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402SERBSF10,625

Site Name (Subject):	STEWART-WARNER CORP/BASSICK-SACK
Site ID (Document ID):	NCD024895864
Document Name (DocType):	Preliminary Assessment/Site Inspection (PA/SI)
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Description:	Site Inspection Prioritization
Date of Document:	3/29/1994
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Document Category:	FACILITY

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State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

DEHNR

29 March 1994

Mr. Craig Benedikt
NC Project Officer
US EPA Region IV, Waste Division
345 Courtland Street, NE
Atlanta, GA 30365

Subject: Site Inspection Prioritization (SIP) report for Stewart-Warner, Bassick-Sack Division, Winston-Salem, NC
NCD 024 895 864

Dear Mr. Benedikt:

Please find attached a copy of the SIP report for the subject site. I recommend that the site be assigned a disposition of No Further Remedial Action Planned.

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

Sincerely,

Grover Nicholson
Environmental Engineer
NC Superfund Section

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STATE OF NORTH CAROLINA

Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
Superfund Section

SITE INSPECTION PRIORITIZATION

Stewart-Warner, Bassick-Sack Division
Forsyth, Winston-Salem, NC
NCD 024 895 864
Reference No. 02723

March 1994

Grover Nicholson, Environmental Engineer
Division of Solid Waste Management
Superfund Section

SITE INSPECTION PRIORITIZATION

Stewart-Warner, Bassick-Sack Division
NCD 024 895 864
Forsyth County, Winston-Salem NC

March 1994

Superfund Section
Division of Solid Waste Management
North Carolina Department of Environment, Health and Natural Resources

Prepared by:

Grover Nicholson
Environmental Engineer

Reviewed by:

Pat DeRosa
CERCLA Branch Head

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Site Inspection Prioritization

Stewart-Warner Corporation
Bassick-Sack Division
NCD 024 895 864

1.0 INTRODUCTION

The purpose of this Site Inspection Prioritization (SIP) is to update the assessment of the site based on the guidelines established by the revised Hazard Ranking System, which became effective in March 1991. The information used to complete this SIP relies on still valid information contained in the Site Inspection Report for the site, which was completed in April 1991, and on new and updated information from additional sources.

2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

2.1 Site Location

The site is located at 2941 Indiana Avenue, Winston-Salem, Forsyth County, NC, 21705, which is in the north central portion of the city in an area of residential, commercial, and light industrial land use. For a graphic representation of the site, refer to Figure 1, Site Location Map, and Figure 2, Site Layout Map. The site is best described by five sets of latitude and longitude coordinates (Ref. 1 & 5), but the single coordinate site reference point is:

Latitude:	36 07 44.5
Longitude:	080 14 22.5

Annual precipitation is about 46 inches and mean annual lake evaporation is about 39 inches (Ref. 2). Net annual rainfall is 7 inches. The 2-year, 24-hour rainfall is about 3.5 inches (Ref. 3).

2.2 Site Description

Since 1945, the site has been a facility for metal finishing of furniture hardware and for the manufacture of zinc die-cast locks. Located on the approximately 12 acre site are a main building with offices, a warehouse, a foundry, a foundry baghouse, and a wastewater treatment plant. A paved asphalt parking lot covers a large portion of the site between the plant buildings and Indiana Avenue. The remainder of the site is open land. The site is bordered on the north and east by the Southern Railway and on the south and west by Indiana Avenue. Directly across Indiana Avenue is the Hanes-Lowrance Middle School. To the south and west of the site is a residential district named Bon Air. The area to the north of the site is primarily commercial and light industrial land, but with some residences. To the east is the Southern Railway, commercial and industrial areas, and US Highway 52 (Refs. 4, 5, & 6 and Figs. 1 & 2).

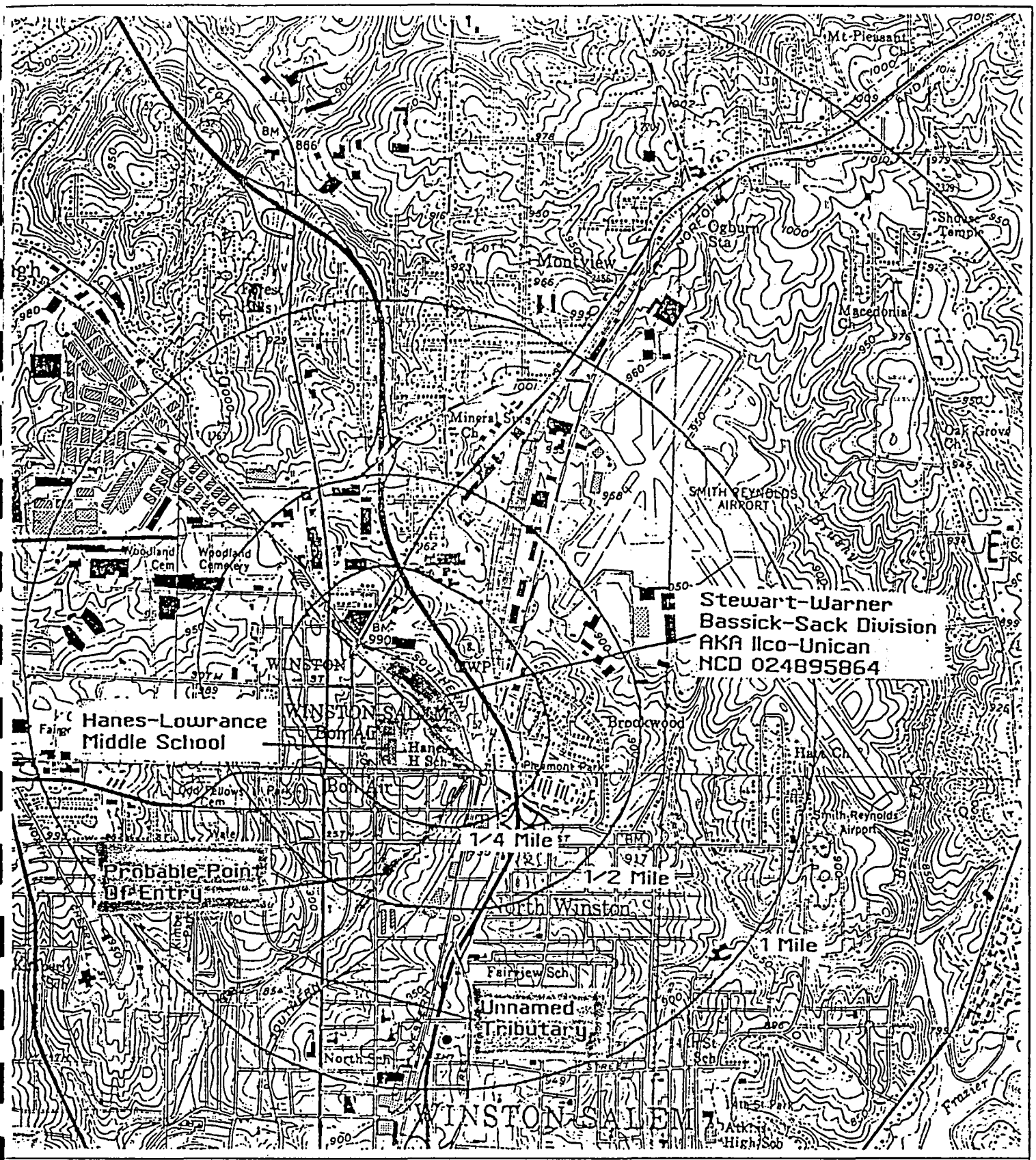

Fig. No: 1	Title: Site Location Map		
North Carolina Division of Solid Waste Management	Scale: 1:24000	Date: 25 Jan 94	Drawn By:
Superfund Section	Site Name: Stewart-Warner Bassick-Sack		NCD 024 895 864

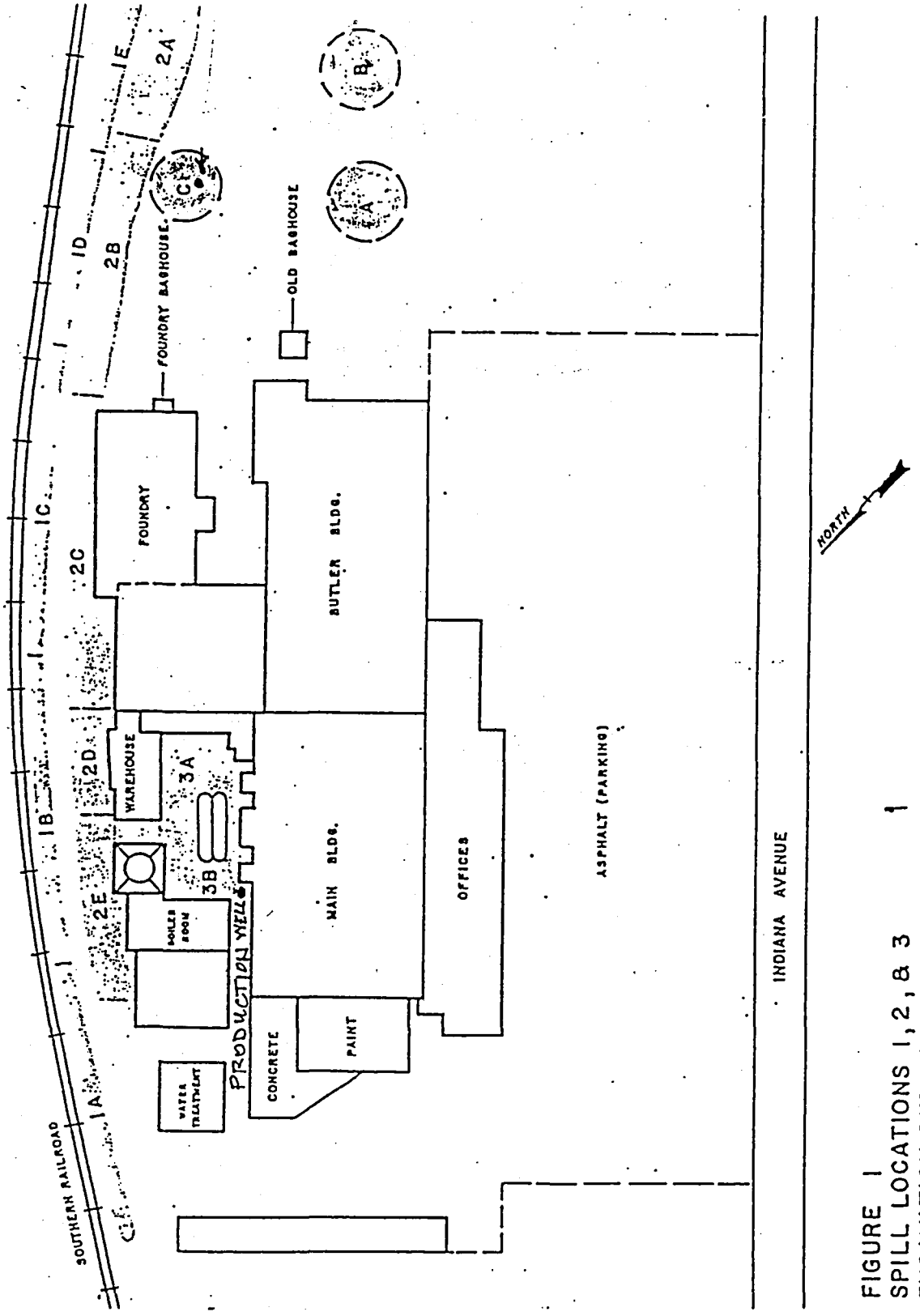

FIGURE 1
SPILL LOCATIONS 1, 2, & 3
EXCAVATION PITS A, B, & C
ILCO-UNICAN
WINSTON-SALEM, NORTH CAROLINA

Fig. No: 2	Title: Site Layout Map		
North Carolina Division of Solid Waste Management	Scale:Approx 1:1320	Date: 25 Jan 94	Drawn By:
Superfund Section	Site Name: Stewart-Warner Bassick-Sack		NCD 024 895 864

2.3 Operational History and Waste Characteristics

The facility was first used as a cotton mill. In 1945, it was purchased by Stewart-Warner Corporation and converted into a facility for manufacturing and finishing metal furniture hardware. These manufacturing processes continued until 1988 when the facility was purchased by Ilco-Unican, who began using the facility for the manufacture of zinc die-cast locks. The facility is still being used for this purpose (Refs. 4, 7, & 8).

Manufacturing processes since 1945 consist of foundry work, vibratory finishing, electroplating, oxidizing, buffing, degreasing, lacquering, and painting. Waste streams generated include degreasing sludges and spent tetrachloroethene, plating bath bottom sludges containing heavy metals and cyanide, wastewater treatment sludges containing heavy metals and cyanide, baghouse dust, and waste paint lacquer and thinner containing xylene, acetone, ethyl acetate, n-butyl alcohol, methanol, toluene, and methyl isobutyl ketone (Refs. 4 & 8).

Waste handling practices between 1945 and 1980 are unclear. However, in 1980, Stewart-Warner was permitted as a Treater/Storer/Disposer (TSD) of hazardous wastes under RCRA, and handled its hazardous wastes in accordance with RCRA guidance until closure in March 1986 (Refs. 9, 10, 11, & 12). The primary reason for a CERCLA assessment of the site, however, is the series of spills and the discovery of past disposals that have occurred on the site. Documented spills of cyanide-contaminated wastewater have occurred on at least four occasions, and have contaminated soils along the railroad siding and near the warehouse and boiler room. Stewart-Warner removed spilled liquid and contaminated soil from these areas. During a comprehensive site assessment associated with cleanup of the spills, Stewart-Warner discovered a drum burial. Drums and contaminated soils were also removed from this area and disposed off-site. The NC Hazardous Waste Branch provided oversight of the remediations and notified Stewart-Warner that, though the remediations were successful under RCRA, the site might still be assessed by CERCLA (Refs. 13, 14, 15, 16, & 17). In addition, during a 1989 assessment of the site by Groundwater Technology, Inc., buffer dust containing concentrations of heavy metals was discovered on the roof of the building (Ref. 29).

3.0 GROUND WATER PATHWAY

3.1 Hydrogeologic Setting

The Stewart-Warner site is located in the western edge of the Piedmont Physiographic Province. Surface soils are of the Pacolet series and are primarily the well drained soils of gently to steeply sloping uplands (Ref.18). Their hydraulic conductivity ranges from 4.23 x 10E-4 to 1.4 x 10E-3 cm/sec (Ref.18). Beneath the soil is a layer of weathered rock called saprolite which extends downward, becoming less and less weathered, to the underlying competent igneous and metamorphic bedrock. The bedrock consists of gneisses and schists with granitic intrusions.
Ground water is found in the pore spaces of the saprolite and in the fractures of the underlying bedrock. These two units are well connected hydraulically and behave as a single unconfined aquifer. Their hydraulic conductivities are similar and range from 3.5 x 10E-4 to 7.0 x 10E-3 cm/sec (Ref. 19).

3.2 Ground Water Targets

Most residents of the area are supplied with drinking water by the Winston-Salem water system, which supplies most of Forsyth County with water obtained from two surface water intakes. Both the primary intake on the Yadkin River and the backup intake on Salem Lake are well upstream of the site and are unaffected by it (Ref. 6). There are no known private wells near the site. There are, however, four known community wells within four miles of the site that supply some residents with drinking water. Data on these wells is tabulated below (Refs. 20 & 21).

System Name	Distance from Site	Population Served
Charles Baker	15800 feet	100
Shady Grove Trl Park	16500 feet	67
Country Club Annex SD	16700 feet	228
Bud Owen	17800 feet	125

There are no wellhead protection areas within 4 miles of the site (Ref.25).

3.3 Ground Water Conclusions

Most residents in the area are supplied with water from sources that are unaffected by the site. There are only four known water supply wells within four miles of the site, with the nearest one about 15800 feet to the north. No water supply wells are known to have been affected by contaminants from the site.

Analysis of a sample of water from the former production well on the site shows concentrations of tetrachloroethene at 200 ug/l and trichloroethene at 14 ug/l, compared to trip blank and field blank concentrations of less than 5.0 ug/l. Analysis of a sample from a monitoring well (MW-1) constructed on the site show contaminant concentrations as described below.

Contaminant	Concentration	Standard
1,1-Dichloroethene	1500 ug/l	7.0 ug/l
1,1,1-Trichloroethane	5700 ug/l	200 ug/l
Trichloroethene	6300 ug/l	2.8 ug/l
Tetrachloroethene	7400 ug/l	0.7 ug/l
1,1-Dichloroethane	440J ug/l	--------
cis/trans -1,2-Dichloroethylene	180J ug/l	--------
Barium	1.5 mg/l	1.0 mg/l
Cobalt	0.026 mg/l	0.010 mg/l
Mercury	0.0080 mg/l	0.0011 mg/l

4.0 SURFACE WATER PATHWAY

4.1 Hydrologic Setting

Runoff from the approximately 12 acre site moves primarily to the southwest towards Indiana Avenue and is collected into drop inlets on the site and into a storm water culvert just across Indiana Avenue from the southern portion of the site. This water is piped underground toward the southwest for about 2400 feet before it emerges near Blum Park just southwest of the intersection of Ivy Avenue and 24th Street. Another short unnamed tributary, flowing from the east, enters the stream there. This tributary flows above-ground and in an underground pipe to the southwest and south for another 3500 feet until it reaches Peters Creek. Peters Creek flows southward for about three miles and empties into Salem Creek. Salem Creek flows southwesterly for about eight miles and empties into Muddy Creek. Muddy Creek flows to the south and empties into the Yadkin River. However, the fifteen-mile surface water pathway ends in Muddy Creek about three miles downstream of the point Salem Creek enters (Refs. 5 & 6).

4.2 Surface Water Targets

The unnamed tributary from the site and Peters Creek are urban watercourses and are not used for recreation or fishing, and do not have wetlands along them. Salem Creek and Muddy Creek support light fishing and boating and have small to moderate sized wetlands lying along their channels (Ref. 22).

There are no critical habitats located along the surface water pathway (Ref. 23). The site is not in any floodplain (Ref. 24), and no surface water intakes lie along the pathway (Ref. 6).

4.3 Surface Water Conclusions

All surface water intakes lie either outside of the target area or upstream of the surface water runoff pathway from the site. No intakes are found along the surface water migration pathway. The only surface water targets are the fisheries, recreational areas, and wetlands located along Salem Creek and Muddy Creek.

5.0 SOIL EXPOSURE AND AIR PATHWAYS

5.1 Physical Conditions

Access to the site is restricted by fencing and locking gates along the Indiana Avenue border, and along the northwest and southeast sides of the site, and by the railroad embankments along the northeast side. About half of the site is covered by buildings and an asphalt parking lot. The remainder of the site is grass and soil. To the east and northeast of the site, the land use is primarily commercial and light industrial. Directly across Indiana Avenue to the southwest are the Hanes-Lowrance Middle School and residential areas (Refs. 5 & 6).

5.2 Soil and Air Targets

There are approximately 130 workers on the site (Ref. 7). The nearest residences are within 500 feet of the site to the west. Hanes-Lowrance Middle School lies to the west and southwest across Indiana Avenue and is within 200 feet of the site. Enrollment for the 1992-1993 school year was 89 students at the Lowrance portion and 599 students at the Hanes part (Ref. 26).

The resident population and wetland targets within four miles of the site are tabulated below (Refs. 22, 27, & 28).

Distance From Site Location	Resident Population	Estimated Wetland Acreage
0 to 1/4 mile	1085	0
> 1/4 to 1/2 mile	2209	0
>1/2 to 1 mile	7233	0
> 1 to 2 miles	20729	10
> 2 to 3 miles	27668	100
> 3 to 4 miles	32283	100

5.3 Soil Exposure and Air Pathway Conclusions

Access to the site is limited to the public by fencing and the railroad embankment. The 130 site workers, however, could be exposed to contaminated soils. There are a large number of residents within four miles of the facility. A estimated total of 210 acres of wetlands are also within four miles of the site.

In addition, the school directly across the street, which has a combined student population of about 688, is a potential target for contamination from the site. A broken duct deposited buffer dust containing heavy metals on the roof of the facility (Ref. 29) and this dust could have been blown into the schoolyard. To address this concern, four samples were taken of the surficial soils in the schoolyard. Analyses of the samples showed that one sample had a slightly elevated concentration of chromium of 27 mg/kg (Ref. 30). This concentration, however, is only barely above the detection limit of 20 mg/kg and is well within naturally occurring levels in soil that range from 5 to 3000 mg/kg (Ref. 31).

6.0 SUMMARY AND CONCLUSIONS

The Stewart-Warner site was assessed to identify potential threats to human health and the environment and to determine the need for further investigation.

Based on sample analyses, ground water beneath the site is contaminated with organic solvents and heavy metals. No private well users were located within four miles of the site, but four community wells, located between 2.5 and 4 miles of the site, serve a total of 520 people. The entire area within four miles of the site, however, is supplied with drinking water by the Winston-Salem municipal system. This system draws water from two surface sources unaffected by the site - one in a different drainage basin (Yadkin River) and one upstream of the site (Salem Lake). The threat posed by the site to the ground water pathway is of minimal concern.

Surface water flowing from the site enters an unnamed tributary about 2400 feet southwest of the site and then flows into Peters Creek. Both of these watercourses wind through much of central Winston-Salem. Although no sampling of surface water has been done, attribution of contaminants to the site would be difficult due to the urban nature of the streams and the many possible sources of contaminants along them. The remainder of the 15-mile surface water pathway is via Salem Creek and Muddy Creek. There are no intakes along the pathway, and only Salem Creek and Muddy Creek have wetlands and are used for recreational fishing. The threat posed by the site to the surface water pathway is minimal.

The soil exposure pathway is the only pathway of concern at the site. Access to the site is limited by fencing and gates, and there have been several soil and contaminant removals conducted by Ilco Unican, but workers may still be exposed to hazardous contaminants left in the soil. There is the possibility that contaminated dust has blown from the roof of the facility onto the playgrounds of the Hanes-Lowrance school across the street. Samples were taken from the schoolyard and one sample showed a concentration of 27 mg/kg of chromium. This concentration is less than 1/100 of the reference dose screening concentration of 2900 mg/kg, and is close to the lower end of the naturally occurring chromium concentration of 1 to 1000 mg/kg, and is not a health concern. Reportedly, the dust had solidified on the rooftop, which prevented it from blowing around, and was later removed.

Based on the information gathered about the site, we recommend that the site be assigned a disposition of No Further Remedial Action Planned. However, we intend to address the possibility of soil contamination on the school property by taking additional samples there and by inspecting the Ilco-Unican facility to make sure all roof dust has been removed and duct work repaired.

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STEWART-WARNER CORPORATION
BASSICK-SACK DIVISION
NCD 024 895 864

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REFERENCE 1

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF NORTH CAROLINA
DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES
RALEIGH, NORTH CAROLINA

RURAL HALL QUADRANGLE
NORTH CAROLINA-FORSYTH CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF NORTH CAROLINA
DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES
RALEIGH, NORTH CAROLINA

Winston-Salem Municipal Water System Limit

Country Club Annex S/D

Shady Grove Trailer Park

Bud Owen

Charles Baker

Stewart-Warner Bassick-Sack Division AKA Eco Unicar HCD 024895564

Haines-Lowrance Middle School

Probable Point Of Entry

Unnamed Tributary

Surface Water Drainage Pathway

Peters Creek

Salem Creek

Wetlands

Dashed line indicates fishery

Winston-Salem Municipal Water System Limit

Wetlands

Muddy Creek

Wetlands

15-Mile Downstream Limit

WELCOME, N. C.
35080-H3-TF-024
1969
PHOTOREVISED 1987
DMA 4955 IV NE-SERIES V842

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and North Carolina Geodetic Survey

Culture and drainage in part compiled from aerial photographs taken 1948

Topography by plane-table methods 1949–1950

Polyconic projection. 10,000-foot grids based on North Carolina coordinate system, 1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 10 meters south and 19 meters west as shown by dashed corner ticks

Red tint indicates area in which only landmark buildings are shown

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

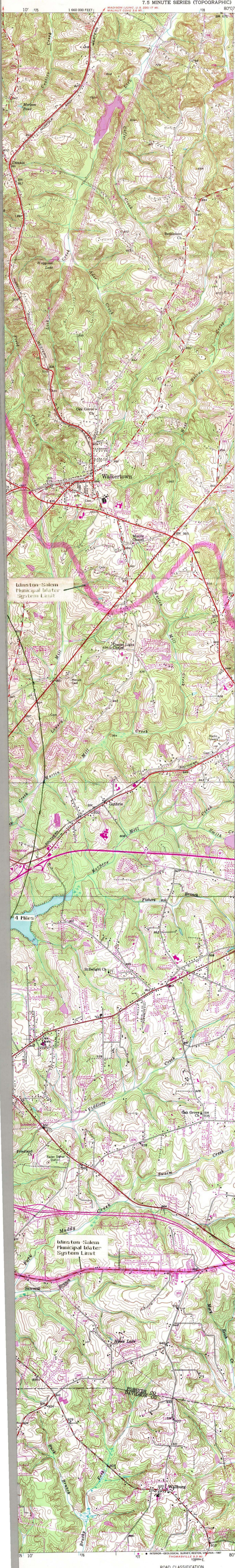
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WALKERTOWN QUADRANGLE

NORTH CAROLINA-FORSYTH CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)



INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1987

ROAD CLASSIFICATION

Heavy-duty — 4 LANE | 6 LANE
Medium-duty — 4 LANE | 6 LANE
Light duty
Unimproved dirt

U. S. Route
State Route
Interstate Route

N. C.
QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled in cooperation with State of North Carolina agencies from aerial photographs taken 1984 and other sources. This information not field checked
Map edited 1987

Purple tint indicates extension of urban areas

WINSTON-SALEM EAST, N. C.

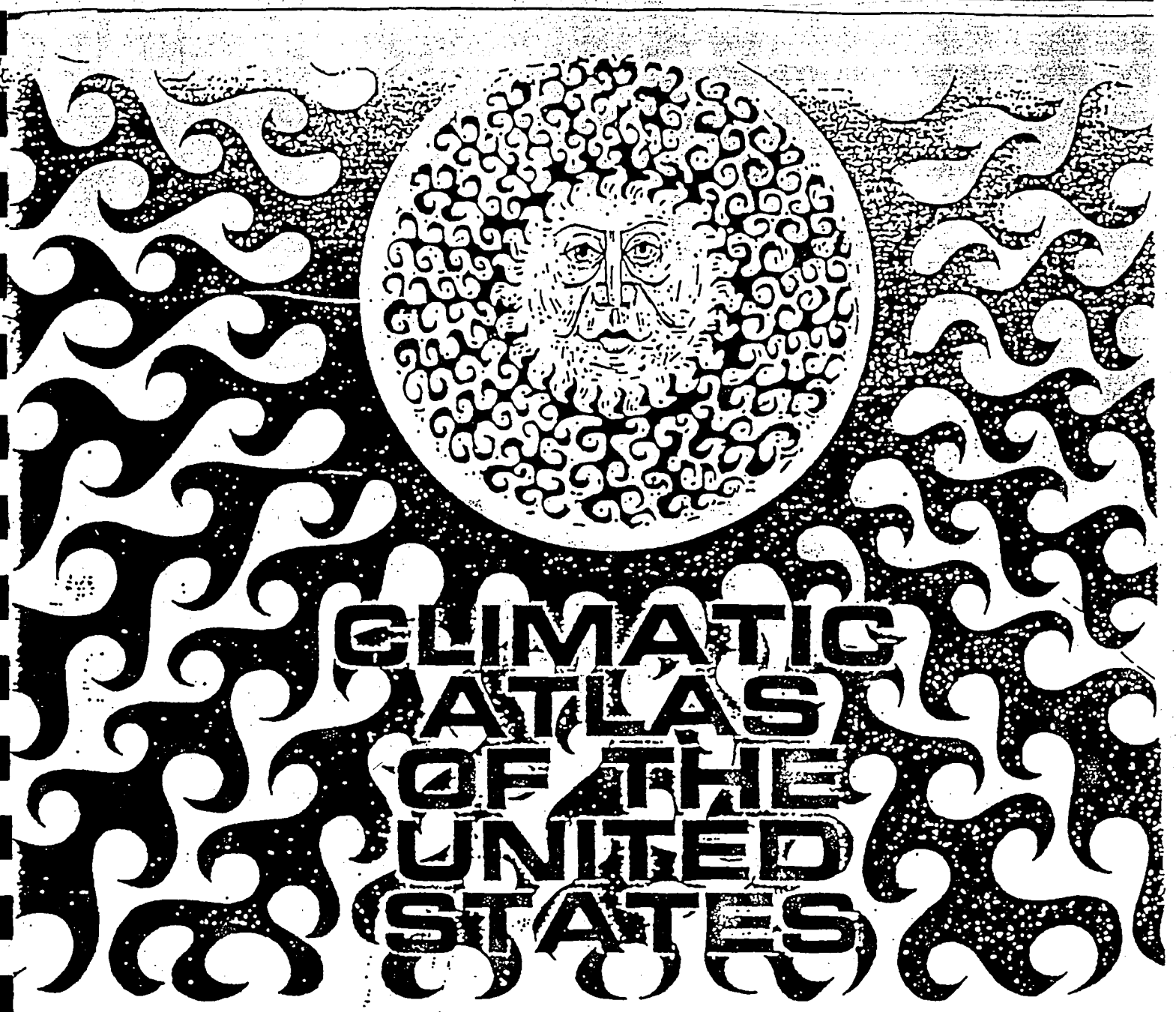
36080-A2-TF-024

1950

PHOTOREVISED 1987

DMA 4956 II SW—SERIES V842

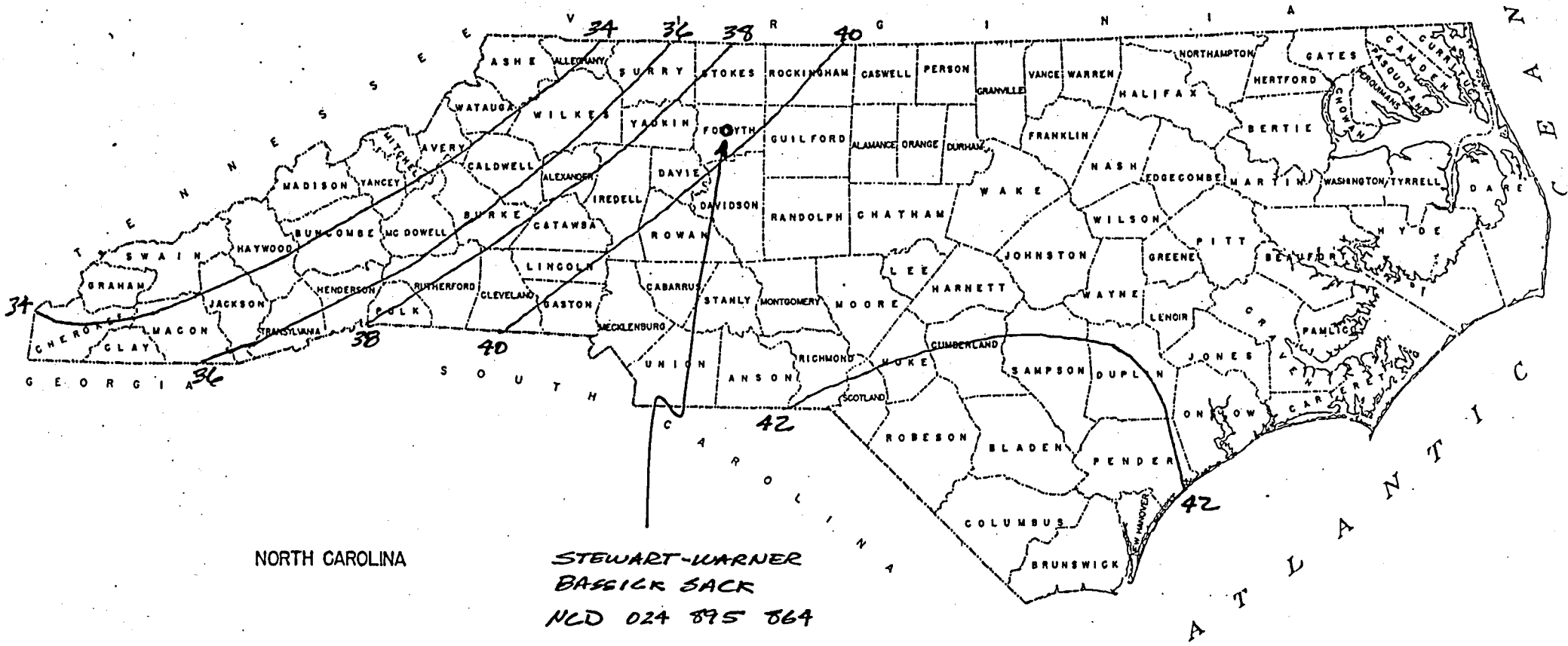
REFERENCE 2



CLIMATIC ATLAS OF THE UNITED STATES

RCE . Environmental Science Services Administration . Environmental Data Service

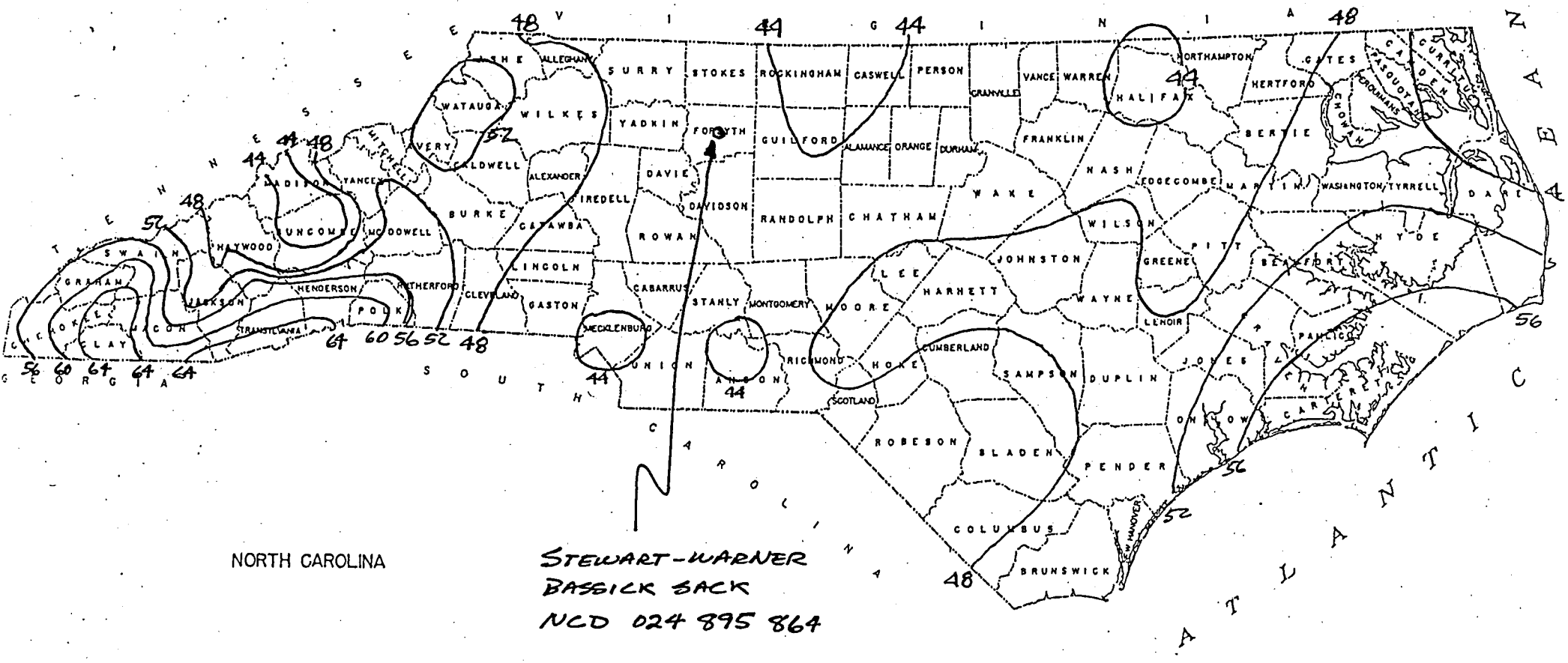
MEAN ANNUAL LAKE EVAPORATION
(INCHES)



