United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R04-87/030
September 1987

EPA

Superfund Record of Decision:

Independent Nail, SC

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA/ROD/R04-87/030		

TLE AND SUBTITLE	5. REPORT DATE
SUPERFUND RECORD OF DECISION Independent Nail, SC First Remedial Action	September 28, 1987 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report 14. SPONSORING AGENCY CODE 800/00
15. SUPPLEMENTARY NOTES	

16. ABSTRACT

The Independent Nail Company site, occupying 24.6 acres, is located near Beaufort, South Carolina. Land use in the vicinity of the site is a combination of fields, woodlands and wetlands. Endangered and threatened species may occur within the area of influence of the site, although habitation has not been confirmed. The previous owners of the site, the Blake and Johnson Company, manufactured metallic screws and fasteners. As part of the manufacturing process, the company discharged approximately 33,000 gallons per day of plating wastewater into an unlined infiltration lagoon. The lagoon was in use from approximately 1969 to 1980. The South Carolina Department of Health and Environmental Control (SCDHEC) reported that the wastewater contained some organic cleaning solvents, phosphate, cyanide, chromium, cadmium, lead, mercury, nickel, zinc, copper and iron. In April 1980 the Blake and Johnson Company ceased operation. Two months later the Independent Nail Company purchased the plant. They currently operate a paneling nail coating process at the plant, but do not discharge any wastewater to the lagoon. The primary contaminants of concern to the soil and sediment include: cadmium, chromium, nickel and zinc.

The selected remedial action for this site includes: excavation of contaminated soils and lagoon sediments; solidification/stabilization of excavated soils and sediments (6,200 yd^3); placement of treated soils and sediments back into the excavated lagoon
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Independent Nail, SC First Remedial Action Contaminated Media: soil, sediment Key contaminants: chromium, other heavy metals		

DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 55
	20. SECURITY CLASS (This page) None	22. PRICE

EPA/ROD/R04-87/030
Independent Nail, SC
First Remedial Action

16. ABSTRACT (continued)

and cover with 6 inches of top soil and seed. The estimated capital cost for this remedial action is $1,032,000 with annual O&M of $22,500 for years 1-2 and $5,600 for years 3-30.

DECLARATION FOR THE RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Independent Nail Company
Beaufort, Beaufort County, South Carolina

Statement of Purpose:
This decision document represents the selected remedial action for this Site developed in accordance with CERCLA as amended by SARA, and to the extent practicable, the National Contingency Plan. The State of South Carolina concurs with the selected remedy.

Statement of Basis
This decision is based upon the administrative record for the Independent Nail Company Site. The attached index identifies the items which comprise the administrative record upon which the selection of a remedial action is based.

Description of Selected Remedy:

* This is Operable Unit One of the Remedial Actions to be undertaken at the Site. It is a source control measure to mitigate the threat of off-site migration (via air pathways or groundwater) of metals contamination. The RI/FS for groundwater (Operable Unit Two) is currently underway.

* Soils/Lagoon Sediments

- Excavation of contaminated soils and lagoon sediments.
- Solidification/stabilization of excavated soils and sediments.
- Backfilling of excavated lagoon sediments with a bottom layer of clean soil.
- Return of treated soils and sediments to the lagoon at a level of approximately two feet above the high groundwater table.
- Vegetation cover of top soil and grass seed over treated material.
- Based on the Endangerment Assessment performed for the site, this remedy would entail treatment of a total of 6200 cubic yards of soil/sediments to achieve a lifetime cancer risk level of 10^{-6} or less.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

I have also determined that the action being taken is appropriate when balanced against the availability of trust fund monies for use at other sites.

9/28/87
Date

Lee A. DeHihns III
Acting Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

INDEPENDENT NAIL COMPANY SITE

BEAUFORT COUNTY, SOUTH CAROLINA

Prepared By:

U.S. Environmental Protection Agency
Region IV
Atlanta, Georgia

TABLE OF CONTENTS

LIST OF FIGURES & TABLES

ATTACHMENTS

RECORD OF DECISION
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
INDEPENDENT NAIL COMPANY SITE
BEAUFORT COUNTY, SOUTH CAROLINA

1.0 Introduction

The Independent Nail Company Site was added to the National Priorities List (NPL) in September 1984. Thus far, Operable Unit 1 of the Independent Nail Company Site has been the subject of a remedial investigation (RI) and feasibility study (FS) performed by the Region IV REM II Contractor, Camp, Dresser & McKee, Inc. (CDM). No monitor wells were installed to keep the costs for the study within the predefined limit. Operable Unit 2, a RI/FS for groundwater, is currently underway. The Operable Unit 1 RI Report, which examines soil and sediment contamination at the site, was issued June 8, 1987. The FS, which develops and examines alternatives for remediation of the site, was issued in draft form to the public on July 27, 1987.

This Record of Decision has been prepared to summarize the remedial alternative selection process and to present the selected remedial alternative.

Site Location and Description

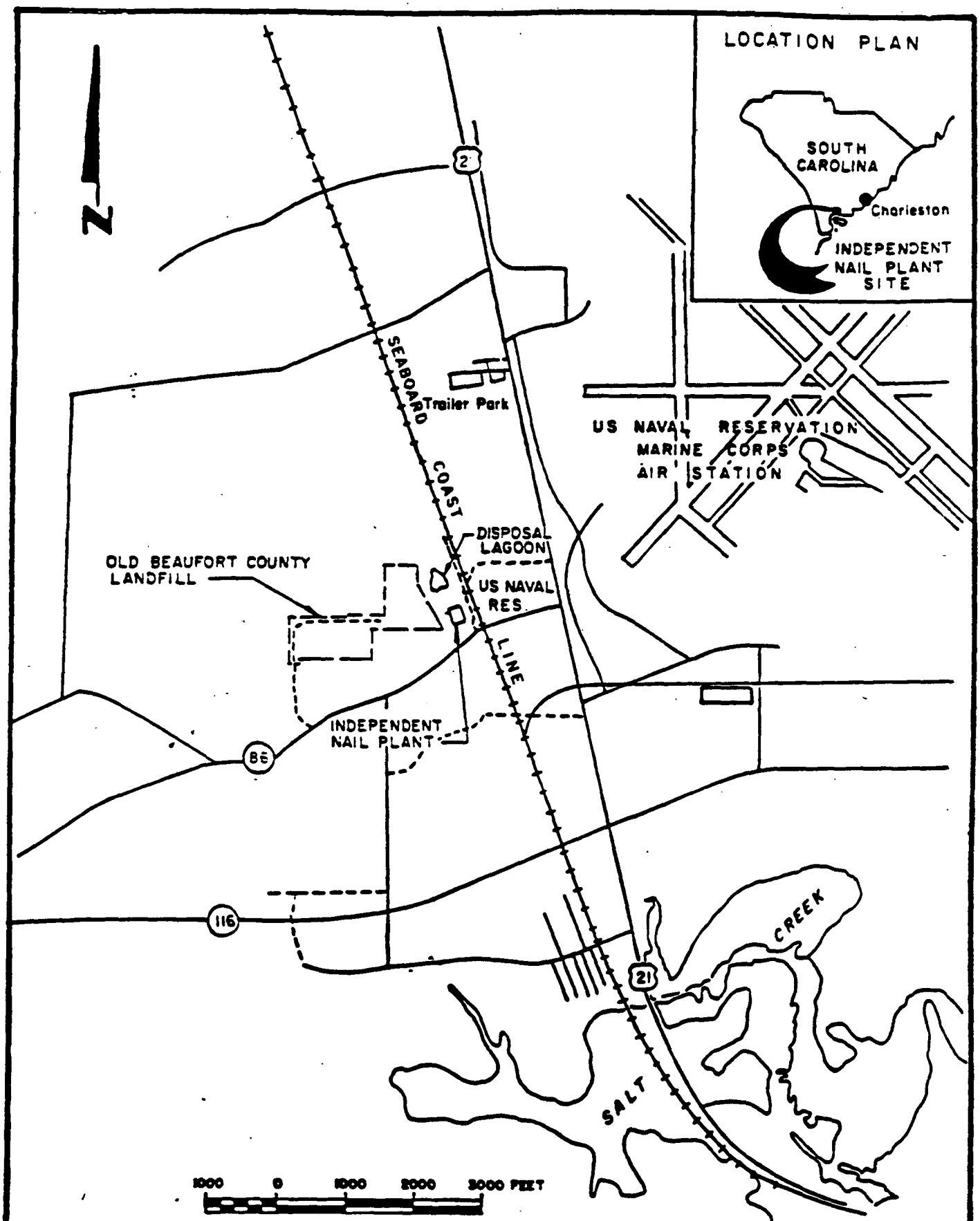
The Independent Nail Site is located near Beaufort, South Carolina on South Carolina State Route 86, 3,200 feet west of Highway 21 (Figure 1-1 and Figure 1-2). The Independent Nail Company property occupies 24.6 acres. The site is located at latitude N 32 degrees 80'00" and longitude W 80 degrees 44'30" and at N-230,750, E-2,079,500 based on the South Carolina Coordinate System, South Zone. The area is rural with some light industry. Several residences are located near the site on South Carolina Route 86. The old Beaufort County Landfill is located near the site to the west. The U.S. Marine Corps Air Station is located east of the site across Highway 21. Kalama Specialty Chemicals was once located approximately one half mile north of the site. The company is no longer in operation. The town of Beaufort, South Carolina is approximately three miles to the southeast. Savannah, Georgia is approximately 40 miles to the southwest. It is estimated that less than 25 people live within one quarter mile of the site.

Land use in the vicinity of the site is a combination of fields, woodlands and wetlands. Major surface waters with associated wetlands are located within 1.5 miles south of the site. The nearest surface waters are Mulligan Creek which is approximately two miles to the northeast and Salt Creek which is located approximately 1.5 miles to the south. Salt Creek may not be in the drainage path (EPA, 1983). A drainage map is shown on Figure 1-3.

Single family residences are located south of the site along South Carolina Route 86. The largest residential development in the area is the Laurel Bay Naval Housing Area located approximately three miles to the west.

Small commercial areas are located north and south along Route 21 in the vicinity of the towns of Grays Hill and Burton, respectively. Several small industries are also scattered around the area. Agricultural lands are found in the surrounding area. An old borrow pit is located to the north.

