1-mile radius is approximately 258; within a 4-mile radius, the population is estimated to be 2,300 (Ref. 12, Appendix A). The nearest residence is located approximately 400 feet west of the facility. No day-care centers are located adjacent to the facility. The nearest school identified is located approximately 1.1 miles south of the facility (Appendix A). Direct access to the facility is limited by a chain-link fence which restricts unauthorized entry (Figure 2).

3.1.2 Land Use

The majority of the land area within a 1-mile radius of the facility is rural (Appendix A). Cattle production is the primary type of agricultural activity practiced in the county. The county has about 34,500 head of cattle and ranks second in the state in cattle production. Permanent pastureland accounts for a large portion of the local land use, with the remainder in forestland (Ref. 13, Appendix A). Forest products, hay, tobacco, corn, and truck crops account for the remaining agriculture (Ref. 13). Only small towns exist in the study area which include Lansing, Smithport, and Warrensville (Appendix A). The area is best characterized as hilly and mountainous and has many relatively high mountain peaks (Ref. 13, Appendix A).

Phoenix Mountain, located approximately 1 mile southeast of the facility, is a sensitive environment which supports 11 peripherally rare plant species plus several endangered species (Ref. 14). The Cooper's hawk (Occipiter cooperii), bog rose (Arethusa bulbosa), robin runaway (Dalibarda repens), fringed gentian (Gentianopsis crinita), spreading avens (Geum radiatum), virginia spiraea (Spiraea virginiana), and the roseroot (Sedum rosea) are state endangered species in Ashe County. In addition, several state listed threatened species also exist in Ashe County (Ref. 15).

3.2 SURFACE WATER

3.2.1 Climatology

The average annual rainfall in the Ashe County region is approximately 50 inches per year. Mean annual evaporation is approximately 33 inches per year. Net rainfall is, therefore, 17 inches per year. In the month of July, the site area receives most of its normal precipitation (approximately 6 inches) (Ref. 16). The site area receives the least precipitation during the month of October (approximately 3 inches) (Ref. 16). The 2-year, 24-hour rainfall is approximately 3 inches (Ref. 17). In winter, the average temperature is 34°F, and in summer the average temperature is 67°F (Ref. 13).

3.2.2 Overland Drainage

Surface water run-off from the facility has the potential to migrate north, east, and west into the North Fork of the New River located adjacent to the facility. The North Fork of the New River follows a meandering path to the northeast, beyond 15 miles downstream from the facility (Appendix A). Since the facility property is located adjacent to the river, run-off has the potential to enter the river directly.

3.2.3 Potentially Affected Water Bodies

There are no known surface water intakes utilized for potable purposes located along the drainage pathway; however, fishing, boating, and swimming are recreational uses of the river (Refs. 18, 19). The New River is utilized for irrigational purposes (Ref. 18).

3.3 GROUNDWATER

3.3.1 Hydrogeology

The Sprague Electric Company is located in the Blue Ridge physiographic province and Piedmont-Blue Ridge groundwater region. This region is characterized by a thick layer of residual soil and weathered rock overlying fractured crystalline and metamorphosed sedimentary rocks (Refs. 20, plate 28; 21, pp. 251, 252). The immediate area around the facility consists of high hills and steeply sloped, narrow valleys (Appendix A).

Geologically, the area of the electric company is underlain by residual soils ranging from 25 to 36 feet thick. The residuum is underlain by blue and white metamorphosed granite rocks of the Late

Proterozoic era (Ref. 22). The aquifer used in the area is the crystalline rock aquifer system (Ref. 23, p. 331). Two wells drilled in the city of Warrensville, 1.5 miles south of the facility, were 80 and 130 feet deep. The 80-foot deep well reached water at 70 and 75 feet below land surface (bls). The 130-foot deep well reached water at 50 feet bls (Ref. 22). Water levels in the immediate area of the facility are less than 25 feet bls because of its proximity to the New River. The direction of groundwater flow is in the local area downgradient toward the North Fork of the New River (Appendix A).