NORTH CAROLINA

STEWART-WARNER
BASSICK SACK
NCD 024 895 864

NORMAL ANNUAL TOTAL PRECIPITATION
(INCHES)



NORTH CAROLINA

STEWART-WARNER
BASSICK SACK
NCD 024 895 864

REFERENCE 3

DEPARTMENT OF COMMERCE
[illegible] H. Hodges, Secretary

WEATHER BUREAU
F. W. Reichelderfer, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

PROPERTY OF THE
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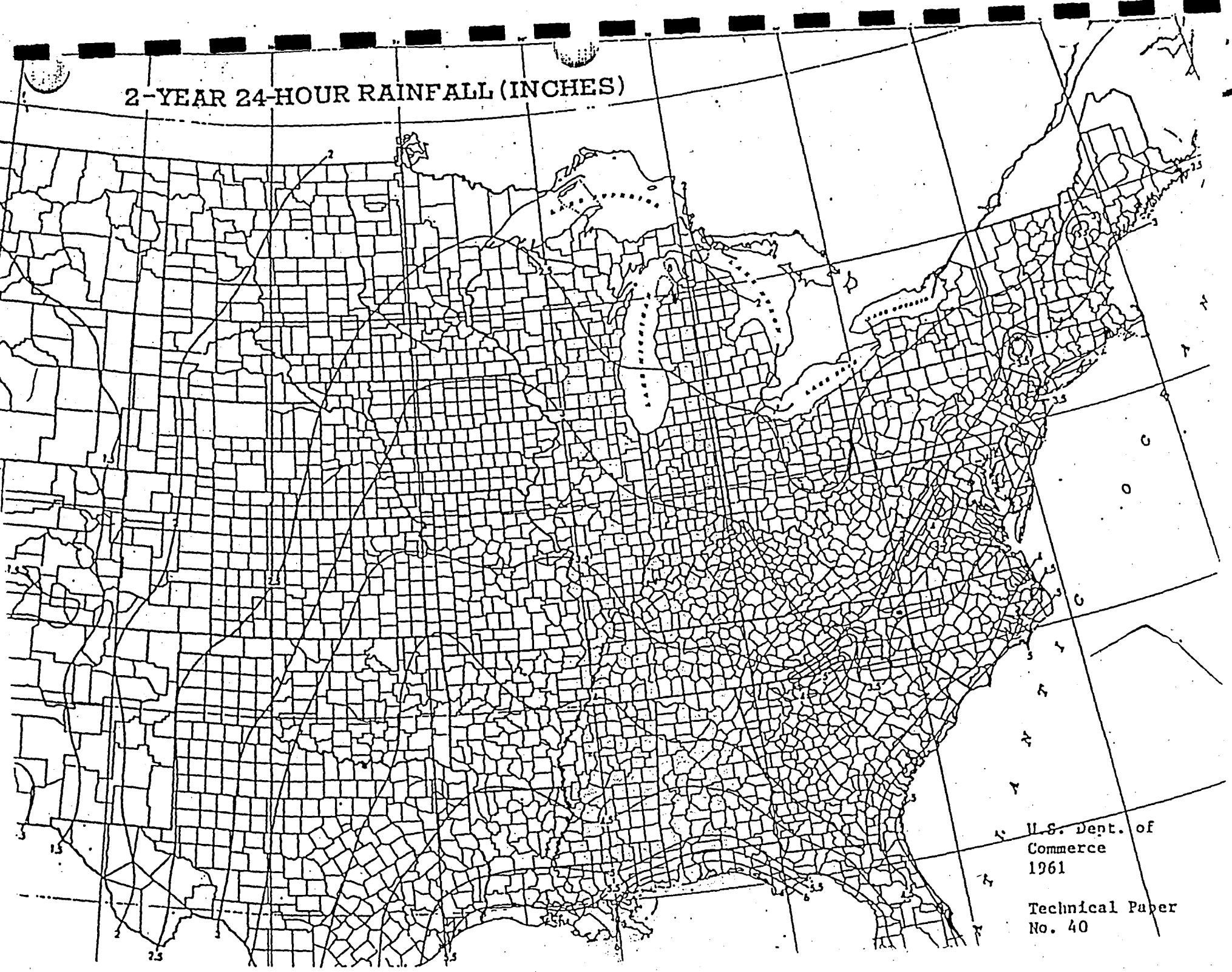
2-YEAR 24-HOUR RAINFALL (INCHES)



U.S. Dept. of Commerce
1961

Technical Paper No. 40

REFERENCE 4

Please print or type in the unshaded areas only
(Fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. ...8-R0175

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

EPA I.D. NUMBER: F N C D 0 2 4 8 9 5 8 6 4 3 D

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

000201

RECEIVED
EPA REGION IV

PLEASE PLACE LABEL IN THIS SPACE

NOV 19 10 33 AM '80

ENFORCEMENT DIVISION

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1. SKIP SASSICK-SACK DIV OF STEWART WARNER CORP

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 DUMSHA DENNIS WASTE SUPERVISOR	919 725 1331

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 P O BOX 4152

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 WINSTON-SALEM	NC	27105

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 2941 INDIANA AVENUE

B. COUNTY NAME

FORSYTH COUNTY

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 WINSTON-SALEM	NC	27105	

CONTINUE ON REVERS

ITINUED FROM THE FRONT

. SIC CODES *(4-digit, in order of priority)*

A. FIRST		B. SECOND	
3420	(specify) Furniture Hardware & Casters	C 7	(specify)
C. THIRD		**D. FOURTH**	
	(specify)	C 7	(specify)

I. OPERATOR INFORMATION

A. NAME: STEWART WARNER CORPORATION

B. Is the name listed in Item VIII-A also the owner? ☑ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*
= FEDERAL M = PUBLIC *(other than federal or state)*
S = STATE O = OTHER *(specify)*
P = PRIVATE
(specify)

D. PHONE *(area code & no.)*: C A 312 883 6000

E. STREET OR P.O. BOX: 326 DIVERSEY PARKWAY

F. CITY OR TOWN: CHICAGO | G. STATE: IL | H. ZIP CODE: 60614

IX. INDIAN LAND
Is the facility located on Indian lands? ☐ YES ☑ NO

EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	D. PSD *(Air Emissions from Proposed Sources)*	
N N/A	9 P 0 0 3 4 5 0 0 0 1 P	
B. UIC *(Underground Injection of Fluids)*	**E. OTHER** *(specify)*	
U N/A	9 1 1 5 4	(specify) City of Winston-Salem Permit for Sewer
C. RCRA *(Hazardous Wastes)*	**E. OTHER** *(specify)*	
R	9 3 0 4 2	(specify) N.C. State Certificati for Waste Treating Facilit

. MAP

ttach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show e outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste eatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface ater bodies in the map area. See instructions for precise requirements.

I. NATURE OF BUSINESS *(provide a brief description)*

Metal Finishing of Furniture Hardware. Steps included are Brass Foundry, Zinc Die-Cast Foundry, Vibratory Finishing, Electroplating, Oxidizing, Buffing, Lacquering, Painting and Degreasing.

II. CERTIFICATION *(see instructions)*

certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all ttachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the pplication, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting alse information, including the possibility of fine and imprisonment.

NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
Wesley J. Kiley, Vice President	X Wesley J. Kiley	October 28, 1980

OMMENTS FOR OFFICIAL USE ONLY

Please print or type in the unshaded areas only
(Fill-in areas are spaced for elite type, i.e., 12 characters per inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

EPA I.D. NUMBER: F N C D 0 2 4 8 0 5 8 5 4 (T/A: 3, C: 1)

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR.	MO.	DAY
45	01	01

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.
1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP (T/A: 1)

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	S02	33,400	G		7				
2	S03	7,500	Y		8				
3	T01	4,000	U		9				
4	S01	2200	G		10				

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I. PROCESSES *(continued)*

. SPACE FOR ADDITIONAL PROCESS CODES OR DESCRIBING OTHER PROCESSES *(code "T0.* FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

V. DESCRIPTION OF HAZARDOUS WASTES

. **EPA HAZARDOUS WASTE NUMBER** — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

. **ESTIMATED ANNUAL QUANTITY** — For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

. **UNIT OF MEASURE** — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

. **PROCESSES**

1. *PROCESS CODES:*
   For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

OTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by ore than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

XAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds er year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non—listed wastes. Two wastes e corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 00 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K054	900	P	T03 D80	
X-2	D002	400	P	T03 D80	
X-3	D001	100	P	T03 D80	
X-4	D002				included with above

 CONTINUE ON PAGE 3

ntinued from page 2.
OTE: Photocopy this page before completing if you more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
NCD024895864 T/A 3 C 1	W DUP T/A C 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	F001	960	P	S01			S03	
2	F002	800	P	S01			"	
3	F003	10,000	P	S01			"	
4	F006	72	T	S01			"	
5	F007	6,360	P	S01	T01		"	
6	F008	50,000	P	S01	T01		"	
7	F009	320,000	P	S01	T01		"	
8	P029	22,500	P	S01	T01	S02	"	
9	P030	30,150	P	S01	~~S02~~	T01	"	S02
10	P098	7,500	P	S01	T01	S02	"	
11	P106	30,000	P	S01	T01	S02	"	
12	P121	10,000	P	S01	T01	S02	"	
13	P076	100	P	S01	T01	S02	"	
14	U024	480	P	S01		S02	"	Incinerated through Atomic Absorption Unit
15	U210	960	P	S01		S02	"	
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

inued from the front.

DESCRIPTION OF HAZARDOUS WASTES (continued)

USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE

EPA I.D. NO. (enter from page 1): N C D 0 2 4 8 9 5 8 6 4 T/A 3 C 6

FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground–level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
36 08 01	-080 13 20

II. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
Stewart-Warner Corporation	312-983-6000

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
1826 Diversey Parkway	Chicago (C G)	IL	60614

OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
Wesley J. Kiley, Vice President	Wesley J. Kiley	October 28, 1980

OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
Dennis Dumsha	Dennis Dumsha	October 28, 1980

CONTINUE ON PAGE 5

NCD024895864

BASSICK-SACK

COMPANY ADDRESS	CITY	STATE ABBREV.	ZIP CODE
	WINSTON-SALEM	NC	

CONTACT PERSON'S NAME/TITLE	TELEPHONE NUMBER (INCLUDE AREA CODE)
DENNIS DUMSHA	919 725-1331

CONTACT RECORD

DATE	CONTRACTOR'S INITIALS	ITEMS DISCUSSED/RESOLUTION
9-21	P.S.	III. & IV. - RECEIVED PERMISSION TO
		MAKE CHANGES. S01 ADDED TO
		PG. 1 OF 5 & S03, T01 & S02 TO
		PG. 3 OF 5.
9/23	AW	Line 2 (III) Unit of Measure changed from G to Y.

REFERENCE 5

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street • Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor

Division of Solid Waste Management
Telephone 919 - 733-2801

Jonathan B. Howes, Secretary

4 March 1993

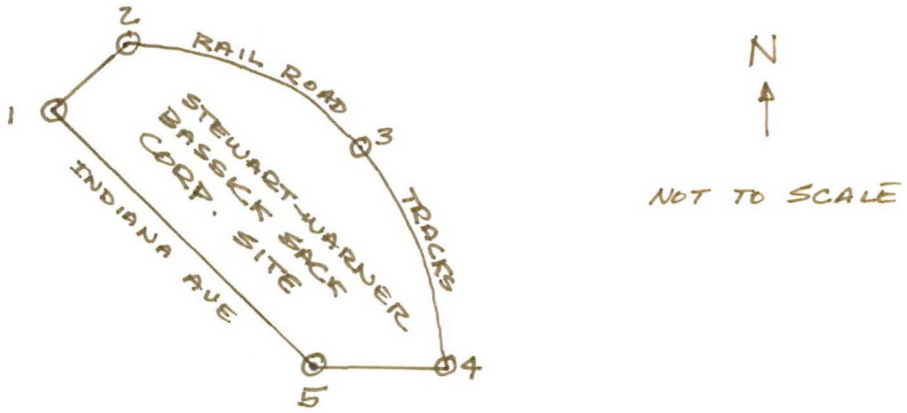
To: File

From: Grover Nicholson, Environ. Engr.
NC Superfund Section

Subject: Stewart-Warner Bassick Sack Corporation
AKA Ilco-Unican Corporation
NCD 024 895 864

Calculation of Site Coordinates

Five points describe the site for purposes of population counts. They were calculated from the USGS 7.5′ topographic maps using the accepted US EPA method. See the attached pages for the calculations. A sketch of the site identifying the points used is shown below.



P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4984 Fax # 919-733-0513

An Equal Opportunity Affirmative Action Employer

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: STEWART-WARNER BASSICK SACK CERCLIS #: NCD 024 895 864

AKA: ILCO-UNICAN SSID: _____

ADDRESS: 2941 INDIANA AVENUE

CITY: WINSTON-SALEM STATE: NC ZIP CODE: 27105

SITE REFERENCE POINT: #1 CORNER PROPERTY & INDIANA AVE IN NORTH

USGS QUAD MAP NAME: WALKERTOWN TOWNSHIP: — N/S RANGE: — E/W

SCALE: 1:24,000 MAP DATE: 1951 PR-1986 SECTION: — 1/4 — 1/4 — 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: —

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 80 ° 07 ' 30 " LATITUDE: 36 ° 07 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 80 ° 12 ' 30 " LATITUDE: 36 ° 07 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 44

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 14 . 6 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 14 . 5 "

D) ADD TO STARTING LATITUDE: 36 ° 07 ' 30 . 0 " + 0 ' 14 . 5 =

SITE LATITUDE: 36 ° 07 ' 44 . 5 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 340

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 112 . 3 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1 ' 52 . 5 "

D) ADD TO STARTING LONGITUDE: 80 ° 12 ' 30 . 0 " + 1 ' 52 . 5 =

SITE LONGITUDE: 80 ° 14 ' 22 . 5 "

INVESTIGATOR: GROVER NICHOLSON DATE: 4 MAR 93

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: STEWART-WARNER BASSICK SACK CERCLIS #: NCD 024 895 864

AKA: ILCO-UNICAN SSID: ____

ADDRESS: 2941 INDIANA AVENUE

CITY: WINSTON-SALEM STATE: NC ZIP CODE: 27105

SITE REFERENCE POINT: #2 CORNER PROPERTY & RAILROAD IN NORTH

USGS QUAD MAP NAME: WALKERTOWN TOWNSHIP: — N/S RANGE: — E/W

SCALE: 1:24,000 MAP DATE: 1951 PR-1986 SECTION: — 1/4 — 1/4 — 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: —

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 80 ° 07 ' 30 " LATITUDE: 36 ° 07 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 80 ° 12 ' 30 " LATITUDE: 36 ° 07 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 51

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 16 . 9 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 17 . 0 "

D) ADD TO STARTING LATITUDE: 36 ° 07 ' 30 . 0 " + 0 ' 17 . 0 =

SITE LATITUDE: 36 ° 07 ' 47 . 0 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 333

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 110 . 02 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1 ' 50 . 0 "

D) ADD TO STARTING LONGITUDE: 80 ° 12 ' 30 . 0 " + 1 ' 50 . 0 =

SITE LONGITUDE: 80 ° 14 ' 20 . 0 "

INVESTIGATOR: GROVER NICHOLSON DATE: 4 MAR 93

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: STEWART-WARNER BASSICK SACK CERCLIS #: NCD 024 895 864

AKA: ILCO-UNICAN SSID: _____

ADDRESS: 2941 INDIANA AVENUE

CITY: WINSTON-SALEM STATE: NC ZIP CODE: 27105

SITE REFERENCE POINT: #3 MIDWAY ALONG PROPERTY LINE & RAILROAD

USGS QUAD MAP NAME: WALKERTOWN TOWNSHIP: — N/S RANGE: — E/W

SCALE: 1:24,000 MAP DATE: 1951 PR-1986 SECTION: — 1/4 — 1/4 — 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: —

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 80 ° 07 ' 30 " LATITUDE: 36 ° 07 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 80 ° 12 ' 30 " LATITUDE: 36 ° 07 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 38

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 12 . 6 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 12 . 5 "

D) ADD TO STARTING LATITUDE: 36 ° 07 ' 30 . 0 " + 0 ' 12 . 5 =

SITE LATITUDE: 36 ° 07 ' 42 . 5 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 309

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 102 . 1 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1 ' 42 . 0 "

D) ADD TO STARTING LONGITUDE: 80 ° 12 ' 30 . 0 " + 1 ' 42 . 0 =

SITE LONGITUDE: 80 ° 14 ' 12 . 0 "

INVESTIGATOR: GROVER NICHOLSON DATE: 4 MAR 93

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: STEWART-WARNER BASSICK SACK CERCLIS #: NCD 024 895 864

AKA: ILCO-UNICAN SSID: _____

ADDRESS: 2941 INDIANA AVENUE

CITY: WINSTON-SALEM STATE: NC ZIP CODE: 27105

SITE REFERENCE POINT: #4 CORNER PROPERTY & RAILROAD IN SOUTH

USGS QUAD MAP NAME: WALKERTOWN TOWNSHIP: — N/S RANGE: — E/W

SCALE: 1:24,000 MAP DATE: 1951 PR-1986 SECTION: — 1/4 — 1/4 — 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: —

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 80 ° 07 ' 30 " LATITUDE: 36 ° 07 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 80 ° 12 ' 30 " LATITUDE: 36 ° 07 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 17

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 5 . 6 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 5 . 5 "

D) ADD TO STARTING LATITUDE: 36 ° 07 ' 30 . 0 " + 0 ' 5 . 5 =

SITE LATITUDE: 36 ° 07 ' 35 . 5 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 292

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 96 . 5 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1 ' 36 . 5 "

D) ADD TO STARTING LONGITUDE: 80 ° 12 ' 30 . 0 " + 1 ' 36 . 5 =

SITE LONGITUDE: 80 ° 14 ' 06 . 5 "

INVESTIGATOR: GROVER NICHOLSON DATE: 4 MAR 93

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: STEWART-WARNER BASSICK SACK CERCLIS #: NCD 024 895 864

AKA: ILCO-UNICAN SSID: ____

ADDRESS: 2941 INDIANA AVENUE

CITY: WINSTON-SALEM STATE: NC ZIP CODE: 27105

SITE REFERENCE POINT: #5 CORNER PROPERTY & INDIANA AVE IN SOUTH

USGS QUAD MAP NAME: WALKERTOWN TOWNSHIP: — N/S RANGE: — E/W

SCALE: 1:24,000 MAP DATE: 1951 PR-1986 SECTION: — 1/4 — 1/4 — 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: —

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 80 ° 07 ' 30 " LATITUDE: 36 ° 07 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 80 ° 12 ' 30 " LATITUDE: 36 ° 07 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 17

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 5 . 6 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 5 . 5 "

D) ADD TO STARTING LATITUDE: 36 ° 07 ' 30 . 0 " + 0 ' 5 . 5 =

SITE LATITUDE: 36 ° 07 ' 35 . 5 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 309

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 102 . 1 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1 ' 42 . 0 "

D) ADD TO STARTING LONGITUDE: 80 ° 12 ' 30 . 0 " + 1 ' 42 . 0 =

SITE LONGITUDE: 80 ° 14 ' 12 . 0 "

INVESTIGATOR: GROVER NICHOLSON DATE: 4 MAR 93

SITE NAME: STEWART-WARNER BASSICK SAC NUMBER: NCD.024 895 864
AKA ILCO-UNICAN

TOPOGRAPHIC MAP QUADRANGLE NAME: WALKERTOWN SCALE: 1:24,000

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID:

LATITUDE: 36° 07' 30" LONGITUDE: 80° 12' 30"

REFERENCE 6

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street • Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor

Division of Solid Waste Management
Telephone 919 - 733-2801

Jonathan B. Howes, Secretary

10 March 1993

To: File

From: Grover Nicholson, Environ. Engr.
NC Superfund Section

Subject: Trip Report
Stewart-Warner Bassick Sack Division
AKA Ilco-Unican Corporation
NCD 024 895 864

On Wednesday, 3 March 1993, I made a trip to Winston-Salem, NC with Harry Zinn and Doug Moore, also of the NC Superfund Section. The purpose of the trip was to conduct PA Recons of two sites, Winston-Salem Coal Gas Plants #1 and #2, and to do a SIP Recon of the Stewart-Warner Bassick Sack site. In particular, we were all looking for ground water users and surface water flow paths.

We left Raleigh at 0800, and arrived in Winston-Salem at 1030. From 1030 until 1130 we looked at the Winston-Salem water supply system maps and the Winston-Salem storm drainage system maps. Copies were made as necessary. We determined that the Winston-Salem water distribution system extended well beyond four miles of each of the sites. Runoff from the sites generally flowed into the storm drainage system.

From 1130 until 1200, we tried to locate the present owners of the Winston-Salem Coal Gas Plant #2 by checking the tax maps at the county courthouse. We had lunch from 1200 until 1245.

At 1300, we met with Steve Phibbs, RCRA Waste Management Specialist, and Margaret Foster, Regional Supervisor, at the Winston-Salem field office of the Dept. of EHNR. After a short while, Margaret invited the Ground Water Section people to join us, since they were also working on Stewart-Warner. For a little over n hour we listened as Steve, Margaret, and the Ground Water

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4984 Fax # 919-733-0513

An Equal Opportunity Affirmative Action Employer

Section people told us what they knew of the history of waste disposal and spillage at the Stewart-Warner site and we discussed our role in assessing the sites, paying particular attention to explaining our target analysis. I wanted them to understand that, even though these sites may be contaminated, if there were not enough affected people and environments, there would not be any action taken under CERCLA. Steve Phibbs gave us some information about the recent underground tank removal at Stewart-Warner. Margaret Foster was very interested in Winston-Salem Coal Gas Plant #2, since she had never been there and had no information about it.

After the meeting, we went to the Winston-Salem Coal Gas Plant #2 site. We met there with Steve Phibbs and Margaret Foster. On the site of the former plant was a new building, a parking area, and a "strollway", (a path for walking through Old Salem, the historic district). We looked for any remains of the site and at the drainage pathway from the site area. Margaret Foster left us there.

At 1500 we and Steve Phibbs went to Winston-Salem Coal Gas Plant #1. Again, we traced the apparent surface water flow pathways. At about 1530, we left the site and Steve led us to the Stewart-Warner site. There, we spent about an hour tracing the surface water pathway from the site. We found that runoff from the site generally flows into drop inlets on site or moves southwestward onto Indiana Avenue. From both the drop inlets and Indiana Avenue, the water enters the storm water drainage system and flows to the southwest. The runoff is piped underground beneath a school playing field, residential lots, and Blum Park for a distance of about 2400 feet before it emerges just southwest of the intersection of 24th Street and Ivy Avenue. Another short unnamed tributary, flowing from the east, enters the stream there. Based on USGS 7.5′ topographic maps, water originating at the site then flows above ground and southwestward for about 3000 feet, southward and in an underground pipe for another 2000 feet, and then empties into the headwaters of Peter's Creek. Peter's Creek flows to the south for about three miles and empties into Salem Creek.

Land use in the area immediately around the site varies. Directly across Indiana Avenue to the south is a school. To the south and west of the school is a residential district, called Bon Air. To the west of the site is a residential and light commercial area. The area to north of the site is primarily commercial and light industrial with some houses. To the east is a Southern Railroad line, commercial and industrial areas, and US Highway 52.

No water wells were noted near any of the sites.

REFERENCE 7

Field Notes For Stewart/Warner Site

G&O personnel: Marie Fisher
Billy Dixon

Date: January 10, 1990

NCDEHNR personnel: Harvey Allen
Steve Phibbs

Ilco personnel: Brian Wells
Nader Iskander
Edwin Smith
Roce Boyles
Anthony Widler

Ilco Unican Corporation purchased facility about 2 years ago (1988), presently they manufacture zinc diecast locks. Ilco is presently in the porcess of cleaning-up the facility from when it was owned by Stewart/Warner since 1945. Ilco has discontinued many of the processess that were performed at the site. The site is about 9.8 acres. 130 employees work at the site.

Current waste generated include:

- electroplating dry sludge and solution waste w/cyanide (F006 & F007), generated from the pre-treatment plant (1,600 pounds/quarter or about 1 55-gal drum/month)
- non-hazardous hydraulic oils
- approximately 60 drums in the hazardous waste storage area located inside the building, appears to be adequately diked. This is a high number of drums, because they include the dust from the roof, and the cyanide bath waste from one of the plating lines that was removed. Also tanks in this area are washed, the drain in this area goes to the Pre-Treatment system.

The electroplating waste sludge is sent to World Resource, Inc. for recyling, the hydraulic oil is sent to Southeastern Chemical in South Carolina. Painting of the locks is with a dry non-hazardous paint - no hazardous waste is generated from this process. All cleaning of the equipment is done with pressurized steam cleaning - no solvents or hazardous chemicals are used to clean equipment.

Pre-Treatment Plant:

- discharges 30,000-gallons/day
- used to treat all plating solution waste water (tanks are cleaned about once a month)
- Discharged solution in compliance, except for minor problems
- Pre-Treatment plant started in 1974, proir to treatment plant discharged to sewers
- Most of the sumps and drains are directed to the pre-treatment plant.
- Prior to the Pre-Treatment plant, waste were either dumped into the city sewer system or in ditches around the facility

Processes that have been discontinued:

- Brass Foundry discontinued 1990 - brass foundry molds and formed objects from molten metal, such as door pulls and knobs. Sand casting process, waste generated include:
    - o floc's of metling metal
    - o slag from the mold

  Waste contain heavy metals, such as lead, zinc, and copper
- Lacquer Painting, dicontinued 1990 - painting of the metal parts. Waste generated include solvents from the lacquer paint and paint sludge. Currently using dry paint instead of wet paint, no hazardous waste generated.
- Buffing Operation, discontinued 1990 - Buffed metal parts, waste generated included:
    - o chlorinated solvents, such as 1,1,1-trichloroethane and perchloroethene, associated with the degreasing of the metal prior to buffing.

Waste and Spill Problems:

- At least 4 spills from the plating baths occurred while Stewart/Warner operated the site. Three of the spills occurred in 1987. The spills mainly were released to the environment on the east side of the plant and migrated down the railroad track ditch and back onto the south end of the proberty.
- One spill occured recently in October 1990. A cyanide pre-treatment tank overflowed due to an operator error. Approximately 300 gallons of waste were lost. Standing waste water was treated with HTH and removed. The spill went through one of the storm-water drains that drained to the railroad tracks. This drain has since been plugged.
- One of the employee's Edwin Smith said that in the early 80's for an approximate 3-year period, plating bath sludge was disposed of on the ground in south end of the property. During the site tour no vegetation was observed to be growing in this area.
- Three pits have been identified on the south end of the proberty. Drums were discovered in Pits A & B, during a soil remediation event. No drums were found in Pit C, although, according to Brian Wells this pit is the most contaminated.
- In the buffing operations waste dust was filtered out of the building through a vent. Dust was observed to be built up on the roof when Ilco purchased the property in two areas on the roof. Most of the dust has been removed, but during the site tour dust was still observed on the roof. Soils from these pits have been removed by GSX, under the operatio of Stewart/Warner.

Tanks:

- Above-ground tanks associated with Pre-Treatment system.
- One below-ground fuel oil tank
- One above-ground cyanide holding tank about 4,500 gallons. recently been diked. Overflowed during Stewart/Warner's operation, no diking was present around the tank at that time.
- 2 1,000-gallon plating solution holding tanks formerly located outside on the east side of the plant. Tanks have since, have been removed, and soils in this area have been remediated.

- Above-ground propane tank observed, empty
- Above-ground diesel fuel tank.

Bagfilters:

- Two baghouse filters - one was used for the Diecast bag filter the other for Foundery baghouse filter.
- Soil contamination was found around the Foundry baghouse filter.

RCRA & Permit Status:

- Ilco operates under a large generater
- According to Steve Phibb's (RCRA inspector) they did apply for a TSD facility but never got it.
- Maintain an Air permit for bag house for the Brass Foundry and Pinating with lacquer paint. All of these operations are not in use and the permit will probably will be allowed to run out.

Surrounding Land Use:

- Lowrance School across Indiana Ave.
- Fertilizer plant to east of the site across the railroad tracks.
- Railroad tracks border site
- Some residential areas located in the vicinity of the site.

ACTIONS NEEDED:

Contact Jim Bryan from the County Health Department - Harvey will give us his number.

REFERENCE 8

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

(5)

January 15, 1986

RECEIVED
JAN 17 1986
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. John Dickinson
United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, GA 30368

Dear Mr. Dickinson:

Enclosed are the Amended Part "A" permit application forms. The amended copy shows that we have a tank rather than a waste pile to store our waste treatment sludge in.

If you have additional questions, please feel free to contact me at 919-725-1331.

Sincerely,

I. D. Blakley
Plant Engineer

IDB/jhb

enclosures

cc: Mr. Keith Lawson
North Carolina Dept. of Human Resources

Mr. W. J. Kiley
Stewart-Warner Corp.

Mr. M. B. Lipscomb
Bassick-Sack Division

FORM 1 GENERAL

EPA

ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F N C D 0 2 4 8 9 5 8 6 4 | T/A 3 | C D

LABEL ITEMS

EPA I.D. NUMBER

I. FACILITY NAME

FACILITY MAILING ADDRESS

I. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area*(s)* below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge to waters of the U.S.**? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge to waters of the U.S.**? (FORM 2B)		X	(4)
C. Is this a facility which currently results in **discharges to waters of the U.S.** other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge to waters of the U.S.**? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X		X	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)			

NAME OF FACILITY

SKIP BASSICK-SACK DIV OF STEWART-WARNER CORP

FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*: EDWIN SMITH WASTE SUPERVISOR

B. PHONE *(area code & no.)*: 919 725 1331

FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: 941 INDIANA AVENUE

B. CITY OR TOWN: WINSTON-SALEM | C. STATE: NC | D. ZIP CODE: 27105

FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: 941 INDIANA AVENUE

B. COUNTY NAME: FORSYTH COUNTY

C. CITY OR TOWN: WINSTON-SALEM | D. STATE: NC | E. ZIP CODE: 27105 | F. COUNTY CODE *(if known)*:

CONTINUE ON REVERSE

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
3429 (specify) Furniture Hardware & Casters	(specify)
C. THIRD	**D. FOURTH**
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME: STEWART-WARNER CORPORATION

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL; M = PUBLIC (other than federal or state); S = STATE; O = OTHER (specify); P = PRIVATE

(specify)

D. PHONE (area code & no.): A 312 883 6007

E. STREET OR P.O. BOX: 1826 DIVERSEY PARKWAY

F. CITY OR TOWN: CHICAGO

G. STATE: IL

H. ZIP CODE: 60614

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	N/A	**D. PSD** (Air Emissions from Proposed Sources)	9P 0034600001P
B. UIC (Underground Injection of Fluids)	N/A	**E. OTHER** (specify)	1154 (specify) City of Winston-Salem Permit for Sewer
C. RCRA (Hazardous Wastes)		**E. OTHER** (specify)	9 3042 (specify) N.C. State Certification for Waste Treatment Facility

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Metal finishing of Furniture Hardware. Steps included are Brass Foundry, Zinc Die-Casting Foundry, Vibratory Finishing, Electroplating, Oxidizing, Buffing, Lacquering, Painting and Degreasing.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Wesley J. Kiley Vice President	Wesley J. Kiley	1/14/86

COMMENTS FOR OFFICIAL USE ONLY

...ess are spaced for elite type, i.e., 12 ... ters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

EPA

ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

	F	N	C	D	0	2	4	8	9	5	8	6	4	3	1		

Y/A C

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR.	MO.	DAY
4 5	0 1	0 1

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.
1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

DUP Y/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	0 2	600	G		5				
X-2	0 3	20	E		6				
	0 2	33,400	G		7				
	0 2	37	Y		8				
	0 1	4,000	U		9				
	0 2	2,200	G		10				

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS [illegible] OR FOR DESCRIBING OTHER PROCESSES [illegible] *f04*"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES

a. For listed hazardous waste — For each listed hazardous waste entered in column A, select the code*(s)* from the list of process codes contained in Item IV-D(1) to indicate how the waste will be stored, treated, and/or disposed of at the facility.

b. For non—listed hazardous wastes — For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous waste for that characteristic or toxic contaminant.

NOTE: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on Page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION — If a code is not listed for a process that will be used, describe the process in the space provided on the form and in Item III.

NOTE: HAZARDOUS WASTES DESCRIBED BY CODE "T" — ONE EPA HAZARDOUS WASTE NUMBER — If a hazardous waste that exhibits more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A on the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D (2) enter the line number included with above-listed intake and other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE: FOR COMPLETING ITEM IV (*shown in line numbers X-1, X-2, X-3 and X-4 below*): A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition the facility will treat and dispose of three non—listed wastes. Two of the non—listed wastes are completely toxic and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES: 1. PROCESS CODES (enter)			2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K054	900	P	T03	D80		
X-2	D002	400	P	T03	D80		
X-3	D001	100	P	T03	D80		
X-4	D002						included with above

CONTINUE ON PA

...ued from page 2.

...TE: Photocopy this page before complet... have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)

N C D 0 2 4 8 9 5 8 6 4 | T/A 3 | C 1

FOR OFFICIAL U... ONLY

W - DUP | T/A | C 2 | DUP

V. DESCRIPTION OF HAZARDOUS WASTES (continued)

...O ...N	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F006	85,000	P	S02	Disposal at GSX Pinewood, South Carolina
2	D008	2,840	P	S01	Disposal at GSX Pinewood, South Carolina
3	D001	110	G	S01	Disposal at Caldwell Systems, Lenoir, North Carolina
	F001	25	G	S01	Disposal at GSX Pinewood, South Carolina

3

...rm 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

...ified from the front.

DESCRIPTION OF HAZARDOUS WA... (continued)

USE THIS SPACE TO LIST ADDITION... PROCESS CODES FROM ITEM D(1) ON PA...

EPA I.D. NO. (enter from page 1)

C	D	0	2	4	8	9	5	8	6	4	T/A	C
											3	6

FACILITY DRAWING

...xisting facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

PHOTOGRAPHS

...xisting facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, ...tment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
36 08 010	-080 - 13 200

FACILITY OWNER

A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
Stewart-Warner Corporation	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
1826 Diversey Parkway	Chicago	IL	60614

OWNER CERTIFICATION

...tify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached ...ments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the ...itted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, ...ding the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
...sley J. Kiley ...ice President	Wesley J. Kiley	1/14/86

OPERATOR CERTIFICATION

...ify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached ...ments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the ...itted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, ...ding the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
...lo B. Lipscomb ...neral Manager	M B. Lipscomb	1/12/85

STEWART-WARNER CORPORATION
SYMBOL OF SW EXCELLENCE
Bassick·Sack Division
2941 INDIANA AVENUE · WINSTON-SALEM, NORTH CAROLINA 27105 · 919/725-1331

October 30, 1985

RECEIVED
OCT 31 1985
HAZARDOUS WASTE MANAGEMENT BRANCH
S01D 8 01708

24

Mr. William E. Meyer
North Carolina Department of Human Resources
Division of Health Services
P. O. Box 2091
Raleigh, North Carolina 27602-2091

Dear Mr. Meyer:

This is to advise you that the tank we store our waste treatment sludge F006 and Foundry Baghouse house lime with D008 meets the definition as stated in regulation 40 CFR 260.

Mr. Jarvis D. Middleton, Environmental Engineer, from the EPA Region IV, Atlanta office recently visited our plant. He took pictures of the tank and approved of our method of storage in the tank.

Please advise if you need additional information.