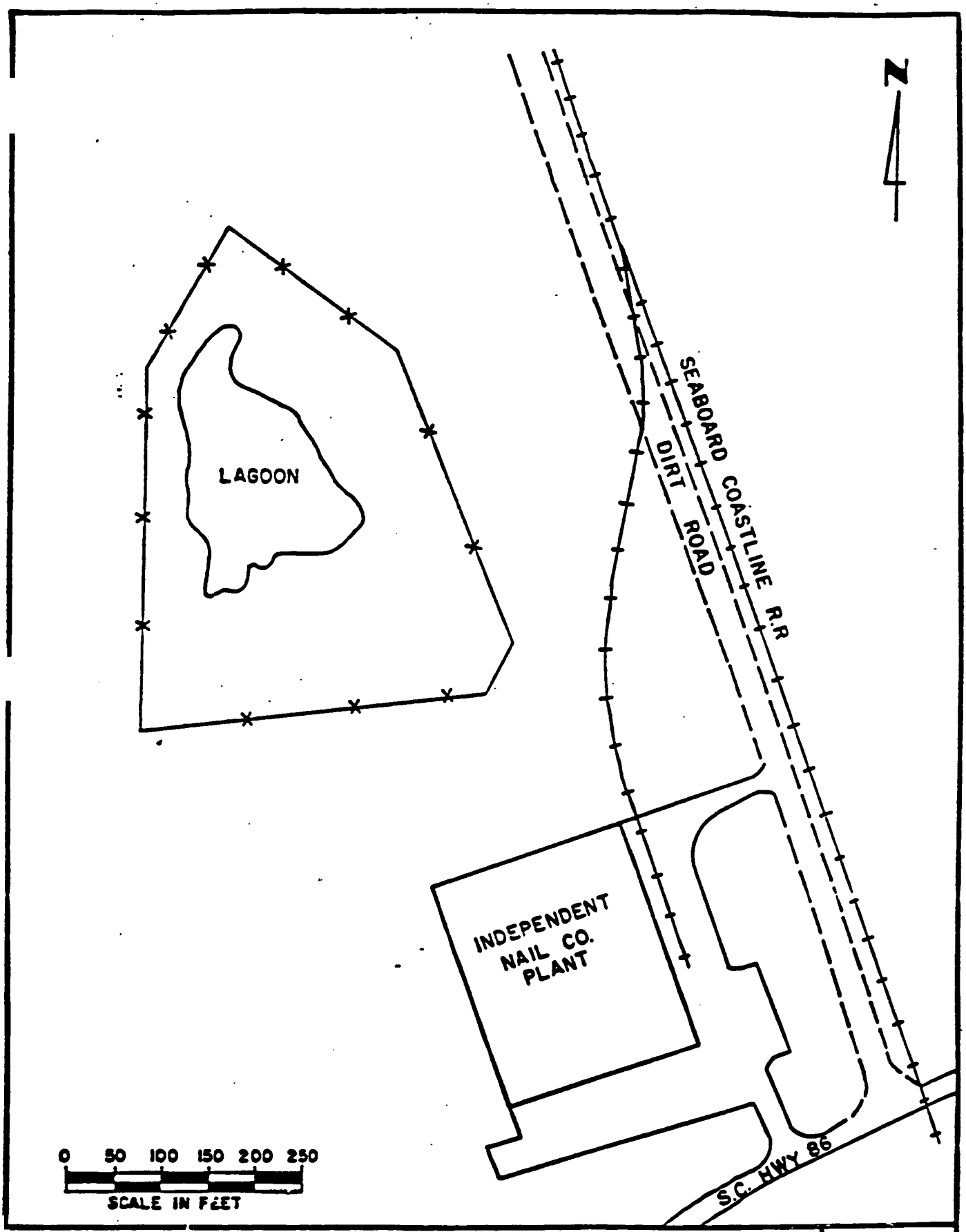
The U.S. Fish and Wildlife Service (1987) indicated that endangered and threatened species may occur in the area of influence of the Independent Nail Company Site. These species are the West Indian manatee, bald eagle,



LOCATION PLAN

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA

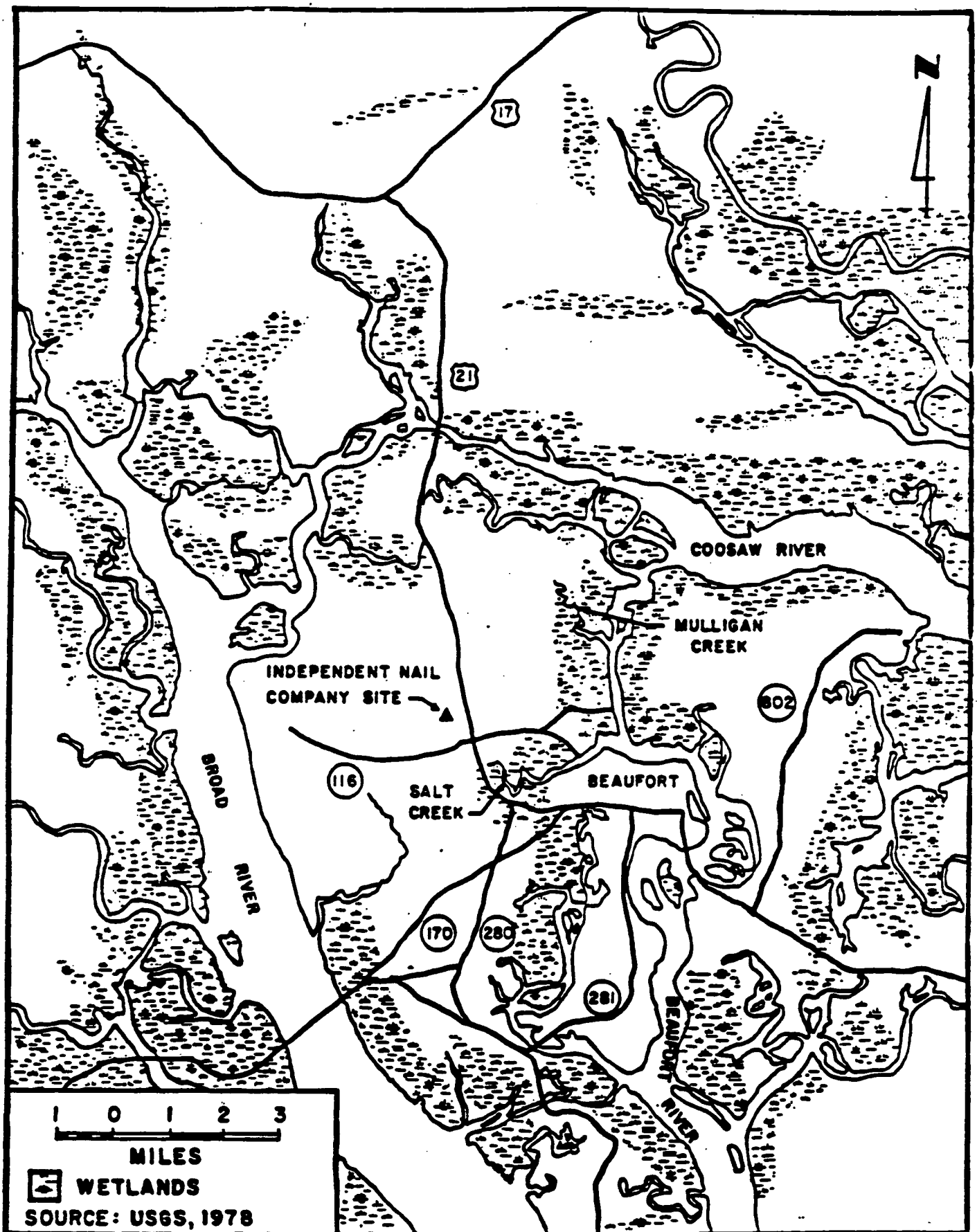
FIGURE NO. 1-1



AREA MAP

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA

FIGURE NO.
1-2



DRAINAGE MAP

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA

FIGURE NO.
1-3

wood stork and Artic peregrin falcon (endangered) and the American alligator (threatened). However, these species have not been confirmed to be habitating areas that may be impacted by the site.

The lagoon is presently inactive and is surrounded by a fence. Rain water collects in the lagoon. The topography of the site is such that precipitation which may come in contact with contaminants does not run off. The water level in the lagoon varies at different times of the year depending on the level of the ground water table. The Independent Nail Company plant is directly south of the lagoon.

The areas to the north, east and west are wooded. The old Beaufort County landfill is located to the west and northwest. A Seaboard Coast Line Railroad spur parallels the site to the east.

Ground water is an important source of water supply in the site vicinity for private, municipal and commercial use. However, many wells are used only at times of peak water demand and as backup wells. The Burton Well Field, approximately 2.5 miles southeast of the site, is used to handle peak demand from May through September in combination with Savannah River water. The Marine Corps Air Station, located east of the site, and the Laurel Bay Naval Housing Area to the west, rely on wells placed in the deep Floridan Aquifer as a backup water supply. Because these wells are deep and the ground water flow through the site is parallel to the air station and housing area, it is unlikely that these populations would be at risk from any contamination emanating from the site. Private homes immediately south of the site are connected to the municipal water supply, however several have private wells that are likely used for lawn and garden watering. These wells may be screened in the water table aquifer. Several industries in the local area also use well water for their process waters (EPA, 1983).

Other local natural resources include sand and gravel pits and agricultural land scattered throughout the area.

The topography of Beaufort County consists of nearly level lowland and low ridges that have slopes of less than 2 percent. The area surrounding Independent Nail Company Site is at an elevation of approximately 40 feet, which is the high point of the area (US Geological Survey, 1979). The on-site land surface slopes from approximately 38 to 40 feet above mean sea level at the fence surrounding the lagoon to less than 30 feet at the center of the lagoon. A topographic map of the Independent Nail Company Site is presented as Figure 1-4. Figure 1-5 shows the topography for the general area based on the US Geological Survey map for the area.