Groundwater flows along the fractures in the bedrock and in the intergranular pore spaces of the residual soils. The porosity and the hydraulic conductivity of the soil decreases as depth increases (Ref. 24, pp. 12-14). Some igneous dikes are found in the Piedmont region, but these have few fractures and contain little water (Ref. 24, p. 10). The residual soils and bedrock are hydrologically interconnected (Ref. 21, pp. 252, 253). The unsaturated zone of the residual soils represents the layer of lowest hydraulic conductivity. Soils of this type have been shown to have hydraulic conductivities that range between 1×10^{-3} cm/sec and 1×10^{-5} cm/sec (Ref. 25, p. 29).

3.3.2 Aquifer Use

Two municipal water systems exist within a 4-mile radius of the facility. The nearby town of Lansing obtains its water from two wells located approximately 1.5 miles north of the facility and within the Lansing corporate boundary (Ref. 26, Appendix A). This system currently provides service to 65 customers (2.89 x 65 = 187 people) within the corporate boundary (Ref. 26). The Jefferson Water Department provides service to a very small segment of the study area located approximately 3.8 miles southeast of the facility (Appendix A). This system obtains its water from seven wells located in and near Jefferson, North Carolina (Ref. 26, Appendix A). Only one of these wells, however, is situated within the 4-mile radius and is located approximately 3.9 miles southeast of the facility. The water from these wells is mixed prior to distribution (Ref. 26, Appendix A). This system currently provides service to 535 customers (2.89 x 535 = 1,546 people) (Ref. 26). Residences not served by these municipal systems rely on wells and springs to supply their potable water needs. Information derived from a house count on USGS 7.5 minute series topographic quadrangle maps was used to approximate the number of private wells and springs being utilized. Within a 4-mile radius of the facility, approximately 800 residences and 600 municipal customers (2.89 x 1,400 = 4,046 people) utilize groundwater from private wells or springs for potable purposes. The nearest well is located approximately 500 feet west of the facility (Appendix A).

4.0 FIELD INVESTIGATION

4.1 SAMPLE COLLECTION

During the field investigation, conducted the week of December 11, 1991, FIT 4 attempted to identify and characterize contaminants which may be present in the environment as a result of activities that were conducted at Sprague Electric Company. To accomplish this, FIT 4 collected environmental surface soil, subsurface soil, sediment, and surface water samples from a number of strategic locations. These locations were selected based on historical information, hydrogeological data for the region and site area, and direct observation at the site.

4.1.1 Sample Collection Methodology

All sample collection, sample preservation, and chain-of-custody procedures used during this investigation were in accordance with the standard operating procedures as specified in Sections 3 and 4 of the Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual; United States Environmental Protection Agency, Region IV, Environmental Services Division, April 1, 1986.

4.1.2 Duplicate Samples

Duplicate samples were offered to and declined by Thomas Miller, a designated representative of Sprague Electric Company. Receipt for sample forms are on file at FIT 4.

4.1.3 Description of Samples and Sample Locations

During the sampling investigation, a total of 16 environmental samples were collected. Surface and subsurface soil samples were collected from near the aboveground storage tank area and from the drum storage area. Background samples for these media were collected south of the facility adjacent to the New River. Surface water and sediment samples were collected from locations upstream and downstream of the facility on the New River. An additional surface water sample and a sediment sample were also collected from an onsite surface impoundment. No groundwater samples were collected due to the depth to groundwater and the presence of rock at shallow depths (Ref. 10). Sample codes, descriptions, locations, and rationale are presented in Table 1. All sample locations are shown in Figure 3.