Sincerely,

I. D. Blakley
Plant Engineer

IDB/jhb

cc: Mr. Keith Lawson

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

November 4, 1985

27

Mr. Ike Blakely
Bassick-Sack Division,
Stewart-Warner Corp.
PO Box 4152
Winston Salem, NC 27105

Dear Mr. Blakely:

After all the discussion about the status of your tank, we have had one more call from EPA in Atlanta. Apparently they do not feel able to send a letter of correction to the mayor of Winston Salem until they have on file a corrected part A of a permit application for their records.

The corrected copy should show that you have a tank rather than a waste pile. I realize that this seems somewhat superfluous in view of your intention to terminate interim status anyway, but if it is necessary to get the whole situation straightened out, I recommend doing it.

Please note that a part A (form 3 in the pamphlet) must be signed by an officer of the corporation of at least vice-president level.

Send the original to Mr. John Dickinson, EPA Region IV, 345 Courtland St., Atlanta, GA 30365, and send a xerox copy to us.

Please try to get the amended part A to EPA as quickly as you can. Please call me if you have any questions.

Very truly yours,

Keith Lawson

Keith Lawson, Envir. Chemist
Solid & Haz. Waste Mgt. Branch

KL/pcs

attachment

REFERENCE 9

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

(8)

October 21, 1985

RECEIVED
SOLID & OILTOS
OCT 28 1985
HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. Keith Lawson
Solid and Hazardous Waste
Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, North Carolina 27602-2091

Dear Mr. Lawson:

This is with reference to the attached copy of my letter dated August 9, 1985, and as a follow-up of our schedule to recover our lacquer solvents.

The solvent recovery unit to recover our waste lacquer thinner was promised to be shipped the first week in October, however, all the units were sold and our vendor was unable to meet their delivery date. We have been advised that our unit is in route via boat from Germany and should arrive in New York the last week of October. The new shipping date from New York is the middle of November.

Due to the delivery of the distillation unit, we can not meet the November 1, 1985 disposal date and because of the economics, with your approval, we plan to wait and recover the solvent. The new schedule completion date is December 6, 1985.

If you have any questions, please feel free to contact me at 919-725-1331. I would appreciate a letter from the state confirming an approval of our new schedule.

Sincerely,

I. D. Blakley
Plant Engineer

IDB/jhb

cc: W. Kiley
M. Lipscomb
L. O'Neill
B. Weesner

Mr. William Page
Division of Health Services

Mr. Stephen Phibbs
Division of Health Services

attachment

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

August 23, 1985

23

Mr. Ike Blakley
Stewart-Warner Corporation,
Bassick-Sack Division
2941 Indiana Avenue
Winston Salem, NC 27105

Dear Mr. Blakley:

Thank you for your letter of August 9. I have also discussed your plans with Steve Phibbs and Julian Foscue. We agree that the procedure outlined in your letter is satisfactory to our office, with the understanding that if, for any reason, your program for installing and operating a still fails to meet schedule, you will manifest the waste lacquer thinner on site to an incinerator or commercial recovery facility. I believe Bassick-Sack has already agreed to do this.

Please call or write if we can help you in any way.

Very sincerely

Keith Lawson

Keith Lawson
Environmental Chemist

KL/tca:3377A

cc: Julian Foscue
Steve Phibbs

RESEARCH & ANALYTICAL LABORATORIES, INC.
P.O. Box 473 106 Short Street
Kernersville, North Carolina 27284
Telephone 919/996-2841

N.C. CERT. #84

Bassick-Sack
P.O. Box 4152
Winston-Salem, NC 27105
Attn: Mr. Ike Blakely

JOB NUMBER 00464

DATE SAMPLE COLLECTED 6/12/85
DATE SAMPLE RECEIVED 6/13/85
DATE SAMPLE ANALYZED 6/14-28/85
DATE OF REPORT 7/9/85
ANALYSES PERFORMED BY Vaden/Champion

PARAMETER	STORET NUMBER	UNITS	LAB SAMPLE NUMBER			
			8393			
pH	00400	NONE	4.5			
Arsenic	01102	mg/l	<0.02			
Beryllium	01012	mg/l	<0.007			
Cadmium	01027	mg/l	0.027			
Chromium	01034	mg/l	0.039			
Lead	01051	mg/l	0.270			
Mercury	71900	mg/l	<0.003			
Flashpoint		°F	<70			
BTU			114,827/Gal			
Specific Gravity			0.846			
Chlorine		%	0.046			
Ash		mg/l	0.10			
CLIENT'S SAMPLE NUMBER	N/A	N/A	Laquer & Paint Mixture			

LRE BLAKELEY

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick·Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

August 9, 1985

RECEIVED AUG 12 1985 SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

22

Mr. Keith Lawson
Solid and Hazardous Waste
Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, North Carolina 27602-2091

Dear Mr. Lawson:

This is per your recent request as to the schedule date that Bassick-Sack will switch to the 90 day disposal of hazardous waste.

Bassick-Sack will remove all the wastewater treatment sludge (F006) and the foundry baghouse dust containing lead (D008) by September 1, 1985, and will dispose of it every 90 days, or less, thereafter. The storage container will then be used for new waste generated within 90 days.

We presently have 600 gallons of waste lacquer thinner (D001) on hand. Attached is a copy of an analysis of this material. It is more economical for us to recover this material by distillation. We plan to purchase a solvent distillation unit. The delivery and installation is approximately 10 weeks. The sludge from the recovery will be disposed of every 90 days, or less, starting November 1, 1985 or sooner.

Other hazardous waste will be disposed of every 90 days or less. For our records and protection, I would appreciate a letter from the state confirming approval of our schedule and method of disposal.

Sincerely,

IDB/jhb

cc: W. Kiley
M. Lipscomb
L. O'Neill
B. Weesner

Mr. William Page
Division of Health Services

Mr. Stephen Phibbs
Division of Health Services

attachment

REFERENCE 10

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

(1)

DIVISION OF HEALTH SERVICES
NORTH CENTRAL REGIONAL OFFICE
720 Coliseum Drive-Plaza West
Winston-Salem, N.C. 27106
(919) 761-2390

February 22, 1982

RECEIVED
MAR 1 1982
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

MEMORANDUM

TO: O. W. Strickland, Head
Solid and Hazardous Waste Management Branch

FROM: Steve Phibbs, District Sanitarian
North Central Regional Office

SUBJECT: Interim Status Inspection

COMPANY: Bassick Sack-Stewart Warner
2941 Indiana Avenue
Winston-Salem, NC 27105
E.P.A. ID#NCD024895864

CONTACT: Larry O'Neill

CURRENT WASTE DISPOSAL SITE: S.C.A. in South Carolina ✓

On February 16, 1982, a RCRA interim status inspection was conducted at the Bassick Sack-Stewart Warner plant in Winston-Salem, NC. The following violations were noted:

1) 262.31 Labeling and Marking Containers - all containers of 110 gallons or less must be properly labeled.

2) 262.39 Accumulation Dates - the accumulation date must be properly marked on each container.

3) 265.13 Waste Analysis Plan - a waste analysis plan must be adopted and maintained at Bassick Sack. The information must include the test(s) methods used and the sampling method.

4) 265.110 and 267.404 Closure Plan - this plan must include the maximum amount of wastes on site at time of closure with the: total cost of cleanup and decontamination of equipment. This must include all wastes in drums, tanks, and wastes piles.

3/31/82 (over)*

5) 265.17(a) No Smoking Signs -- must be posted in the drum storage areas.

A compliance date of March 31, 1982, was established.

SP/mrw

RCRA INSPECTION REPORT

1) Facility Information

Bassick Sack-Stewart Warner
2991 Indiana Avenue
Winston-Salem, NC
E.P.A. ID#NCD024895864
Forsyth County

2) Facility Contact

Larry O'Neill

3) Survey Participants

Larry O'Neill, Bassick Sack
Jim Bryan, Forsyth County Health Department
Steve Phibbs, District Sanitarian, Division of Health Services

4) Date of Inspection

February 16, 1982

5) Applicable Regulations

40 CFR Parts 263 and 265

6) Purpose of Survey

RCRA inspection was conducted by the N. C. Solid and Hazardous Waste Management Branch. The scope of the survey covered a site survey, record review and manifest reporting procedures. Applicable regulations covered those in 40 CFR Part 263, generator standards and Part 265, general facility standards, subparts on waste piles, chemical, physical and biological treatment, use and management of containers and tanks check-list.

7) Facility Information

Bassick Sack manufactures furniture fixtures and generate electroplating sludges (metal hydroxide). The electroplating sludges contains cyanides, chromium, copper and zinc. The cyanides are converted to cyanates when oxygen is fed into the wastewater treatment system. The heavy metals are precipitated out of the wastewater with the final discharge going to the Winston-Salem wastewater treatment system.

Solidified cyanide material scraped periodically from the bottom of the dip tanks is put back into solution, discharge into Bassick Sack's wastewater treatment system and subjected to the cyanide destruction system.

The metal hydroxide sludge is removed from the wastewater tanks and placed in a waste pile which is kept covered with a tarpolin. Waste degreasing solvents will be sent to a reclamation operation for recycling.

A filter press is used to remove all metal sludges prior to discharge. This is the material that comprises the waste pile. A final pH adjustment is necessary before final discharge.

8) Site Deficiencies

1 - Failure to properly mark and label containers. 262.31

2 - Failure to label containers with the appropriate accumulation dates. 262.34

3 - Failure to maintain a facility waste analysis plan. 265.13

4 - Failure to maintain a written closure plan. 265.110 and 265.404

5 - Failure to post no smoking signs in drum storage area. 265.17(a)

9) Recommendations

1 - Control storm water drainage around the storm sewer discharge.

2 - Clean up drum storage area and eliminate all unnecessary drums. Cyanide wastes should be treated as soon as possible after the dip tank has been cleaned out.

3 - Keep spill and clean up materials (straw, shovels and absorbent material) on site.

4 - Keep all emergency contingency information in central file and educate employees on proper emergency procedures.

5 - Compliance date set for March 31, 1982.

REFERENCE 11

DIVISION OF HEALTH SERVICES
NORTH CENTRAL REGIONAL OFFICE
720 Coliseum Drive-Plaza West
Winston-Salem, N.C. 27106
(919) 761-2390

RECEIVED
SEP 20 1983
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

September 16, 1983

MEMORANDUM

TO: O.W. Strickland, Head
Solid and Hazardous Waste Management Branch

FROM: Steve Phibbs
Waste Management Specialist
North Central Regional Office

SUBJECT: RCRA Inspection

COMPANY: Stewart Warner Corp. - Bassick Sack
Box 4152
2941 Indiana Ave.
Winston-Salem, N.C. 27105

CONTACT: Larry O'Neill

EPA ID#: NCD024895864

On September 15, 1983 a RCRA hazardous waste inspection was conducted at Stewart Warner Corporation, Bassick-Sack in Winston-Salem, N.C. The following violations were noted:

1) 262.30 - 262.34 Pre-transport Requirements - Condition of Containers and Labeling of Containers - containers of hazardous wastes will not meet D.O.T. transport requirements because of corrosion, and hazardous wastes labels must be filled out completely and must be legible.

2) 265.15 - Written Inspection Schedule and Inspection Log Book - A written inspection schedule and log must be kept on facility operating equipment, security devices, monitoring equipment, etc.

3) 265.16 - Personnel Training Records - personnel handling and transporting hazardous wastes must be properly trained and records of the training must be maintained.

4) 265.52(E) - Contingency Plan-Emergency Equipment List - A list of facility emergency equipment must be added to the contingency plan.

5) 265.73 - Operating Record - a facility operating record must be maintained for the amounts of hazardous waste on site.

6) 265.174 - Use and Management of Containers - containers of hazardous wastes were corroding and several were open to the atmosphere. All wastes materials should be classified and properly disposed of instead of remaining on site.

7) 265.253(B) - Wastes Piles - Bassick Sack electroplating sludge waste pile is not being properly protected from precipitation. The present cover needs repairing or a new cover must be provided.

A November 1, 1983 compliance date was established.

SP/kd

Enclosure

RCRA INSPECTION REPORT

1) Facility Information

Stewart Warner Corporation, Bassick-Sack
Box 4152
2941 Indiana Ave.
Winston-Salem, N.C. 27105
EPA ID#NCD024895864

2) Facility Contact

Larry O'Neill, Plant Manager

3) Survey Participants

Larry O'Neill, Bassick-Sack
Ike Blakely, Bassick-Sack
Dennis Salt, Bassick-Sack
Jim Bryan, Forsyth Co. Health Dept.
Steve Phibbs, Waste Management Specialist

4) Date of Inspection

September 15, 1983

5) Applicable Regulations

40 CFR Part 262 and Part 265

6) Scope of Survey

No change

7) Facility Description

No change

8) Site Deficiencies

1) Failure to meet pre-transport requirements. 262.30 and 262.34
2) No written inspection schedule or inspection log. 265.15
3) No personnel training records. 265.16
4) No emergency equipment list. 265.52(E)
5) No facility operating record. 265.73
6) Corroding hazardous wastes containers. 265.174
7) Improper protection from precipitation - wastes pile. 265.253(B)

9) Compliance Schedule/Recommendations

November 1, 1983

REFERENCE 12

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

(11)

March 19, 1986

Mr. M. B. Lipscomb
Bassick-Sack Division
Stewart-Warner Corporation
2941 Indiana Avenue
Winston-Salem, North Carolina 27105

Dear Mr. Lipscomb:

Thank you for your letter of March 14 to Mr. Meyer.

We agree that the closure operation has been completed in conformity with the closure plan. Bassick-Sack will no longer be subject to the various provisions for assurance of closure costs or for sudden or non-sudden discharge insurance which are part of hazardous waste regulations. Additionally, it will no longer be subject to the requirements of 40 CFR 265, except in those specific cases where some of these apply to generators as well as to treatment, storage, or disposal facilities.

Our office is preparing a public notice of intent to terminate your interim status. A 45-day period for comment is allowed after the date of publication. However, this should be purely a formality.

Thank you for your cooperation. Please write or call us if you have any questions.

Very truly yours,

Keith Lawson

Keith Lawson
Environmental Chemist

KL/as

cc: Pam Coble
Bill Hamner
Jerry Rhodes
Larry O'Neill, Bassick-Sack
Ike Blakley, Bassick-Sack

Jerry?
Wm?
(10)

STEWART-WARNER CORPORATION
SYMBOL OF SW EXCELLENCE
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

March 14, 1986

M. B. (MIKE) LIPSCOMB
GENERAL MANAGER

RECEIVED
MAR 17 1986
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. William L. Meyer
Head Solid and Hazardous Waste
Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, North Carolina 27602-2091

Dear Mr. Meyer:

This letter is official notification that Bassick-Sack Division of Stewart-Warner Corporation (I.D. #NCD024895864) has completed our approved Closure Plan submitted, dated April, 1984. Also attached is a letter from Engineering Tectonics, P.A., by Stephen W. Derbyshire, P.E. dated March 4, 1986, certifying that this facility has been closed in accordance with the specifications in the approved Closure Plan.

We will also follow the provisions of 40 CFR Part 262 as a generator of hazardous waste. We will no longer hold hazardous waste at our facility longer than the 90 day limit.

Sincerely,

M. B. Lipscomb

MBL/jhb

cc: Stephen E. Phibbs
N. C. Division of Health Services

Chris Jackson
Stewart-Warner Corporation

Messrs. F. Anderson
I. Blakley
W. Kiley
L. O'Neill
B. Weesner

attachment

(9)

ET

ENGINEERING TECTONICS, P. A.

March 4, 1986

Stewart-Warner Corporation
Bassick-Sack Division
2941 Indiana Avenue
Winston-Salem, North Carolina 27105

Attention: Mr. Isaac D. Blakley

RE: Hazardous Waste Disposal Area
Bassick-Sack Division
2941 Indiana Avenue
Winston-Salem, North Carolina
EPA Facility I.D. No. D024-8950864

Gentlemen:

On March 3, 1986 a representative of Engineering Tectonics, P.A. visited the referenced site to inspect the hazardous waste accumulation at that time.

It is our opinion, based on our inspection, that the closure plan submitted, dated April 1984 has been properly implemented, and we hereby certify closure of the facility as outlined in the plan.

Very truly yours,

ENGINEERING TECTONICS, P.A.

Stephen W. Derbyshire

Stephen W. Derbyshire, P. E.
Chief Engineer

SWD:rmm

WINSTON-SALEM: P.O. Box 11846 Winston-Salem, N.C. 27106 (919) 767-8807 Greensboro Direct 379-9537

GREENSBORO: P.O. Box 9867 Greensboro, N.C. 27429-0867 (919) 275-0674

MYRTLE BEACH: P.O. Box 1496 Myrtle Beach, S.C. 29578 (803)238-3451

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

(3)

June 7, 1984

Mr. Larry O'Neill
Stewart - Warner Company
Bassick - Sack Division
2941 Indiana Avenue
Winston-Salem, NC 27105

Re: 024895864

Dear Mr. O'Neill:

The Solid and Hazardous Waste Management Branch acknowledges, with thanks, the receipt of your closure plan. We appreciate your cooperation.

It is possible that some aspects of your operations will change from time to time. Therefore you should periodically review your plan to make sure, it still covers all your activity. This is in addition to the annual review for adequacy of your financial assurance.

Our branch expects that part B of the permit application will be called for every treatment, storage, or disposal site in the state within the next few weeks. A sound closure plan is an integral part of the part B application. You may wish to review your plan again, to see if any points were not covered, because the analysis of your closure plan as a component of part B is a very thorough one.

Very sincerely,

Keith Lawson

Keith Lawson, Environmental Chemist
Solid and Hazardous Waste Management Br.
Environmental Health Section

OWS/KL: tl

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick·Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 910/

RECEIVED
APR 2 1984
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

March 30, 1984

Mr. Keith Lawson
Chemical Consultant
Solid & Hazardous Waste Mgt. Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602-2091

(2)

Dear Mr. Lawson:

In answer to your March 1, 1984, letter, find enclosed a revised closure plan that includes all items checked on that letter.

Larry O'Neill

Larry O'Neill (jh)
Director of Personnel

LWO/jhb

cc: M. Lipscomb
General Manager
A. Lowe
Director of Manufacturing
D. Solt
Chemist

CLOSURE PLAN

BASSICK-SACK DIVISION

2941 INDIANA AVENUE

WINSTON-SALEM, N. C. 27105

DIVISION OF

STEWART-WARNER CORPORATION

1826 DIVERSEY PARKWAY

CHICAGO, ILLINOIS 60614

APRIL, 1984

CLOSURE PLAN

EPA Facility I.D. No. N C D024 895 864

Owner's Name Bassick-Sack Division of Stewart-Warner Corporation

Address & Phone No. 1826 Diversey Parkway, Chicago, Illinois 60614 (312) 883-6000

Facility Address 2941 Indiana Avenue, Winston-Salem, N. C. 27105 (919) 725-1331

1. FACILITY CONDITIONS

A. General information

1. Size: Land area of 70 x 100 feet containing the structure housing the waste treatment facility and one outdoor storage tank.

2. Tanks: One

3. Storage:

   a. Bulk storage, plus storage of 55 gallon drums

   b. Bulk volume is maximum of 34 cubic yards. Drum volume is maximum 90-55 gallon drums.

4. Other on-site facilities: Not applicable

5. Waste characterization:

   a. Combined waste: (F006 and D008) F006 is wastewater treatment sludge from electroplating operations. D008 is baghouse dust from a foundry. The dust contains lead above EP toxicity limits. The combined waste is a semisolid containing heavy metals.

   b. (F001) spent tetrachloroethane and sludges from the recovery of this solvent used in a degreasing operation. This material is a semisolid.

   c. Combined waste: (F003 and F005) waste paint, lacquer, and thinner used in a painting operation. Waste is a liquid which contains Xylene, Acetone, Ethyl Acetate, N-Butyl Alcohol, Methonal, Tolnene, and Methylx Ethyl Isetone. This waste is also flammable.

   d. (F008) Plating bath sludges from the bottom of plating bath from electroplating operations where cyanides are used in the process. This waste is a semisolid containing heavy metals and amenable cyanide.

B. Maximum Inventory

1. F006 and F008 combined waste maximum 34 cu. yards.
2. F001 degreading sludge: 5 drums
3. F003 and F005 combined waste Non-Halogenated solvents 30 drums
4. F008 plating bath sludges 55 drums

C. Auxiliary Equipment - not applicable

D. Final Closure Schedule

1. There will be no partial closure at this facility since we only generate and store hazardous waste to be shipped to other disposal facilities.

2. We do not anticipate closing the facility any any time.

3. Closure Time Table:

a. Notify N. C. Division of Health Services of intention to close facility.

b. 180 days later production ceases

c. 60 days from day production ceases all waste would be removed from facility.

d. 14 days from time waste is removed all decontamination will be complete.

e. The only possiblity of ground becoming contaminated would be due to a spill and this would be cleaned up immediately.

f. No interim inspections required.

g. 90 days from last day of production certification of closure will be completed by a company officer and a professional engineer.

II. REMOVING INVENTORY

A. Maximum waste on-site

1. See paragraph I., A., 3, b.

2. See paragraph 1., A., 3, b.

3. See paragraph 1., A., 3, b.

B. Pretreatment - not applicable

C. Removal of Inventory

1. <u>On-site treatment:</u> not applicable

2. <u>Off-site removal</u>:

a. Quantity - as stated above

b. Mode of disposal

1. F006 and D008 would go to SCA Services landfill in Pinewood, South Carolina. S.C.A. I.D. #S.C.D070375985. The transporter would be. U. S. Pollution Control Inc. Oklahoma City, Oklahome. Their I. D. # is O.K. T410010474.

2. F001 degreasing sludge would be disposed of the same as the F006 and D008.

3. F003 and F005 (non-Halogenated Solvents). This waste would be incinerated by Caldwell Systems, Inc., Lenoir, North Carolina. Their I.D. # is N. C. D086871282. Caldwell Systems would also transport this waste.

4. F008 Cyanide plating bath sludges would be chemically treated by SCA Services in New Jersey. Transporting would be done by

U. S. Pollution Control, Inc., Oklahome City, Oklahoma.

III. DECONTAMINATING THE FACILITY

A. Area of soil contamination - not applicable

1. List areas - not applicable

2. Depth of soil - not applicable

3. Amount of soil - not applicable

B. Equipment requiring cleaning

1. Equipment requiring cleaning: One tank for sludge, 10 x 20 x 5 feet deep, open-top, to be steam cleaned.

a. By owner

b. Residue of 50 gallons of cleaning liquids from cleaning of above Sludge Tank. This residue would be treated in our wastewater treatment plant which is regulated under the Clean Water Act.

c. The only sampling necessary would be to check the sludge tank for any remaining residue which can be done visually.

2. Treatment of residue

a. Quantity disposed on-site: - 50 gallons through wastewater treatment system.

IV. CLOSURE CERTIFICATION

A. Schedule of inspections - three

- Post closure - By Company Officer and a Profession Engineer

Following is a list of the maximum amount of hazardous waste and we will have on hand at any given time and the cost to dispose of it. Prices are as of 4-1-84.

1.	F006 and D008 combined waste 40,000 lbs.	
	cost .005 / lb.	$ 2,200.00
	Freight	844.00
2.	F008 Cyanide waste 55 barrels	
	cost 550.00 each	30,250.00
	Freight	844.00
3.	F003 and F005 combined waste 30 barrels	
	cost 69.00 each	2,070.00
	Freight	1,688.00
4.	F001 degreasing sludge 4 barrels	
	cost 69.00 each	276.00
	Freight	100.00
	Total	$38,272.00
Preparation for shipment		3,000.00
Professional Engineer fee for post closure inspection		200.00
	Total	$41,472.00

REFERENCE 13

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

November 15, 1982

RECEIVED
NOV 16 1982
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

8

Mr. Thomas C. Karnoski, Environmental Engineer
Solid & Hazardous Waste Management Branch
Division of Health Services
P.O. Box 2091
Raleigh, North Carolina 27602-2091

Re: Permit No. 34-01-E Closure

Dear Mr. Karnoski:

This letter is to advise you of the completion of soil and water tests required to demonstrate closure, as provided in Paragraph 10 of the above referenced Emergency Hazardous Waste Permit.

Listed are the results of tests as provided by the two laboratories involved. Written analyses from the labs will be forwarded to your office as they are received here.

Soil Sample

10-14-82	10.8 ppm
10-22-82	8.2 ppm
11-02-82	3.6 ppm

Run Off Water Sample

8-04-82	less than .005 mg/l
10-29-82	less than .005 mg/l
11-08-82	less than .005 mg/l

It is our understanding the above results demonstrate compliance with closure requirements. Therefore, soil treatment activities have been suspended.

At this time, the Bassick-Sack Division of Stewart-Warner wishes to thank you for the understanding of our problem and for the technical assistance offered by your department, in particular by Steve Phibbs and Keith Lawson.

We look forward to written confirmation of closure from your office.

Sincerely,

Larry O'Neill

Larry W. O'Neill
Director of Personnel

LWO:agn

cc: Mike Lipscomb
General Manager

Alan Lowe
Director of Manufacturing

Ike Blakley
Manager of Plant Engineering

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

November 3, 1982

Mr. Larry W. O'Neill
Bassick-Sack Division
Stewart-Warner Corporation
2941 Indiana Avenue
Winston-Salem, NC 27105

Dear Mr. O'Neill:

7

This is to advise you that you need not start additional treatment of the cyanide-contaminated soil until analytical results are obtained on the sample now outstanding, plus a water run-off sample to be obtained after the next rain. Should these analyses prove satisfactory as defined in Mr. Karnoski's letter of July 21, 1982, there should be no need to continue treatment at all.

Please be sure to let me have your analytical results as soon as you receive them.

Sincerely,

Keith Lawson

Keith Lawson, Environmental Chemist
Solid & Hazardous Waste Management Branch
Environmental Health Section

KL:lc

cc: Mr. Steve Phibbs

[redacted] Caro[redacted] Department [redacted] of Health [redacted] and Environmental [redacted] Control
Solid and Hazardous Waste Management Division
2600 Bull Street, Columbia, SC 29201
Phone: (803) 758-5681

HAZARDOUS WASTE MANIFEST

[redacted] Manifest [redacted] Document [redacted] Number [redacted]
№ 17438

A. Name	I.D. Code	Address	Phone Number (area code & number)	Date Shipped or Accepted
(1) Generator Stewart Warner Corp Bassick Sack Div.	NCD024895864	2941 Indiana Ave. Winston-Salem N.C. 27105	919-725-1331	82 (year) 12 (month) 8 (day)
(2) Transporter No. 1 Williams Trucking	SCD0709297	4900 Banco Rd, Charleston Hgts S.C.	803-747-0974	82 (year) 12 (month) 8 (day)
Transporter No. 2				(year) (month) (day)
(3) TSDF				82 (year) 12 (month) 09 (day)

B. (1) Generator Item Count: Number	Container Type	(2) DOT Proper Shipping Name/Hazard Class/ DOT Identification Number	(3) Total Quantity	(4) Weight (pounds)	(5) Waste Code	(6) TSDF Item Check: Number	Container Type	(7) Quantity by Weight (pounds)
1	Bulk	Haz. Waste Solid ORM E NOS NA 9819		37450	NC D024895864 F006 92-1701	1	Dump	~~37450~~ 37,590
		Called Mr. Salt 1-3-83						
		For him To complete forms				JR		

C. Emergency Response Information:
In event of an emergency, phone the Generator at: (919) 725 1331
In event of a spill in South Carolina, call the Department at (803) 758-5531

D. Special Handling Instructions: None

E. Comments: SCA Workorder #26078

F. This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to all applicable regulations of the U.S. DOT, U.S. EPA, the S.C. PSC and the S.C. DHEC.

Dennis A. Sock — Signature
Waste Treatment Supervisor — Name and Title
12/8/82 — Date

G. I hereby certify that I am an authorized representative of the transporter and that the waste(s) and quantity described in this Manifest have been accepted by us for ultimate delivery to the TSDF identified above.

Transporter No. 1: J.R. McMillan #7 — Signature
Williams Trucking Co — Name
12-8-82 — Date

Transporter No. 2: Signature / Name / Date

H. I hereby certify that I am an authorized representative of the TSDF identified above and that the waste(s) and quantity in this Manifest have been accepted by me for treatment, storage, and/or disposal.

Hope Barwick — Signature
SCA Services, Technician — Name and Title
12-9-82 — Date

REFERENCE 14

NCD024895864

STEWART-WARNER CORPORATION
SYMBOL OF EXCELLENCE
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

31

March 18, 1987

RECEIVED
APR 6 1987
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. Jerry Rhodes
North Carolina Natural Resources Dept.
Albermarle Building
325 N. Salisbury Street
Raleigh, North Carolina 27611

Dear Mr. Rhodes:

This is to advise that on February 27, 1987, at Bassick-Sack Division, 2941 Indiana Avenue, Winston-Salem, NC 27105, at 2:15 PM a tank used to mix brass plating solution was over filled with water and less than 50 gallons of water containing approximately 3% cyanide per gallon ran onto the ground and along 150 feet of adjoining railroad siding. The solution was diked and dipped up and approximately 570 gallons of dirt and solution was collected in 30 gallon containers. The cyanide will be treated in our wastewater treatment plant.

The soil was tested on March 5, 1987, and it contained 63 mg/kg cyanide. Additional treatment of lime and HTH was used. On March 9, 1987, the run off sample indicated 6.6 Mg/L cyanide. Additional treatment was applied and on March 13, 1987, the run off on the railroad contained (0.013 cyanide and 13 Mg/L on the Bassick-Sack property. We have applied additional lime and HTH and we will keep you advised as to the final results. If you desire additional information, please phone 919-725-1331.

There were no injuries. We believe there were no potential hazards to human health or the environment.

Sincerely,

I. D. Blakley
Plant Engineer

IDB/jhb

RECORD OF COMMUNICATION	☒ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☐ OTHER (SPECIFY) (Record of item checked above) 3	
TO: File	FROM: Wm. Paige	DATE 3-17-87 TIME 1:30 pm

SUBJECT Stewart Warner Bassett-Sacks Winston Salem NCD024895864 Issac Blakely 725-1331

SUMMARY OF COMMUNICATION

William received a call from Larry Bunn (Forsyth Co. HD) regarding a cyanide spill at Bassett Sacks in Winston Salem approx. 1 week ago

Larry noted:

- spill was reported apparently to DEM or some state agency other than Hazardous Waste Branch
- Employees (of Bassett) apparently have been attempting cleanup activities eg. adding lime, HTH to the material.
- Employee has reportedly been ill from the fumes? reaction?
- Could not reach Steve Phibbs & called William Pary

CONCLUSIONS, ACTION TAKEN OR REQUIRED

Gw

INFORMATION COPIES TO:

EPA Form 1300-6 (7-72)

RECORD OF COMMUNICATION

☒ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☐ OTHER (SPECIFY)

(Record of item checked above)

TO: File

FROM: D. Holzfeld

DATE: 3-17-87

TIME: 1:50 pm

SUBJECT: Stewart Warner - Barnett Sacks discussion w/ Isaac Blakely 725-1331

SUMMARY OF COMMUNICATION

Per Mr. Blakely:

- Removed large portion → drums → WWTP
- Treating in place with Cl2 + HTH to reduce cyanide .15 ppm mg/l 26 ppm mg/l

Called Coast Guard at time of incident
Steve Phibbs has been notified + has visited the site.

Water in tank overflow tank for cyanide plating bath
~ 50 gallons/ lost

Questioned: about employee getting sick
was using rubber gloves
- boots
→ temporary help (Not trained)
→ referred to Env. Epidemiology 733-3410

CONCLUSIONS, ACTION TAKEN OR REQUIRED

- Report incident per 265.56 j
- DO NOT USE UNTRAINED OR UNSUPERVISED EMPLOYEES in any form or fashion
- Treatment requires Em. Permit? No, Per J. Rhodes consider it immediate response ok to utilize WWTP for drained material.
- May use professional contractor personnel trained + equipped
- Referred Mr. Blakely to ENV. Epidemiology for sick personnel for appraisal.

INFORMATION COPIES TO: T. TAYLOR or Greg Smith

EPA Form 1300-6 (7-72)

RECORD OF COMMUNICATION	☐ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☐ OTHER (SPECIFY) (Record of item checked above)	
TO: T. H	FROM: D. Holzfield	DATE 3-17-87 TIME 4:00 pm

SUBJECT
Stewart Warner / Bassett Sales

SUMMARY OF COMMUNICATION

Larry Brown Forsyth Co. H-D 727-2760

- I spoke with Larry reg. my conversation with Mr. Blakely at Stewart Warner
- Larry indicated that temp. help was a student at Appalachian State + that he should go to local H-D or infirmary for evaluation if he feels ill.
- Referred Larry to T. Taylor / Greg Smith at Env. Epid. + any efforts could be described to them by the infirmary.
- Also, Steve is aware of site

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA Form 1300-6 (7-72)

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

May 21, 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED:

NOTICE OF VIOLATION
Docket # 87-468

Mr. Mike Lipscomb, General Manager
Stewart Warner Corporation
Bassick - Sack Division
2941 Indiana Avenue
Winston-Salem, North Carolina 27105

Re: Plating solution spill (cyanide), NCD 024 895 864

Dear Mr. Libscomb:

On December 18, 1980 the State of North Carolina, Solid and Hazardous Waste Management Branch (State) was authorized to operate the State RCRA hazardous waste program under the Solid Waste Management Act, (Act) N.C.G.S. 130-A, Article 9 and rules promulgated thereto at 10 NCAC 10F (rules) in lieu of the federal RCRA program.

On March 2, 1987, Mr. Steve Phibbs, Waste Management Specialist with the Branch responded to investigate the release of a brass plating solution containing cyanide at the Bassick-Sack Division site in Winston-Salem, Forsyth County, North Carolina. Mr. Phibbs was informed that a tank used to mix brass plating solutions containing cyanide, had been overfilled with water. Subsequently, a release of the material contaminated soils on and beyond Bassick-Sack property.

> 40 CFR 261.1(a), codified at 10 NCAC 10F .0029, states:
> This part identifies those solid wastes which are subject to regulation as hazardous wastes under Parts 262 through 265 and Parts 270, 271, and 124 of this Chapter and which are subject to the notification requirements of Section 3010 of RCRA.

> 40 CFR 261.2(b), codified at 10 NCAC 10F .0029, states:
> Materials are solid waste if they are abandoned by being [1] disposed of; or [2] burned or incinerated; or [3] accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated.

> 40 CFR 261.3(a), codified at 10 NCAC 10F .0029, states:
> A solid waste, as defined in Section 261.2 is a hazardous waste if:
>
> 1. It is not excluded from regulation as a hazardous waste under Section 261.4(b); and

2. It meets any of the following criteria:

   i. It exhibits the characteristics of hazardous waste identified in Subpart C.
   ii. It is listed in Subpart D and has not been excluded from the lists in Subpart D under Sections 260.20, and 260.22 of this chapter.
   iii. It is a mixture of solid waste and a hazardous waste that is listed in Subpart D solely because it exhibits one or more of the characteristics of hazardous waste identified in Subpart C, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in Subpart C.
   iv. It is a mixture of solid waste and one or more hazardous wastes listed in Subpart D and has not been excluded from this paragraph under Sections 260.20 and 260.22 of this chapter.

Spent cyanide plating bath solutions from electroplating operations is a listed hazardous waste (F007).

40 CFR 261.7(a)(2), codified at 10 NCAC 10F .0029, states:
Any hazardous waste in either (i) a container that is not empty or (ii) an inner liner removed from a container that is not empty is subject to regulation under Parts 261 through 265, and Parts 270 and 124 of this chapter and to the notification requirements of Section 3010 of RCRA.

40 CFR 260.10, codified at .0002, states that:
"Disposal" is defined as the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters. "Storage" is defined as the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

It is the determination of this agency that the cyanide contaminated soils on and beyond Bassick-Sack property constituents disposal, and the subsequent storage of cyanide contaminated soils and liquids constituents storage of listed hazardous waste subject to all applicable requirements of 40 CFR 262 through 265 and 270.