2.0 Site History

PERMIT AND REGULATORY HISTORY

The Blake and Johnson Company (previous owners of the site) manufactured metallic screws and fasteners. As part of the manufacturing process, the company discharged approximately 33,000 gallons per day of plating wastewater into an unlined infiltration lagoon (EPA, 1983). The discharge may have been as high as approximately 75,000 gallons per day (South Carolina State Board of Health and Pollution Control Authority, 1968). The lagoon was in use from approximately 1969 to 1980. The South Carolina Department of Health and

Environmental Control (SCDHEC) reported that the wastewater contained some organic cleaning solvents, phosphate, cyanide, chromium, cadmium, lead, mercury, nickel, zinc, copper and iron. In April 1980, the Blake and Johnson Company ceased operation. Two months later, the Independent Nail Company purchased the plant. The Independent Nail Company currently operates a panelling nail coating process at the plant, but does not discharge any wastewater to the lagoon.

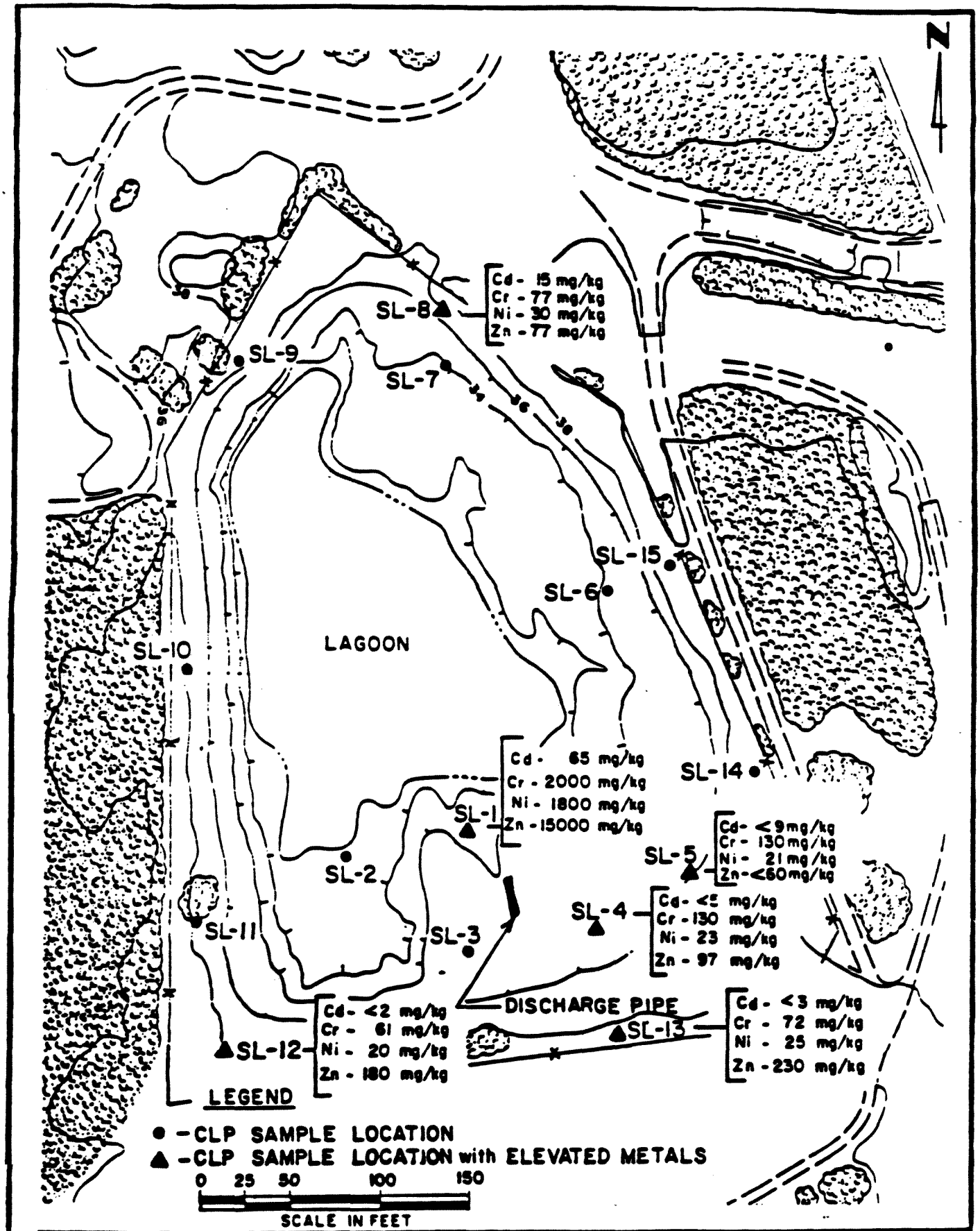
A study done by SCDHEC from May 21 to 23, 1975 revealed that a break in the side of the lagoon may have allowed wastewater from the lagoon to enter a drainage ditch located north of the lagoon. Analysis of a sample collected from this ditch in August 1975 showed cadmium and chromium contamination. The break and resulting discharge appear to have been a single, short term incident.

Beginning in August 1975, the state of South Carolina and a local engineering firm (Davis and Floyd) conducted several ground water investigations. Monitor wells were placed into the water table aquifer at various locations near the lagoon. The results of these sampling efforts indicated that the quality of the ground water was being affected by the wastes discharged to the lagoon. Chromium, lead, iron, and mercury concentrations were found in excess of drinking water standards in some of these water samples.

Sampling performed on April 21, 1980 indicated that concentrations of chromium and lead in the ground water exceeded drinking water standards. The chromium level in one well was 0.210 mg/l and the lead concentration in another was 0.150 mg/l. A second sampling of the same wells in May 1980 found chromium levels in two wells exceeding drinking water standards. Lead concentrations were all below the drinking water standard. The drinking water standard (Maximum Contaminant Level) for both of these metals is 0.05 mg/l. Later in May 1980, SCDHEC requested that three intermediate depth (40 to 50 feet) wells be installed for monitoring. Chromium levels in all three of these wells exceeded drinking water standards when sampled in June 1980. However, sampling of these wells by REM II personnel in August 1985 showed no metal contamination above drinking water standards, based on local laboratory analytical data.

On June 11, 1980, the Industrial and Agricultural Wastewater Division of SCDHEC sent a letter to Blake and Johnson stating that ground water at the facility contained "chromium at approximately the concentration of the drinking water standard. Based on this information, there is little likelihood of finding serious contamination of ground water". The following day, a letter was sent by SCDHEC to Independent Nail relating "we have recently completed evaluation of ground water at Blake and Johnson with favorable results".

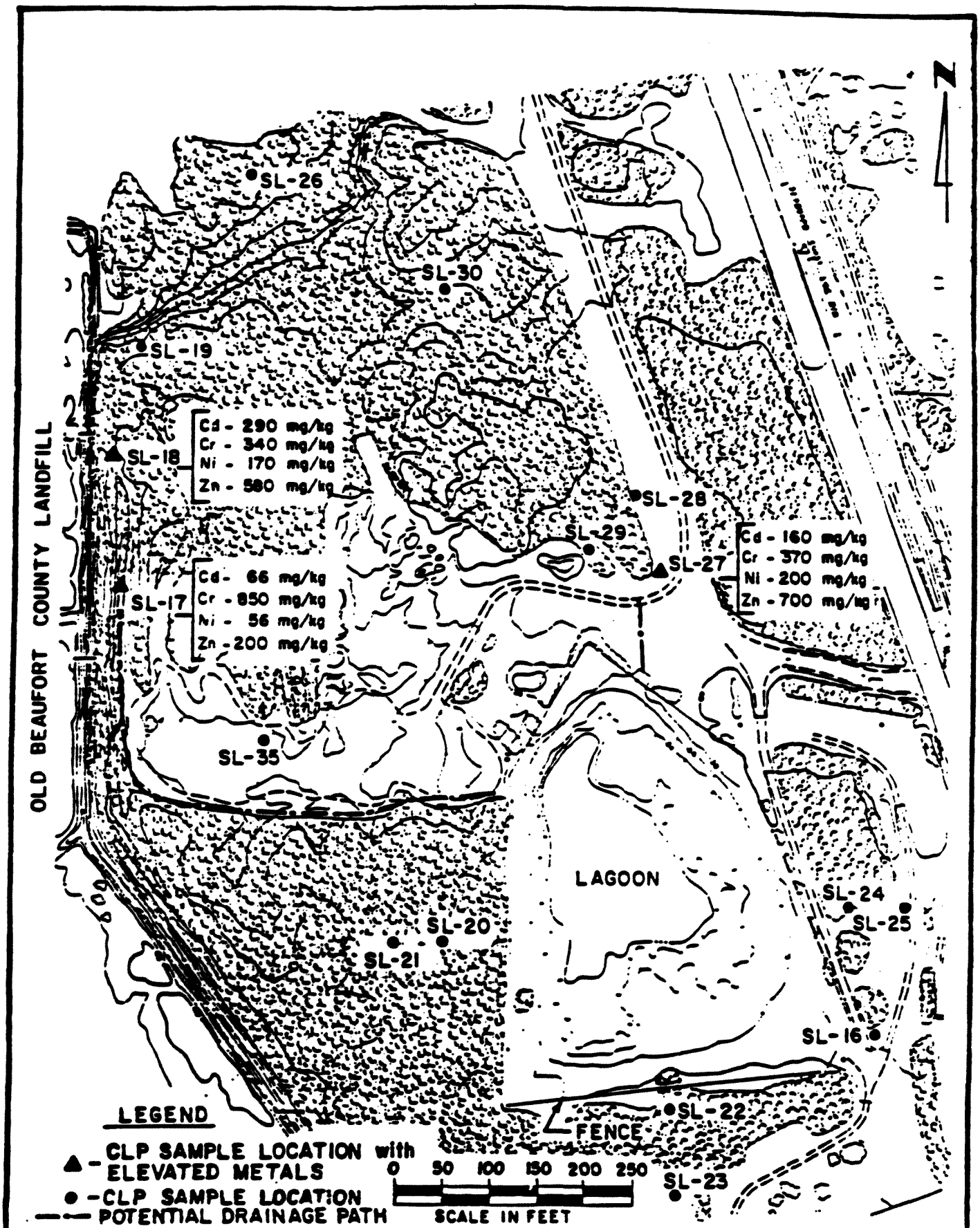
EPA became involved with the site on February 26, 1981 with the preparation of a Potential Hazardous Waste Site Investigation Report and Preliminary Assessment Report. In April 1981, a site inspection was undertaken, and as a result, a Final Strategy Determination (May 18, 1981) stated that "no action [was] needed" at the site. On November 6, 1981, a SCDHEC interagency memo from the Ground Water Protection Division stated the seriousness of land disposal practices in the vicinity of the site due to its location in a major recharge zone. The memo also stated that the previous SCDHEC letters of June 11 and 12, 1980 were "not consistent with our assessment of the situation".