TABLE 1

SAMPLE CODES, DESCRIPTIONS, LOCATIONS, AND RATIONALE
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

Sample Code	Description	Location	Rationale
SE-SS-01	Surface Soil	From an area south of the facility adjacent to the New River	To assess background conditions
SE-SS-02	Surface Soil	From the northern side of the main facility adjacent to a drum storage area	To determine presence or absence of contaminants
SE-SS-03	Surface Soil	From the eastern side of the main facility adjacent to the nitric and sulfuric acid storage tanks	To determine presence or absence of contaminants
SE-SS-04	Surface Soil	From an area located approximately 20 feet east of the nitric and sulfuric acid storage tanks	To determine presence or absence of contaminants
SE-SB-01	Subsurface Soil	From an area south of the facility adjacent to the New River at 3 to 4 feet bls	To assess background conditions
SE-SB-02	Subsurface Soil	From the northern side of the main facility adjacent to a drum storage area at 4 feet bls	To determine presence or absence of contaminants
SE-SW-01	Surface Water	From an upstream location on the New River south of the facility	To assess upstream (background) surface water conditions
SE-SW-02	Surface Water	From a downstream location west of the facility on the New River from a facility discharge pipe	To determine presence or absence of contaminants
SE-SW-03	Surface Water	From a location north and downstream of the facility on the New River	To assess downstream surface water conditions
SE-SW-04	Surface Water	From a surface impoundment located east of the facility	To determine presence or absence of contaminants
SE-SW-05	Surface Water	From a location southeast and downstream of the facility on the New River	To assess downstream surface water conditions
SE-SD-01	Sediment	From an upstream location on the New River south of the facility	To assess upstream sediment conditions

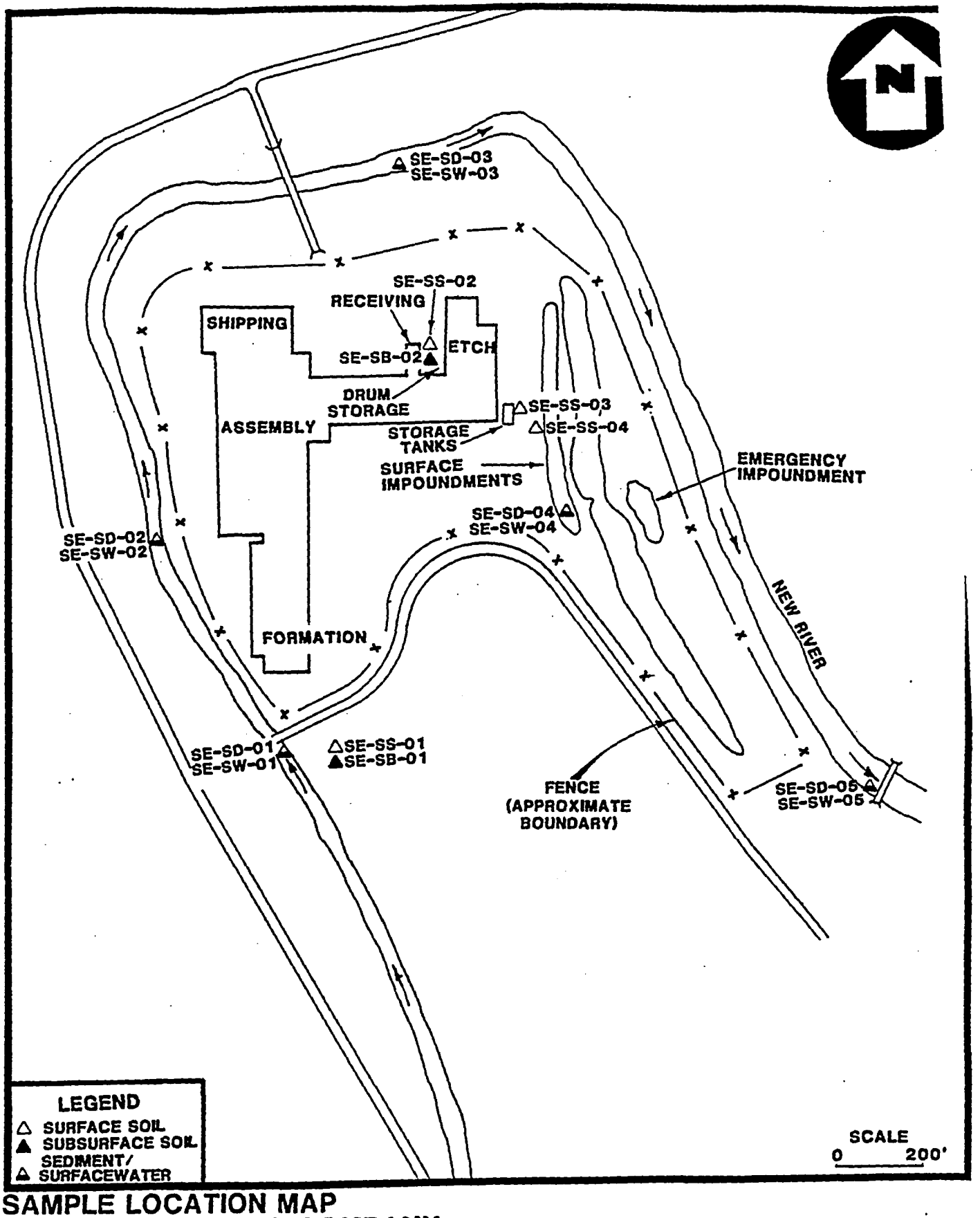
SE - Sprague Electric Company
SS - Surface Soil
SB - Subsurface Soil
SD - Sediment
SW - Surface Water
bls - Below Land Surface