10 NCAC 10F .0032(a), states that any person who treats, stores, or disposes of hazardous waste shall do so in compliance with the standards set forth in this rule, and only after having received a permit from the Department as required by 10 NCAC 10F .0034(b)(1), or having received interim status according to NCAC 10F .0034(b)(3).

The storage and disposal of the wastes described above, is in violation of 10 NCAC 10F .0032(a) in that the site is not a permitted hazardous waste treatment, storage or disposal facility.

COMPLIANCE SCHEDULE

By June 30, 1987, your site shall no longer store hazardous waste, and all hazardous waste previously on site shall have been treated or shipped to a properly permitted hazardous waste treatment, storage or disposal facility.

During the interim, pending shipment of the waste, 40 CFR 262.34(a), codified at 10 NCAC 10F .0030, states that:

1. If the waste is placed in containers the generator must comply with Subpart I of 40 CFR Part 265 or if the waste is placed in tanks, the generator must comply with Subpart J of 40 CFR Part 265 except 265.193.
2. The date upon which each period of accumulation begins is clearly marked and visible for inspection on each container.
3. While being accumulated on-site, each container and tank is labeled or marked clearly with the words, "Hazardous Waste"; and
4. The generator complies with the requirements for owners or operators in Section 265.16. Bassick-Sack Division must ensure that untrained, unsupervised personnel are not utilized in any manner for cleanup activities.

By June 15, 1987, develop and submit to this office a comprehensive sampling/analysis plan which will characterize soil contamination at and beyond your site. This plan must specify constituents to be analyzed, sampling procedures, sampling location, and depths that will assess the horizontal and vertical extent of contamination. In addition, the location of any water supplies within the vicinity must be noted. In conclusion, the plan must describe methods, procedures and a schedule for remedial activities. Upon approval of the plan, Bassick-Sack Division must implement the plan and complete remedial activities within 30 days.

If the above requirements are not met, pursuant to N.C.G.S. 130A-22(a) and 10 NCAC 10G .0701-.0707 an administrative penalty of up to $10,000.00 per day may be assessed for violation of the hazardous waste law or regulations.

If you have any questions concerning this matter, you may contact me or Doug Holyfield at (919) 733-2178.

Respectfully,

Jerry Rhodes

Jerry Rhodes, Assistant Branch Head
Solid and Hazardous Waste Management Branch
Environmental Health Section

JR:pgb

cc: Steve Phibbs
Doug Holyfield

6789A

STEWART-WARNER CORPORATION SYMBOL OF EXCELLENCE SW
Bassick-Sack Division
2941 INDIANA AVENUE • WINSTON-SALEM, NORTH CAROLINA 27105 • 919/725-1331

June 8, 1987

RECEIVED JUN 11 1987 SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. Jerry Rhodes
Assistant Branch Head
North Carolina Dept. of Human Resources
Division of Health Services
P. O. Box 2091
Raleigh, North Carolina 27602-2091

Re: Plating Solution Spill (Cyanide) NCD 024 895 864 and Pre-treatment Waste Water Overflow May 29, 1987.

Dear Mr. Rhodes:

Per your request of May 21, 1987, enclosed is a copy of the sampling/analysis plan required by the North Carolina Solid and Hazardous Waste Management Branch.

If you have any questions, please contact me at (919) 725-1331. With your approval, we will implement the plan.

Sincerely,

Isaac D. Blakley

IDB/jhb

cc: C. Butler
W. Kiley
M. Lipscomb
S. Phibbs

enclosure

Comprehensive Sampling/Analysis Plan To Determine the Extent of Chemical Contamination at Spill Site(s) Located at Bassick-Sack Division, Winston-Salem, North Carolina

Prepared For:

Stewart-Warner Corporation
Bassick-Sack Division
2941 Indiana Avenue
Winston Salem, North Carolina 27105

Prepared By:

Reserach & Analytical Laboratories, Inc.
106 Short St.
Kernersville, North Carolina 27284
(919) 996-2841

RECEIVED
JUN 11 1987
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

June 1987

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1.0 Introduction

In response to the notice of violation (Docket # 87-468) letter dated May 21, 1987 from the North Carolina Solid and Hazardous Waste Management Branch pertaining to plating solution spill at Stewart Warner Corporation - Bassick-Sack Division (Winston-Salem, NC) a comprehensive sampling/analysis plan has been developed in the following sections of this report which will characterized soil contamination at and beyond the spill site(s). In addition to the plating solution spill investigation on March 2, 1987 by Mr. Steve Phibbs (Waste Management Specialist) another spill involving treated effluent wastewater from wastewater treatment plant (WWTP) was reported to Mr. Steve Phibbs on May 1987. Both the above mentioned spills will be included in this plan of action with remedial action schedule for the removal of contaminated soils. The following sections of this plan submitted for approval to the North Carolina Solid and Hazardous Waste Management Branch include:

1) Site Plan Development of Spill Areas
2) Location of any Water Supplies in the Area
3) Soil Sampling and Location Procedures
4) Determination of Soil Sampling Depths to Assess the Horizontal and Vertical Extent of Contamination.
5) Analytical Testing Criteria and Methodology
6) Remedial Activities

2.0 Plan of Action

The following sampling/analysis plan describes the comprehensive soils evaluation procedures pertaining to the aforementioned spill sites at Bassick-Sack Division and will be implemented immediately upon approval by the North Carolina Solid and Hazardous Waste Management Branch. Preliminary investigations have already been completed at both spill sites to determine approximate severity and clean-up strategies necessary for compliance with applicable environmental regulations. It is the intent of Stewart Warner Corporation to do all that is necessary to comply with these regulations in the most expeditious way possible.

2.1 Site Plan Development

A site plan will be developed during these investigations showing spill site locations, soil sampling locations, water supplies (if any), and any reference buildings within the study area pertinent to this investigation. This site plan will be submitted to the solid and hazardous waste regulatory authorities as a part of the final report.

2.2 Location of Water Supplies

The site plan will identify any water supplies that exist in or near the spill sites. Specifically, all water supplies within a 1000 feet radius of spill sites will be identified including ground water supplies.

2.3 Soil Sampling and Location Procedures

Representaive soil samples will be collected by dividing spill sites into quadrants and collecting five (5) core samples in each section. The core samples collected from each section will be composited resulting in four (4) separate composite samples from each quadrant. Each quadrant will be kept separate with respect to soil samples collected at other quadrants. Core samples collected from each quadrant will be taken at four depth intervals down to one (1) foot. Only core samples at the same depth interval will be composited

so that the vertical extent of the contamination can be determined. Sampling points for cores within each quadrant will be selected using an imaginary grid and random number table. If quadrants exceed 150 feet by 50 feet then the spill site(s) will be divided into larger number of smaller sections.

Soil samples will be collected using a stainless steel auger with four (4) inch diameter bucket. Procedures for cleaning auger after each sample collection includes the following:

1) Phosphate - free soap and tap water wash
2) Tap water rinse
3) Distilled water rinse
4) Air dry

Isopropyl alcohol rinse was not considered necessary since organics were not applicable for testing. Auger was wrapped in aluminum foil to prevent contamination before use.

In addition, soil sampling procedures will include the following information:

1) Name(s) of people present
2) Date(s) for each sampling event
3) Sample number and analytical test parameter
4) Weather conditions
5) Comments
6) Chain of Custody Documentation

2.4 Determination of Soil Sampling Depths to Assess the Horizontal and Vertical Extent of Contamination

Procedures for the determination of the vertical extent of soil contamination at both spill sites have been identified in Section 2.3. Horizontal determination of soil contamination will be evaluated in conjunction with background samples collected within 50 feet outside the perimeter of the spill

sites. Surface samples to the three (3) inch depth outside the area of contamination will be collected and analyzed for the same chemical constituents tested within the spill sites. A radius of 50 feet intervals and 50 feet outside the spill sites will be used to determine horizontal sampling for soil contaminants. The same procedures used for vertical sampling within spill sites will be used should background samples show contamination.

2.5 Analytical Testing Criteria and Methodology

The analytical tests selected for this investigation represent all known chemical constituents found to be significant with respect to the industrial process solutions and/or treated wastewater which was reported to be spilled at the two (2) sites currently under investigation. The parameters selected for soils testing include the following:

1) Total Chromium
2) Total Copper
3) Total Nickel
4) Total Zinc
5) Total Cyanide
6) pH
7) Total Residue
8) E.P. Toxicity

The methodology utilized in the analytical testing include the following:

1) EPA Test Methods for Evaluating Soild Waste Volume 1A: Laboratory Manual, Physical/Chemical Methods - Methods 3050 (metals), 9010 (cyanide), and 9045 (pH).
2) Total Residue - Standard Methods for the Examination of Water and Wastewater - 15th Edition (method 208).

2.6 Remedial Activities

Upon approval of this plan a comprehensive investigation will commence immediately to assess the horizontal and vertical

extent of contamination. It is only after that study has been completed can Bassick-Sack determine the volume of soil that will need to be removed and the approximate length of time it will take to remove it. It is Bassick-Sack's intent, however, to contract with an approved hazardous waste removal company and dispose of contaminant soil in an EPA approved landfill. The study findings will be used to determine the best approach to take for disposal, so that complete remedial activities can be met within the target date of 30 days after program plan approval.

32

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

June 26, 1987

Mr. Isaac D. Blakley
Stewart-Warner Corporation, Bassick-Sack Division
2941 Indiana Avenue
Winston-Salem, North Carolina 27105
NCD 024 895 864

Re: Sampling and Analysis Plan

Dear Mr. Blakley:

This office has reviewed and approved the Sampling and Analysis Plan submitted 6-8-87 with the following comments:

A comprehensive site report must be developed and submitted to this office by July 31, 1987. This site plan must include preliminary sampling results (background), contamination assessment, a detailed remedial proposal and schedule for completion.

Section 2.3 describes sampling procedures that will be undertaken. Sampling results to the (1) foot noted is assumed to be at 3" intervals. Positive results at the (1) foot level will require additional sampling at 6" intervals until "clean".

As noted previously, remedial activities must be described fully and within the boundaries of RCRA. Any soils considered hazardous must be managed as such, with respect to 90-day storage, inspections, etc. All personnel must be fully trained with records that document such training. This remedial plan must provide for treatment, storage and disposal activities along with decontamination procedures for equipment.

Residual clean-up levels (extractables) of the heavy metals will be the interim primary drinking water standards and 1.0 ppm for cyanide.

In conclusion, post-excavation sampling procedures should be described to ensure completion of remedial activities (trench bottom, sidewells, etc.)

This office must be notified 5 days prior to final sampling to collect split samples. This should be coordinated through Mr. Steve Phibbs at (919) 761-2390.

Please call should you have any questions.

Sincerely,

R. Douglas Holyfield

R. Douglas Holyfield, Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Management Branch

RDH:pgb

cc: Steve Phibbs

6923A

REFERENCE 15

COMPREHENSIVE SITE REPORT FOR THE ASSESSMENT OF CHEMICAL CONTAMINATION AT SPILL SITES 1 and 2

BASSICK-SACK DIVISION
WINSTON-SALEM, NORTH CAROLINA

Prepared for:

Stewart-Warner, Bassick-Sack Division
Winston-Salem, North Carolina

Prepared by:

Research & Analytical Laboratories, Inc.
106 Short Street
Kernersville, North Carolina 27284
919/996-2841

July 1987

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SOLID & HAZARDOUS WASTE MANAGEMENT DIVISION

REFERENCE 16

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18

WRITER'S DIRECT NUMBER

(919) 721-3714

February 9, 1988

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Bassick-Sack Clean-up -- Progress Report and Request for permission to backfill

Dear Doug:

By way of update, all areas indicated contaminated in our spill site assessment should be excavated, assuming good weather, on or before February 10, 1988. Currently, we have taken post-excavation samples from sections 1A, 1B, 1C, 1D, 1E (the main railroad track area) and 3A (the compound or courtyard at the facility). Post-excavation samples will be taken from the remaining areas as soon as possible with testing results possibly available as early as February 18, 1988.

Based on the residual contamination levels revealed in our post-excavation samples, we request the Section allow for the backfilling of those areas designated 1A through 1E and 3A. In addition, we request the Section render a written opinion the above described areas have been "cleaned" to a level acceptable to the Section without the imposition of groundwater monitoring or other post-excavation care. In support of this request we enclose the post-excavation sampling results and other general information indicating residual contamination in the excavated areas fails to pose a measurable threat to human health or the environment.

As you are aware, the Section's initial extractable residual contamination limits for the site (based on drinking water quality criteria) were as follows:

Zinc	-	5.0 ppm
Chromium	-	0.05 ppm
Copper	-	1.0 ppm
Nickel	-	.35 ppm
Cyanide	-	0.2 ppm.

In response, Bassick-Sack presented its proposal, drafted by R&A Laboratories, for establishing permissible maximum extractable residual levels at a meeting with you August 21, 1987. The Bassick-Sack proposed limits were based on those contaminant levels applicable to North Carolina's sanitary landfills and were ten (10) times those proposed by the Section. Bassick-Sack's justifications for this increase included:

1) Minimum human or wildlife contact with the area (assuming backfill at depths of 6" to 18");

2) The lack of any groundwater potable source within two thousand (2,000) feet of the sites;

3) A depth to groundwater estimated by the United States Geological Service to be between thirty-five (35) and forty (40) feet;

4) A predominantly clay to clay - loam soil type at a one (1) foot depth (this has been confirmed across the excavated sites which consistently reveal clay from 9" to 18");

5) The Federal Office of Drinking Water Health Advisory indicating existing advisory limits, while to be used as recommended guidelines, have no legal basis;

6) A lack of EPA adopted limitations or standard methods for testing with respect to a maximum acceptable limit for cyanide in soil; and

7) According to the EPA, the lack of an accepted method for analyzing extractable cyanide in soil.

Further, during the course of the meeting we supported our proposed residual contamination levels based on the following factors:

1) The application of water quality limits on soil contamination was inappropriate at this site;

2) We understood materials contaminated with heavy metals up to ten (10) times the water quality standards (or approximately one-tenth of the RCRA level rendering a material "hazardous") are permitted to be disposed in sanitary landfills (which are not required to have either RCRA liners or leachate collection systems); and

3) The limits proposed by Bassick-Sack would provide adequate and proper protection to human health and the environment in the area and that further excavation would only result in costs to Bassick-Sack disproportionate to any resulting benefit to human health or the environment.

Finally, we requested by letter dated August 21, 1987, that the emphasis of the clean-up effort be on the cyanide and chromium contaminants as they are the only "toxics" among the hazardous materials detected at the spill sites. As a result, we proposed that upon an adequate clean-up of cyanide and chromium, the Section refrain from requiring any further actions as to copper, zinc or nickel. In addition, we asserted any residual heavy metals would be "soil-locked" because of the underlying clay layer and the natural tendancy of heavy metals to remain near or at the surface of soil thereby preventing any migration to a potable water source.

You responded by letter dated August 26, 1987, indicating it would be "inappropriate" for the Section to concur with the Bassick-Sack proposed levels prior to an initiation of a comprehensive clean-up effort. You also indicated the Section would specifically address cyanide, chromium and nickel concentrations, but not necessarily to the exclusion of future enforcement activities by the Division of Environmental Management should they choose to address copper or zinc.

In view of the parameters established in the above documents and correspondence, we present the post-excavation sampling results for spill site sections 1A through 1E and 3A. All samples were taken with Steve Phibbs in attendance and split samples were shared with the Section. The samples were subjected to

the E.P. toxicity leachate test to determine residual amounts of heavy metals and the testing methodology established by the Section for determining residual amounts of cyanide.

As the results indicate, residual levels for both chromium and cyanide are substantially below the Section's initial limitations of 0.05 ppm (chromium) and 0.2 ppm (cyanide). Therefore, those hazardous materials considered "toxic" by the Environmental Protection Agency have been removed from soil to a level acceptable in drinking water.

As to nickel, while residual amounts ranged from 0.33 ppm to a high of 2.67 ppm, the vast majority of samples reveal levels of 1.0 ppm or less. As a result, residual contamination levels of nickel are generally three (3) times or less the Section's initial limit of 0.35 ppm. However, we understand the Section's limit is not based on any primary or secondary drinking water standard. Further, sanitary landfills are permitted to accept waste contaminated with nickel at levels up to ten (10) times the Section's initial limit (i.e., 3.5 ppm), a limit all amounts of residual nickel at the Bassick-Sack facility fall within. Clearly, allowing these minimal residual amounts of nickel to remain in the soils fails to pose an appreciable risk to human health or the environment in view of the lack of human contact with the area, the depth to groundwater, the tendancy of heavy metals to remain locked in soil and the predominantly clay type soils found in the area. In any case, any threat to human health or the environment is substantially less than that posed by sanitary landfills across the state.

As to zinc and copper, while the residual amounts exceed those limits initially set by the Section, virtually all are well within the limits permitted at sanitary landfills. Also, the Environmental Protection Agency has recently removed zinc from the Safe Drinking Water Act list of contaminants for which it must set primary drinking water standards. The Agency's removal of zinc was based upon a lack of evidence concerning adverse health effects associated with the metal and the fact even the presence of large amounts of zinc in water causes only aesthetic problems. Again, based on the factors applied to residual nickel, we assert there is virtually no negative impact upon human health or the environment associated with leaving these amounts of zinc and copper in the soils.

Based on the foregoing, we request the Section permit us to backfill these excavated and tested areas in order to allow for a speedy and economical conclusion of this clean-up effort. While we understand and support the Section's commitment to

protecting the State's environment and the human health of its citizens we contend further excavation is unnecessary and unduly burdensome in this instance in view of the types and minimal levels of materials remaining in the soils. Clearly, any additional benefit to the protection of human health or the environment resulting from further excavation will be greatly outweighed by the cost to both Bassick-Sack and the Section. A quick response from the Section as to this request would be appreciated as we have a contractor on site and ready to initiate the backfilling and wish to avoid incurring the expense of standby fees.

Again, all other post-excavation sampling results will be shared with the Department as soon as possible. Should you have any questions concerning this request or require further information prior to making a determination feel free to call upon me.

Very truly yours,

Brad A. DeVore

BAD:asi

cc: Edgar DeVylder, Esq.
R. Howard Grubbs, Esq.

PARTIAL POST-EXCAVATION SAMPLING RESULTS
BASSICK- SACK SPILL SITES 1 & 2

ALL LEVELS ARE PPM EXTRACTABLES (E.P. TOXICITY)

ANALYSES BY R & A LABORATORIES

Source	Zinc	Copper	Nickel	Chromium	Cyanide
$1A_{(1)}$	5.2	0.982	0.556	0.017	.005
$1A_{(3)}$	8.4	0.91	1.08	0.017	.005
$1A_{(3)}$	8.63	0.37	1.03	0.017	.005
$1B_{(1)}$	57.8	4.6	2.67	0.017	.005
$1B_{(2)}$	38.7	2.0	1.58	0.017	.005
$1B_{(3)}$	22.0	0.65	1.19	0.017	.005
$1C_{(1)}$	29.8	1.86	1.89	0.017	.005
$1C_{(2)}$	15.2	0.65	1.0	0.017	.005
$1C_{(3)}$	10.0	0.44	0.47	0.017	.005
$1D_{(1)}$	20.8	3.12	2.05	0.017	.005
$1D_{(2)}$	21.2	3.08	1.97	0.017	.005
$1D_{(3)}$	15.6	1.57	1.27	0.017	.005
$1E_{(1)}$	9.3	0.89	0.64	0.017	.005
$1E_{(2)}$	3.83	0.16	0.33	0.017	.005
$1E_{(3)}$	4.45	0.13	0.44	0.017	.005
$3A_{(1)}$	35.7	3.7	0.833	0.016	0.068
$3A_{(2)}$	41.3	2.43	0.722	0.016	0.164
$3A_{(3)}$	40.8	4.26	0.806	0.016	0.055

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WRITER'S DIRECT NUMBER

(919) 721-3714

February 11, 1988

Mr. Gary Babb
Compliance
Department of Human Resources
Solid & Hazardous Waste Management Section
Post Office Box 2091
Raleigh, North Carolina 27602-2091

Re: Section permission to backfill Bassick-Sack excavated areas

Dear Gary:

The purpose of this letter is to confirm our conversation of February 10, 1988, concerning the Section permitting Bassick-Sack to backfill certain areas excavated pursuant to a required remedial action at the Bassick-Sack facility. Specifically, in response to our request of February 9, 1988, you have permitted us to backfill, without imposing any post-excavation obligations (including those under the Resource Conservation and Recovery Act), those excavated sections designated in our original site assessment as 1A, 1B, 1C, 1D, 1E and 3A. However, this permission has been granted by the Section with the understanding Bassick-Sack acknowledges there remains in those sections residual levels of nickel which are above those levels permitted in water under applicable drinking water standards but which are also substantially below those permitted in North Carolina sanitary landfills.

Based on your permission we expect the backfilling of these areas to begin February 15, 1988. Further, post-excavation sample results for the other remedial action sections are expected on or about February 15, 1988 and will be shared with

the Section to determine if the backfilling of those areas may likewise go forward.

Within our request of February 9, 1988 we asked the Section to provide written confirmation the above described sections had been "cleaned" to a level acceptable to the Section without the imposition of groundwater monitoring or other post-excavation care. Please find enclosed a draft of such a "confirmation" for your review. We would appreciate your returning a signed copy of this draft or another similar document in the near future for placement in our files. Should you have any questions concerning this letter or the draft feel free to give me a call.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq.
R. Howard Grubbs, Esq.

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WRITER'S DIRECT NUMBER

(919) 721-3714

63

February 16, 1988

Mr. R. Douglas Holyfield
Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Bassick-Sack clean-up -- Progress report and request for permission to backfill

Dear Doug:

As we discussed on February 15, 1988, all areas indicated contaminated in our initial spill site assessment were excavated as of February 12, 1988. Enclosed are the post-excavation sample results from sections 2A, 2B, 2C, 2D, 2E (the railroad track area) and 3B (the courtyard area).

Based on the residual contamination levels revealed in the enclosed post-excavation samples, we request the Section allow for the backfilling of those areas designated 2A through 2E. In addition, we request the Section render a written confirmation the above described areas have been "cleaned" to a level acceptable to the Section without the imposition of groundwater monitoring or other post-excavation care. Based on the reasoning expressed in our letter of February 9, 1988, (concerning those areas designated 1A through 1E and 3A), we assert the residual contamination in areas 2A through 2E fails to pose a measurable threat to human health or the environment.

We understand the Section will require further action (excavation or treatment) concerning the residual cyanide contamination found in section 3B. As a result, we will soon forward a proposed plan for this section to you. Finally, after additional excavation or treatment, sample results for residual cyanide contamination will be presented to the Section for permission to backfill this section.

We request the Section respond to our request concerning sections 2A through 2E as soon as possible as we have a contractor standing by to backfill those sections. Should you have any questions concerning the sample results or our request please feel free to call upon me.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq.
R. Howard Grubbs, Esq.
Steve Phibbs

POST-EXCAVATION SAMPLE RESULTS

(all amounts are in ppm, all samples were run for triplicate results)

Source	Cyanide	Nickel	Chromium	Zinc	Copper
$2A_{(1)}$	<0.005	0.24	<0.017	10.9	0.19
$2A_{(3)}$	<0.005	0.32	<0.017	15.2	0.93
$2A_{(3)}$	<0.005	0.32	<0.017	15.6	0.73
$2B_{(1)}$	<0.005	0.24	<0.017	15.7	0.13
$2B_{(2)}$	<0.005	0.47	<0.017	53.2	2.1
$2B_{(3)}$	<0.005	0.44	<0.017	59.6	2.96
$2C_{(1)}$	<0.005	0.32	<0.017	62.9	2.9
$2C_{(2)}$	<0.005	0.41	<0.017	78.3	7.5
$2C_{(3)}$	<0.005	0.59	<0.017	149.0	14.7
$2D_{(1)}$	<0.005	0.44	<0.017	34.0	0.73
$2D_{(2)}$	<0.005	0.65	<0.017	80.0	7.1
$2D_{(3)}$	<0.005	0.65	<0.017	78.3	6.9
$2E_{(1)}$	<0.005	2.0	<0.017	18.4	0.96
$2E_{(2)}$	<0.005	2.0	<0.017	33.6	5.0
$2E_{(3)}$	<0.005	3.1	<0.017	40.0	7.1
$3B_{(1)}$	.96	0.65	<0.017	1.7	0.85
$3B_{(2)}$	.552	1.6	<0.017	9.4	1.4
$3B_{(3)}$	_____	1.3	<0.017	8.6	1.2

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WRITER'S DIRECT NUMBER

(919) 721-3714

February 19, 1988

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Bassick-Sack clean-up -- Permission to backfill

Dear Doug:

The purpose of this letter is to confirm our conversation of February 19, 1988 during which you responded to our letter of February 16, 1988 requesting permission to backfill those sections designated in our initial spill site assessments as 2A, 2B, 2C, 2D and 2E. Based on our conversation, we understand the Section has permitted us to backfill the excavated areas designated 2A through 2E without the imposition of any post-excavation requirements (including groundwater monitoring).

Further, we understand the Section requires further excavation and/or treatment of section 3B in order to reduce amounts of residual cyanide contamination found there. During our conversation, you were informed approximately nine (9) inches of additional soils had been removed from section 3B and that, weather permitting, post-excavation samples would be taken on or about February 22, 1988. Results of the residual cyanide contamination analyses will be forwarded to the Section as soon as possible.

Finally, you indicated the Section requests further information on contamination, if any, to those areas located beyond section 1E and 2A (the area beyond where the two railroad tracks meet). In addition, the Section requests data on any other heavy metals residual contamination analyses for spill sites No. 1 and No. 2 (i.e., potential lead contamination). We agreed to forward this information, if available, to the Section in the near future.

As we will attempt to initiate backfilling as early as February 22, 1988, please contact me immediately if you are in disagreement with any aspect of this letter confirming our conversation. Should you have any questions please feel free to give me a call.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq.
R. Howard Grubbs, Esq.
Jim Stanley
Steve Phibbs

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APR 8 1988
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

53

March 28, 1988

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Bassick-Sack Remedial Action for Spill Sites No. 1 and 2 -- Final Sampling and Analysis Report

Dear Doug:

Enclosed please find a final remedial sampling and analyses report for Bassick-Sack Chemical Spill Sites No. 1 and 2. The majority of this information was previously forwarded to you for approval to backfill certain of the excavated areas, which approval was received.

In response to your most recent questions concerning sampling and analyses, I call your attention to page 2 of the report which outlines the sampling and analyses used to determine both the vertical and horizontal movement of contaminants in and around the spill sites. Further, I call your attention to page 8 which reveals post-excavation sampling results for extractable cyanide at Spill Site 1, Quadrant 3, Section B. As the report reveals, the residual cyanide contamination is well below that limit originally proposed by the Section. As a result, we request written approval from your office to backfill this remaining area.

Efforts are underway to remediate the "drum pit" area previously disclosed to you. Currently, we are awaiting approval of our Authorization Request Form (ARF) from the GSX land disposal facility located in Pinewood, South Carolina. We will keep you updated as to the progress of this additional remedial action.

Should you have any questions concerning the enclosed report or other matters relating to the Bassick-Sack remedial actions please feel free to contact me directly.

Very truly yours,

Brad A. DeVore

BAD/asi

Enclosure

cc: Edgar DeVylder, Esq. (with enclosure)
Jim Stanley (w/o enclosure)
Jim Chesire (w/o enclosure)
R. Howard Grubbs, Esq. (w/o enclosure)

ITCO UNION
Bassick Sack
NCD024895864
59

RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical/Process Consultations

25 March 1988

Womble Carlyle Sandridge & Rice
P.O. Drawer 84
Winston-Salem, North Carolina 27102

Attention: Mr. Brad DeVore

Dear Mr. DeVore

Enclosed please find one (1) copy of Remedial Sampling and Analyses at Chemical Spill Sites 1 and 2 for Stewart Warner Corporation/Bassick-Sack Division - January 28, 1988 - February 23, 1988.

If you have any questions concerning this report please so advise.

Sincerely,

RESEARCH & ANALYTICAL LABORATORIES, INC.

James M. Cheshire
President

JMC/jf

enclosure

cc: Mr. Jim Stanley

P. O. Box 473 • 106 Short Street • Kernersville, North Carolina 27284 • 919/996-2841

REMEDIAL SAMPLING AND ANALYSES AT CHEMICAL SPILL SITES 1 and 2 FOR

STEWART WARNER CORPORATION/
BASSICK-SACK DIVISION

WINSTON-SALEM, NORTH CAROLINA

JANUARY 28, 1988 - FEBRUARY 22, 1988

Prepared for:

Stewart Warner Corporation/
Bassick-Sack Division
Winston-Salem, North Carolina

Prepared by:

Research & Analytical Laboratories, Inc.
106 Short Street
Kernersville, North Carolina 27284
919/996-2841

March 1988

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1.0 INTRODUCTION

The information contained in this report consists of the remedial sampling activities provided by Research & Analytical Laboratories, Inc. (RAL) for Stewart-Warner Corporation (Bassick-Sack Division) at two (2) chemical spill sites located at their Winston-Salem, North Carolina facility. The remedial sampling activities, covering a period from 28 January 1988 through 22 February 1988, are in accordance with the Remedial Proposal outlined in Section 4.0 of the Comprehensive Site Report For The Assessment of Chemical Contamination at Spill Sites 1 and 2 - Bassick-Sack Division, Winston-Salem, North Carolina (July 1987). In reviewing the analytical data contained in this report it is important to note the following information:

1) GSX Services, Inc. provided clean-up and disposal of contaminated soils within Chemical Spill Sites 1 and 2. Information pertaining to clean-up and disposal strategies as well as quantities removed etc., should be on record with GSX Services, Inc.
2) The law firm of Womble Carlyle Sandridge and Rice coordinated the transfer of post excavation analytical test results to the North Carolina Solid and Hazardous Waste Management Branch.
3) The North Carolina Solid and Hazardous Waste Management Branch approved the back filling at Chemical Spill Sites 1 and 2 after post excavation and sampling had been completed and reviewed. Uncontaminated soil used for backfill was taken from Vulcan Materials East Forsyth Quarry.
4) A representative from the North Carolina Solid and Hazardous Waste Management Branch was present at Chemical Spill Sites 1 and 2 during post excavation and sampling. No concerns or objections with respect to post excavation, sampling strategies, etc. were communicated or evidenced by this official state representative to RAL personnel.

The following sections of this report include materials, methods, and results of all remedial sampling activities at Chemical Spill Sites 1 and 2.

2.0 MATERIALS AND METHODS

The information contained in this section is based upon the Comprehensive Sampling/Analysis Plan to Determine the Extent of Chemical Contamination at Spill Site(s) Located at Bassick-Sack Division, Winston-Salem, North Carolina prepared by RAL in June 1987. Post excavation sampling analyses for selected parameters were used to verify upon acceptance by regulatory agency the minimum contaminated soil removal requirements at Spill Sites 1 and 2. This also represents the vertical movement of contaminants. The horizontal movement of contaminants was determined by chemical analysis from vertical soil samples collected in Quadrant 26 or 50 feet North of Quadrant 2, Section A on 11 September 1987. The results of this analysis include the following:

	Depth Inverval(inches)			
Parameter	0-3	3-6	6-9	9-12
Extractable Zinc(mg/l)	3.4	0.97	0.59	0.42
Extractable Copper(mg/l)	0.13	0.12	0.02	0.02
Extractable Nickel(mg/l)	0.29	0.17	0.03	0.11
Extractable Chromium(mg/l)	<0.02	<0.02	<0.02	<0.02
Extractable Lead(mg/l)	<0.05	<0.05	<0.05	<0.05
Extractable Cyanide(mg/l)	1.9	0.18	0.17	0.18
pH(Std. Units)	6.2	6.0	6.0	6.0
Total Solids(%)	89	99	94	92

The post excavation sampling/analysis procedures included the following chronology of events:

Date	Time	Event
1/22/88	1000-1200 hrs	Pre-excavation meeting
1/23/88	0800-1200 hrs	Quadrant Marker Replacement
1/24/88	1500-1700 hrs	Quadrant Marker Replacement
1/28/88	0900-1000 hrs	Quadrant 1A Sample Collection
1/28/88	1000-1100 hrs	Quadrant 1B Sample Collection
1/28/88	1100-1200 hrs	Quadrant 1C Sample Collection
1/28/88	1200-1300 hrs	Quadrant 1D Sample Collection
1/29/88	1400-1500 hrs	Quadrant 1E Sample Collection
2/2/88	1500-1600 hrs	Quadrant 3A Sample Collection
2/9/88	1600-1700 hrs	Quadrant 3B Sample Collection
2/11/88	1700-1800 hrs	Backfill Sample Collection
2/22/88	1000-1100 hrs	Quadrant 3B Resample Collection

Random soil composite samples were collected from each spill site section with a stainless steel trowel and soil was transfered to a four (4) gallon container. Composite soil samples from each container were thoroughly mixed and sample aliquot split with regulatory agency representative (ie: Mr. Steve Phibbs - 919/761-2390). Chain of Custody records are identified in Appendix A. The RCRA chemical analyses performed in triplicate on these sectional composite samples include the following parameters:

1) Zinc (Extractable)
2) Copper (Extractable)
3) Nickel (Extractable)
4) Chromium (Extractable)
5) Lead (Extractable)
6) Cyanide (Extractable)

The results of these analyses performed in triplicate were reported to representatives of Stewart Warner Corporation and their attorneys. The attorneys for Stewart Warner Corporation coordinated the analyses reporting with the North Carolina Hazardous Waste Compliance Unit so that backfilling could commence upon agency approval.

3.0 RESULTS

The results of the remedial sampling are described in Tables I-IV. Each composite sample collected was analyzed for selected parameters in triplicate using the RCRA or EP Toxicity Leachate procedure. Quadrant 3, Section B (Chemical Spill Site 1) was resampled after additional excavation had been completed as shown in Table IV. A significant reduction in contaminant concentration was identified for all chemical constituents analyzed.