SOIL SAMPLE LOCATIONS WITHIN THE FENCE

FIGURE NO 3-1

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA



SOIL SAMPLE LOCATIONS OUTSIDE THE FENCE

FIGURE NO. 3-2

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA

3.0 Site Contaminants

The several sampling efforts by SCDHEC indicated that metals are of main concern at the site, particuarly lead, chromium, cadmium, nickel and zinc. With the exception of lead, this was confirmed by REM II's RI.

Remedial Investigation

The remedial investigation study, conducted from September through November, 1986 determined the presence and extent of contamination in the soil, surface waters and sediments on the site and in apparent drainage paths near the lagoon. Samples were taken of each of the media to document the source of contamination and its boundaries and the extent of on-site and off-site contamination. Data were collected to characterize the site and support the analysis of remedial alternatives during the feasibility study.

Soil Data - Soil contamination was primarily found in the lagoon and areas within the fence and at two areas outside of the fence. Metal contamination, particularly Cadmium, Chromium, Nickel and Zinc are of concern. Some organics were found in some samples, however, there was no pattern of detection and these are not believed to originate on-site. Unidentified compounds and evidence of petroleum products were also found in numerous samples, again with no pattern of detection. These compounds may be attributable to military aircraft which often fly low over the area during take-offs and landings from the nearby U.S. Marine Corps Air Station or may be a result of off-road vehicles, truck traffic along Route 86 or from the nearby railroad spur. Because organics do not appear to be a result of site operations, they will not be considered for cleanup.

Vertically, soil contamination was limited to surface samples. Subsurface samples collected approximately 20 inches below the surface contained background levels of contaminants. Soil was estimated to be contaminated to a depth of one foot. Confirmatory soil sampling would be performed during the implementation of a remediation. The depth of contamination in the lagoon sediments could not be determined since only surface samples were taken. Surface sediment samples taken from the lagoon are estimated to be contaminated to a depth of two feet. Confirmatory sampling would be performed during remediation.

Figures 3-1 and 3-2 delineate the areas investigated where soil samples contained metals at concentrations an order of magnitude greater than background. Concentrations of various metals found in the soils on-site (within the fence) are shown in Table 3-1. The table gives the concentrations of metals found in sample INC-SL-01-1 which was taken at the abandoned discharge pipe, the concentrations of metals in all other samples within the fence (excluding sample INC-SL-01-1), and the geometric mean for all surface soil samples taken from within the fence. The ranges of metal concentrations in the lagoon sediment samples and background soil samples are also given.

Surface Water/Sediment Data - Surface water and sediment samples were taken from two locations in the lagoon, from a ditch near the old Beaufort County Landfill and from another ditch surrounding the landfill. The samples taken from the ditches showed only Zinc in detectable quantities. The levels detected were well below the secondary drinking water standard for Zinc (5,000 ug/l), but above ambient water quality criteria for protection of human health and aquatic life. Samples taken from within the lagoon showed elevated levels

of Nickel and Zinc. Nickel was detected at 100 ug/l in both samples and Zinc at 500 and 620 ug/l.

Sediment samples were taken at the same locations as surface water samples. Cadmium, chromium, nickel and zinc were detected in all sediment samples. Maximum concentrations were detected in a sample taken from the lagoon. These maximum concentrations are show in Table 3-1.

4.0 ENDANGERMENT ASSESSMENT

ICF/Clement Associates, Inc. performed an endangerment assessment for the site based on analytical results for soils, surface water and sediment. Cadmium, Chromium, Cyanide, Nickel and Zinc were identified as contaminants of concern. The primary exposure pathways for these chemicals are in direct contact with surface soils and the inhalation of airborne contaminated dust.

Toxicity of Contaminants

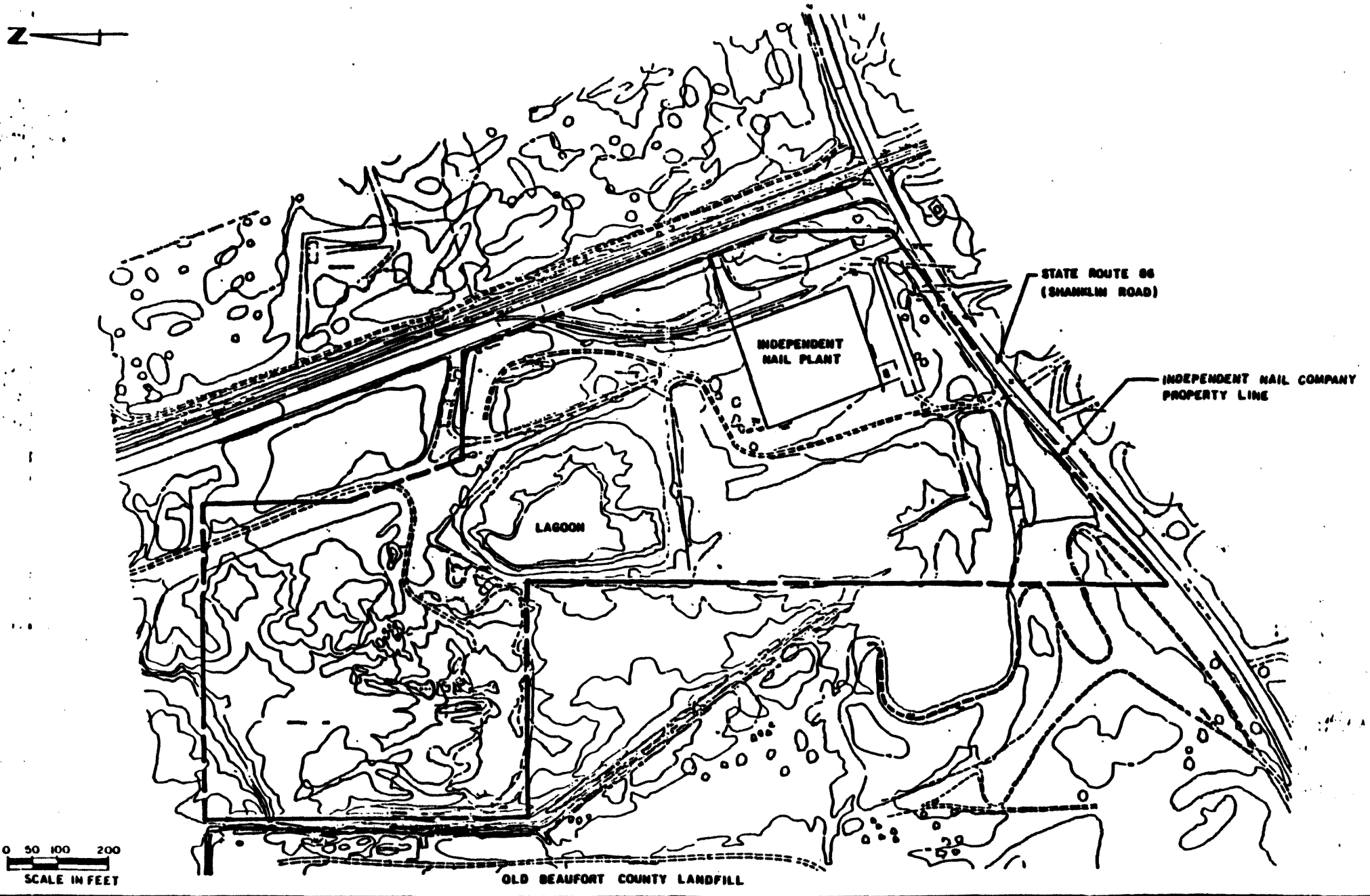
Brief descriptions of the toxic effects of the contaminants of concern are given in the following paragraphs. Detailed descriptions and the cited references can be found in the Remedial Investigation Report for the site (Document Control No. 237-RI1-RT-EFPL, dated June 1, 1987).

Cadmium - Cadmium is an element of the transitional metal series that occurs widely in nature, usually in lead or Zinc ores. Elemental Cadmium is insoluble in water, although many Cadmium salts are quite soluble (EPA 1985, a,b). The general human population is exposed to Cadmium in drinking water and food; cigarette smoke also contains high levels of Cadmium. Additional inhalation exposure occurs in industrial settings (EPA 1985 a,b).

The toxicology of Cadmium has been reviewed by Friberg, et al. (1974), the International Agency for Research on Cancer (IARC) (1976), and EPA (1980, 1981, 1985b,c). Injection of Cadmium into laboratory animals results in injection-site sarcomas and testicular tumors of the Leydig cells (EPA 1981). A relationship between human exposure to Cadmium and cancer of the prostate, lung, or kidney has been suggested by several epidemiological studies (Thun, et al. 1985, EPA 1985b). Cadmium may impair DNA repair, but has not been shown to be mutagenic. It is a well-documented animal teratogen.

Cadmium bioccumulates in mammals, particularly in the kidney and liver (EPA 1981, 1985c). Epidemiological studies have revealed an association between nonmalignant pulmonary diseases and inhalation of Cadmium. Renal tubular disfunction, of which the first sign is proteinuria, occurs at lower levels of oral or inhalation exposure to Cadmium and may be the primary defect responsible for the bone damage characteristic of Itai-Itai disease. It is also suspected that chronic exposure to Cadmium produces hypertension, anemia, sensory loss (particularly smell), endocrine alterations, and immunosuppression in humans.

Cadmium and some of its compounds are known to be carcinogenic in experimental animals exposed by injection or inhalation, but the carcinogenic effects are absent when Cadmium is administered orally (EPA 1985b). It is not known which cadmium compounds are responsible for the inhalation carcinogenic effects in humans.