TABLE 1

SAMPLE CODES, DESCRIPTIONS, LOCATIONS, AND RATIONALE
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

Sample Code	Description	Location	Rationale
SE-SD-02	Sediment	From a downstream location west of the facility on the New River, near a facility discharge pipe	To determine presence or absence of contaminants
SE-SD-03	Sediment	From a location north and downstream of the facility on the New River	To assess downstream sediment conditions
SE-SD-04	Sediment	From a surface impoundment located east of the facility	To determine presence or absence of contaminants
SE-SD-05	Sediment	From a location southeast and downstream of the facility on the New River	To assess downstream sediment conditions

SE - Sprague Electric Company
SS - Surface Soil
SB - Subsurface Soil
SD - Sediment
SW - Surface Water
bls - Below Land Surface



SAMPLE LOCATION MAP
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

FIGURE 3

NUS CORPORATION

4.1.4 Field Measurements

Field measurements were performed on all water samples (Table 2). Parameters measured included temperature, pH, and conductivity of the sample at time of collection. No field measurements were performed on the soil samples during this investigation.

4.2 SAMPLE ANALYSIS

4.2.1 Analytical Support and Methodology

All samples collected were analyzed under the Contract Laboratory Program (CLP) and analyzed for all organic and inorganic parameters listed in the Target Compound List (TCL). Organic analysis of soil and water samples was performed by Compuchem of Research Triangle Park, North Carolina. Inorganic analysis of soil and water samples was performed by S-Cubed of San Diego, California.

All laboratory analyses and laboratory quality assurance procedures used during this investigation were in accordance with standard procedures and protocols as specified in the Laboratory Operations and Quality Control Manual, United States Environmental Protection Agency, Region IV, Environmental Services Division, issued October 24, 1990; or as specified by the existing United States Environmental Protection Agency standard procedures and protocols for the Contract Laboratory Program (CLP) Statement of Work (SOW), as applicable.

4.2.2 Analytical Data Quality and Data Qualifiers

All analytical data were subjected to a quality assurance review as described in the EPA Environmental Services Division laboratory data evaluation guidelines. In the tables, some of the concentrations of the organic and inorganic parameters have been flagged with a "J". This indicates that the qualitative analysis was acceptable, but the quantitative value has been estimated. A few other compounds are flagged with an "N", indicating that they were detected based on the presumptive evidence of their presence. This means that the compound was tentatively identified, and its detection cannot be used as positive identification of its presence. Results for some background samples are reported with a "U" flag. This flag means that the material was analyzed for but not detected. The reported number is the laboratory-derived minimum quantitation limit (MQL) for the compound or element in that sample. At times, miscellaneous organic compounds that do not appear on the target compound list are reported with a data set. These compounds are labeled as "JN", indicating that they are tentatively identified at estimated quantities. Because these

TABLE 2

FIELD MEASUREMENTS
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

Sample Code	pH	Conductivity (umhos/cm)	Temp. (°F)
SE-SW-01	7.65	54	53.1
SE-SW-02	8.94	990	72.9
SE-SW-03	7.57	578	57.4
SE-SW-04	5.03	328	47.2
SE-SW-05	7.05	91	43.5

SE - Sprague Electric
SW - Surface Water

compounds are not routinely analyzed for or reported, background levels or MQL values are not generally available for comparison. The complete analytical data sheets and analytical data qualifier reports are presented in Appendix B.