TABLE I - Remedial Sampling for Selected Parameters at Chemical Spill Site[1]
Bassick-Sack, Winston-Salem, North Carolina (February 2-9, 1988)

Source	Zinc (mg/l)	Copper (mg/l)	Nickel (mg/l)	Chromium (mg/l)	Lead (mg/l)	Cyanide (mg/l)
$3A_1$	35.7	3.7	0.833	0.016	<0.110	0.068
$3A_2$	41.3	2.43	0.722	0.016	<0.110	0.164
$3A_3$	40.8	4.26	0.806	0.016	<0.110	0.055
AVG.	39.3	3.46	0.787	0.016	<0.110	0.091
$3B_1$	1.73	0.85	0.65	<0.017	<0.110	0.936
$3B_2$	9.40	1.4	1.60	<0.017	<0.110	0.936
$3B_3$	8.60	1.2	1.30	<0.017	<0.110	0.816
AVG.	6.58	1.15	1.18	<0.017	<0.110	0.896
$2A_1$	10.9	0.19	0.240	<0.017	<0.110	<0.005
$2A_2$	15.2	0.93	0.320	<0.017	<0.110	<0.005
$2A_3$	15.6	0.73	0.320	<0.017	<0.110	<0.005
AVG.	13.9	0.62	0.293	<0.017	<0.110	<0.005
$2B_1$	15.7	0.13	0.240	<0.017	<0.110	<0.005
$2B_2$	53.2	2.1	0.470	<0.017	<0.110	<0.005
$2B_3$	59.6	2.96	0.440	<0.017	<0.110	<0.005
AVG.	42.83	1.73	0.383	<0.017	<0.110	
$2C_1$	62.9	2.9	0.320	<0.017	<0.110	<0.005
$2C_2$	78.3	7.5	0.410	<0.017	<0.110	<0.005
$2C_3$	149	14.7	0.590	<0.017	<0.110	<0.005
AVG.	96.73	8.37	0.44	<0.017	<0.110	<0.005
$2D_1$	34.9	0.73	0.440	<0.017	<0.110	<0.005
$2D_2$	80.0	7.1	0.650	<0.017	<0.110	<0.005
$2D_3$	78.3	6.9	0.650	<0.017	<0.110	<0.005
AVG	64.4	4.91	0.58	<0.017	<0.110	<0.005
$2E_1$	18.4	0.96	2.0	<0.017	<0.110	<0.005
$2E_2$	33.6	5.0	2.0	<0.017	<0.110	<0.005
$2E_3$	40.0	7.1	3.1	<0.017	<0.110	<0.005
AVG.	30.67	4.35	2.37	<0.017	<0.110	<0.005

TABLE II - Remedial Sampling for Selected Parameters at Chemical Spill Site 2
Bassick-Sack, Winston-Salem, North Carolina (January 28, 1988)

Source	Zinc (mg/l)	Copper (mg/l)	Nickel (mg/l)	Chromium (mg/l)	Lead (mg/l)	Cyanide (mg/l)
$1A_1$	5.2	0.982	0.556	<0.017	<0.110	<0.005
$1A_2$	8.4	0.91	1.08	<0.017	<0.110	<0.005
$1A_3$	8.63	0.37	1.03	<0.017	<0.110	<0.005
AVG.	7.41	0.754	0.889	<0.017	<0.110	<0.005
$1B_1$	57.8	4.6	2.67	<0.017	<0.110	<0.005
$1B_2$	38.7	2.0	1.58	<0.017	<0.110	<0.005
$1B_3$	22.0	0.65	1.19	<0.017	<0.110	<0.005
AVG.	39.5	2.42	1.81	<0.017	<0.110	<0.005
$1C_1$	29.8	1.86	1.89	<0.017	<0.110	<0.005
$1C_2$	15.2	0.65	1.0	<0.017	<0.110	<0.005
$1C_3$	10.0	0.44	0.47	<0.017	<0.110	<0.005
AVG.	18.3	0.983	1.12	<0.017	<0.110	<0.005
$1D_1$	20.8	3.12	2.05	<0.017	0.110	<0.005
$1D_2$	21.2	3.08	1.97	<0.017	0.110	<0.005
$1D_3$	15.6	1.57	1.27	<0.017	0.110	<0.005
AVG.	19.2	2.59	1.76	<0.017	0.110	<0.005
$1E_1$	9.3	0.89	0.64	0.017	<0.110	<0.005
$1E_2$	3.83	0.16	0.33	<0.017	<0.110	<0.005
$1E_3$	4.45	0.13	0.44	<0.017	<0.110	<0.005
AVG.	5.86	0.393	0.47	<0.017	<0.110	<0.005

TABLE III - RCRA Analyses of Backfill Soil for Selected Parameters for Chemical Spill Sites I and II at Bassick-Sack, Winston-Salem, North Carolina (February 11, 1988)

Parameter	Concentration (mg/l)
Zinc	0.124
Copper	0.019
Nickel	0.029
Chromium	<0.017
Cyanide	<0.125

TABLE IV - Remedial Sampling for Extractable Cyanide at Chemical Spill Site 1, Quadrant 3, Section B, Bassick-Sack, Winston-Salem, North Carolina (February 22, 1988)

Source	Cyanide(mg/l)
$3B_1$	0.16
$3B_2$	0.18
$3B_3$	0.17

4.0 DISCUSSION

The information contained in this report has been used by representatives for Stewart Warner Corporation to seek approval from the North Carolina Solid and Hazardous Waste Management Branch to commence with the back-filling of Chemical Spill Site's 1 and 2. Total compliance with remedial clean-up activities and backfill operations as approved by regulatory agency for Chemical Spill sites 1 and 2 is expected by April 8, 1988

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February 21, 1988

RCRA cleanup -

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Discovery of additional areas of contamination at *Bassick-Sack facility and proposed plan for remediation

Dear Doug: *a.k.a. Stewart-Warner

As you are aware, Bassick-Sack has been conducting a remedial action (which the Section permitted in its letter of August 17, 1987) at those areas described as spill sites No. 1 and No. 2 in our "Assessment of Chemical Contamination" submitted July 30, 1987. During the course of excavation and removal we have discovered an additional contaminated area adjacent to the Bassick-Sack facility.

Briefly, on February 10, 1988 pursuant to the instructions of Bassick-Sack, GSX Chemical Services, Inc. personnel excavated an area adjacent to the Bassick-Sack facility to an approximate depth of three (3) feet revealing a number (approximately ten (10)) of drums, the contents of which were unknown. Steve Phibbs of the Section observed the excavation while at the Bassick-Sack facility obtaining post-excavation samples of spill sites No. 1 and No. 2. After discovery of the drums, GSX personnel, pursuant to instructions from Bassick-Sack, ceased the excavation effort and placed plastic sheeting over both a small

stockpile of soil and the excavated area. Thereafter, on the same day Jim Chesire of R&A Laboratories took multiple samples from the stockpile and excavated area in order to determine the level of contaminants, if any, in the soil or drums. Bassick-Sack requested results of all analyses be reported as quickly as possible.

On February 17, 1988, Jim Chesire presented Bassick-Sack with the results of RCRA E.P. toxicity and volatile organic analyses of the drum contents and surrounding soils. These results, (Attachment 1), indicate minimal levels of heavy metals contamination (E.P. toxicity). However, various volatile organics were detected, including toulene at 15,000 ppb.

In view of the discovery of this additional contamination, Bassick-Sack submits an addendum, (Attachment 2), to its "Comprehensive Sampling/Analysis Plan to Determine the Extent of Chemical Contamination at Spill Sites located at Bassick-Sack Division, Winston-Salem, North Carolina," which was submitted to the Section in August, 1987. The addendum outlines the procedures Bassick-Sack will instruct its contractor to follow in remediating this contamination. Those procedures include, but are not limited to: the use of portable direct reading instruments to determine airborne levels of organics; the use of overpacks for buckled or corroded drums; the use of roll-off containers for drums and contaminated soil; and sorbents, pumps and other equipment to properly control any spills. In addition, Bassick-Sack will instruct its contractor to conduct all remedial actions in compliance with applicable United States Environmental Protection Agency and Occupational Safety and Health Act regulations.

Bassick-Sack intends to have all excavated barrels and contaminated soils removed to a level protective of human health and the environment. All contaminated materials will be properly transported to either a RCRA permitted landfill or incinerator, as may be required. Bassick-Sack intends to have the "drum pit" area excavated to a depth approximately one (1) foot below its bottom. Post-excavation samples will then be taken and subjected to those analyses indicated in the addendum. Thereafter, results will be shared with the Section to determine if backfilling may be permitted.

Based on the foregoing, Bassick-Sack requests the Section permit it to go forward in remediating this contamination. Further, we request the Section respond in writing as quickly as possible given the nature of the situation. Should you have any questions concerning the contents of this letter or its attachments, please feel free to call upon me.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq.
R. Howard Grubbs, Esq.
Jim Stanley
Steve Phibbs

2.7 Addendum to Comprehensive Sampling/Analysis Plan to Determine the Extent of Chemical Contamination at Spill Site(s) Located at Bassick-Sack Division, Winston-Salem, North Carolina

In addition to the remedial activities described in Section 2.6 of the Comprehensive Sampling/Analysis Plan (June 1987) it was necessary to include this contingency section in the Plan in case of the detection of buried drums identified on the property.

2.71 Drum Excavation/Removal Procedures

The following procedures will be followed upon detection of buried drum(s) on the property using a Fisher model two (2) box metal detector:

Air monitoring will be conducted to determine unsafe levels of hazardous constituents as soils and drums are being excavated. Portable direct reading instruments which will be used for this purpose include:

- Photoionization Detectors
- Combustible gas detectors for measuring the lower explosive limit.

As drums are uncovered, a visual inspection of the drum will be made to determine whether it is empty, intact, leaking or potentially dangerous. Evidence of bulking, buckling, corrosion or other deformations will be noted.

Drums suspected of containing explosive or shock sensitive materials will be handled remotely or with vehicles equipped with a plexiglas safety shield. Drums critically over pressurized will be isolated until the pressure can be relieved remotely. Leaking drums, badly corroded drums or deformed drums will be overpacked or have its contents transferred to a new or reconditioned container.

Gas cylinders, if encountered, will be moved to an area where the temperature can be controlled and they are not effected by direct sunlight. Gas cylinders will not be rolled or slid. Care will be taken not to drop the cylinders or allow them to strike one another.

Contaminated soils and drums will be transferred to roll-off containers or a temporary storage area as they are being excavated. Gas analyzers will be used to determine the approximate level of contamination in the soil. Pools of liquid waste will be removed using pumps.

Environmental Controls

The following preventive and mitigative measures will be followed for controlling environmental releases during the excavation activities:

1) Contaminated soils which have been excavated will be covered with visqueen to prevent leaching of contaminants.
2) Sorbents, pumps and other equipment will be used throughout the operation to clean up spills promptly.
3) Drums that are leaking or may soon leak will be promptly overpacked.
4) Supplies of overpacks and drums will be maintained in the work areas.
5) Incompatible wastes will not be mixed.

2.72 Sampling and Analysis

Upon removal of drum(s) and potentially contaminated soil (ie: horizontally and vertically) samples will be collected as approved in this Plan and analyzed for the following:

1) RCRA Extractable Metals & Cyanide
2) RCRA Ignitability
3) RCRA Reactivity
4) RCRA Corrosivity
5) Priority Pollutant Analyses (Metals, VOA, Base-neutral, Acid Extractable, PCB, etc.)

TABLE VI - RCRA AND Volatile Organic Analysis for Selected Parameters at Drum Pit 2, Bassick-Sack, Winston-Salem, North Carolina

Parameter	Type	Unit	Concentration
Zinc	RCRA	mg/l	96.9
Copper	RCRA	mg/l	1.49
Nickel	RCRA	mg/l	1.6
Chromium	RCRA	mg/l	<0.015
Lead	RCRA	mg/l	<0.1
Arsenic	RCRA	mg/l	<0.011
Selenium	RCRA	mg/l	<0.003
Barium	RCRA	mg/l	0.714
Silver	RCRA	mg/l	<0.13
Cadmium	RCRA	mg/l	0.083
Cyanide	Extratable	mg/l	<0.005
Cyanide	RCRA	mg/kg	9.64
Sulfide	RCRA	mg/kg	14.4
Ethyl benzene	VOA	µg/kg	1,500
Toluene	VOA	µg/kg	15,000
Trichloroethene	VOA	µg/kg	790
T. Xylenes	VOA	µg/kg	8,600
Flash Point	RCRA	°F	>140
Corrosivity	RCRA	pH Std. Units	6.1

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HAZARDOUS WASTE MANAGEMENT
1988

March 1, 1988

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid & Hazardous Waste Section
306 North Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: "Drum Pit" Remediation at Bassick-Sack Facility

Dear Doug:

The purpose of this letter is to confirm our conversation of February 29, 1988 in which you permitted Bassick-Sack to go forward, as necessary, to remediate contamination, if any, existing at the "drum pit" discovered at the Bassick-Sack facility which was previously disclosed to you by letter of February 21, 1988. As we discussed, Bassick-Sack intends to go forward with the remediation of this area in the near future and after excavation to a level of approximately one (1) foot below the yet to be determined bottom of the pit, post-excavation samples will be taken from the pit bottom and sides and subjected to required analysis. Thereafter, post-excavation results will be shared with the Section to determine whether the area may be backfilled.

We will take every effort to keep you updated as to the progress of the this remedial action as events unfold. Should you have any questions concerning this letter or the remedial action in general, please feel free to call upon me.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq.
Jim Stanley
R. Howard Grubbs, Esq.

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SOLID WASTE MANAGEMENT SECTION

G

52

July 6, 1988

Mr. Gary Babb
Compliance
Department of Human Resources
Solid and Hazardous Waste Management Section
P.O. Box 2091
Raleigh, North Carolina 27602-2091

Re: Bassick-Sack Facility -- Permission to backfill certain excavated areas

Dear Gary:

The purpose of this letter is to confirm our conversation of June 6, 1988 regarding the above referenced matter. Specifically, you were presented with the following information in an effort to obtain the Section's permission to backfill these areas.

First, Bassick-Sack has retained GSX Services, Inc. to excavate those areas to be designated in R&A Laboratories' final report as "Area A" and "Area B". Second, upon completion of the excavation, R&A Laboratories took samples from the sides (approximately 10) and the bottoms (approximately 10) of each of the areas. These multiple samples were then composited for each of the areas and were thoroughly mixed to create representative samples. Third, R&A Laboratories then subjected the samples to analyses for volatile organics (EPA method 624) and other constituents (EP Toxicity). A review of the results of those analyses is enclosed.

It is our understanding that based upon the above information, the Section has granted Bassick-Sack permission to

backfill those excavated areas to be designated as "Area A" and "Area B" in the R&A Laboratories final report. This permission was granted because the residual contamination within these areas failed to exceed any limits imposed by the Section. Bassick-Sack will be relying upon this commitment in backfilling the areas on July 11, 1988.

Should you disagree with or have any questions concerning the contents of this letter please contact me prior to July 11, 1988. We appreciate your cooperation in this matter.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq. (w/ enclosure)
Jim Stanley (w/ enclosure)
Jim Chesire (w/ enclosure)

POST EXCAVATION SAMPLE ANALYSES REPORT

Volatile Organics (VOA)/EPA Method 624

"A"	"B"
< 20 ppb for all VOAs	< 20 ppb for all VOAs

EP TOXICITY (Extractables)

	"A"	"B"
Chromium	< 0.017	< 0.017
Copper	< 1.77	< 5.32
Lead	< 0.10	< 0.10
Nickel	< 0.47	< 0.529
Zinc	< 37.3	< 192.0
Cyanide	< 0.005	< 0.005
Sulfide	< 2.56	< 2.88
Ignitability	> 140°F	> 140°F
Corrosivity	6.6	6.6

61

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July 14, 1988

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P.O. Box 2091
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Re: Bassick-Sack Facility -- Permission to backfill certain excavated areas

Dear Gary:

The purpose of this letter is to confirm our conversation of July 13, 1988 regarding the above referenced matter. Specifically, you were presented with the following information in an effort to obtain the Sectin's permission to backfill this area.

First, Bassick-Sack has retained GSX Services, Inc. to excavate those areas to be designated in R&A Laboratories' final report as "Area C". Second, upon completion of the excavation, R&A Laboratories took samples from the sides (approximately 10) and the bottoms (approximately 10), of the area. These multiple samples were then composited and thoroughly mixed to create a representative sample. Third, R&A Laboratories then subjected the sample to analyses for volatile organics (EPA method 624) and other constituents (EP Toxicity). A review of the results of those analyses is enclosed.

It is our understanding that based upon the above information, the Section has granted Bassick-Sack permission to backfill that excavated area to be designated as "Area C" in the

R&A Laboratories final report. This permission was granted because the residual contamination within this area failed to exceed any limits imposed by the Section. Bassick-Sack will be relying upon this commitment in backfilling the area on July 18, 1988.

Should you disagree with or have any questions concerning the contents of this letter please feel free to contact me prior to July 18, 1988. We appreciate your cooperation in this matter.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Edgar DeVylder, Esq. (w/ enclosure)
Jim Stanley (w/ enclosure)
Jim Chesire (w/ enclosure)

Stewart Warner - Bassick Sack
NCD024895864
02

WOMBLE CARLYLE SANDRIDGE & RICE
1600 ONE TRIAD PARK
AND
2400 WACHOVIA BUILDING
WINSTON-SALEM, NORTH CAROLINA 27101

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WRITER'S DIRECT NUMBER
(919) 721-3714

RECEIVED
SEP 8 1988
HAZARDOUS WASTE BRANCH

September 5, 1988

Mr. R. Douglas Holyfield
Field Operations Supervisor
Hazardous Waste Compliance Unit
Solid and Hazardous Waste Section
306 N. Wilmington Street
Room 213, Bath Building
Raleigh, North Carolina 27602

Re: Bassick-Sack -- Remedial Activities -- Report on Completion of all Activities at Facility Located at 2941 Indiana Avenue, Winston-Salem, NC

Dear Doug:

The purpose of this letter is to provide you with the necessary information to confirm Bassick-Sack has completed all required remedial activities at the above referenced location. In support of this statement, please find enclosed final reports covering the remedial actions completed at the facility regarding "Spill Sites 1 and 2" and "Areas A, B and C" (Attachments I and II). Also enclosed are copies of letters to the Section confirming the permission granted to Bassick-Sack to backfill various excavated areas (Attachment III).

A review of these documents reveal the contaminants found within Spill Sites 1 and 2 and Areas A, B and C were remediated to residual levels acceptable to the Section. Thereafter, all excavated areas were properly backfilled with clean soil. Note, Steve Phibbs of your office was often in attendance during the course of the remedial activities and/or took split samples of potentially contaminated soils for analysis.

In view of the foregoing, Bassick-Sack requests the Section provide written confirmation the Company has completed all appropriate and necessary remedial activities at the site (including those required by any Notices of Violations). We appreciate the cooperation provided by yourself and other members of the Section in completing these activities. In the event you have questions concerning the enclosed documents or this request, please feel free to contact me directly.

Very truly yours,

Brad A. DeVore

BAD/asi

cc: Gary Babb (w/ enclosures)
Edgar DeVylder, Esq. (w/ enclosures)
R. Howard Grubbs, Esq. (w/ enclosures)

Stewart Warner - Bassick Sack - Illo Unican
NCD 024 895 864
13

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

November 16, 1988

Mr. Brad A. DeVore
Womble, Carlyle, Sandridge and Rice
P.O. Drawer 84
Winston-Salem, North Carolina 27102

RE: Bassick-Sack, Completion of Remedial Activities

Dear Brad:

This office has reviewed the final report regarding site remediation and concurs with your conclusion that RCRA activities are complete. Residual levels of cyanide and the RCRA heavy metals are well within the acceptable levels previously established for Spill Sites 1 and 2. However, as noted in the analyses and your letter of 2-11-88, several secondary constituents remain above the ideal levels established in the interim primary drinking water standards. This however does not indicate the need for any additional remedial efforts at this time. In addition, our review of Areas A, B, and C indicated similar success.

In conclusion, I would like to have copies of all manifests associated with the cleanup to complete my files. In that this site is listed as a CERCLA site, and that minor residual constituents remain, additional site and record reviews may be undertaken by that program and it may not preclude the possibility that the Division of Environmental Management may choose to evaluate the groundwater. Please call if you should have any questions or comments.

Sincerely,

R Douglas Holyfield

R. Douglas Holyfield, Supervisor
Hazardous Waste Compliance Program
N. C. Hazardous Waste Branch

cc: Steve Phibbs
Gary Babb

FINAL REPORT CONCERNING CHEMICAL SPILL SITES 1, 2 and AREAS A, B, and C

STEWART-WARNER CORPORATION
BASSICK-SACK DIVISION
WINSTON-SALEM, NORTH CAROLINA

Prepared by:

Research & Analytical Laboratories, Inc.
106 Short Street
Kernersville, North Carolina 27284
919/996-2841

August 1988

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1.0 INTRODUCTION

In response to Mr. Brad DeVore's (Consulting Attorney - Womble Carlyle Sandridge and Rice) July 14, 1988 letter to Mr. Gary Babb (North Carolina Solid and Hazardous Waste Section), Research & Analytical Laboratories, Inc. (RAL) has prepared this Final Report in an effort to document the conclusions of all environmental remedial activities at the Winston-Salem, North Carolina Bassick-Sack Facility with respect to Chemical Spill Site 1, 2 and Area A, B, and C. The reference material preceding this report which details the chronology of events includes the following:

1) Comprehensive Sampling/Analysis Plan To Determine the Extent of Chemical Contamination at Spill Site(s) Located at Bassick-Sack Division, Winston-Salem, North Carolina - June 1987
2) Comprehensive Site Report for the Assessment of Chemical Contamination at Spill Sites 1 and 2, Bassick-Sack Division, Winston-Salem, North Carolina, July 1987
3) Proposal for Establishing Maximum Limits for Cyanide, Copper, Chromium, Zinc, and Nickel at Chemical Spill Sites 1 and 2, Stewart Warner Corporation - Bassick-Sack Division, Winston-Salem, North Carolina - August 1987
4) Remedial Sampling and Analyses At Chemical Spill Sites 1 and 2 for Stewart Warner Corporation - Bassick-Sack Division, Winston-Salem, North Carolina, January 28, 1988 - February 22 1988.
5) Progress Report Concerning The Excavation and Remedial Sampling of "Pit Area" Outside Chemical Spill Sites 1 and 2, Stewart Warner Corporation, Bassick-Sack Division, Winston-Salem, North Carolina, March 1988.

The environmental support groups involved in the coordination-negotiations, technical assessment-verification, and excavation-disposal include the following:

1) Womble Carlyle Sandridge and Rice Attorneys (Mr. Brad A. DeVore, Esq. 919/721-3714)
2) Research & Analytical Laboratories, Inc. (Mr. James M. Cheshire, 919/996-2841)
3) GSX, Services, Inc. (Mr. John DiCarlo,, 803/452-5003)

A checklist was prepared during these investigations at Chemical Spill Site 1, 2, and Area's A-C. A summary of this information, if needed, is available upon request which includes the following:

1) Synopsis or abstract concerning statement of problem, regulatory conflict, environmental assessment, and closure
2) Site map
3) Authorization Request Form
4) Written or verbal approval by North Carolina regulatory agency for backfilling
5) Excavation starting and ending dates
6) Manifests
7) Quantity of waste material removed
8) Backfill starting and ending dates
9) Verification of backfill compaction
10) Verification of compaction testing
11) Reference listing

The following sections of this report provide certified analytical data concerning the contaminated soil removal for Areas A, B, and C located outside chemical spill sites 1 and 2. This information, as well as the closure of chemical spill sites 1 and 2, should conclude all remedial activities at these sites.

2.0 Areas's A-C - Excavation and Sampling Verification

A map showing Area A-C in relationship to Chemical Spill Sites 1 and 2 is provided in the insert pocket of this report. Excavation of drums, metal debris, crucibles, and contaminated soils, etc. were completed in July 1988. Three (3) zones of contamination were identified in this area and were identified as Pit A, B, and C. Soil samples were collected and composited from each pit after excavation showed no visible signs of soil discoloration. Soil samples were collected from the bottom and sidewalls of each pit in order to assess the vertical and horizontal extent of any residual contamination. Excavation continued after initial sampling if volatile organics (VOA) were still presentand/or if RCRA copper, nickel, zinc, chromium, or cyanide showed significantly high concentrations. Tables 1 and 2 show the VOA and RCRA results for Pits A, B, and C during excavation. Table 3 identified the contaminated stock pile with respect to RCRA and VOA tests. Table 4 represents backfill analyses to verify that fill material was not contaminated.

Results of soil analysis from each pit was submitted to Mr. Brad DeVore who in turn reported this information to the North Carolina Solid and Hazardous Waste Section for approval to commence backfilling. The same procedure was followed for Chemical Spill Sites 1 and 2 which has been reported in the Remedial Sampling and Analyses at Chemical Spill Sites 1 and 2, January 28, 1988 - February 22, 1988

TABLE 1 - RCRA and Volatile Organic Analyses for Selected Parameters at Area's A-C (Pit A, B, and C) on June 29, 1988 (Bassick-Sack, Winston-Salem, North Carolina)

Parameter	Type	Unit	Pit A	Pit B	Pit C
Chromium	RCRA	mg/l	<0.017	<0.017	<0.017
Copper	RCRA	mg/l	1.77	5.32	76
Nickel	RCRA	mg/l	0.47	0.529	1.32
Zinc	RCRA	mg/l	37.3	192	283
Cyanide	RCRA	mg/l	3.51	2.24	3.49
Cyanide	Extractable	mg/l	<0.005	<0.005	<0.005
Sulfide	RCRA	mg/l	<2.56	<2.88	<2.8
Lead	RCRA	mg/l	<0.10	<0.10	2.0
Corrosivity	RCRA	Std. Units	6.6	6.6	7.6
Flash Point	RCRA	°F	>140	>140	>140
VOA	VOA	µg/kg	<20*	<20*	**

*All volatile organics (Method 624) were reported less than 20 µg/kg

** Trichloroethene = 70 µg/kg
Tetrachloroethene = 203 µg/kg
All other VOA = < 20 µg/kg

TABLE 2 - RCRA and Volatile Organic Analyses for Selected Parameters at Area's A-C (Pit A,B,C) on July 7, 1988 (Bassick-Sack, Winston-Salem, North Carolina)

Parameter	Type	Unit	Pit A	Pit B	Pit C
Arsenic	RCRA	mg/l	<0.010	<0.010	<0.010
Barium	RCRA	mg/l	0.30	0.30	0.2
Cadmium	RCRA	mg/l	0.008	0.032	0.008
Chromium	RCRA	mg/l	<0.020	<0.020	0.04
Lead	RCRA	mg/l	<0.120	<0.120	<0.120
Mercury	RCRA	mg/l	<0.0002	<0.0002	<0.0002
Selenium	RCRA	mg/l	<0.002	<0.002	<0.002
Silver	RCRA	mg/l	<0.016	<0.016	<0.016
Cyanide	RCRA	mg/l	2.8	9.0	2.6
Cyanide	Extractable	mg/l	<0.005	<0.005	<0.005
VOA	VOA	µg/kg	*<20	*<20	*<20
Zinc	RCRA	mg/l	---	136	77
Nickel	RCRA	mg/l	---	0.47	0.47
Copper	RCRA	mg/l	---	4.7	9.2

*All volatile organics (Method 624) were reported less than 20 µg/kg

TABLE 3 - RCRA and Volatile Organic Analysis of Stock Pile from Area's A-C (Pit A, B, C) on July 8, 1988 (Bassick-Sack, Winston-Salem, North Carolina)

Parameter	Type	Unit	Concentration
Arsenic	RCRA	mg/l	<0.010
Barium	RCRA	mg/l	0.9
Cadmium	RCRA	mg/l	0.22
Chromium	RCRA	mg/l	<0.020
Lead	RCRA	mg/l	<0.120
Mercury	RCRA	mg/l	<0.0002
Selenium	RCRA	mg/l	<0.002
Silver	RCRA	mg/l	<0.016
Flash Point	RCRA	°F	>140
Corrosivity	RCRA	mg/l	6.6
Sulfide	RCRA	mg/l	<0.40
Cyanide	Estractable	mg/l	<0.025
VOA	VOA	µg/kg	*

* Trichloroethene = 78 µg/kg

Tetrachloroethene = 120 µg/kg

All other VOAs = <20 µg/kg

TABLE 4 - Backfill Analyses for Selected Parameters from Samples Collected on July 14, 1988 (Bassick-Sack, Winston-Salem, North Carolina)

Parameter	Type	Units	Concentration
Arsenic	RCRA	mg/l	<0.005
Barium	RCRA	mg/l	<0.083
Cadmium	RCRA	mg/l	0.008
Chromium	RCRA	mg/l	<0.010
Lead	RCRA	mg/l	<0.12
Mercury	RCRA	mg/l	<0.0002
Selenium	RCRA	mg/l	<0.002
Silver	RCRA	mg/l	<0.016
Copper	RCRA	mg/l	<0.02
Nickel	RCRA	mg/l	0.176
Zinc	RCRA	mg/l	0.021
Flash Point	RCRA	°F	>140
Sulfide	RCRA	mg/l	<0.4
Cyanide	RCRA	mg/kg	<0.039
Corrosivity	RCRA	Std. Units	4.6
Chromium	Total	mg/kg	23
Copper	Total	mg/kg	20
Lead	Total	mg/kg	12
Nickel	Total	mg/kg	25
Zinc	Total	mg/kg	80
VOA	VOA	µg/kg	*<20

*All volatile organics (Method 624) were reported less than 20 µg/kg

3.0 DISCUSSION

This report concludes all remedial activities at the Bassick-Sack Facility (Winston-Salem, North Carolina) for Chemical Spill Sites 1,2, and Area's A-C. Since the final approvals to backfill all of the above referenced sites by the North Carolina Solid and Hazardous Waste Section, all required reporting, assessments, clean-up, disposal, and backfilling has been completed by July 29, 1988. Research & Analytical Laboratories, Inc., principal technical consultant on project, certifies that to the best of its knowledge all information presented within this and previous RAL project satus reports is true and correct.

POST EXCAVATION SAMPLE ANALYSES REPORT FOR AREA "C"

Volatile Organics (VOA)/EPA Method 624

< 20 ppb for all VOAs

EP TOXICITY (Extractables) FOR AREA "C"

Chromium	< 0.04
Copper	< 9.2
Nickel	< 0.47
Zinc	< 77.0
Cyanide	< 0.005

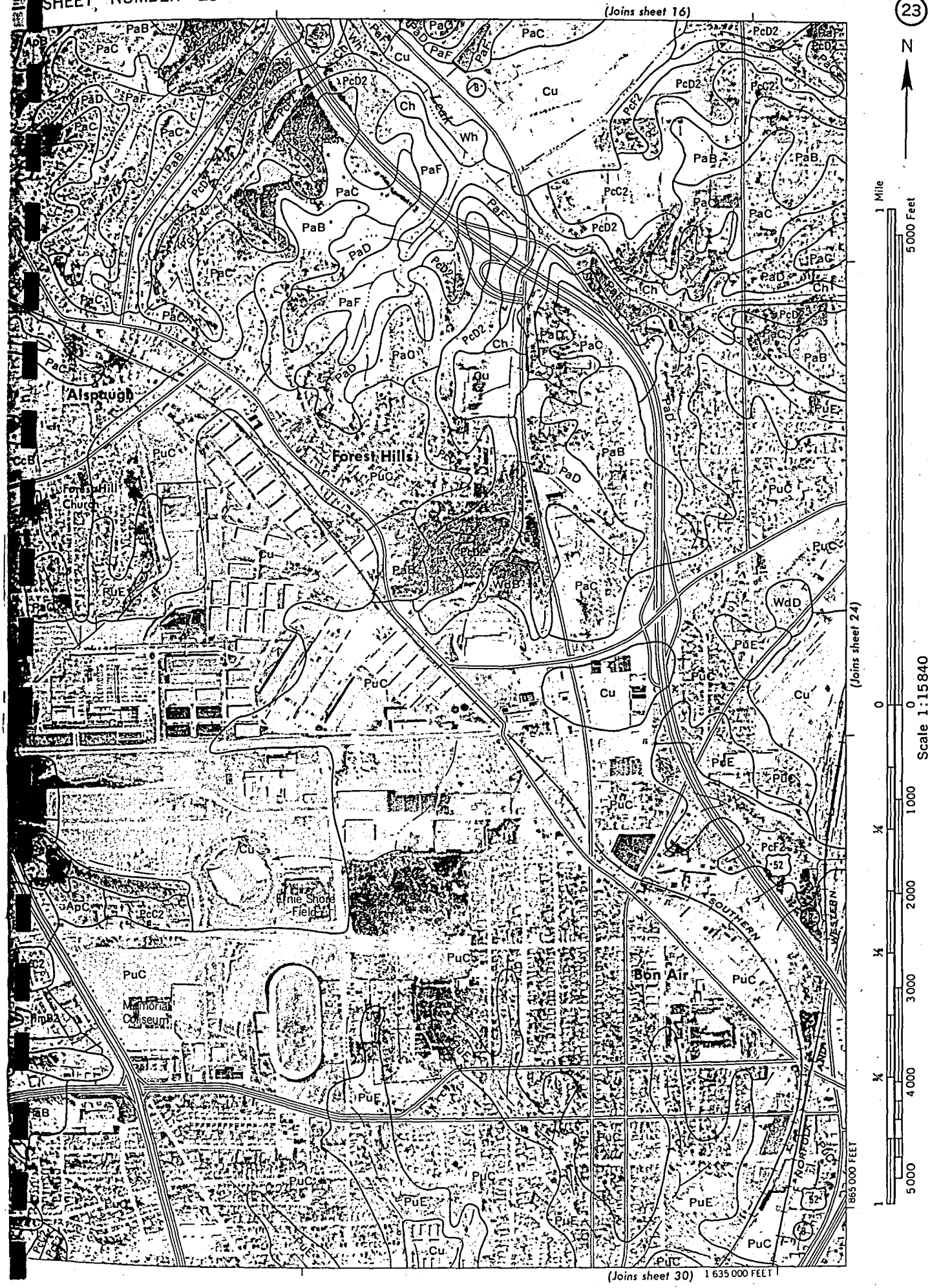
REFERENCE 18

SOIL SURVEY OF

Forsyth County, North Carolina

United States Department of Agriculture
Soil Conservation Service
In cooperation with
North Carolina Agricultural Experiment Station

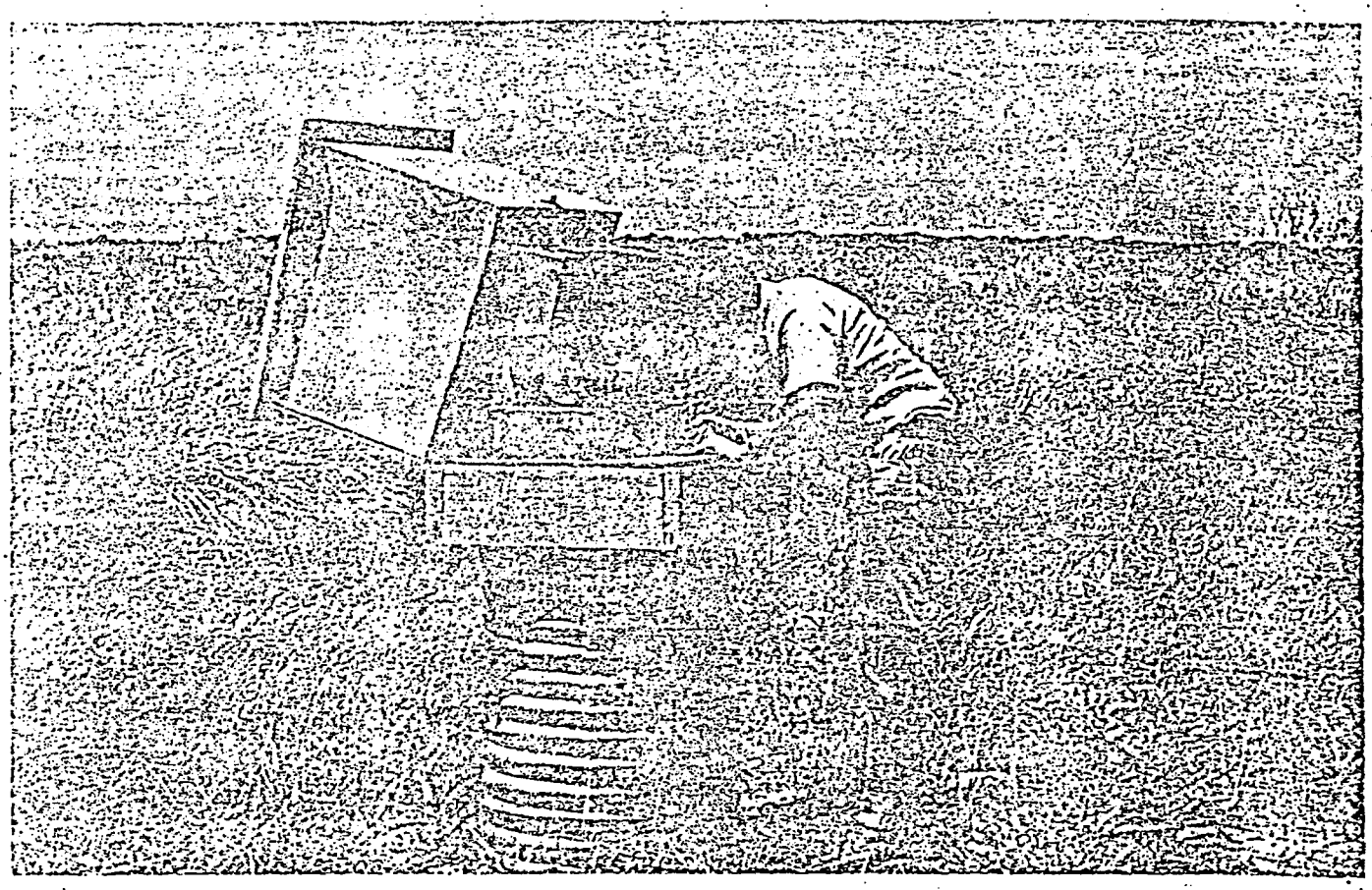
SHEET NUMBER 23



23

REFERENCE 19

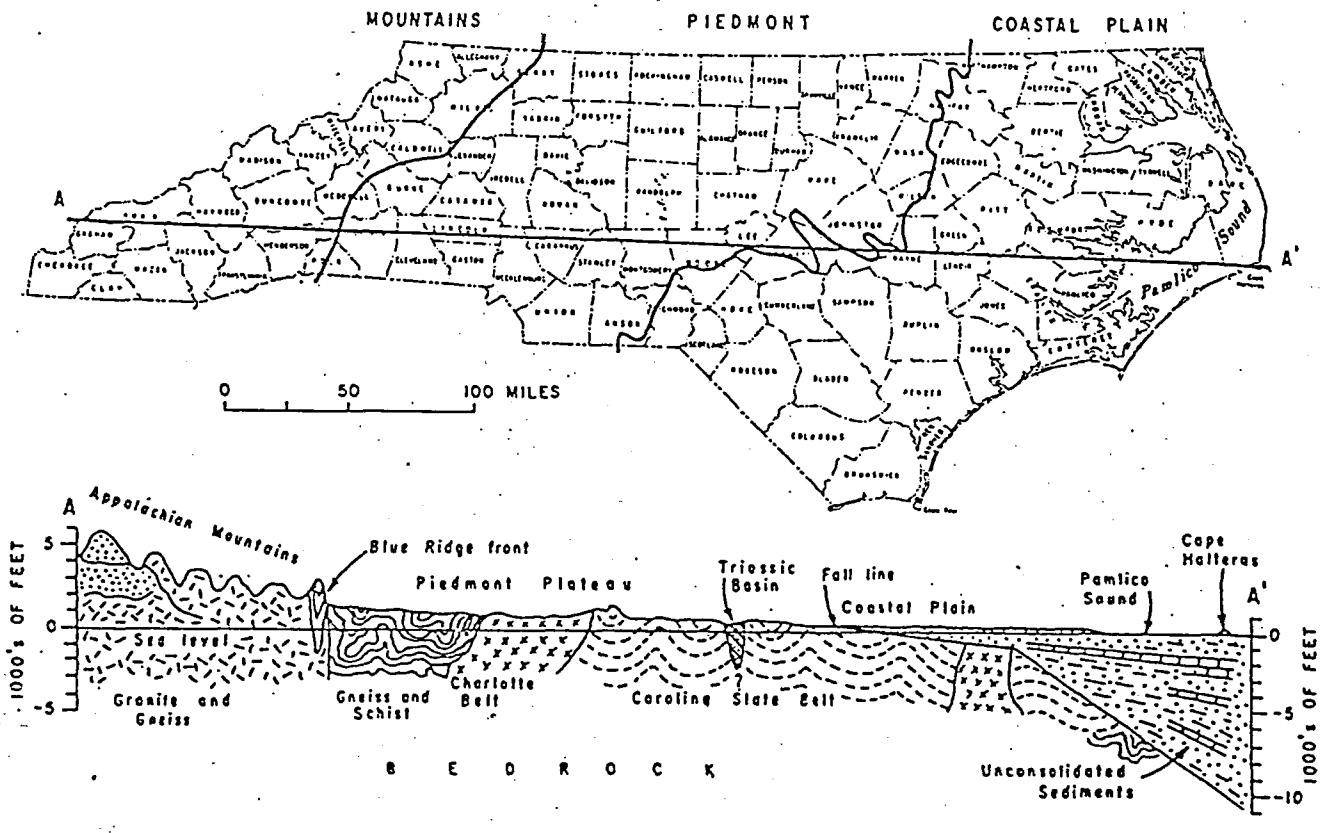
Basic Elements of Ground-Water Hydrology with Reference to Conditions in North Carolina



U.S. GEOLOGICAL SURVEY
WATER RESOURCES INVESTIGATIONS
OPEN-FILE REPORT 80-44

Prepared in cooperation with the
North Carolina Department of Natural
Resources and Community Development

Physical Setting of the Ground-Water System



From the standpoint of ground-water hydrology, North Carolina may be divided into two zones, one zone consisting of the Coastal Plain and the other consisting of the Piedmont Plateau and the Appalachian Mountains. Because differences in the ground-water system coincide with the different topographic divisions of the State, it will be useful to briefly review these divisions.