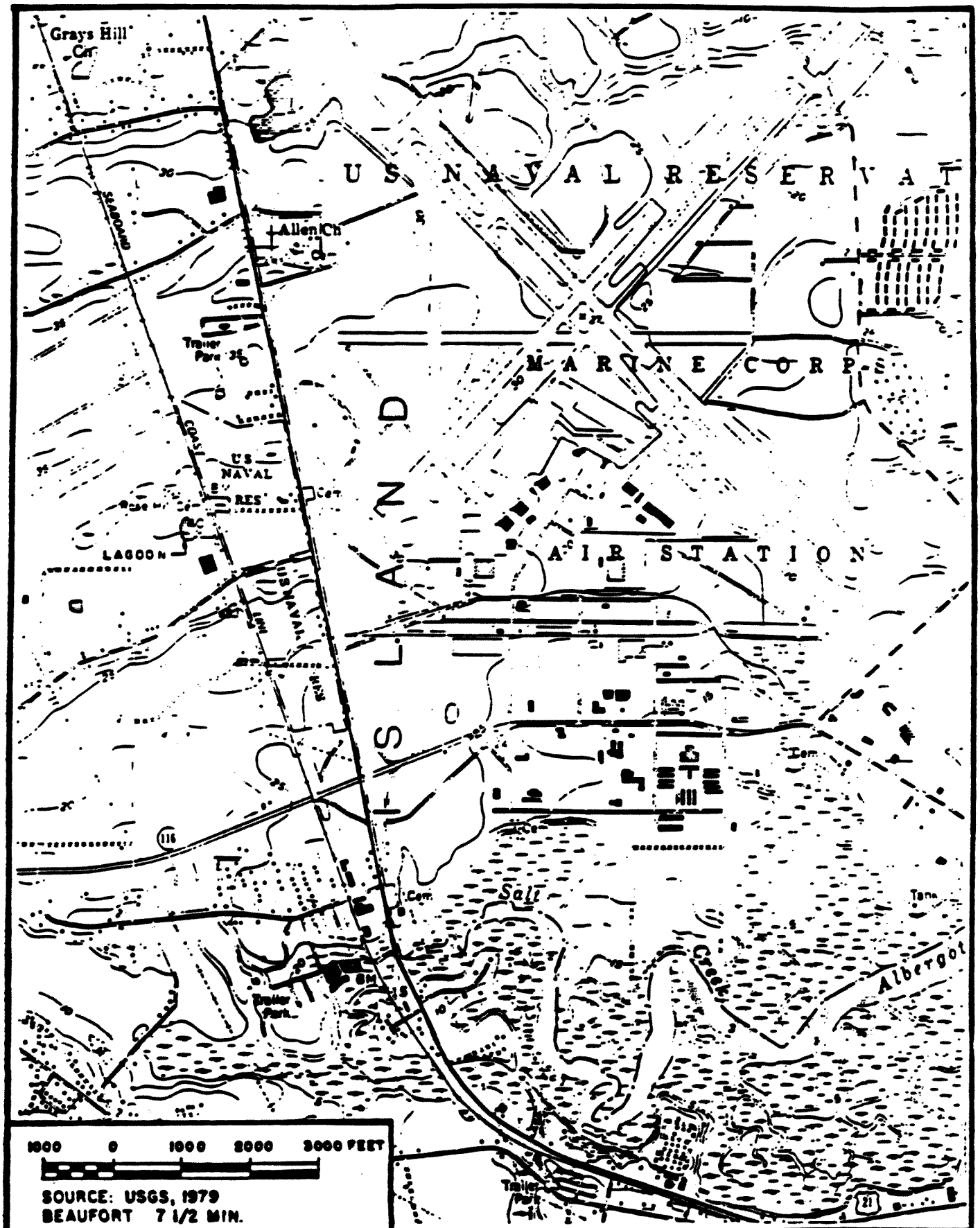
CONTOUR MAP

INDEPENDENT NAIL CO. SITE

BEAUFORT, N. CAROLINA

FIGUR

1-4



AREA TOPOGRAPHIC MAP

INDEPENDENT NAIL CO. SITE
BEAUFORT, S. CAROLINA

FIGURE NO.
1-5

TABLE 3-1

DETECTED CONCENTRATIONS OF METALS
IN SOIL AND SEDIMENT
INDEPENDENT NAIL COMPANY SITE
BEAUFORT, SOUTH CAROLINA

	CONCENTRATION, MG/KG AND FREQUENCY OF DETECTION (#)				
METAL	SAMPLE NEAR DISCHARGE PIPE	RANGE OF ALL OTHER SURFACE SOIL SAMPLES WITHIN FENCE	GEOMETRIC MEAN SURFACE SOIL SAMPLES WITHIN FENCE	RANGE OF LAGOON SEDIMENT SAMPLES	RANGE OF BACKGROUND SURFACE SOIL SAMPLES
Antimony	55JN	U-16 (1)	4.6	U	U
Arsenic (2)	U	U-19 (3)	1.4	U	U
Beryllium	U	U	U	U	U
Cadmium	65JN	U-15 (2)	2.9	22-27 (2)	U-2.6 (1)
Chromium	2,000	U-130 (9)	44.8	93-310 (2)	U-5.3 (1)
Copper	89	U-20 (1)	4.9	U-25 (1)	U-8.9 (1)
Lead	13	U-14 (12)	8.5	U-4.6 (1)	12-34 (4)
Mercury	U	U	U	U	U
Nickel	1,800	1-30 (14)	13.8	19-150 (2)	U-12 (2)
Selenium	5R	U-4R (12)	1.4R	U	U
Silver	21	U	1.2	U	U
Thallium	U	U	U	U	U
Zinc	15,000	U-230J (6)	48.9	260-2,000 (2)	U-20J (1)
Cyanide	77	U	0.8	U	U

Total number of surface soil samples within fence = 15

Total number of lagoon sediment samples = 2

Total number of background surface samples = 4

All subsurface soil samples contained approximately background concentrations

J - Estimated value

N - Presumptive evidence of compound

U - Undetected

R - Data not reliable

The evidence that exposure to airborne Cadmium compounds increases the risk of cancer in humans is characterized as limited (IARC 1982, EPA 1985b). Although several studies of exposed workers have suggested that airbourne Cadmium increases the risk of cancer of the lung or prostate, most of the results have been inconclusive because of small sample sizes, lack of statistical significance, confounding effects of other exposures, or other factors. The most recent study (Thun, et al. 1985), however, showed a significant increase in the number of lung cancer deaths (16 observed versus 6.99 expected) among a group of Cadmium smelter workers.

Although this finding may be somewhat confounded by the effects of smoking and exposure to arsenic, EPA (1985b) concluded that neither of the latter was sufficient to explain the observed effect.

Recent studies have firmly associated inhalation of airborne Cadmium with lung cancer in animals. In a biossay in which male Wistar rats were administered Cadmium Chloride aerosols 23 hours/day for 18 months at concentrations of 9, 12.5, 25, and 50 ug/m^3, Takenaka et al.'s (1983) found a highly significant dose-response relationship. The incidence of lung carcinomas was 0/38, 5/39, 20/38, and 25/35 in the four treatment groups. This marked response adds further support to the evidence on the carcinogenicity of inhaled Cadmium and justifies the use of Thun, et al.'s (1985) data as the basis for risk assessments of airborne Cadmium. Like the injection-site sarcomas and Leydigomas reported in animals (EPA 1985b), these lung carcinomas might be interpreted as carcinogenic responses in the directly exposed tissue only.

Chromium - Chromium (Cr) is a steel-grey lustrous metal with the atomic number 24 and an atomic weight of 52 g/mole. It can have a valence of 2, 3 or 6. Chromium is used in stainless and alloy steels, in corrosion-resistant products, in pigments, and as a tanning agent for leather.

Epidemiological studies of worker populations have clearly established that inhaled Cr(VI) is a human carcinogen, with the respiratory passages and the lungs as target organs. Convincing evidence for carcinogenicity of Cr(VI) compounds in animals is not available, except for the induction of sarcomas at the sites of implantation or injection of certain Chromium (VI) salts and Chromium trioxide (EPA 1980, 1984a).

Neither Cr(III) or Cr(VI) compounds have been shown to be carcinogenic by the oral route. Rats administered Chromium (III) oxide at doses up to 5 percent of their diet for two years had no increase in tumor rates over control animals (Ivankovic and Preussmann 1975 as cited in EPA 1984a). Dogs given Cr(VI) as potassium chromate at concentrations of 0.45 to 11.2 mg/liter in drinking water for 4 years had no observed adverse effects (Anwar, et al. 1961 as cited in EPA 1984a).

Chromium is an essential micronutient and is not toxic in trace quantities. High levels of soluble Cr(VI) and Cr(III) produce kidney and liver damage. Chronic inhalation exposure may led to respiratory system damage. Epidemiological studies of workers exposed to Cr(VI) via inhalation demonstrate that it is a human carcinogen. EPA's (1984b) quantitative risk assessment is based upon a single study of a cohort of workers exposed over a six year period and followed for approximately 40 years. Smoking habits were not considered in the study. Assumptions and extrapolations included in the calculations lead to a very wide range of uncertainty in the risk factor. The relative carcinogenic potency of Cr(III) has not been demonstrated.

Cyanide - Hydrogen cyanide and its simple salts, such as sodium cyanide, are highly toxic by all routes (AOGIH 1986, EPA 1980). Many reports are available regarding acute poisonings in humans. Hydrogen Cyanide vapor is irritating at very low concentrations, is considered dangerous at 20 ppm (20 mg/m^3), and is fatal at concentrations of 100 ppm (100 mg/m^3) for 1 hour. NIOSH (1976) noted reports of chronic poisoning resulting in fatigue, weariness, and other subjective symptoms in workers, but these findings have been disputed by other investigators. Chronic exposure to low levels of Cyanide salts has been reported to cause enlargement of the thyroid gland in humans, apparently due to inefficient elimination of the Cyanide metobolite thiocyanate. NIOSH (1976) concluded that there was no evidence of carcinogenicity, mutagenicity, or teratogenicity for Cyanides.

Cyanide has been shown to produce chromosome breaks in a bean plant, Vicia faba. Because of its mechanism of action, inhibition of the electron transport system in oxidative phosphorylation, Cyanide is acutely toxic to almost all forms of life.

Nickel - Nickel (Ni) is a lustrous white, hard metal with atomic number 28 and an atomic weight of 58.7 g/mole. It is used in welding, in electroplating, in storage batteries, and in numerous high temperature and corrosion-resistant alloys.

The occurrence of statistically significant excesses of nasal cavity and lung cancers in Nickel refinery workers has been conclusively demonstrated in a number of epidemiologic studies. It is generally believed that these excess risks are primarily due to inhalation of metallic Nickel, Nickel subsulfide, Nickel Oxide, and Nickel carbonyl. These conclusions have been supported by observations in experimental animals, and IARC has concluded that it is likely that some forms of Nickel are carcinogenic to man by inhalation (IARC 1982). However, because simultaneous exposure to several Nickel compounds usually occurs in the workplace, it has been difficult to determine which specific compounds are carcinogenic under these conditions.