4.2.3 Presentation of Analytical Results

This section presents a discussion and interpretation of the analytical results from the environmental samples collected during the investigation at Sprague Electric Company. Results of surface soil, subsurface soil, sediment, and surface water samples are presented in Tables 3, 4, 5, 6, 7, 8, and 9. Background samples have been designated for all media. Values for background sample results are presented as either a measured value or as the minimum quantitation limit (MQL). Samples containing concentrations of contaminants greater than three times the background level or MQL of these contaminants are considered to be elevated. These samples are noted in the text.

Summaries of inorganic analytical results can be found in Tables 3, 4, 5, and 6. There were four surface soil samples collected during the investigation. Sample SE-SS-02 was collected from the north side of the main facility adjacent to a drum storage area. This sample contained elevated levels of mercury (0.40J mg/kg; 3 times MQL), nickel (190 mg/kg; 5 times background), and zinc (260 mg/kg; 3 times background). Another surface soil sample containing elevated levels of metals was SE-SS-04, collected 20 feet east of the nitric and sulfuric acid storage tanks. This sample contained lead at an estimated level 3 times background (40J mg/kg). The remaining two surface soil samples contained no elevated levels of metals.

There were two subsurface soil samples collected. The onsite sample SE-SB-02 was taken from the same location as the corresponding surface soil sample (north of the main building adjacent to the drum storage area). It was determined that this sample contained beryllium at a level 3 times MQL (1.6 mg/kg).

There were five locations at which a sediment and a surface water sample were collected. Of the five sediment samples, only one, SE-SD-04, contained inorganics at elevated concentrations. This sediment sample was collected from a surface impoundment located east of the facility building. SE-SD-04 contained aluminum (290,000 mg/kg; 8 times background), mercury (0.8J mg/kg; 4 times MQL), and sodium (9100 mg/kg; 25 times MQL).

TABLE 3

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (mg/kg)	Background SE-SS-01	North of Main Building, Adjacent to Drum Storage Area SE-SS-02	West of Main Building, Adjacent to the Nitric and Sulfuric Acid Storage Tanks SE-SS-03	20 feet West of Nitric and Sulfuric Acid Storage Tanks SE-SS-04
ALUMINUM	43,000	25,000	69,000	41,000
ARSENIC	3.5	-	2.7	-
BARIUM	270	380	210	640
CADMIUM	1.1U	2.4	-	-
CALCIUM	2700	5400	5500	2600
CHROMIUM	88	45	93	92
COBALT	24	22	52	25
COPPER	42	100	42	37
IRON	48,000	36,000	58,000	54,000
LEAD	13J	33J	14J	40J
MAGNESIUM	7600	7700	5600	13,000
MANGANESE	590U	650	1300	700
MERCURY	0.13U	0.40J	-	-
NICKEL	35	190	35	38
POTASSIUM	3700	4900	1600	9900

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.

TABLE 3

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (mg/kg)	Background SE-SS-01	North of Main Building, Adjacent to Drum Storage Area SE-SS-02	West of Main Building, Adjacent to the Nitric and Sulfuric Acid Storage Tanks SE-SS-03	20 feet West of Nitric and Sulfuric Acid Storage Tanks SE-SS-04
SODIUM	3600	-	-	-
VANADIUM	120	110	170	130
ZINC	76	260	68	86
CYANIDE	0.66U	-	0.86	0.89

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.

TABLE 4

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (mg/kg)	Background SE-SB-01	North of Main Building, Adjacent to Drum Storage Area SE-SB-02
ALUMINUM	22,000	26,000
BARIUM	170	360
BERYLLIUM	0.53U	1.6
CADMIUM	0.96U	-
CALCIUM	2900	6600
CHROMIUM	68	37
COBALT	23	23
COPPER	36	37
IRON	30,000	39,000
LEAD	5.6J	3.2J
MAGNESIUM	6300	9000
MANGANESE	560	620
NICKEL	24	18
POTASSIUM	2700	6300
VANADIUM	81	120
ZINC	47	39

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.