As Jasper L. Stuckey, former North Carolina State Geologist, has said, "The State of North Carolina extends from the crest of the Great Smoky and Unaka mountains on the west, to the Atlantic Ocean on the east and lies across three major topographic provinces of the United States. As a result, it is divided into three natural divisions—the Coastal Plain on the east, the Piedmont Plateau in the center, and the Appalachian Mountains on the west. Beginning at sea level at the eastern edge of the State the surface of North Carolina rises gradually in elevation and increases in irregularity until it reaches its maximum height and ruggedness in the Appalachian Mountains on the west."

The *Coastal Plain* includes almost one-half of the area of the State and extends west from the Atlantic Ocean to the *Fall Line*. The Fall Line is not a line but a zone 30 to 40 miles wide that is marked by discontinuous rapids where major streams leave the bedrock areas of the Piedmont and flow onto the unconsolidated sediments of the Coastal Plain. Altitudes in the Coastal Plain range from sea level at the coast to about 300 to 500 ft. along the Fall Line. The Coastal Plain can conveniently be divided into the Tidewater Region, in which the effect of tides and other oceanic influences are apparent, and the Inner Coastal Plain which, though underlain by unconsolidated (Coastal Plain) sediments, is not subject to direct oceanic effect.

The *Piedmont Plateau* contains about 20,000 mi², or two-fifths of the land area of the State. It lies between the Coastal Plain on the east and the Appalachian Mountains on the west. Altitudes in the Piedmont range from about 500 ft above sea level along the Fall Line to about 1500 to 2000 ft. along its western border. The Piedmont consists of well-rounded hills and long-rolling ridges with a northeast-southwest trend. Parts of the Piedmont contain prominent hills referred to as mountains, including the Uwharrie Mountains in Montgomery and Randolph Counties, the South Mountains in Burke and Rutherford Counties, and the Brushy Mountains in Wilkes County.

The Appalachian Mountains are bounded on the east by the Blue Ridge Mountains and on the west by the Great Smoky and Unaka Mountains. The mountain slopes are gentle, presenting smooth rounded outlines. The mountain region of North Carolina contains the highest peak east of the Mississippi, Mt. Mitchell at 6,684 ft., 43 peaks above 6,000 ft, and 82 peaks between 5,000 and 6,000 ft. in altitude. The eastern Continental Divide follows the Blue Ridge Mountains so that most of the mountain area drains west to the Gulf of Mexico. The streams are well graded and cascades and waterfalls are only locally abundant.

Reference: Stuckey, Jasper L., 1965, North Carolina: its geology and mineral resources: North Carolina Department of Conservation and Development, 550 p.

Water-Bearing Rocks

The rocks underlying the surface of North Carolina form the environment in which ground water occurs and moves.

Geologists divide all rocks exposed at the Earth's surface into one of two great classes: (1) igneous, or (2) sedimentary. *Igneous rocks* are those that have formed from a molten or partially-molten state. Some types of igneous rocks, including granite, solidify at great depth below the land surface and are referred to as intrusive igneous rocks. Other igneous rocks form from lava or volcanic ash ejected onto the surface and are referred to as extrusive igneous rocks.

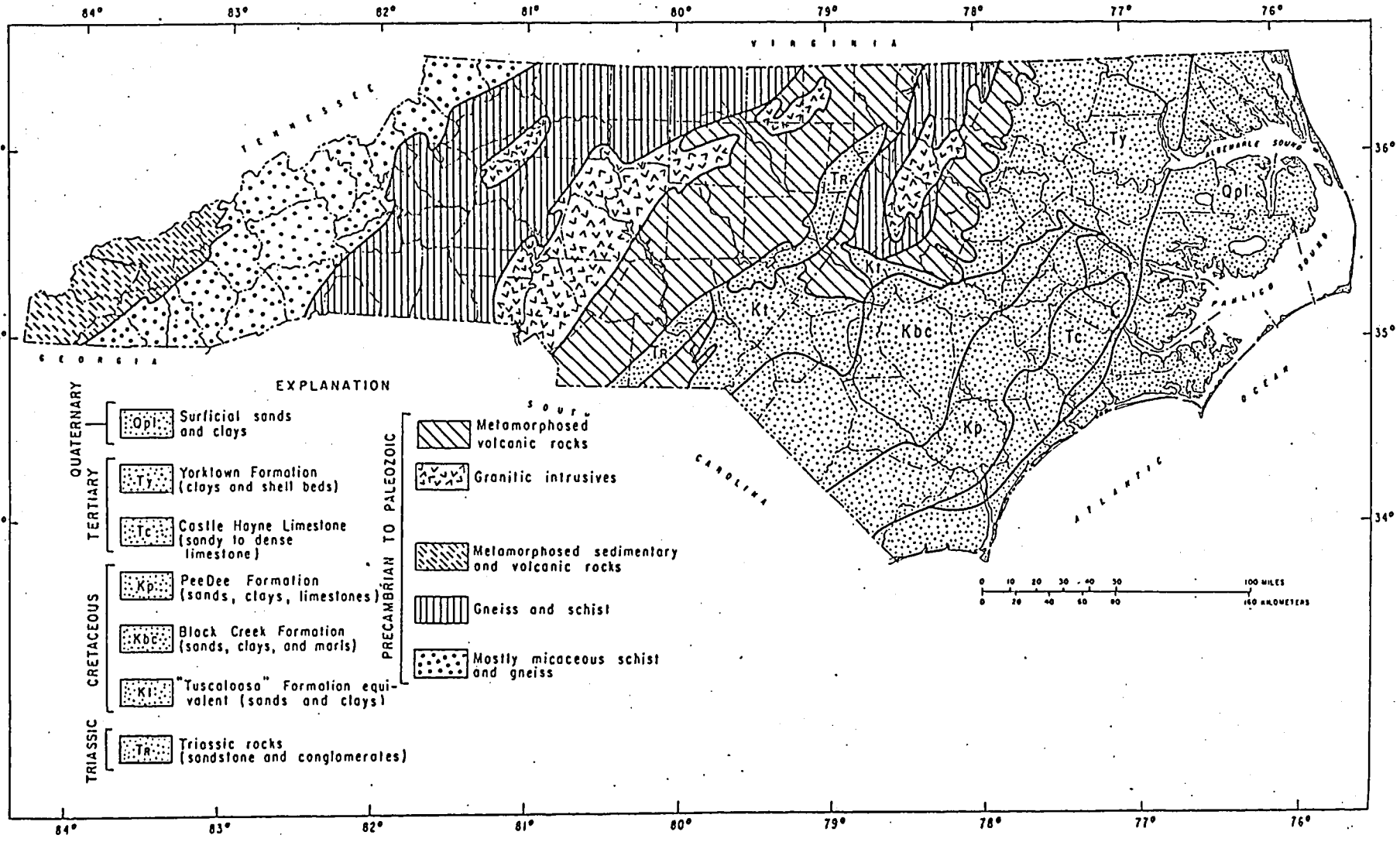
Sedimentary rocks are rocks formed by the accumulation of sediment in water or from the air. Most sedimentary rocks are unconsolidated (soil-like) at the time of formation. If they are, in time, buried deeply enough, or if they undergo certain chemical changes, they may become consolidated.

Both igneous and sedimentary rocks may, over the course of geologic time, reach depths beneath the Earth's crust at which they are subjected to great heat and pressure. This may alter both their structural characteristics and their mineral composition to such an extent that they are changed into *metamorphic rocks.* Depending on their original mode of origin, they may be referred to, for example, as metavolcanic or metasedimentary rocks.

North Carolina is underlain by an unusually large number of different types of rocks, including representatives of both the igneous and sedimentary classes and types of both classes that have been subjected to metamorphism. The major types of rocks are shown on the accompanying generalized geological map.

The Piedmont and mountain regions are underlain by igneous and metamorphosed igneous and sedimentary rocks that are referred to collectively as *bedrock*. They form broad northeast - southwest trending zones in which the rocks are of similar composition and origin. Most of these rocks were formed in the Precambrian and Paleozoic Eras of the Earth's history and thus are at least several hundred million years old. The bedrock in the Piedmont and mountains is exposed at the surface along steep hillsides and stream channels and in roadcuts. In most other areas they are covered by unconsolidated material formed from the breakdown of the bedrock in the process referred to by geologists as weathering. This layer of weathered material is referred to as *saprolite* or *residuum.*

The Coastal Plain region is also underlain by the same types of igneous and methamorphic rocks as those present in the Piedmont. However, in the Coastal Plain they are covered by unconcolidated sedimentary deposits which range in thickness from a few feet along the Fall Line to about 10,000 ft. at Cape Hatteras. (See the geologic section in PHYSICAL SETTING OF THE GROUND-WATER SYSTEM.) The sediments underlying the Coastal Plain include sand, clay, beds composed of seashells, and limestone.


84°
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36°
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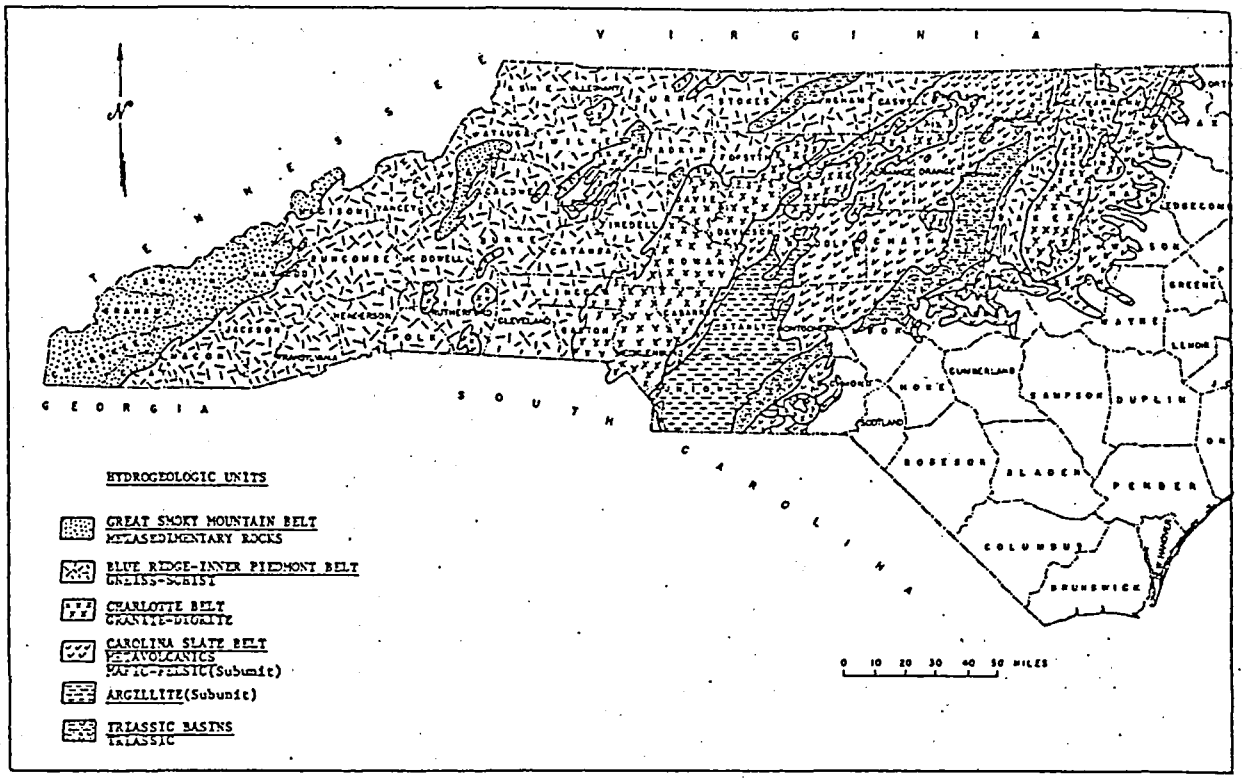
VIRGINIA
TENNESSEE
GEORGIA
SOUTH CAROLINA
ATLANTIC OCEAN
ALBEMARLE SOUND
PAMLICO SOUND
Ty
Qpl
Tc
Kbc
Kp
Kt
TR
EXPLANATION
QUATERNARY
Qpl Surficial sands and clays
TERTIARY
Ty Yorktown Formation (clays and shell beds)
Tc Castle Hayne Limestone (sandy to dense limestone)
CRETACEOUS
Kp PeeDee Formation (sands, clays, limestones)
Kbc Black Creek Formation (sands, clays, and marls)
Kt "Tuscaloosa" Formation equivalent (sands and clays)
TRIASSIC
TR Triassic rocks (sandstone and conglomerates)
PRECAMBRIAN TO PALEOZOIC
Metamorphosed volcanic rocks
Granitic intrusives
Metamorphosed sedimentary and volcanic rocks
Gneiss and schist
Mostly micaceous schist and gneiss
0 10 20 30 40 50 100 MILES
0 20 40 60 80 160 KILOMETERS

Rock Units and Aquifers in the Piedmont and Mountains



The rocks underlying the Piedmont and mountains can be divided into two groups: (1) bedrock, and (2) saprolite (or residuum). The saprolite underlies the land surface and ranges in thickness from a foot or two near bedrock outcrops to more than 100 ft. Bedrock underlies the saprolite and is the parent rock from which the saprolite was derived in the process referred to as weathering.

Many stream valleys, especially those of larger streams, are underlain by a layer of material similar in composition to saprolite. This material, which has been deposited by the streams during floods, is correctly referred to as *alluvium*. However, to avoid unnecessary complications, we will lump the alluvium in with the saprolite for the purpose of this discussion.

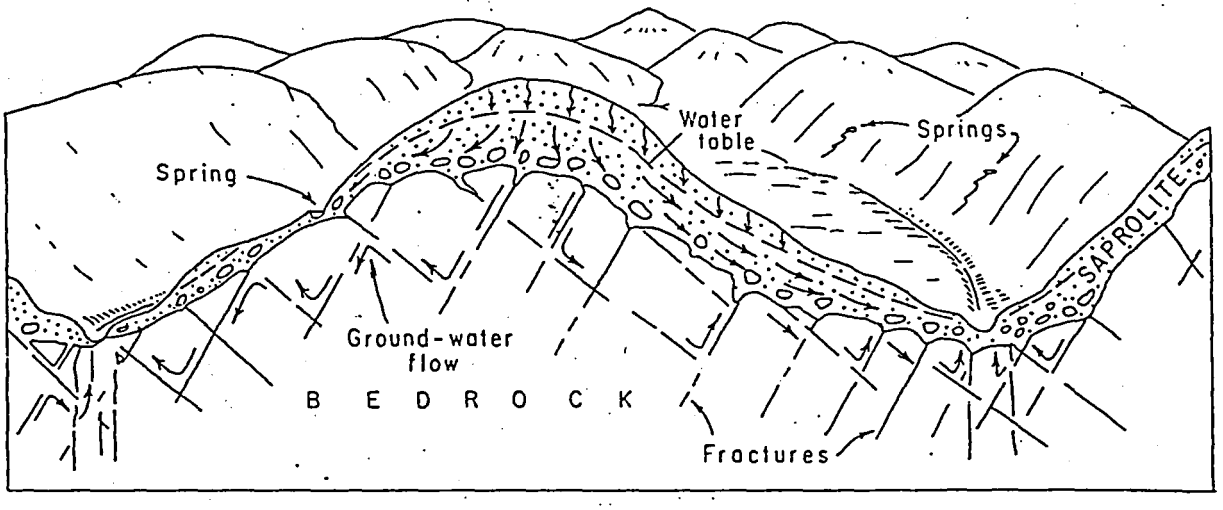
The bedrock underlying the Piedmont and mountains consists of many different types of igneous and metamorphosed igneous and sedimentary rocks. The Generalized Geological Map of North Carolina accompanying the discussion of WATER-BEARING ROCKS divides the bedrock in the Piedmont and mountains into six units. The 1:500,000 scale Geologic Map of North Carolina, published in 1958, divides the bedrock in the same area into 48 different units. But, a much larger number of units have been identified and are shown on large scale geologic maps.

The bedrock units differ from each other in mineral composition and other geologic characteristics. Fortunately, these differences do not result in large differences in hydraulic characteristics so that it is possible to combine the bedrock units into a relatively small number of hydrogeologic units.

The accompanying map shows the hydrogeologic units into which the bedrock in the Piedmont and mountains has been divided by the U.S. Geological Survey and the North Carolina Groundwater Section.

The most productive hydrogeologic units are the Great Smoky Mountain belt and the Blue Ridge-Inner Piedmont belt. The least productive units are the Carolina Slate Belt and the Triassic Basins. The Charlotte Belt is intermediate in productivity.

Ground-Water Situation in the Piedmont and Mountains



The *saprolite* (weathered rock) that forms the land surface in the Piedmont and mountains consists of unconsolidated granular material. It thus contains water in the pore spaces between rock particles.

The *bedrock*, on the other hand, does not have any significant intergranular (primary) porosity. It contains water, instead, in sheet-like openings formed along fractures (that is, breaks in the otherwise "solid" rock). Fractures in bedrock are of two types: (1) *joints*, which are breaks along which there has been no differential movement; and (2) *faults*, which are breaks along which the adjacent rocks have undergone differential movement.

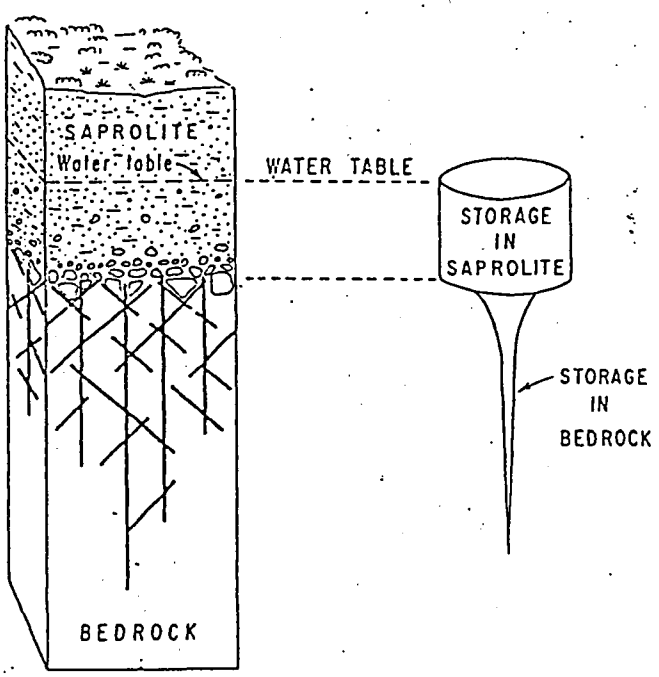
Faults are formed during earthquakes and generally contain larger and more extensive openings than those developed along joints. Joints, however, are far more numerous than faults.

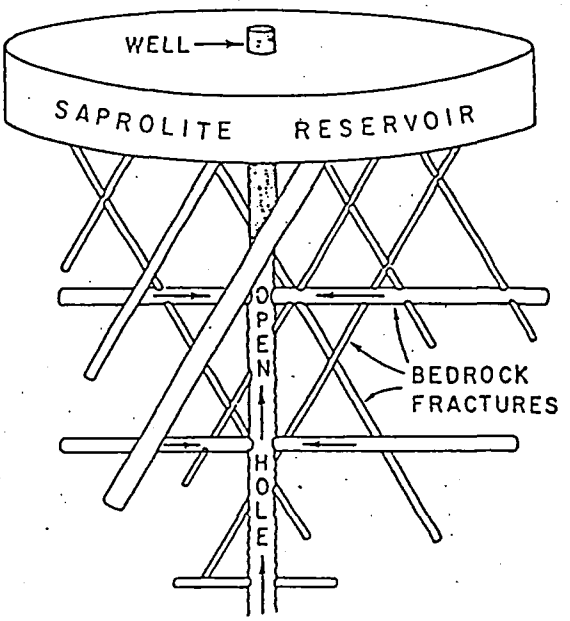
Fractures (joints and faults) are more abundant under valleys, draws, and other surface depressions than under hills. In fact, geologists assume that it is the presence of fractures that determined the position of valleys in the first place. Fractures tend to be more closely-spaced and the openings developed along them tend to be larger near the surface of the bedrock. Most fractures appear to be non water-bearing below a depth of 300 to 400 ft. Large water-bearing openings, penetrated below this depth are probably associated with faults.

The ground-water system in the Piedmont and mountains is recharged by precipitation on the interstream areas. A part of the precipitation infiltrates through the unsaturated zone to the water table, which normally occurs in the saprolite.

Ground water moves laterally and downward through the saprolite to points of ground-water seepage (springs) on the hillsides and to the streams in the adjacent valleys. Some of the water in the saprolite also moves downward into the bedrock and, thereafter, through the fractures to the adjacent valleys.

Hydraulic Characteristics of the Piedmont and Mountain Ground-Water System





One of the most basic concepts of ground-water hydrology is that aquifers function both as reservoirs, in which water is in storage, and as pipelines, which transmit water from one point to another. This is referred to as the *reservoir-pipeline concept:* This concept forms a useful basis on which to discuss the hydraulic characteristics of the Piedmont and mountain ground-water system.

The reservoir (storage) function of aquifers depends on the porosity. The pipeline function depends on the hydraulic conductivity and the thickness of the aquifer. The approximate range in porosity and hydraulic conductivity for the saprolite and bedrock is shown in the following table.

Rock type	Porosity in percent	Hydraulic conductivity in feet per day	
Saprolite	20-30	1-20	3.5×10^{-4} cm/sec
Bedrock	0.1-1	1-20	7.0×10^{-5} cm/sec

The above values suggest that the principal difference between saprolite and bedrock is in water-storage capacity. In other words, the saprolite has the capacity to store a much larger quantity of water than does the bedrock. This is not the entire story, however.

As we noted above, the capacity of an aquifer to transmit water depends both on hydraulic conductivity and on aquifer thickness. The part of the bedrock containing water-bearing fractures is several times thicker than the saprolite.

We can then, without great error, view the ground-water system in the Piedmont and mountains as consisting of a saprolite reservoir overlying a bedrock pipeline consisting of numerous small, interconnected pipes. In the vicinity of a pumping well the bedrock fractures ("pipes") convey water from the saprolite reservoir to the well.

The yield of a well drawing from fractured bedrock depends on several factors. The most important of these are believed to be:

1. The number, size, areal extent, and degree of interconnection of the fractures penetrated by the well,
2. The thickness of saturated saprolite in the vicinity of the well and the specific yield of the saprolite, and
3. The hydraulic conductivity of the saprolite and the nature of the hydraulic connection between the saprolite and the bedrock.

The number and the size of the fractures control the rate at which water can enter the well. The areal extent and degree of interconnection of the fractures control the size of the area that supplies water to the well.

The thickness and the specific yield of the saprolite determines the volume of water available from storage in the saprolite. The hydraulic conductivity of the saprolite and the nature of the hydraulic connection between the saprolite and the bedrock determines the rate at which water can drain from the saprolite into the bedrock fractures.

REFERENCE 20

PMPGRID STATE N.C. PUBLIC WATER SUPPLY SYSTEM 03/01/93
ACTIVE SYSTEMS
GRID LATITUDE: 360000 / 361500, LONGITUDE: 0800730 / 0802230

PWS ID	SYSTEM NAME	TYPE	POPULATION	REG.PERSON WORK PHONE	SOURCE NAME	SOURCE TYPE	SOURCE AVAIL.	LATITUDE	LONGITUDE
0234010	WINSTON-SALEM, CITY OF	C	205000	9197847597	SALEM/THOMAS	S	P	360530	801145
234020	KERNERSVILLE, TOWN OF	C	11686	9199966916	WINSTON-SALEM	[illegible]	P	360515	801130
234025	WALKERTOWN, TOWN OF	C	1350	9195954212	WELL #1 PINEHAL	G	P	361035	801010
	WALKERTOWN, TOWN OF		1350	9195954212	WELL #4 JONES	G	P	361025	801020
	WALKERTOWN, TOWN OF		1350	9195954212	WELL #5 SHIRLEY	G	P	361040	801030
234030	RURAL HALL, TOWN OF	C	1711	9199696856	WELL SUPPLY	G	P	361400	801645
	RURAL HALL, TOWN OF		1711	9199696856	WELL SUPPLY	G	P	361400	801645
	RURAL HALL, TOWN OF		1711	9199696856	WELL SUPPLY	G	P	361400	801645
234108	BIG OAK TRAILER COURT 2 WELLS	C	100	9197673105	WELL	G	P	361125	801440
	BIG OAK TRAILER COURT		100	9197673105	WELL	G	P	361125	801440
234115	COUNTRY CLUB ANNEX SUBDIVISION	C	228	7045257990	WELL #1	G	P	361045	801458
	COUNTRY CLUB ANNEX		228	7045257990	WELL #2	G	P	361045	801500
234116	SHADY ACRES MHP	C	70	9197272535	WELL	G	P	360100	802025
234117	ECHO BLUFF MHP	C	80	9197840346	WELL #1	G	P	360135	801850
	ECHO BLUFF MHP		80	9197840346	WELL #2	G	P	360140	801845
234124	GRANDVIEW WATER SYSTEM	C	977	7045257990	WELL #1	G	P	360950	802145
	GRANDVIEW WATER SYSTEM		977	7045257990	WELL #2	G	P	360955	802110
	GRANDVIEW WATER SYSTEM		977	7045257990	WELL #3	G	P	360940	802120
234125	GREEN ACRES MOBILE COURT ?	C	40		WELL #1	G	P	360935	801030
234145	SHADY GROVE TP	C	67	9199832876	WELL	G	P	361045	801355
234156	THREE R'S MOBILE PARK INC	C	235	9197888347	WELL	G	P	360015	801340
	THREE R'S MOBILE PARK INC		235	9197888347	WELL	G	P	360015	801340
234165	YORKTOWN S/D	C	537	9199964161	WINSTON-SALEM	[illegible]	P	360530	801145
234173	VALLEYDALE MH ESTATES	C	105	9195958736	WELL SUPPLY	G	P	360910	800740
234178	COUNTRY WEST WATER SUPPLY S/D	C	70	9196650817	WELL	G	P	360225	802025
234411	POINDEXTER LUMBER CO	N	25	9197651630	WELL	G	P	360425	801808
234416	BLUE BIRD MOTEL	N	25	9197673110	WELL	G	P	361112	801645
234423	HILLCREST GOLF	N	155	9197659961	WELL SUPPLY	G	P	360315	801930
234429	PINEBROOK CLUB	N	35	9197672941	WELL	G	P	361115	801530
234433	SHILO PROMISED CMPGD	N	28		WELL	G	P	361007	801907
234438	HENDRIX ENTERPRISES	N	25	9197667300	WELL	G	P	360225	802225
234443	SEDGE GARDEN FOOD	N	100	9197881877	WELL	G	P	360540	800820
234444	MRS AVA FRUITT - SH DRIVE-IN REST.	N	250	9197679815	WELL	G	P	360935	801220
234452	HILLTOP EXXON	N	30		WELL	G	P	360018	801355
234453	PARKERS USED AUTO PARTS	N	50		WELL	G	P	360322	801227
234456	FELLOW BAPT CH	N	113	9197840202	WELL	G	P	360230	801230
234457	NORTHWOODS BAPT CH	N	30	9197670528	WELL	G	P	360925	801235
234458	HOUSE & GROUNDS COMM	N	60	9197889068	WELL	G	P	360445	800945
234460	FRIEDLAND MORAVIAN CHURCH	N	73	9197882652	WELL	G	P	360345	800950
234461	FRAT CH OF BRETHREN	N	26	9197650610	WELL	G	P	360130	802130
234462	FIRST WESLEYAN CH	N	30	9197247838	WELL	G	P	360225	801610
234463	CHRIST WESLEYAN CH	N	60	9197888813	WELL	G	P	360250	801040
234464	FREEDOM BAPT CH	N	50		WELL	G	P	361400	801507
234466	CAMP CIVITAN	N	140	9197249205	WELL	G	P	361445	801130
234470	DOT OXENDINE	N	200	9197692025	WELL	G	P	360350	800735
	DOT OXENDINE		200	9197692025	WELL	G	P	360350	800735
	DOT OXENDINE		200	9197692025	WELL	G	P	360350	800735
	DOT OXENDINE		200	9197692025	WELL	G	P	360350	800735
234473	EDWIN WEIDL -924-2914	N	28		WELL	G	P	361025	801730

761-2390

PMMGRID STATE N.C. PUBLIC WATER SUPPLY SYSTEM 03/01/93

ACTIVE SYSTEMS

GRID LATITUDE: 360000 / 361500, LONGITUDE: 0800730 / 0802230

PWS ID	SYSTEM NAME	TYPE	POPULATION	RES.PERSON WORK PHONE	SOURCE NAME	SOURCE TYPE	SOURCE AVAIL.	LATITUDE	LONGITUDE
234475	HAROLD JONES	N	75	9199245226	WELLS	G	P	361115	802000
	HAROLD JONES	~~T~~	~~75~~	9199245226	WELLS	G	P	361115	802000
234476	WINFRED SMITH	N	100	9197670380	WELL	G	P	361300	801500
234479	KEMP SAVAGE	N	50		WELL	G	P	361500	801407
234483	T E HAMM	N	30	9199245738	WELL	G	P	360900	802130
234486	BUD OWEN	N	125	9197670618	WELL wrong number	G	P	361015	801230
234487	CHARLES BAKER	N	100	9197676871	WELL " "	G	P	361015	801515
234480	ARTHUR LIVENGOOD	N	275	9197658016	WELL	G	P	360315	801815
234489	DOUGLAS BUTLER - CHURCH W-S 27105	N	732 ~~300~~	9197673341	WELL - now on city water	G	P	361030	801545
234497	HOUSE & GROUNDS COMM	N	35	9197678222	WELL	G	P	361200	801420
234498	RICHARD PARKER	N	25	9195958231	WELL	G	P	361430	800920
234552	TANGLEWOOD - 6TH TEE-EAST COUR	N	100		WELL	G	P	360211	801824
234559	FAITH CH OF THE NAZARENE	N	25		WELL	G	P	360550	801545
234560	HOPEWELL MERAVIAN CH	N	125		WELL	G	P	360745	801833
234561	PINE GROVE UNITED METH CH	N	225		WELL	G	P	361010	802100
234563	POINDEXTER LBR CO (CLEMMONS)	N	30	9197651630	WELL	G	P	360350	801910
234566	SMALL WONDERS LEARNING CENTER	P	80	9197683700	WELL	G	P	360130	802200
234567	BEREAN BAPTIST CHURCH	P	40	9197630527	WELL	G	P	360230	801110
234568	LITTLE MISS ROBIN INC - DAY CARE	P	113	9195958480	WELL #1	G	P	360925	801030
234571	C.G. HILL MEMORIAL PARK	N	50	9197272946	WELL #1	G	P	361010	802230

3-4

2-3

City H.O.

Summit Rd

REFERENCE 21

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street • Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor

Division of Solid Waste Management
Telephone 919 - 733-2801

Jonathan B. Howes, Secretary

16 March 1993

To: File

From: Grover Nicholson, Environ. Engr.
NC Superfund Section

Subject: Stewart-Warner Bassick Sack
AKA Ilco-Unican Corporation
NCD 024 895 864

Today I spoke with Jim Tesch, 1-800-222-5291, who is the area manager for Carolina Water Service. He told me that Carolina Water Service provided well water to Country Club Annex, a subdivision in the north part of Winston-Salem. The two wells that serve the subdivision are located on the subdivision property. He explained to me over the phone the location of the subdivision and I plotted it on the topographic map. Jim Tesch also said that the only other two well systems that they serve in Winston-Salem are located in Pfafftown (Grandview Water System) and in Kernersville. Both of these are outside of the four mile distance from the site. Mr. Tesch said that the Yorktown subdivision is also serviced by Carolina Water Service, but the subdivision uses city water for its source. He also recommended that I call Hydraulics Limited in Greensboro because they operate some systems in the Winston-Salem area.