There is no evidence that Nickel is carcinogenic in humans when ingested, and EPA (1985a) does not consider Nickel to be carcinogenic by ingestion. Laboratory studies have demonstrated depressed weight gain, alterations in hematology parameters, and cytochrome oxidase activity following high-dose oral exposure to Nickel (EPA 1985a).

Nickel salts are known to produce allergic contact dermititis. In this allergic condition, symptoms may develop in 7 to 10 days following exposure to Nickel salts. However, Nickel dermatitis more frequently develops after several years of continued low exposure (Klaassen and Amdur 1986). Once acquired, Nickel sensitivity tends to persist. Sensitized subjects may experience allergic reactions at concentrations between 0.5 and 2 ug/ml Nickel Clayton and Clayton 1981).

Zinc - Zinc (Zn) is a silvery metal of low to intermediate hardness, atomic number 30 and atomic weight 65.38 g/mole. Primary uses of zinc in industry are as a component of dry cells and other batteries, in electrogalvanizing, and as alloys. Zinc compounds are used therapeutically as topical astringents, antidandruff products, antiseptics, and emetics.

Zinc is an essential element and is present in a number of metalloenzymes, including carbonic anhydrase carboxypeptidase, alcohol dehydrogenase, glutamic dehydrogenase, lactic dehydrogenase, and alkaline phosphatase (Valle 1959 as cited by Hammond and Beliles 1980). Zinc is necessary for normal growth and development. Human dwarfism and a lack of sexual development have been related to zinc deficiency (Halsted, et al. 1974 as cited by Hammond and Beliles 1980).

There is no evidence that zinc is carcinogenic. Studies which have been performed on zinc-containing organics failed to demonstrate teratogenic effects (Stokinger 1981). Zinc salts of strong acids are astringent and corrosive. Upon ingestion, they act a emetics, and they can cause symptoms of fever, nausea, vomiting, stomach cramps and diarrhea.

Zinc chloride is caustic and causes severe and occasionally fatal irritation of the epithelium lining, the trachea and bronchi. Acute interstitial fibrosis of the lung occurred in one fatal case following inhalation of $ZnCl_2$ smoke from a smoke generator (Millinken, et al. 1963).

Chronic administration of 0.5-34.4 mg zinc oxide per day for periods of one month to one year failed to produce signs of toxicity in rats (Drinker, et al. 1927 as sited by Stokinger 1981). In another study, 0.1 percent Zinc was tolerated in the diet of rats, but more than 0.5 percent Zinc reduced their capacity to reproduce, and one percent inhibited growth and caused severe anemia and death (Sutton and Nelson 1937 as cited by Stokinger 1981).

Risk Assessment

Two scenarios were developed for risk assessment. Under the current-use scenario, the site remains as is and the intermittent exposure of nearby workers is considered. In the future-use scenario, the site is developed for residential use and nearby residents are regularly exposed throughout their lifetimes. Each scenario was evaluated for exposure to both average case (geometric mean) and maximum contaminant concentrations.

Under the current-use scenario, direct contact with contaminated soils does not appear to pose a human health risk. However, inhalation exposure to maximum contaminant concentrations could pose an excess lifetime cancer risk greater than 10^{-6}.

Incidental ingestion of contaminated soils does not represent a health risk under the average case future-use scenario, although the concurrent ingestion of soil contaminants at the maximum concentrations detected could endanger the health of residents.

Inhalation of airborne particulate matter may pose excess cancer risks as high as 10^{-3} under future-use scenarios. Chemical contaminants in soil at the site do not appear to endanger wildlife under plausible current-use or future-use scenarios.

5.0 Enforcement Analysis

The Independent Nail Company Site was added to the NPL in September 1984, and EPA assumed lead responsibility for the site at that time. Due to the nature of contamination at the site and its well-documented history, the Blake and Johnson Company and the Independent Nail Company are the two identified Potentially Responsible Parties. A notice letter was sent to the Independent Nail Company in June 1985. Since they declined to participate, EPA proceeded

6.0 Community Relations History

The following community relations activities were performed at the Independent Nail Company Site:

* A Fact Sheet on the Site was prepared in November 1986.

* Community Relations Plan finalized January 1987

* An information repository was established in January at:

  Beaufort County Library (803) 525-7279
  710 Craven Street
  Beaufort, South Carolina 29902

  Contact: Ms. Julie Zachowski, Librarian

* A press release providing an opportunity for a public meeting and information on the opening of the public comment period was issued July 21, 1987.

* Public notices providing the same information ran in the July 23 and July 24, 1987 editions of the Beaufort Gazette, a daily paper determined to be the most widely read in the area.

Key Community Concerns

The primary concern expressed by every interviewee during development of the Independent Nail Co. Site Community Relations Plan was the possibility of contamination of area ground water.

7.0 Alternative Evaluation

The purpose of the Operable Unit One remedial action at the Independent Nail Company Site is to mitigate and minimize contamination in the soils and lagoon sediment, and to reduce current and future potential risks to human health and the environment. Based on the level of contaminants found at the site, the endangerment assessment and regulatory requirements, the following cleanup objectives were determined:

* To protect the public health and environment from exposure to contaminated soils through inhalation, direct contact and erosion of soils.

* To prevent the spread of contaminants to other soils.

* To reduce or prevent contamination of ground water.

Cleanup goals were developed for the contaminated soil at the Independent Nail Company Site based on applicable or relevant and appropriate requirements (ARARs) of federal and state statutes or other guidelines (Table 7-1). The goals were developed to prevent potential ground water contamination from exceeding ARARs and to reduce potential cancer risk from inhalation to below 10^{-6}.

An initial screening of applicable technologies was performed to identify those which best meet the criteria of section 300.68 of the National Contingency Plan (NCP). Following the initial screening of technologies, potential remedial action alternatives were identified and analyzed. These alternatives were screened and those which best satisfied the cleanup objectives, while also being cost effective and technically feasible, were developed further.

Table 7-2 summarizes the results of the screening process. Each of the remaining alternatives for soils and sediment remediation was evaluated based upon cost, technical feasibility, institutional requirements, and degree of protection of public health and the environment. A cost summary is presented in Table 7-3. All alternatives would involve remediation of approximately 6200 Cubic Yards of soil/sediment.

ALTERNATIVE 1: SOIL WASHING AND VEGETATIVE COVER

EPA currently operates an experimental mobile soil washing unit. This unit has been used to remove lead from soil, but has not been used for the removal of the metals detected at the Independent Nail Company Site (i.e. cadmium, chromium, nickel, and zinc). IT Corporation has a mobile centrifuge system which has been used for washing/neutralization of sodium hydroxide contamination in soil and a mobile inorganics treatment system which could be used to treat the washing solution.

Costs generated for the treatability testing and process development of a mobile soil washing system for the Independent Nail Company Site are based on the use of IT Corporation mobile treatment units. Details of the full scale soil washing system would be determined by laboratory testing. It is anticipated that the laboratory testing would be conducted in two phases. Phase I would involve preliminary range finding experiments with different washing solutions to determine their effectiveness in reducing the metal content of the soil. Phase II testing would examine the successful solution on a bench scale, define metals removal from the solution and removal of the washing solution from the soil, and preparation of a preliminary design, cost and schedule estimates.

The anticipated scope of Phase I would be to test the removal efficiency of four different aqueous solutions:

* Water
* HCl, pH 3.5
* Acetic Acid, pH 3.5
* Na-EDTA, 5 EDTA/metals molar ratio

These tests would involve laboratory shaker tests and result in the selection of the most appropriate washing solution. Phase II would involve further investigation of the process using the selected solution. The scope of Phase II is expected to be:

* Laboratory treatability tests of contaminated soils with the selected solution

* Laboratory treatability tests of the selected solution for metals removal

TABLE 7-1
SUMMARY OF SOIL CLEANUP GOALS
INDEPENDENT NAIL COMPANY SITE
BEAUFORT, SOUTH CAROLINA

Compound	Soil Cleanup Goal (mg/kg)					
	Protection of Ground Water	Future-use Maximum Case Protection		Local Background	Regional Background (Maximum)	Goals Selected For Site Remediation
		Ingestion	Inhalation			
Cadmium	0.6	172	3.5	2.6	11	2.6
Chromium	8.9	1,277	0.5	5.3	100	5.3
Cyanide	0.02	---	---	---	---	0.02
Nickel	53.5	1,277	18	12	70	18
Zinc	1,785	13,413	---	20	100	1,785

* Laboratory treatability tests of treated soil for washing solution removal

* A process flow diagram and material balance for the selected process scheme

* Development of costs and schedule for the onsite remediation of 6,200 Cubic Yards of contaminated soil

Overall, project costs and schedules presented in this report are preliminary and would be refined following the laboratory testing.

Contaminated soil would be excavated and temporarily stockpiled onsite. The soil would be securely covered to prevent contact with precipitation. The lagoon would then be partially backfilled to two feet above the assumed high water table with clean local soil. Washed soil would then be placed in the lagoon. A vegetative cover would be constructed as described in Alternative 6.

ALTERNATIVE 2: ATTENUATION AND VEGETATIVE COVER

Attenuation of the soil contamination would be accomplished by mixing clean soil with the contaminated soil. All contaminated soil would be excavated, temporarily stockpiled onsite, and securely covered to prevent wind blown dust and contact with precipitation. The lagoon would then be backfilled with clean local soil to two feet above the assumed high water table. Clean soil (preferrably high in organic and/or clay content) would then be spread in layers over the lagoon area. A portion of the contaminated soil would be mixed with each layer of clean soil applied. Soil suspected of significantly higher concentrations than the average (area near discharge pipe) may be segregated and mixed with a larger volume of clean soil. Laboratory testing may be required to ensure that contamination is being decreased to the levels necessary for the protection of ground water. A vegetative cover would then be constructed as described in Alternative 6.