TABLE 5

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (mg/kg)	Background SS-SD-01	Downstream, West of Facility on the New River SE-SD-02	Downstream, North of Facility on the New River SE-SD-03	Surface Impoundment East of Facility SE-SD-04	Downstream, Southeast of Facility on the New River SE-SD-05
ALUMINUM	37,000	6000	17,000	290,000	12,000
BARIUM	290	51	120	55	98
CALCIUM	2400	1500	3400	750	1500
CHROMIUM	48	17	36	23	26
COBALT	28	6.8	17	5.7	12
COPPER	32	35	53	46	22
IRON	49,000	12,000	25,000	13,000	18,000
LEAD	31J	17J	27J	7.3J	9.2J
MAGNESIUM	7800	1800	4400	1200	3600
MANGANESE	920	210	480	110	360
MERCURY	0.18U	-	-	0.80J	-
NICKEL	28	28	21	15	14
POTASSIUM	4500	-	2500	1600	2100
SODIUM	U	-	-	9100	-
VANADIUM	100	32	67	43	45
ZINC	99	39	100	48	49
CYANIDE	0.91U	-	-	1.7	-

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.

Elevated inorganic concentrations were detected in three of the surface water samples. Sample SE-SW-02, collected downstream on the New River west of the site, contained copper (29 ug/l; 7 times MQL), sodium (13,000 ug/l; 5 times MQL), and zinc (43 ug/l; times MQL). The surface water collected from a surface impoundment (SE-SW-04) contained calcium (11,000 ug/l; 3 times background), manganese (120 ug/l; 6 times MQL), and sodium (47,000 ug/l; 19 times MQL). SE-SW-05 was collected downstream on the New River southeast of the site. This sample contained elevated concentrations of iron (800 ug/l; 4 times MQL) and manganese (100 ug/l; 5 times MQL).

Most of the metals detected can be attributed to operations at the facility. The plant manufactures aluminum electrolytic capacitors. Many metals are commonly found in a binary system with aluminum, including beryllium, copper, iron, manganese, nickel, lead, and zinc (Ref. 27). These and other impurities can be removed from aluminum in the etching bath process. This could explain their presence in samples collected during the investigation. The source of the mercury (identified in estimated values in two of the samples) is uncertain. The major use of mercury is in electrical applications such as batteries, electric lamps, wiring and switching devices (Ref. 28).

Summaries of organic results can be found in Tables 7, 8, and 9. There were no organic compounds detected at elevated levels in any of the samples collected. There were, however, several polynuclear aromatic hydrocarbons detected in estimated concentrations in a few of the onsite soil samples. These contaminants were not, however, at concentrations above the MQLs for those compounds.

TABLE 7

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (ug/kg)	Trip Blank SE-TB-01S	Background SE-SS-01	North of Main Building, Adjacent to Drum Storage Area SE-SS-02	West of Main Building, Adjacent to the Nitric and Sulfuric Acid Storage Tanks SE-SS-03	20 feet West of Nitric and Sulfuric Acid Storage Tanks SE-SS-04
EXTRACTABLE COMPOUNDS					
ACENAPHTHENE	-	890U	81J	-	-
FLUORENE	-	890U	86J	-	-
PHENANTHRENE	-	890U	780J	130J	-
ANTHRACENE	-	890U	190J	-	-
FLUORANTHENE	-	890U	-	160J	-
PYRENE	-	890U	480J	-	-
CHRYSENE	-	890U	310J	-	-
BENZO(B AND/OR K)FLUORANTHENE	-	890U	420J	-	-
BENZO-A-PYRENE	-	890U	430J	-	-
INDENO (1,2,3-CD) PYRENE	-	890U	210J	-	-
BENZO(GHI)PERYLENE	-	890U	230J	-	-
UNIDENTIFIED COMPOUNDS	-	7000J/5	800J	3000J/3	-
BENZACEPHENANTHRYLENE(1)			500JN		

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.
N Presumptive evidence of presence of material.
(1) Tentatively identified and unidentified compound. This compound is not on Target Compound List and is reported only as detected in individual samples; MQL not determined.