Today I spoke with Chris Perkins, a manager of Hydraulics Limited, 919-665-0817. She told me that the only water system that they operated in the Winston-Salem area was Country West subdivision. She gave me directions so that I could plot the location of the subdivision on my map. It is well outside of the area of concern.

Today I spoke with Chester Sides, 919 767-3105, who is the owner of Big Oak Trailer Court. He helped me locate the trailer park on my map. It is located over four miles from the site. The trailer park is supplied with water by two wells that are located on the property. They are both completed into rock; one is 485 feet deep and the other is 125 feet deep.

Today I spoke with Robert Chamberlain, 919 983-2876, who is the owner of Shady Grove Tailer Park. He helped me locate the trailer park on my map. He told me that the wells that supplied the park with water are located on the property.

Today I spoke with Crystal Garrett, 919 595-8480, whose mother owns and operates Little Miss Robin, Inc. day care. She told me that the day care had moved from its former location and was now connected to the city water system.

Today I spoke with Rod Fulcher, 919 767-3341, who is the pastor of Oak Summit United Methodist Church. He told me that the church had been connected to the city water system for the last 10 years. He verified the location of the church for me.

REFERENCE 22

REFERENCE 22

US Department of the Interior
Fish and Wildlife Service

National Wetlands Inventory Maps

Rural Hall
Walkertown
Welcome
Winston-Salem East
Winston-Salem West

REFERENCE 23

May 18, 1989

TO: Superfund Branch Staff

FROM: Pat DeRosa PD

RE: Critical Habitats of Federally Listed Endangered Species in North Carolina

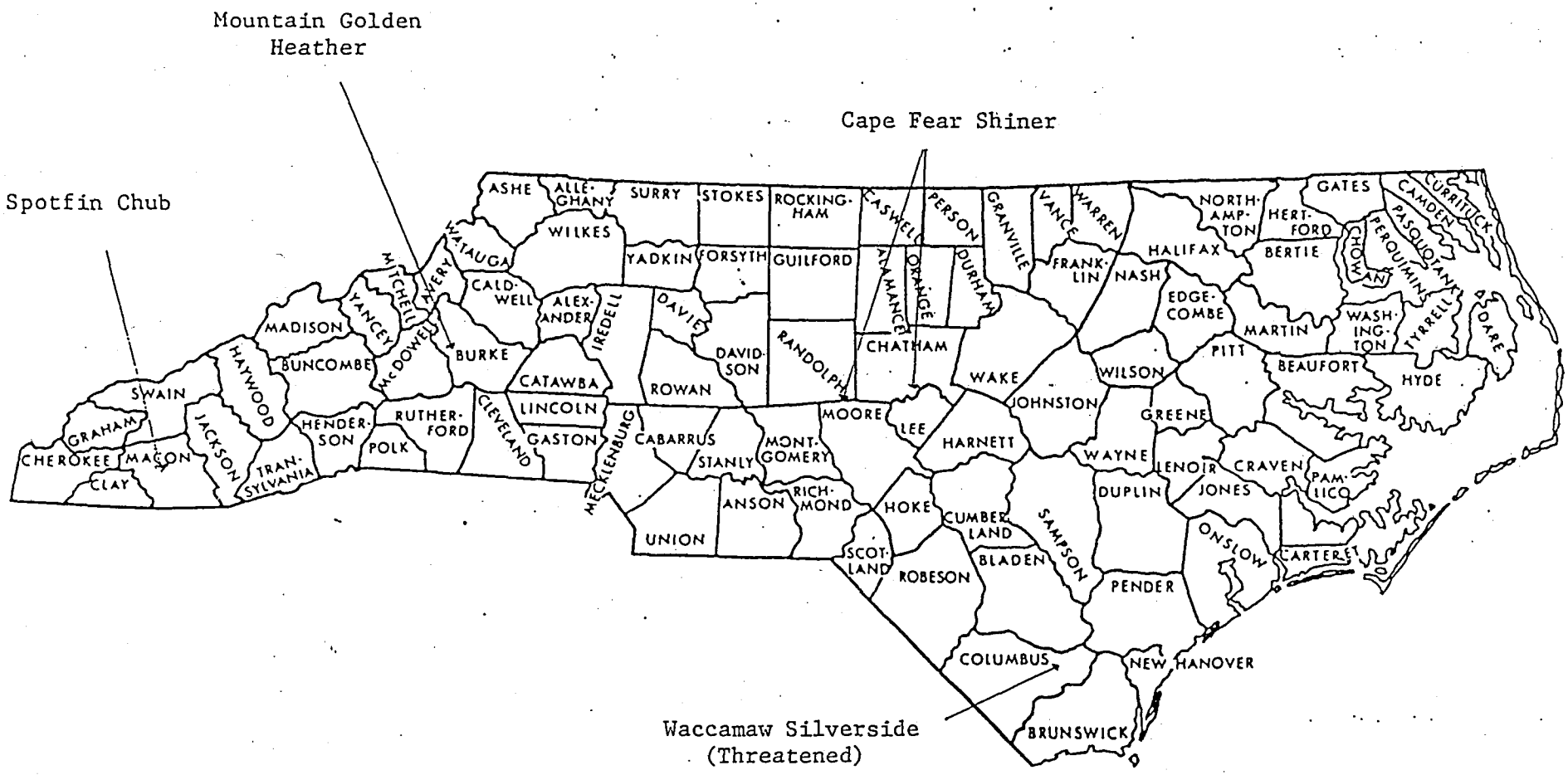
On May 18, 1989, I spoke by telephone with John Fridell, US Fish and Wildlife Service, Asheville, NC (704) 259-0321 to request an update on critical habitats in North Carolina. Mr. Fridell said the Fish and Wildlife Service has been reorganized into a western and eastern office in North Carolina. His office now handles only western North Carolina. He said there have been no changes in the designated critical habitats identified in western North Carolina.

I then spoke by telephone with Debby Mignogno, US Fish and Wildlife Service, Raleigh, NC (919) 856-4520 regarding critical habitats in eastern North Carolina. Ms. Mignogno sent the attached maps of the 2 critical habitats designated in eastern North Carolina. Please note that the Waccamaw Silverside is listed as threatened, not endangered.

PD/pb/critical.hab

CRITICAL HABITATS OF FEDERALLY LISTED

ENDANGERED SPECIES IN NC



1 inch = approx. 53 miles

RECEIVED
MAY 19 1989
6/88
SUPERFUND BRANCH

CAPE FEAR SHINER

Notropis mekistocholas

Order: Cypriniformes

Family: Cyprinidae

Status: Endangered (Federal Register 9/25/87)

Range: The Cape Fear shiner is known from four small populations in the Cape Fear River drainage in Randolph, Moore, Lee, Harnett, and Chatham Counties, North Carolina.

The strongest population is located around the junction of the Rocky River and Deep River in Chatham and Lee Counties where the fish inhabits the Deep River from the upstream limits of the backwaters of Locksville Dam upstream to the Rocky River; then upstream from the Rocky River to Bear Creek, and upstream from Bear Creek to the Chatham County Road 2156 Bridge. A few individuals have been collected just downstream of the Locksville Dam, but because of the limited extent of Cape Fear shiner habitat at this site, it is not believed this is a separate population. Instead, it is thought these fish represent a small number of individuals that periodically drop down from the population above Locksville Dam pool.

The second population is located above the Rocky River Hydroelectric Dam. This population was historically the best, but the area yielded only one specimen after extensive surveys by Pottern and Huish (1985). The third population is found in the Deep River system in Randolph and Moore Counties. This population is believed to be small (Pottern and Huish 1985, 1986). In a 1985 survey, three individuals were found above the Highfalls Hydroelectric Reservoir; one in Fork Creek, Randolph County, and two in the Deep River, Moore County. The species was also found downstream of the Highfalls Dam. However, the extent of suitable habitat in this stream reach is limited, and it is thought that these individuals likely result from downstream movement from above the reservoir where Cape Fear shiner habitat is more extensive. The fourth population is found in Neal Creek, which flows into the Cape Fear River near Lillington in Harnett County.

Three historic populations have apparently been extirpated: one in Robeson Creek, Chatham County, believed lost when Jordan Lake flooded part of the creek; and one each in Parkers Creek and Kenneth Creek in Harnett County, which disappeared for unknown reasons. Other undiscovered populations or population segments have likely been lost due to reservoir construction in the Deep, Haw, and Cape Fear Rivers.

CAPE FEAR SHINER - N. mekistocholas 6/88

Description: The Cape Fear shiner is small, rarely exceeding 2 inches in length. The fish's body is flushed with a pale silvery yellow, and a black band runs along its sides (Snelson 1971). The fins are yellowish and somewhat pointed. The upper lip is black, and the lower lip bears a thin black bar along its margin. The Cape Fear shiner, unlike most other members of the large genus Notropis, feeds extensively on plant material, and its digestive tract is modified for this diet by having an elongated, convoluted intestine.

Reasons for Current Status: The Cape Fear shiner may always have existed in low numbers. However, its recent reduction in range and its small population size (Pottern and Huish 1985, 1986) increases the species' vulnerability to a catastrophic event, such as a toxic chemical spill. Dam construction in the Cape Fear system has probably had the most serious impact on the species by inundating the species' rocky riverine habitat; and changes in flow regulation at existing hydroelectric facilities could further threaten the species.

The deterioration of water quality has likely been another factor in the species' decline. The North Carolina Department of Natural Resources and Community Development (1983) classified water quality in the Deep River, Rocky River, and Bear Creek as good to fair, and referred to the Rocky River below Siler City as an area where their sampling indicates degradation. That report also stated: "Within the Cape Fear Basin, estimated average annual soil losses from cropland ranged from 3 tons per acre in the lower basin to 12 tons in the headwaters." The North Carolina State Division of Soil and Water Conservation considers 5 tons of soil loss per acre as the maximum allowable.

Potential threats to the species and its habitat could come from such activities as road construction, stream channel modification, changes in stream flows for hydroelectric power, impoundments, land use changes, wastewater discharges, and other projects in the watershed if such activities are not planned and implemented with the survival of the species and the protection of its habitat in mind.

Habitat: The species is generally associated with gravel, cobble, and boulder substates and has been observed to inhabit slow pools, riffles, and slow runs (Snelson 1971, Pottern and Huish 1985). In these habitats, the species is typically associated with schools of other related species, but it is never the numerically dominant species. Juveniles are often found in slackwater, among large rock outcrops in midstream, and in flooded side channels and pools (Pottern and Huish 1985).

Critical Habitat: (1) North Carolina, Chatham County. Approximately 4.1 miles of the Rocky River from North Carolina State Highway 902 Bridge downstream to Chatham County Road 1010 Bridge; (2) North Carolina,

Chatham and Lee Counties. Approximately 0.5 river mile of Bear Creek, from Chatham County Road 2156 Bridge downstream to the Rocky River, then downstream in the Rocky River (approximately 4.2 river miles) to the Deep River, then downstream in the Deep River (approximately 2.6 river miles) to a point 0.3 river mile below the Moncure, North Carolina, U.S. Geological Survey Gaging Station; and (3) North Carolina. Randolph and Moore Counties. Approximately 1.5 miles of Fork Creek, from a point 0.1 river mile upstream of Randolph County Road 2873 Bridge downstream to the Deep River then downstream approximately 4.1 river miles of the Deep River in Randolph and Moore Counties, North Carolina, to a point 2.5 river miles below Moore County Road 1456 Bridge.

Constituent elements include clean streams with gravel, cobble, and boulder substrates with pools, riffles, shallow runs and slackwater areas with large rock outcrops and side channels and pools with water of good quality with relatively low silt loads.

Feeding Habits: Plant material forms the primary part of the diet.

Reproduction and Development: No information is presently available on breeding behavior, fecundity, or longevity.

Population Level: Total numbers are unknown, but all populations appear to be small. Surveys conducted in 1984 and 1985 yielded 101 individuals from the population located around the junction of the Rocky River and Deep River in Chatham and Lee Counties, 1 specimen from the Rocky River near State Highway Bridge 902 in Chatham County, and 6 specimens from the Deep River system in Randolph and Moore Counties.

Management and Protection: Assuring survival of the Cape Fear shiner will require, at a minimum, maintaining good water quality and the natural conditions of the remaining habitat. Providing for a higher level of security will necessitate determining limiting factors and reestablishing additional populations into suitable waters within the historic range.

References:

North Carolina Department of Natural Resources and Community Development. 1983. Status of Water Resources in the Cape Fear River Basin. 135 pp.

Pottern, G.B., and M.T. Huish. 1985. Status survey of the Cape Fear shiner (Notropis mekistocholas). U.S. Fish and Wildlife Service Contract No. 14-16-0009-1522. 44 pp.

Pottern, G.B., and M.T. Huish. 1986. Supplement to the status survey of the Cape Fear shiner (Notropis mekistocholas). U.S. Fish and Wildlife Service Contract No. 14-16-0009-1522. 11 pp.

Snelson, F.F. 1971. Notropis mekistocholas, a new cyprinid fish endemic to the Cape Fear River basin. North Carolina. Copeia 1971:449-462.

U.S. Fish and Wildlife Service. 1987. Endangered and threatened wildlife and plants; determination of endangered species status and designation of critical habitat for the Cape Fear shiner. Federal Register 52(186):36034-36039.

RECEIVED
MAY 19 1989
SUPERFUND BRANCH

7/87

WACCAMAW SILVERSIDE

Menidia extensa

Order: Mugiliformes

Family: Atherinidae

Status: Threatened (Federal Register 4/8/87)

Range: Known only from Lake Waccamaw and the upper Waccamaw River in Columbus County, North Carolina. The silverside is found in the upper Waccamaw River only during periods of high water and is not a permanent resident. Lake Waccamaw (not to be confused with the town of Lake Waccamaw) is the property of the State of North Carolina and is administered by the North Carolina Department of Natural Resources and Community Development's Division of Parks and Recreation.

Description: The Waccamaw silverside, also known as "skipjack" or "glass minnow," is a small (growing to about 2.5 inches), slim, almost transparent fish with a silvery stripe along each side. Its body is laterally compressed, the eyes are large, and the jaw is sharply angled upward.

Reasons for Current Status: The primary threat is the deterioration of water quality in Lake Waccamaw resulting from nutrient buildup. Although specific sources are currently unidentified, runoff and leachate from surrounding development may be contributing to the buildup. Nutrients in the lake increased since 1973, and it now appears that any further increase could tip the scales toward water quality conditions that would threaten the species. The existing data, as interpreted by Casterlin et al. (1986), indicate that phosphate concentrations and loading rates in the lake more than tripled in the years between 1973 and 1981. They further state that "continued high rates of phosphorus input (organic pollution) will likely bring the lake to a hyper-eutrophic state . . . by the end of the century." Water quality could also be affected by habitat alteration from development and other changes in land use, both around the lake and in its watershed (especially Big Creek), if these activities are not planned and implemented with the protection of the Lake Waccamaw ecosystem in mind.

A permit to propagate hybrid bass at several sites in the Lake Waccamaw watershed has been granted by the North Carolina Wildlife Resources Commission. Although the permit stipulates certain precautionary measures, escape of non-native predators from such a project into the system could upset the existing predator-prey relationships in the lake to the detriment of the Waccamaw silverside and other fishes now present in the lake.

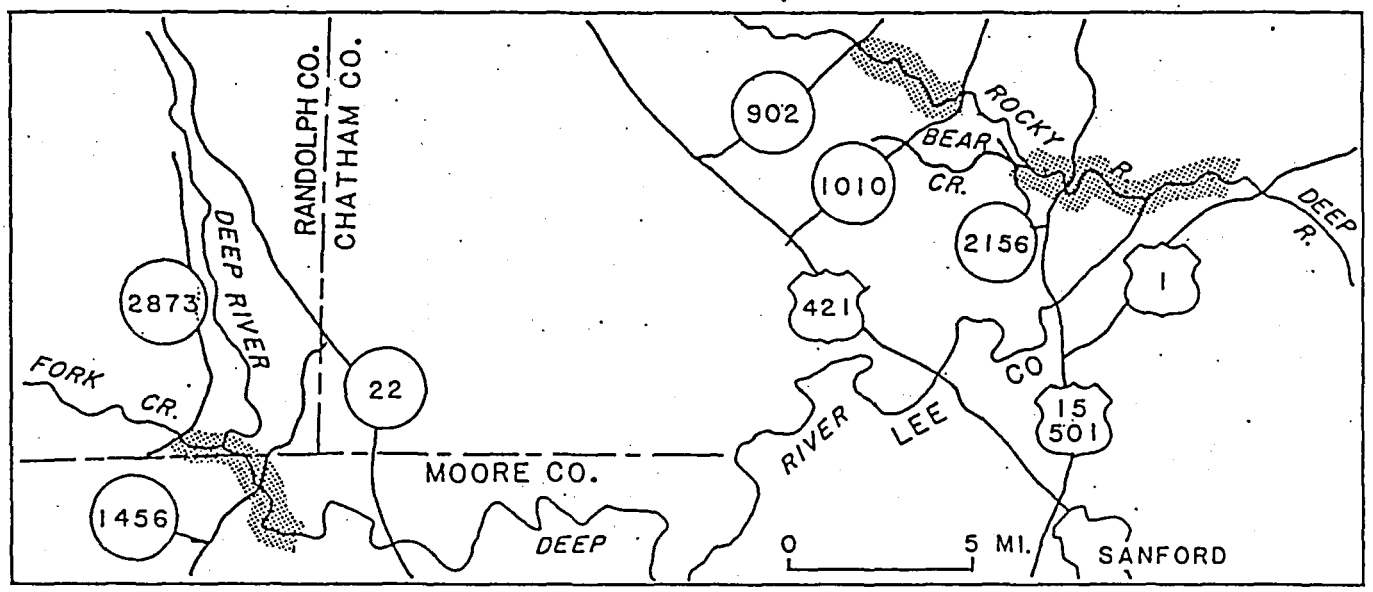
A final factor that could threaten the Waccamaw silverside relates to its very short life cycle. The fish spawn when one-year-old and most die shortly thereafter. Failure to spawn in any one year could jeopardize the species. Water quality problems related to nutrient loading, even on a short-term basis, could cause the extinction of this fish.

NORTH CAROLINA - Critical Habitat

Notropis mekistocholas, "Cape Fear shiner"

(1) Chatham County. Approximately 4.1 miles of the Rocky River from North Carolina State Highway 902 Bridge downstream to Chatham County Road 1010 Bridge;
(2) Chatham and Lee Counties. Approximately 0.5 river mile of Bear Creek, from Chatham County Road 2156 Bridge downstream to the Rocky River, then downstream in the Rocky River (approximately 4.2 river miles) to the Deep River, then downstream in the Deep River (approximately 2.6 river miles) to a point 0.3 river mile below the Moncure, North Carolina, U.S. Geological Survey Gaging Station; and
(3) Randolph and Moore Counties. Approximately 1.5 miles of Fork Creek, from a point 0.1 river mile upstream of Randolph County Road 2873 Bridge downstream to the Deep River then downstream approximately 4.1 river miles of the Deep River in Randolph and Moore Counties, North Carolina, to a point 2.5 river miles below Moore County Road 1456 Bridge.

Constituent elements include clean streams with gravel, cobble, and boulder substrates with pools, riffles, shallow runs and slackwater areas with large rock outcrops and side channels and pools with water of good quality with relatively low silt loads.



WACCAMAW SILVERSIDE - *M. extensa*

Habitat: Lake Waccamaw is a natural lake with an approximate surface area of 8,934 acres and an average depth of 7.5 feet. Although it is fed by acidic swamp streams, the lake has a virtually neutral pH. This neutral condition, unusual among North Carolina's coastal plain lakes, is believed to be caused by the buffering effect of the calcareous Waccamaw Limestone formation, which underlies the lake and is exposed on the north shore. The Waccamaw silverside inhabits open water throughout the lake, where schools are commonly found near the surface over shallow, dark-bottomed areas.

Critical habitat: North Carolina, Columbus County. Lake Waccamaw in its entirety to mean high water level, and Big Creek from its mouth at Lake Waccamaw upstream approximately 0.6 kilometers (0.4 miles) to where the creek is crossed by County Road 1947.

Constituent elements include high quality clear open water, with a neutral pH and clean sand substrate.

Reproduction and Development: Spawning occurs from April through June, but reaches to peak when water temperatures are between 68 and 72F. Fully developed larvae form small isolated schools by early May. No parental care of the young has been noted. The silversides reach sexual maturity by the following spring, spawn, and then shortly thereafter most of the adults die off. A few may survive a second winter.

Population level: Estimated to be in the millions.

Management (Activities, Recommendations, Implications): The taking of silversides for fish bait or for scientific purposes is not considered a threat to the species. These activities may continue in accordance with State regulations. Activities which could affect water and substrate quality by increasing siltation and/or nutrient loading, or by altering temperature or pH, will require monitoring and control as necessary and feasible. Some of the activities that could prove detrimental include indiscriminate logging, land use changes, stream alteration such as channelization or impoundment, bridge and road construction, improper pesticide/herbicide application, and point and nonpoint pollution discharge.

References:

Casterlin, M.E., W.W. Reynolds, D.G. Lindquist, and C.G. Yarbrough. 1986. Algal and Physicochemical Indicators of Eutrophication in a Lake Harboring Endemic Species: Lake Waccamaw, North Carolina. Journal of the Elisha Mitchell Scientific Society 100(3):83-103.

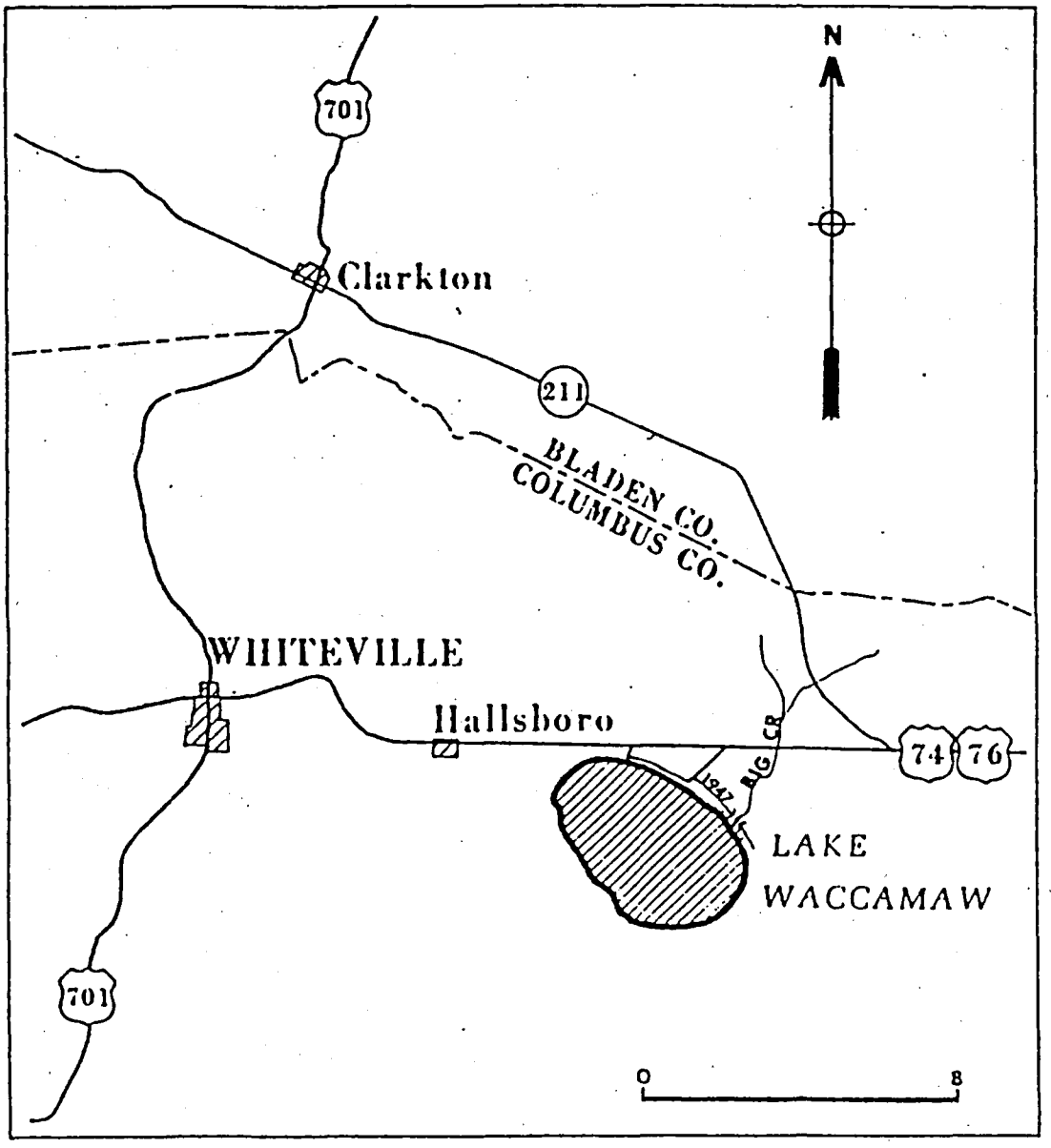
Davis, J.R. and D.E. Louder. 1969. Life History of *Menidia extensa*. Transactions of the American Fisheries Society 98(3):466-472.

NORTH CAROLINA - Critical Habitat

Menidia extensa, "Waccamaw silverside"

Columbus County. Lake Waccamaw in its entirety to mean high water level, and Big Creek from its mouth at Lake Waccamaw upstream approximately 0.6 kilometer (0.4 mile) to where the creek is crossed by County Road 1947.

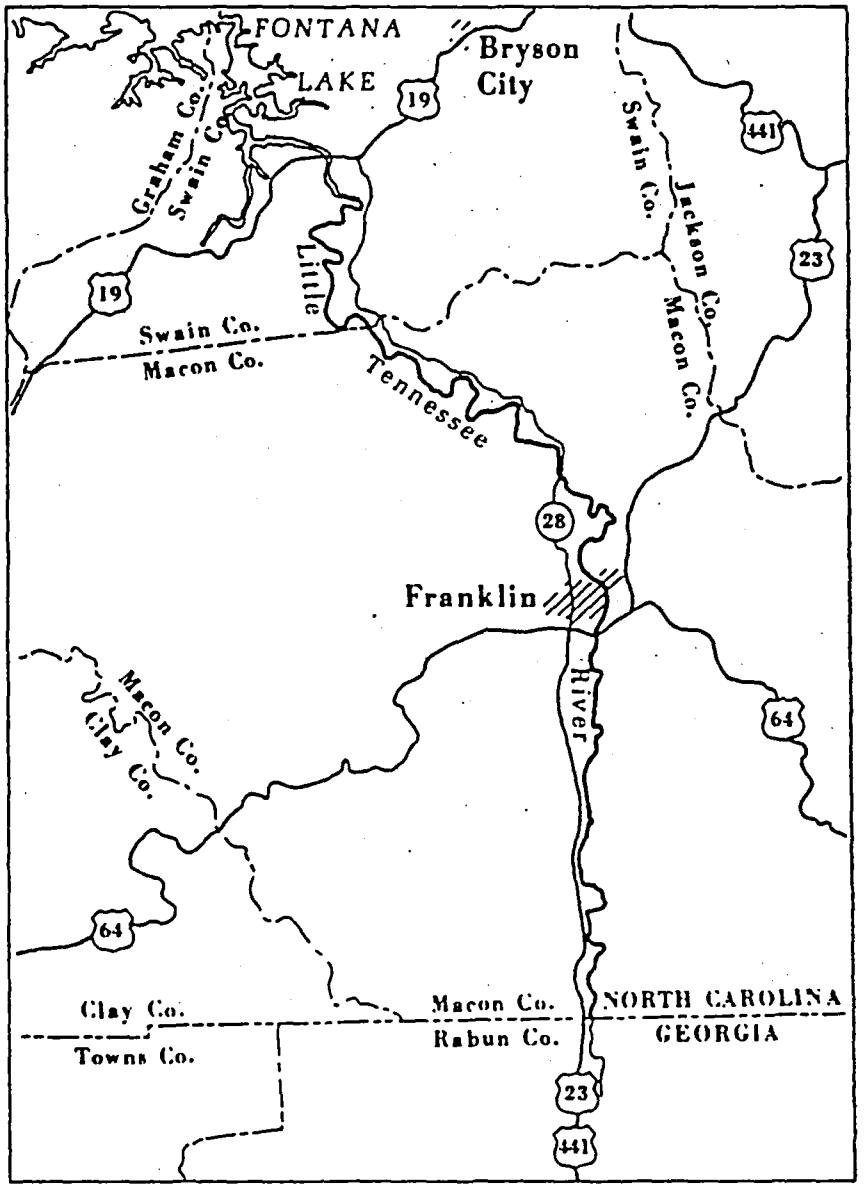
Constituent elements include high quality clear open water, with a neutral pH and clean sand substrate.



NORTH CAROLINA - Critical Habitat

Hybopsis monacha, "spotfin chub"

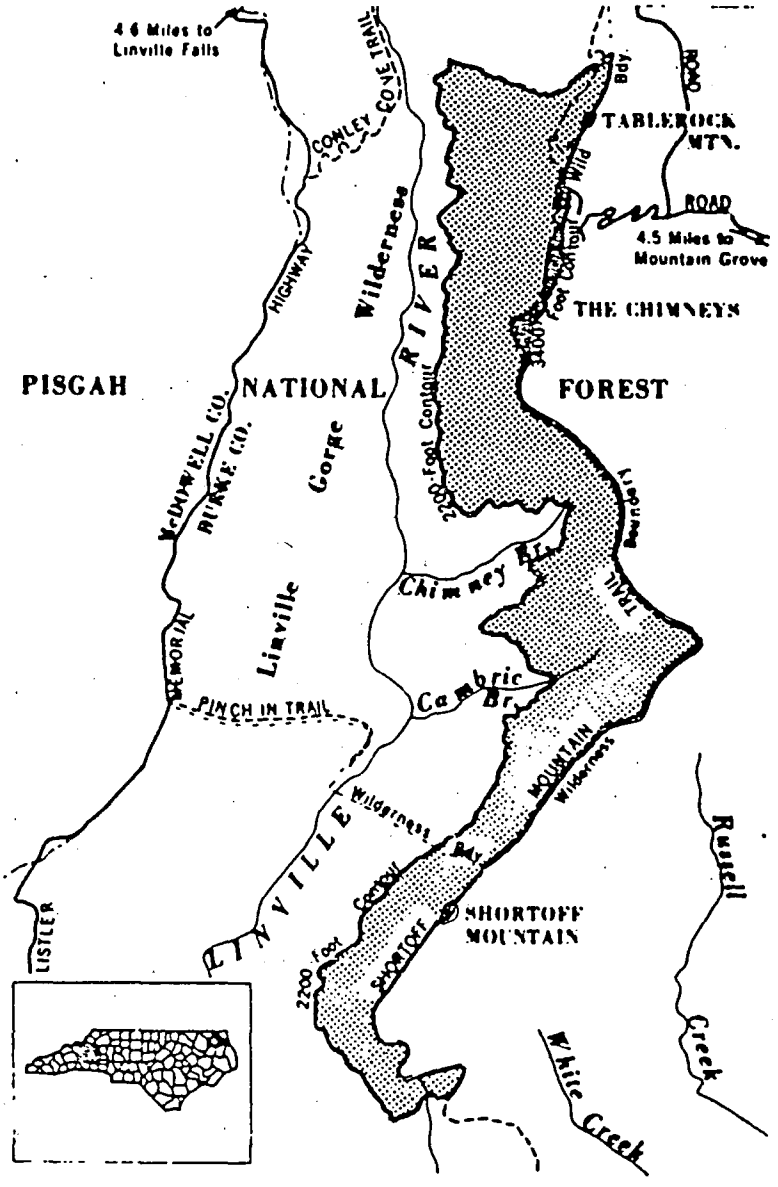
Macon and Swain Counties. Little Tennessee River, main channel from the backwaters of Fontana Lake upstream to the North Carolina-Georgia state line.



NORTH CAROLINA - Critical Habitat

Hudsonia montana, "mountain golden heather"

Burke County. The area bounded by the following: on the west by the 2200' contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2200' contour and the Shortoff Mountain Trail to where it intersects the 3400' contour at "The Chimneys"--then follow the 3400' contour north until it reintersects the Wilderness Boundary--then follow the Wilderness Boundary again northward until it intersects the 3200' contour extending west from its intersection with the Wilderness Boundary until it begins to turn south--at this point the Boundary extends due east until it intersects the 2200' contour.



REFERENCE 24

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WINSTON-SALEM, NORTH CAROLINA
FORSYTH COUNTY

PANEL 40 OF 75

COMMUNITY-PANEL NUMBER
375360 0040 F

MAP REVISED:
JANUARY 5, 1984

Federal Emergency Management Agency

KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	
Zone Designations*	ZONE B / ZONE B
100-Year Flood Boundary	
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
AUGUST 31, 1972

FLOOD INSURANCE RATE MAP EFFECTIVE:
AUGUST 31, 1972

FLOOD INSURANCE RATE MAP REVISIONS:

Interim Map revised July 17, 1974 to change Zone Designation.

Map revised July 25, 1975 to reflect Curvilinear Flood Boundary.

Map revised July 9, 1976 to add Base Flood Elevation and change Curvilinear Flood Boundary.

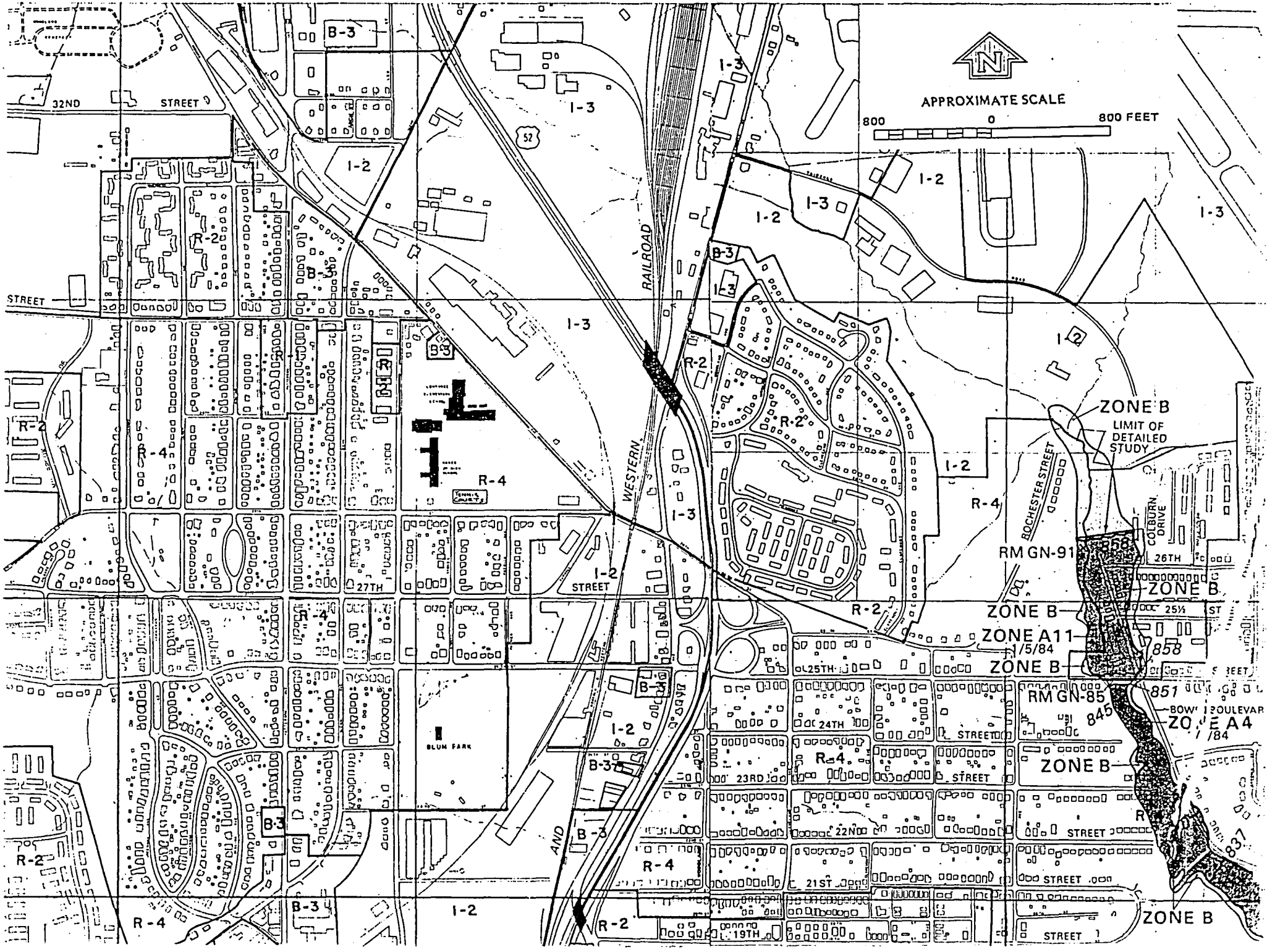
Map revised February 2, 1979 to change Corporate Limits and to adjust Flood Boundaries.