ALTERNATIVE 3 - SOLIDIFICATION/STABILIZATION

A silicate/cement-based process has been selected for evaluation of the solidification/stabilization of soils at the Independent Nail Company Site. These methods have the ability to stabilize materials containing high concentrations of heavy metals, even under acidic conditions. Most processes use two inorganic chemical reagents which react with polyvalent metal ions to form a chemically and mechanically stable solid. The process is based on reactions between soluble silicates and silicate setting agents under controlled conditions to produce a solid matrix. Reagents commonly used include sodium silicate, fly ash, kiln dust, and Portland cement (as the setting agent). The resulting matrix is clay-like and displays properties of high stability, low permeability, high alkalinity, high bearing strength, and high cation exchange capacity. The resulting solid can be easily and economically handled, transported and stored. The volume added to the waste by the treatment process would be between 5 and 10 percent.

TABLE 7-2

TECHNOLOGIES CONSIDERED FOR SCREENING
INDEPENDENT NAIL COMPANY SITE
BEAUFORT, SOUTH CAROLINA

Technology	Eliminated (E) Retained (R)	(If Eliminated, Reason for Doing So)
1. Soil Flushing/Washing	R	
2. Attenuation	R	
3. Immobilization		
Solidification/Stabilization	R	
Adsorption	E	Not Applicable due to waste characteristics
Lime Addition	R	
Clay Addition	R	
4. Capping	R	
5. Vegetative Cover	R	
6. Subsurface Impermeable Barriers	E	Not Applicable due to site characteristics
7. Encapsulation	E	Not Applicable due to waste characteristic
8. Onsite Disposal	E	Not applicable due to site characteristics
9. Off-site Disposal	R	

TABLE 7-3

PRELIMINARY COST ESTIMATES
INDEPENDENT NAIL COMPANY SITE
BEAUFORT, SOUTH CAROLINA

Technology	Present Worth Construction Cost, $1,000	Present Worth O&M Cost, $1,000	Total Present Worth $1,000	Ratio (1)
Soil Washing	2,221	101	2,322	3.2
Attenuation	658	101	758	1.0
Solidification/Stabilization	979	101	1,079	1.5
Immobilization by Clay Addition	785	101	886	1.2
Immobilization by Lime Addition	801	101	902	1.2
Capping	1,321	144	1,465	2.0
Vegetative Cover	585	134	719	1.0
Off-site Disposal	2,696	101	2,796	3.9

(1) Ratio with technology of lowest cost

This process is commercially offered as a complete, onsite, mobile treatment unit. The units are usually outfitted with reagent tanks, metering equipment and an operating console which monitors the entire process. All contaminated soils would be excavated, slurried, then pumped to the treatment units where mixing and chemical reaction with the reagents would occur. The treated material would then be pumped to a holding structure constructed with the local soil used to partially backfill the lagoon. The base of the holding structure would be approximately two feet above the assumed high ground water table. Solidification generally occurs within 72 hours.

After the material had solidified, six inches of topsoil would be spread over the material and vegetated with grass seed.

ALTERNATIVE 4 - IMMOBILIZATION BY CLAY ADDITION AND VEGETATIVE COVER

Contaminated soil would first be excavated and temporarily stockpiled onsite for immobilization by clay addition. The soil would be securely covered to prevent erosion and contact with precipitation. The lagoon would be backfilled with clean local soil to two feet above the assumed high water table. The stockpiled soil would then be mixed with clay and spread evenly over the fill material. Mixing may be best accomplished with a pug mill mixer. For cost purposes, a 1:1 mix of contaminated soil to clay is assumed. Adjustment of pH by the addition of lime may also be necessary. Laboratory treatability testing would be required to determine the quantity of clay required and to evaluate the need and effect of pH adjustment.

A vegetative cover would be constructed over the contaminated soil/clay layer as described in Alternative 6: Vegetative Cover. Areas outside of the lagoon would be backfilled with topsoil and vegetated.

ALTERNATIVE 5 - IMMOBILIZATION BY LIME ADDITION AND VEGETATIVE COVER

Immobilization by lime addition would first involve the excavation and onsite stockpiling of all contaminated soil. Stockpiled soil would be securely covered to prevent erosion and contact with precipitation. The lagoon would then be backfilled with clean local soil to two feet above the assumed high water table. The stockpiled soil would then be mixed with powdered lime and spread evenly over the fill material. Mixing of the soil and lime may be best accomplished with a pug mill mixer. Powdered lime would be added in quantities sufficient for precipitation of metal hydroxides as determined by laboratory treatability studies with onsite soils. A layer of crushed lime rock would then be placed over the contaminated soil/lime mixture to maintain the soil and soil water at the pH necessary to prevent resolubilization of the metals by infiltrating rain water. The amount of lime rock required to maintain the appropriate pH would also be determined in laboratory treatability tests. For cost purposes, this layer is assumed to be 18 inches thick. Overlying the lime rock would be a layer of geotextile fabric and a vegetative cover. The geotextile fabric would stabilize the vegetative cover and prolong the effectiveness of the lime rock by preventing topsoil from being carried into the pore spaces of the lime rock.

Construction of the vegetative cover is described under Alternative 6: Vegetative Cover.

ALTERNATIVE 6: VEGETATIVE COVER

The placement of a vegetative cover over the lagoon area would involve the backfilling of the lagoon and the placement and vegetation of an 18 inch layer of topsoil over an area of approximately two acres. Contaminated soils located outside the lagoon area would be excavated and placed in the area to be covered. The topsoil would be graded to minimum of two percent slope from the center of the lagoon and drainage swales would be constructed around the perimeter of the area. Runoff collected in the swales would be directed to existing drainage paths.

ALTERNATIVE 7: CAPPING

Capping of the lagoon area would involve backfilling the lagoon and construction of a three layered cap conforming to RCRA guidelines. The area to be capped encompasses approximately two acres. Under this alternative, the areas of soil contamination located outside the lagoon area as well as the contaminated soil located below the assumed high water table would be excavated and temporarily stockpiled onsite. The soil would be covered to prevent erosion and contact with precipitation. The portion of the lagoon below the assumed high water table would be backfilled with clean soil and the contaminated soil placed in the lagoon two feet above the high water table. The lagoon would then be further backfilled with clean soil. The areas located outside the lagoon would be backfilled with topsoil and vegetated.

The construction of the cap would follow the complete backfilling of the lagoon and involve the placement of a two-foot clay layer, compacted in six-inch lifts. A twenty-mil synthetic liner would then be placed over the clay. Next, a one-foot thick drainage layer of gravel would be spread and overlain with geotextile fabric. The geotextile fabric would maintain the drainage layer and help to stabilize a final layer of eighteen inches of topsoil by keeping fine topsoil particles from filling the pore space of the gravel layer. The topsoil would be vegetated to prevent erosion. The cap would have a minimum slope of two percent from the center of the lagoon. The lagoon would be backfilled to an elevation that would place the gravel drainage layer at approximately the elevation of the surrounding ground. A drainage swale would be constructed around the perimeter of the cap to direct surface runoff to the existing area drainage paths. Precipitation that percolates through the topsoil would flow laterally through the gravel and over the impermeable synthetic and clay barrier and into the drainage swales.

ALTERNATIVE 8: OFF-SITE DISPOSAL

This alternative requires the excavation of all contaminated soil and the disposal of the waste in an off-site RCRA permitted facility. Approximately 6,200 cubic yards of contaminated soil would be excavated; 5,000 cubic yards from the lagoon and 1,200 cubic yards from the other areas of soil contamination. Some soil within the lagoon may be saturated during excavation. This soil would be placed in a pile near the excavated area and allowed to drain prior to loading into trucks. Water would drain from the soil into the excavated area. The lagoon would be backfilled with clean fill material to an elevation approximately six inches less than the surrounding grade. The upper six inches would be backfilled with topsoil and vegetated. Areas of excavation outside of the lagoon would be backfilled with topsoil and vegetated.

GSX of Pinewood, S.C. was contacted and indicated available capacity and interest in managing the soil removed from the Independent Nail Company Site. This facility is located approximately 125 miles from the site. However, due to a current "out of compliance" status with the Resource Conservation and Recovery Act, this facility cannot be utilized at this time.

ALTERNATIVE 9: NO ACTION

Under the no action alternative, soil would remain contaminated with toxic substances regulated by local, state and federal law. Two variations of this alternative will be considered: no action with periodic monitoring and no action without periodic monitoring. Neither alternative would provide remedial action to reduce mobility, toxicity or volume of contaminated soil. However, with the former, ground water at and adjacent to the site would be monitored. Possible socioeconomic impacts of either no action alternative include the following:

* Decline in property values
* Expenditure for legal services
* Depressed area growth
* Restricted access to the site
* Public and environmental exposures
* Monitoring expenses

8.0 RECOMMENDED ALTERNATIVE

The recommended alternative for remediation of soil and sediment contamination at the Independent Nail Company Site includes solidification and stabilization and backfilling of treated material on the Site.

Contaminated soil will be treated using stabilization/solidification. Following treatment, the soil/sediment will be placed back into the excavated lagoon, be covered with six inches of top soil and then seeded to provide vegetative cover. At selected intervals, during excavation, soil samples will be collected and will be analyzed to determine the limits of excavations. It should also be noted that the action levels in Table 7-1 are preliminary goals and are subject to refinement during remedial design.

This recommended alternative meets the requirements of the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR, 300.68(j) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). This alternative permanently and significantly reduces the mobility of hazardous contaminants in the soil and the sediments in the lagoon. The results of the Operable Unit Two groundwater investigation will determine the necessity for long-term monitoring and maintenance in association with this remedy.

The alternative is cost-effective when compared with other applicable alternatives. The technology has been proven and the alternative is implementable at the Site. It is estimated this alternative could be implemented within twelve months. Alternatives 1, 2, 4 and 5 would require from one to twelve additional months for implementation. Alternative 8 would be out of line with EPA's off-site policy. Alternative 6 would not prevent on-going contamination of ground-water as no soil would be relocated. Alternative 7 would not utilize alternative treatment technologies and would not result in reduction in toxicity, mobility or volume of the waste at the Site.

OTHER STATUATORY REQUIREMENTS

* Occupational Safety and Health Administration (OSHA)

  A health and safety plan will be developed during remedial design and will be followed during field activities to assure that regulations of OSHA are followed.

* Safe Drinking Water Act (SDWA)

  Possible groundwater contamination at the Site will be investigated during the Operable Unit Two remedial investigation. A feasibility study to determine the appropriate cleaup alternative will include measures to ensure conformance with the SDWA.