TABLE 8

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (ug/kg)	Background SE-SB-01	North of Main Building, Adjacent to Drum Storage Area SE-SB-02
EXTRACTABLE COMPOUNDS		
PHENANTHRENE	810U	110J
FLUORANTHENE	810U	91J

J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.

TABLE 9

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES
SPRAGUE ELECTRIC COMPANY
LANSING, ASHE COUNTY, NORTH CAROLINA

PARAMETERS (ug/kg)	Background SE-SD-01	Downstream, West of Facility on the New River SE-SD-02	Downstream, North of Facility on the New River SE-SD-03	Surface Impoundment West of Facility SE-SD-04	Downstream, Southeast of Facility on the New River SE-SD-05
PURGEABLE COMPOUNDS					
CHLOROFORM	10U	-	6J	-	-
EXTRACTABLE COMPOUNDS					
PHENANTHRENE	1300U	-	170J	-	-
DI-N-BUTYLPHTHALATE	1300U	-	170J	-	-
FLUORANTHENE	1300U	-	220J	-	-
PYRENE	1300U	-	120J	-	-
BENZO-A-PYRENE	380J	-	-	-	-
UNIDENTIFIED COMPOUNDS	10,000J/5	-	3000J/2	30,000J/14	5000J/5
PHOSPHORIC ACID, DIOCTADECYLESTER(1)	2000JN				1000JN
PETROLEUM PRODUCT(1)				N	
HYDROXYPHENYLMETHYLPHENOL(1)					700JN

- Material analyzed for but not detected above minimum quantitation limit (MQL).
J Estimated value.
U Material was analyzed for but not detected. The number given is the MQL.
N Presumptive evidence of presence of material.
(1) Tentatively identified and unidentified compound. This compound is not on Target Compound List and is reported only as detected in individual samples; MQL not determined.

5.0 SUMMARY

The surface water pathway is of concern from operations conducted at Sprague Electric Company. Contaminants can enter the river directly via surface water run-off, or indirectly by downward leakage through surface and subsurface soils, through percolation from the lagoon system, or by rainfall, until they reach the water table which eventually discharges into the New River. The New River is utilized for recreational fishing, boating and swimming. The groundwater pathway is also of concern due to the use of the unconfined crystalline rock aquifer in the area. Within a 4-mile site radius, approximately 600 municipal customers and 800 private residences utilize groundwater to supply their potable water needs. The air migration and onsite exposure pathways are of least concern at the facility due to restricted site access, however, onsite employees could be potentially exposed to organic and inorganic contaminants detected in onsite surface soil samples.

The sampling investigation consisted of the collection of 16 environmental samples: four surface soil, two subsurface soil, five sediment, and five surface water samples. No organic compounds were detected at concentrations above the MQLs for those compounds. Several polynuclear aromatic compounds were detected at estimated concentrations in a few of the onsite soil samples, but they are not believed to be site related. Surface and subsurface soil samples collected near the drum storage area and near the storage tank area were found to be contaminated with five different inorganic contaminants. Inorganic contaminants of greatest concern include lead and zinc, which are potential impurities removed from aluminum in the etching bath process. Mercury, which is utilized in electrical applications, was detected in a subsurface soil sample collected near the drum storage area. A sediment sample collected from a surface impoundment contained several metals including aluminum and mercury which are potentially site related. Analysis of surface water samples collected downstream of the facility and from one of the facility's surface impoundments revealed the presence of six inorganic substances. Most notably, copper, iron, manganese, and zinc were detected, and all are potential constituents of the aluminum etching bath process. It appears that these inorganic contaminants have the potential to enter the New River.

Based on the analysis of possible migration pathways, the results of the sampling investigation, and the information obtained from the references, FIT 4 recommends that this site be evaluated using the HRS (effective March 14, 1991).

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