* National Pollutant Discharge Elimination System (NPDES)

  The chosen alternative does not include any discharges, therefore this does not apply.

* Endangered Species Act

  The recommended remedial alternatives is protective of species listed as endangered or threatened under the Endangered Species Act. Requirements of the Interagency Section 7 Consultation Process, 50 CFR, Part 402, will be met. The Department of Interior, Fish and Wildlife Service, will be consulted during the remedial design and Operable Unit Two RI/FS to assure that endangered or threatened species are not adversely impacted by implementation of this remedy.

* Ambient Air Quality Standards

  The soil/sediment treatment system will be designed and monitored to assure that air emissions meet all State and Federal standards.

* State Drinking Water Standards

  Maximum contaminant levels established by the State of South Carolina regulations are adopted from those of the Federal Safe Drinking Water Act, and will be addressed in Operable Unit Two RI/FS at the Site.

CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

Remedial actions performed under CERCLA and SARA must comply with all applicable Federal and State regulations. All alternatives considered for the Independent Nail Company Site were evaluated on the basis of the degree to which they complied with these regulations. The recommended alternatives were found to meet or exceed all applicable environmental laws, as discussed below.

* Resource Conservation and Recovery Act (RCRA)

  The recommended remedy for soil/sediment contamination is not regulated under RCRA, therefore it does not apply.

* Clean Water Act

  Soil remediation is aimed at source control, and implementation of the recommended alternative would result in an end to potential contamination of surface water.

* Floodplain Management Executive Order 11988

  This Site does not lie within a floodplain and, thus, is not subject to the requirements of E.O. 11988.

* Department of Transportation

  Transport of hazardous substances is regulated by the Department of Transportation (DOT). No off-site disposal is anticipated at this Site, therefore no DOT regulations will apply.

OPERATION AND MAINTENANCE

No long-term operation and maintenance requirements are expected for this alternative.

Groundwater monitoring would be required in conjunction with this alternative. Monitoring would help determine the effectiveness of the alternative at reducing migration to the groundwater. Five well clusters of three wells each would be installed. Each of these wells would be sampled on a quarterly basis for the first two years after the alternative is initiated, and yearly thereafter for 28 years. Samples would be analyzed for the Target Compound List metals plus cyanide. Air monitoring during construction would be necessary to ensure that a safe working environment is maintained and that no threat to the public health or the environment is created by air emissions during construction.

OFF-SITE DISPOSAL, PERMITS AND TRANSPORTATION

This alternative does not include the transport or off-site disposal of hazardous wastes. Thus, it is not anticipated that any hazardous waste permits would be required.

Health and Safety

Health and safety requirements during the implementation of this alternative include periodic air monitoring and the use of personal protection equipment by all construction personnel. It is anticipated that Level D personal protection would be required with a contingency to upgrade to Level C if necessary.

It is anticipated that construction can be completed in such a manner that very little heavy equipment decontamination would be required. Personnel decontamination facilities would be necessary.

Preliminary Schedule of Activities

The schedule of this alternative must provide for the immediate vegetation of the topsoil. Seeding is usually most successful in the late summer or early fall. Also, it may be advantageous for excavation to be performed during a time of year when the groundwater table is low.

Allowing six months for design and contractor selection, it is anticipated that this alternative could be completed in approximately thirteen months. Two months would be required to prepare the site (excavation of contaminated soil and partial backfill of lagoon) and to mobilize the Solidification/ Stabilization (S/S) equipment. One additional month would be necessary for the S/S of the soil and three months to complete backfilling of the lagoon and vegetation of the topsoil. This schedule assumes that weather does not cause extreme delays.

Cost Estimate

Solidification/stabilization is expected to have a total present worth cost of approximately $1,132,000. This estimate assumes a cost of $50 per cubic yard for S/S bringing the total construction costs to approximately $1,032,000. Monitoring cost of $22,500 each year for two years after implementation and $5,600 and each year thereafter for 28 years amount to approximately $100,000.

ATTACHMENT 1

ATTACHMENT 1

Responsiveness Summary

1. Overview

A press release announcing the opportunity for a public meeting was issued on July 21, 1987. Public notices announcing the opportunity for a public meeting and the opening of the public comment period appeared in the July 23 and 24 issues of the Beaufort Gazette, the most widely read newspaper in the area of the Independent Nail Company Site. No requests for the meeting or comments on the Feasibility Study Report were received.

2. Community Profile and History of Community Involvement

The City of Beaufort is located on the southeast side of Beaufort County. It is forty-five miles northeast of Savannah, Georgia, and thirty miles north-northeast of Hilton Head, South Carolina. Beaufort County consists largely of a collection of sixty-eight islands, defined by a complex network of waterways. The county is an extremely sensitive environmental area -- according to one local official, it is one of the last "pristine" environments on the east coast.

Tourism, recreation, and fishing are major local industries, with several resorts in the county (including Hilton Head) noted for their boating and golf. There are numerous rivers, creeks, and public and private beaches and golf courses found throughout the county. Several international golf and tennis tournaments are held at Hilton Head each year. There is both recreational and commercial fishing, and local residents are proud of the county's reputation for good seafood.

There is also a large military presence in the county, with approximately 15,000 military personnel living there. In addition to the Air Station, the Marine Corps has a large training camp at Parris Island, which is immediately south of Port Royal Island. According to the Beaufort County Joint Planning Commission (BCJPC), 22,000 recruits are trained at Parris Island each year. There is also a large naval hospital in Beaufort County.

While the county is now considered relatively rural, commercial and residential development is occurring rapidly. According to BCJPC, the county's population has grown 28% since 1980 -- growth in the City of Beaufort has been lower than 28%, while that in the resort areas such as Hilton Head has been much higher.

Both the city and county governments are located in the City of Beaufort. The city is governed by a Mayor and a five-member City Council, all of whom serve four-year terms. There is also a City Manager who is responsible for most of the day-to-day tasks of running the city. The county is run by a County Administrator and a nine-member County Council. These Council members serve two year terms; four are selected at large, five by district. The County Council has a one-member Coastal Council Board/Commission that oversees environmental matters.

The principal State agency involved with the Site is the South Carolina Department of Health and Environmental Control (SCDHEC). SCDHEC has a broad array of responsibilities, including conducting restaurant inspections, monitoring water quality, and handling solid and hazardous waste issues. One elected official said that any resident complaints about environmental matters concerning the Site would be referred to SCDHEC.

County residents, however, have expressed virtually no interest in this site -- no complaints have been received by local officials. There has also been very little publicity about the site -- the only newspaper articles on the site appeared when the site was listed on the NPL. However, officials noted that this seeming lack of specific concern could change rapidly if there is sufficient adverse publicity on the site. The source of this potential, according to local officials, is that the citizens are very interested in environmental issues in general. The county's rapid rate of development has heightened this concern. Many people live in the area because of its natural beauty and recreation opportunities, and they do not want these characteristics ruined. Furthermore, one official commented that many residents, especially in the resort areas, are well-educated retirees who have the time, inclination, and expertise to become heavily involved in local environmental issues. As evidence of this interest, local officials point to heavy attendance at public meetings on issues such as local development projects and a proposal to build a county incinerator.

According to local officials, more residents are concerned about the Wamchem Site then about the Independent Nail Site because of the contaminants involved and Wamchem's proximity to residents. One resident contacted during the preparation of this plan was not aware of the Independent Nail Site; because of his proximity to the Wamchem Site and nearby McCalley Creek, however, he was quite concerned about the contaminants emanating from Wamchem. Even though there has been little publicity or outward evidence of citizen concern about the Wamchem Site, this resident estimated that dozens of residents are directly affected by the Wamchem Site. He thought residents would contact their County Councilman, State Legislator, or SCDHEC if they wanted to register their concerns. This resident also is interested in environmental issues in general and would like to receive any information EPA distributes on the Independent Nail Site.

Key Community Concerns

The primary concern expressed by every interview was the possible contamination of area groundwater. Further investigations in the course of preparing the community relations plan, however, revealed additional concerns dealing with the local industrial base and financial responsibility for the cleaup. These additional concerns currently do not seem to be pressing. According to the people who expressed them, however, these concerns could flare up quickly if activities at the Site or adverse publicity about the Site's affect on the local environment warrant an increase in community concern.

Detail descriptions of concerns expressed by local officials during community interviews are presented below:

1. Groundwater Contamination

   Even though the homes and businesses around the Independent Nail Site are connected to the city water supply, local officials stated that some residents there may use private wells. While officials have yet to receive a complaint concerning the quality of the water from any private well, they want to be sure that this water is not contaminated. Furthermore, local officials are concerned that any groundwater contamination problem could extend far beyond the immediate site area. Because the Site rests over the Floridan aquifer, officials want to be sure that this significant source of drinking water is not threatened.

2. Preservation of the Natural Environment

According to local officials, many of the residents who live in the area do so because of its natural beauty. No residents have expressed concern about the effect of the Independent Nail Site on their environment. They have been involved in other local environmental issues, however, and officials feel this general interest could become focused on this site once the public is aware of its existence. For this reason, officials feel that in order to avoid any unnecessary concern, it is especially important that any publicity about the Site be as accurate and objective as possible.

3. Possible Financial Liability

According to Site files, Beaufort County once owned the land now occupied by the Site, and leased it to Blake and Johnson. EPA at one time identified the county as a PRP because of this relationship. The county, however, has insisted that it had no connections with the operations at the Site, and the County Administrator says that the county is no longer designated a PRP. County officials, however, are still interested in the PRP search process and are concerned that the appropriate parties pay for the cleanup.

4. Preservation of Beaufort's Ability to Attract Industry

Currently, one of the major industries in Beaufort County is tourism; according to one local official, there is only one chemical company in the area. Yet one Beaufort County Councilman said that the county needs both tourism and other, heavier industries. He believes that industries other than those found in the tourist trade can provide Beaufort County residents with jobs that have higher salaries and more potential for advancement In order to encourage a business growth and diversity, the Councilman does not want the county to gain a reputation for hostility to non-tourism industries. Therefore, the Councilman is concerned that publicity about cleaning up the Site and finding PRPs to pay for the cleanup may give Beaufort a reputation for being anti-industry.

3. Summary of Public Comments and Agency Responses

As no comments, oral or written, were received, this Section is not applicable.

4. Remaining Concerns

No remaining concerns have been identified.

Community Relations activities to date are listed in the ROD.