Map revised January 5, 1984 to decrease and increase Base Flood Elevations, to revise Zone Designations, to revise Special Flood Hazard Area's and to add Extraterritorial Limits.

For Elevation Reference Mark descriptions see Exhibit 4 in text.

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620.


APPROXIMATE SCALE
800 0 800 FEET
32ND STREET
STREET
WESTERN RAILROAD AND
ROCHESTER STREET
COLBURN DRIVE
ZONE B
LIMIT OF DETAILED STUDY
RM GN-91
ZONE B
ZONE A11
1/5/84
ZONE B
RM GN-85
ZONE A4
1/84
ZONE B
ZONE B
BLUM PARK
TENNIS COURTS
27TH
25TH
24TH
23RD
22ND
21ST
19TH
26TH
25½ ST
STREET
B-3
R-2
R-4
I-2
I-3
52
858
851
845
837

REFERENCE 25

MEMORANDUM

To: Superfund Section Staff

From: Hal Bryson Hal

Date: August 17, 1992

Subject: Update on Status of Well Head Protection Programs in N.C.

Carl Bailey of the DEM's Groundwater Section has provided me with the following information regarding the establishment of Well Head Protection Areas (WHPAs) in North Carolina:

- Currently there are no WHPAs in North Carolina.

- A number of local governments in the state have been funded by EPA "demonstration grants" to initiate the development of local Well Head Protection Programs; however, the formal designation of WHPAs can not be initiated until the Groundwater Section has a program approved by EPA -- such approval would grant authority to the DEM to formally establish WHPAs in local areas.

- Formal approval by EPA of the Groundwater Section's WHPA Program is expected within 12 to 18 months.

- Counties currently attempting to develop local WHPA programs include Bladen, Buncombe, Columbus, Gaston, Lee, Moore, Randolph, Robeson, Scotland, and Stokes.

The Superfund Section should contact Mr. Bailey in another year or so to update this information.

HCB\whpamem

REFERENCE 26

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street • Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor

Division of Solid Waste Management
(919) 733-2801

Jonathan B. Howes, Secretary

9 July 1993

To: File

From: Grover Nicholson
Environmental Engineer
NC Superfund Section

Re: Stewart-Warner Bassick-Sack
NCD 024 895 864
AKA Ilco-Unican

Today I spoke on the telephone with Ms. Nancy Hicks of the Public Information Office of the Winston-Salem/Forsyth County School System, 919 727-2816. She gave me the following information about the Hanes/Lowrance Middle School.

Until last year, the schools were separate, special educational, schools. The 1992-1993 school year enrollment was 599 for Hanes School and 89 for Lowrance School.

The schools were combined into the Hanes/Lowrance Middle School for the 1993-1994 school year. Projected enrollment is 581 for the Hanes portion and 90 for the Lowrance portion.

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4984 Fax # 919-733-0513

An Equal Opportunity Affirmative Action Employer

REFERENCE 27

Site Name: Stewart-Warner Bassick-Sack
Site Number: NCD 024 895 864

Site Location: Winston-Salem, N.C.
Forsyth County
Latitude: 36 07 44.5
Longitude: 80 14 22.5

Date: March 17, 1993

Calculation Results

Distance from Site Location	Population Per Ring	Population Cumulative	Number of Households Per Ring	Number of Households Cumulative
0 to 1/4 mile	1,085	1,085	440	440
>1/4 to 1/2 mile	2,209	3,294	875	1,315
>1/2 to 1 mile	7,233	10,527	3,144	4,459
>1 to 2 miles	20,729	31,256	9,539	13,998
>2 to 3 miles	27,668	58,924	10,950	24,948
>3 to 4 miles	32,283	91,207	15,350	40,298

Note: The populations and number of households within specified target distance rings were calculated for the NC Superfund Section by the NC State Center for Geographic Information and Analysis using the 1990 US Census data. These values were calculated by summing the population and the number of households data for each census block located within each target ring. For census blocks lying only partially within the ring, the per cent area of the block within the ring was multiplied by the population and household densities of the block.

REFERENCE 28

28 March 1994

To: File

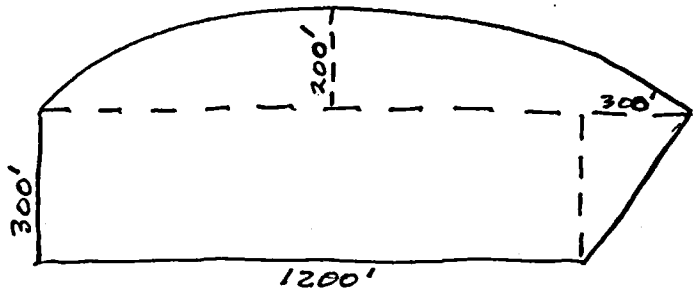
From: Grover Nicholson
Environmental Engineer
NC Superfund Section

Subject: Stewart-Warner, Bassick-Sack Division
NCD 024 895 864
Calculation of wetlands distances from the site, frontage along streams, and site drainage area.

There are five areas of wetland along the 15-mile surface water flow pathway. These distances and frontages are as follows.

Wetland	Distance from site	Frontage
1	9.9 miles	1000 feet
2	10.0 miles	1600 feet
3	12.0 miles	1000 feet
4	12.1 miles	1500 feet
5	14.2 miles	350 feet

The drainage area of the site, which is essentially the entire site, was calculated to be 525000 square feet or 12.05 acres using measurements from the USGS topographic map.



REFERENCE 29

Reference 8

GROUNDWATER TECHNOLOGY, INC.
1244 B Executive Boulevard, Suite 106, Chesapeake, VA 23320 (804) 436-7881
Fax: (804) 436-2312

TECHNICAL PROPOSAL
COMPREHENSIVE SITE EVALUATION
ILCO-UNICAN PRODUCTION FACILITY
WINSTON-SALEM, NORTH CAROLINA

FEBRUARY 15, 1989
(REVISED: 17 SEPTEMBER 1990)

PROPOSAL # 321-P-0413

Prepared for:

Brian Wells
Environmental Manager
ILCO-UNICAN CORPORATION
400 Jeffreys Road
Rocky Mount, NC 27804

Prepared by:
GROUNDWATER TECHNOLOGY, INC.

Jim Garrett
Hydrogeologist
Territory Manager

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Figure 4: Proposed Observation Well Locations	8
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1.0 INTRODUCTION AND BACKGROUND

At the request of ILCO UNICAN CORP (ILCO), Groundwater Technology, Inc. (GTI) has prepared this proposal to conduct a comprehensive environmental assessment at the Capitol Division facility located at 2941 Indiana Avenue, Winston-Salem, North Carolina.

GTI representatives attended a pre-proposal meeting and plant walk-through with Mr. Brian Wells of ILCO. During this meeting, GTI was provided with several assessment/remediation reports prepared by Research Analytical Laboratories, Inc. (RAL) which documented results of their soil investigations and air emissions investigations performed for the Stewart-Warner Corporation. It was discovered that RAL's June 1987 and July 1987 reports were not in the possession of ILCO. By researching the files of the North Carolina Department of Natural Resources (NCDNR), GTI was able to secure copies of these reports for delivery to ILCO.

The following comments are offered regarding GTI's review of the Assessment/Remediation Reports prepared by RAL:

- RAL's work effort was focused toward defining and remediating soil contamination resulting from a surface spill of cyanide plating solution, a surface spill of effluent water from the wastewater treatment plant, and the discovery of buried drums, metal debris, crucibles and contaminated soils on the southeast side of the plant.

- The extent of soil contamination, as defined by RAL, related to the two surface spills is shown in Figure 1, as spill locations 1 and 2. Areas where buried drums and contaminated soils were excavated are also shown in Figure 1 as areas A, B and C.

- RAL collected and analyzed several air emissions samples near roof stacks and found them to contain extremely high concentrations of heavy metals and cyanide (Figure 2). It was also noted (and observed by GTI) that 1-3 inches of zinc dust have accumulated on some areas of the roof. Analyses of this zinc dust have shown copper, nickel, zinc, chromium, lead and cyanide to be present in very high concentrations.

- In terms of remediation, RAL presents data indicating that spill sites 1 and 2 and excavations A, B and C (Figure 1) were remediated to the current satisfaction of NCDHR. This was reportedly accomplished by excavating soils to a depth of 1.5 feet at the spill sites; and by digging excavation pits to remove buried drums and associated contaminated soils at sites A, B and C. Clean-up guidelines initially imposed by the NCDHR required that <u>extractable</u> metals concentrations in soils be below drinking water standards.

- Although RAL notes that air emissions and zinc dust on the roof may act as a constant source of stormwater runoff and soil contamination, these problems were not addressed in their remediation efforts.

- Preliminary soil analyses performed by ILCO-UNICAN have shown high concentrations of heavy metals in the soils adjacent to the foundry baghouse. This was not addressed in the RAL assessment/remediation efforts.

- Although RAL references various sampling quadrants at the site, adequate verbal or graphical descriptions of sample locations have not been available to ILCO or GTI.

- It was stated by RAL that the likelihood of groundwater impact is very low, however, this has never been confirmed by installing and sampling monitoring wells.

The objectives of this proposal are to present an environmental assessment plan designed to determine the following:

(1) Perform confirmation sampling and analyses to determined if Stewart-Warner's remediation efforts have sufficiently removed impacted soils with contaminant concentrations exceeding NCDNH criteria.

(2) Conduct soil sampling and analyses in areas of the plant not addressed by Stewart-Warner in their assessment/remediation program. Particular emphasis will be placed in areas near known sources such as above-ground storage tanks and containers, roof-water runoff points, and air emissions systems (i.e baghouses etc).

(3) Install groundwater monitoring wells to facilitate the determination of deeper soil or groundwater impact by contamination resulting from plant operations. Wells should be installed in or downgradient of areas with known near-surface contamination.

(4) Collect and analyze samples of zinc dust found to be accumulating on the roof of the plant. Evaluate the potential for roof contamination to impact soil and groundwater.

(5) Incoporate RAL's air emissions analyses into the final report. Stewart Warners own data should be sufficinet to show the inadequacy of the systems.

(6) Perform all field sampling and laboratory analyses utilizing strict QA/QC guidelines. It is our intent to generate and sign-off on data that can withstand above average scrutiny. However, the degree to which QA/QC procedures are implemented can have a noticeable effect on total project costs making this topic worthy of further discussion between GTI and ILCO.

The following section of this proposal presents the detailed worksteps that will be implemented by GTI to accomplish the above objectives.

2.0 SCOPE OF WORK

The proposed scope of work is divided into five separate categories or areas of concern. The manner in which GTI proposes to address each category is presented in the following subsections. The categories are:

1. Soil and Groundwater Investigations
2. Evaluation of Roof Sediments
3. Air Emissions Evaluation (Using RAL's data)
4. Development of Quality Control/Quality Assurance Plan
5. Health and Safety Plan

2.1 Soil and Groundwater Investigations

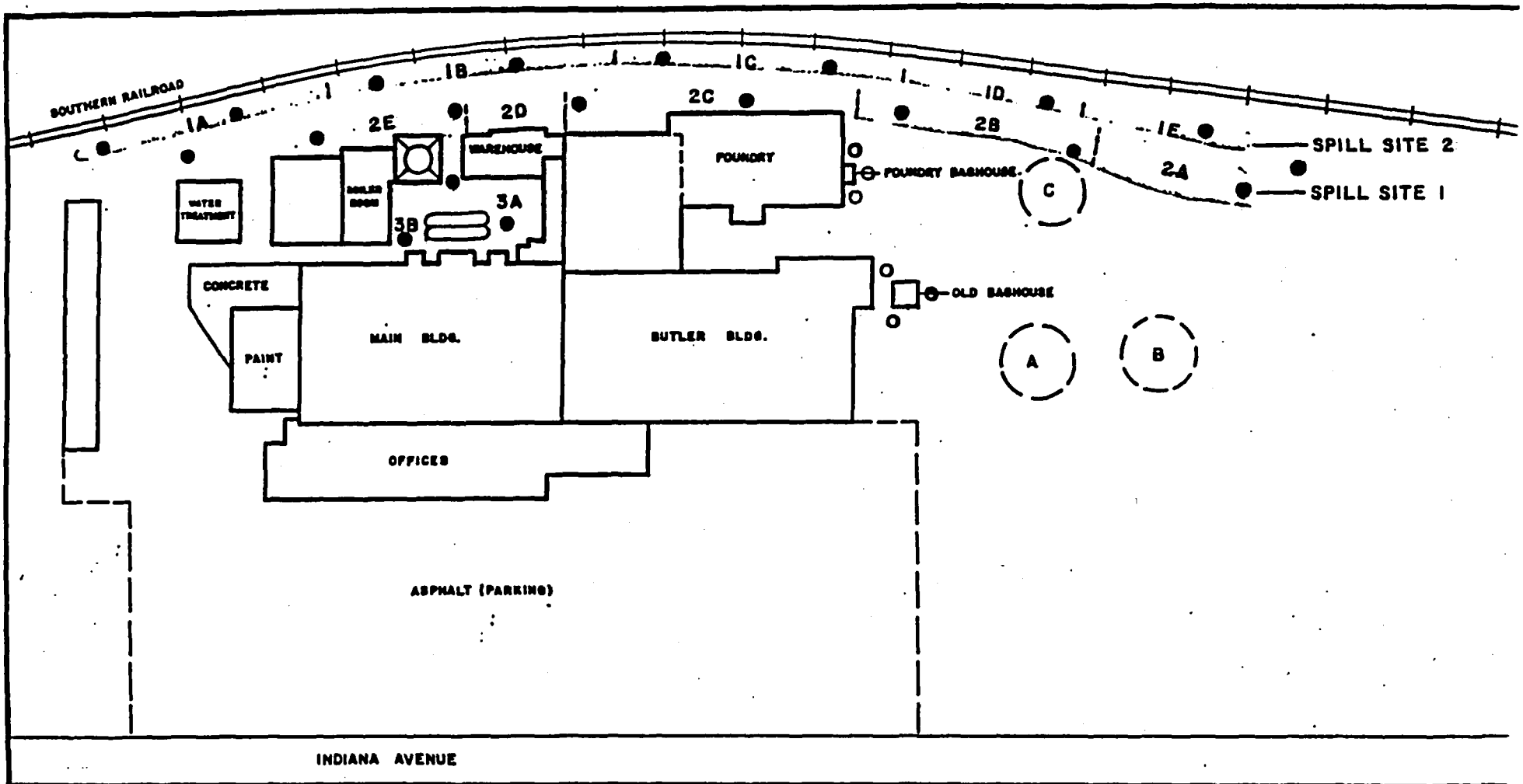
Two main types of soil samples will be collected in this investigation. The first type of soil sampling involves the collection of near-surface soil samples in the 0 to 2 feet depth range. This type of soil sampling program will be used to confirm the success of Steward-Warner's clean-up activities at spill sites 1, 2, 3 and excavations A, B, C. It will also be used to determine existing conditions, in areas not investigated by Steward-Warner, such as soils adjacent to the foundry baghouse and soils exposed to roof runoff.

The second type of soil samples will be those collected at depths greater than four feet. These samples will be collected in conjunction with the installation of monitoring wells. During the installation of monitoring wells (anticipated to be 45 feet deep), soil samples will be collected on five foot centers, and held for possible analyses should near surface soil analyses indicate that contamination has migrated downward.

Prior to initiating field investigations, a pre-assessment site visit will be conducted. The objectives of this site visit will be to refine base map, finalize soil sampling locations, finalize well locations and drill rig access, and clear underground utilities. At this time, GTI and ILCO's Environmental Manager will agree on the details of all aspects of the proposed site evaluation.

2.1.1 Near Surface Soil Sampling Plan

The RAL report prepared for Steward-Warner provides data indicating that soils in quadrants 1A-1E (spill site 2) and quadrants 2A-2E (spill site 1) have been well sampled and excavated down to a depth of 1.5 feet. The RAL report was not so convincing when it came to demonstrating the absence of contamination, at concentrations below NCDNH concern, in the soils at depths greater than 1.5 feet. For this reason a total of 20 soil samples will be collected throughout the spill site quadrants as defined in the RAL reports (2A-E, 1A-E, 3A-B). The two soil sample locations will be selected to best identify contaminated areas based on interviews with ILCO personnel. The soil samples will be collected over the 1.5 to 2.0 feet depth interval. In order to provide a more accurate identification of potential "hot-spots", compositing of these samples is not recommended. This will result in a total of 20 soil samples collected at spill sites 1, 2 and 3. Each of these samples will be analyzed using TCLP method for Chromium, Cadmium, Lead, Nickel, Zinc, Copper (Cd, Cr, Cu, Ni, Pb, Zn) and total cyanide. The results of these analyses will confirm the presence and leachable concentrations of these metals at soil depths below Steward-Warners remediation excavations. Tentative sampling locations are shown in Figure 3.



NORTH

● Confirmation Soil Sample Locations (1.5-2.0 ft)

O Baghouse Soil Sample Locations (0.05 & 1.5-2.0 ft)

FIGURE 3
SPILL LOCATIONS 1, 2, & 3
EXCAVATION PITS A, B, & C
ILCO-UNICAN
WINSTON-SALEM, NORTH CAROLINA

Note: Does not show all soil sampling locations discussed in Text.

GROUNDWATER TECHNOLOGY, I

Additional near surface soil samples will be collected at two depth intervals (0 - 0.5 feet and 1.5 - 2.0 feet) in the areas adjacent to the baghouses to confirm preliminary analyses performed by ILCO. Three soil samples will be collected at each of the above depth intervals, around each of the two baghouses, resulting in a total of 12 samples to be analyzed for TCLP (Cr, Cu, Cd, Pb, Zn, Ni) and total cyanide. Tentative sampling locations are shown in Figure 3. The data obtained from these analyses should be sufficient to determine if existing soil conditions, in the vicinity of the baghouses are in accordance with NCDNH clean-up criteria.

Three separate areas (not to exceed 25 feet in length) most susceptible to receiving stormwater runoff from the roof, will also be selected for near surface soil investigations. Two sampling locations will be selected in each of the three areas. Soil samples from two depth intervals (0-0.5 and 1.5 and 2.0 feet) will be collected at each sampling location, resulting in a total of 12 soil samples to be analyzed. These soil samples will be analyzed by the TCLP method for Cu, Cd, Pb, Zn, Cr, Ni and total cyanide. Actual sampling locations will be selected based on evaluation of roof drainage patterns and interviews with knowledgeable plant personnel. All final soil sampling locations will be submitted to ILCO for approval prior to sampling. Results of these analyses should facilitate determination of roof runoff impacting soils in concentrations above NCDNH action levels. (Sample Locations are not graphically illustrated at this time).

Since potential contaminant source locations are one of the most important factors governing selection of sampling locations, and GTI's knowledge of plant operations and existing conditions is limited; 6 floating sample locations are proposed. This will provide added flexibility to the project and will result in a

more focused sampling program. Final locations will be selected as more detailed information is acquired by direct observation and consultation with ILCO representatives. It is assumed that soil samples will be collected at two depth intervals at each of the six locations, resulting in 12 soils samples to be analyzed for TCLP (Cu, Cd, Cr, Pb, Ni, Zn) and total cyanide. In addidion, it is assumed that three of these soil samples will also be analyzed for volatile organics (EPA 8240). It is anticipated that these floating sample locations will be applied to storage tank areas, and suspected past dumping areas, or any other area that may be of concern to ILCO.

All near surface soil sampling will be performed utilizing standard industry methods and in accordance with the procedures detailed in the site specific QA/QC plan that will be developed (discussed in a later section).

2.1.2 Groundwater Monitoring Wells and Deep Soil Sampling

Three groundwater monitoring wells are proposed. Depth to groundwater is variable in the Winston-Salem area, however it is anticipated/assumed that the wells will be completed at a depth of 45 feet below the surface. If deeper wells are required there will be additional costs incurred to the project. Proposed well locations are shown in Figure 4. Strategy for location of wells is as follows:

Well 1: This well will be located central to spill sites 1, 2, and 3 will be installed as near as possible to the highest contamination levels detected in the RAL investigations.

Well 2: This well will be located between excavation pits A and B.

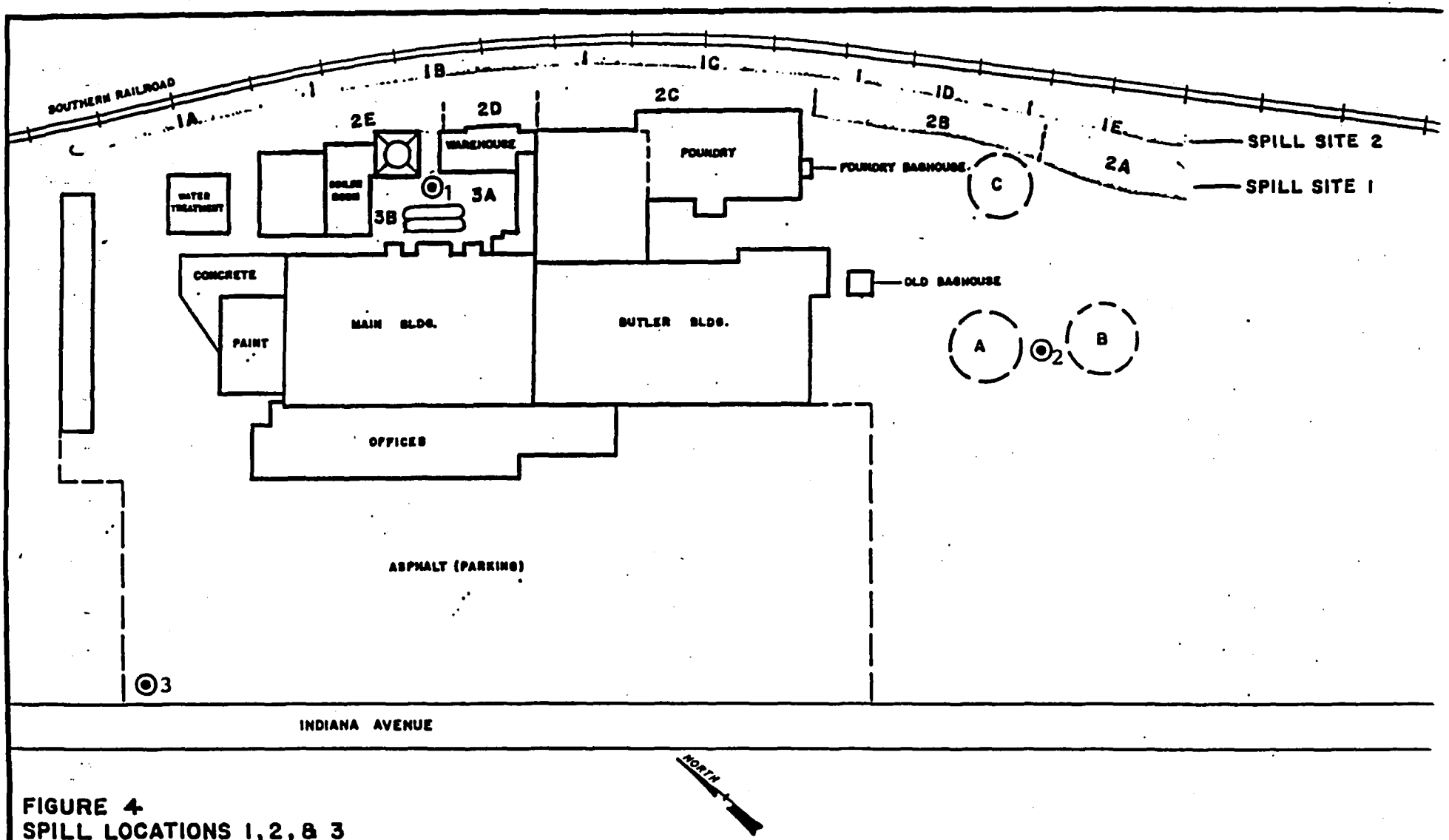
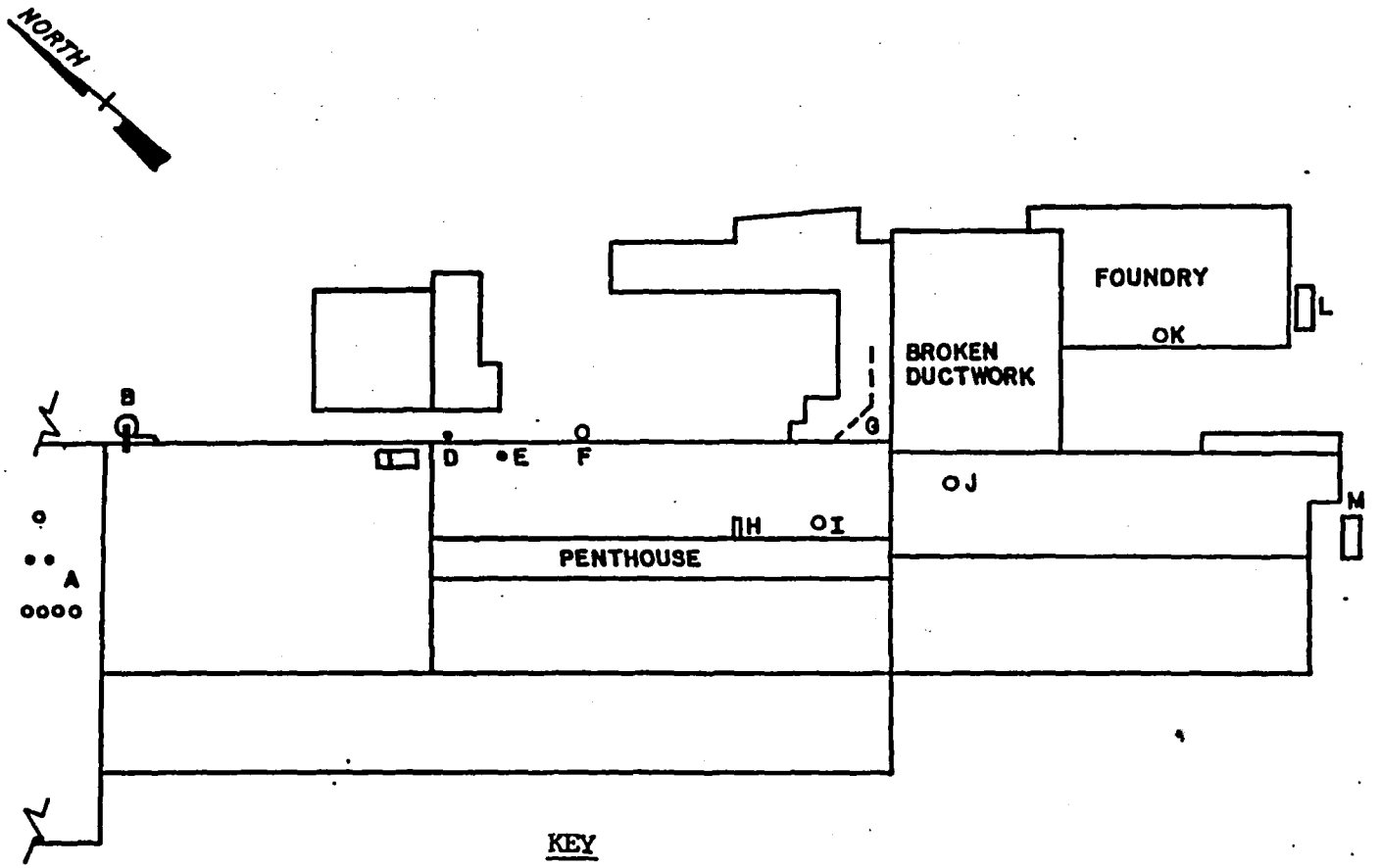


FIGURE 4
SPILL LOCATIONS 1, 2, & 3
EXCAVATION PITS A, B, & C
ILCO-UNICAN
WINSTON-SALEM, NORTH CAROLINA

⊙ MONITORING WELL LOCATIONS

GROUNDWATER TECHNOLOGY, I



KEY

A. Lacquer Painting Area
B. Light Buffing Dust Collector
C. TRI-MER Mist Scrubber
D. Cooper Rack Line
E. Alkaline Acid Cleaning
F. Cyanide Barrel Brass Plating
G, H. Heavy Buffing
I. PCE Degreaser
J. Zinc Remelt
K. Foundry Brass Grinder
L. Foundry Dust Collection
M. Old Baghouse

FIGURE 2
ROOF AREA SKETCH
ILCO - UNICAN
WINSTON-SALEM, NORTH CAROLINA

GROUNDWATER TECHNOLOGY, INC.

Well 3: This will be the background well located near the western corner of the site.

The wells will be drilled by truck mounted drill rig equipped with 10-inch diameter hollow-stem augers. All drilling and sampling equipment will be decontaminated in accordance with the site QA/QC plan. During the drilling of wells, boring logs will be prepared by describing the auger cuttings and collecting undisturbed spilt-spoon soil samples at 0-2 feet, 4-6 feet, and at five foot centers thereafter. The 4-6 foot depth interval split-spoon sample, from each well bore, will be analyzed by the TCLP method (Cu, Cr, Cd, Pb, Ni, Zn) metals and total cyanide. Samples from deeper depth intervals will be held for future analyses. Deeper zone samples will be analyzed only if the 4-6 foot interval sample show significant contamination. The soil samples (4-6') from well bore 2 and 3 will also be analyzed for volatile organics (EPA 8240) - because RAL's report indicated the presence of chlorinated solvents.

Prior to drilling the wells, monitoring well permits will be obtained form the NCDNR. All wells will be 4 inches in diameter and constructed in accordance with NCDNR Guidelines (Figure 5). Each well will be developed by an air lift method for a period not to exceed 2 hours. The horizontal and vertical relationship of each well head will be determined by level survey. This will facilitate preparation of a water table gradient map once the wells have been gauged.

Approximately one week after well development, the wells will be purged of at least three well volumes, and groundwater samples will be secured with a stainless steel bailer. All water samples will be analyzed for <u>total</u> (Cu, Cd, Cr, Pb, Ni, Zn) metals and cyanide. Water samples from wells 1, 2, and 3 will also be analyzed for volatile organics (EPA 624). All sampling

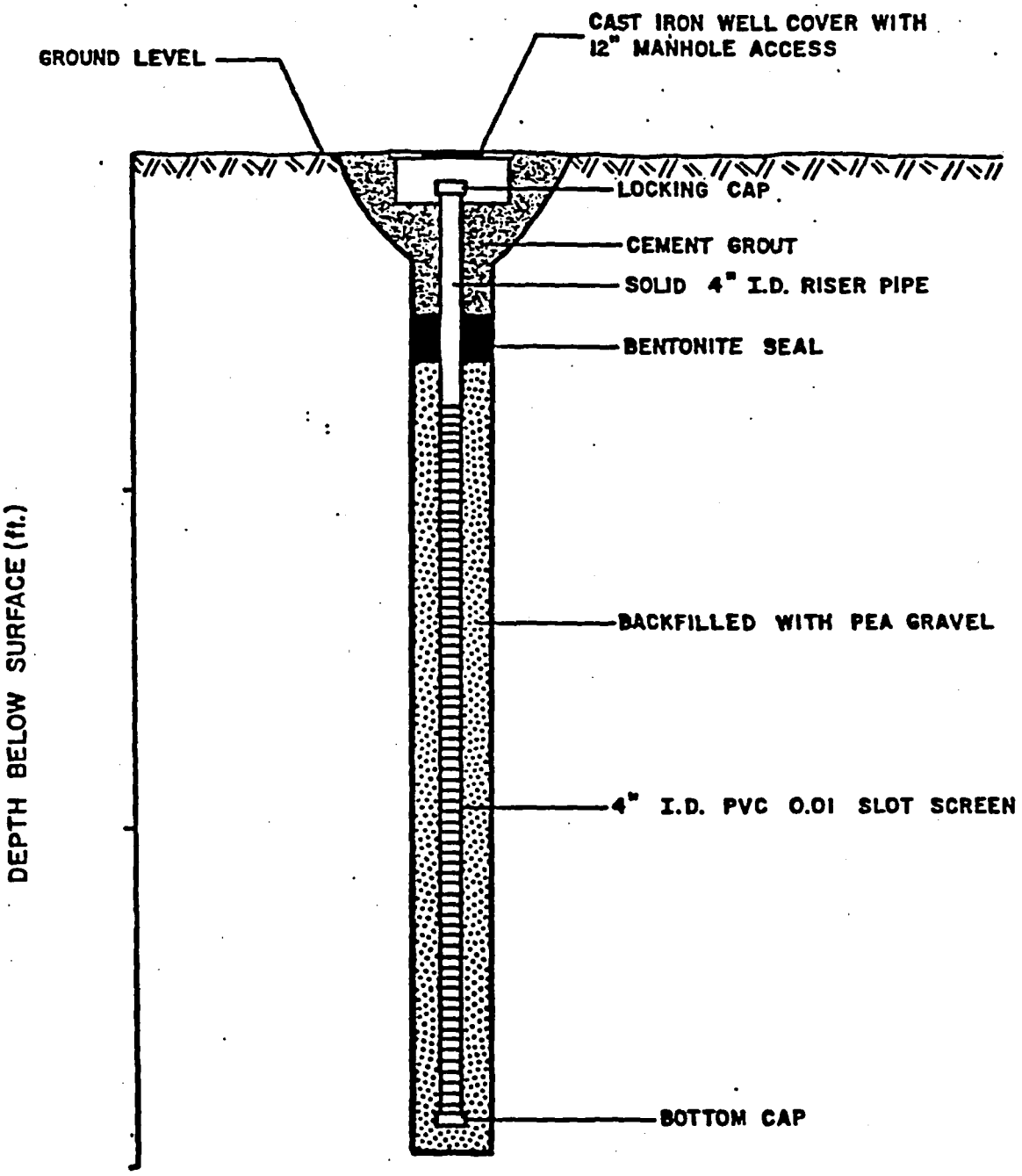


FIGURE 5
OBSERVATION WELL CONSTRUCTION

GROUNDWATER TECHNOLOGY, INC.

procedures will be documented and conducted in strict accordance with the site QA/QC plan. Drill cuttings will be stored on plastic or placed in a location suitable to ILCO.

2.2 Characterization of Roof Sediments

ILCO will provide GTI the means and access to all roofs susceptible to air emissions sedimentation. Areas of roof sedimentation will be inspected and illustrated on a sketch map. The volume of roof sediments will be estimated. A total of three roof sediment samples will be collected and analyzed by TCLP method for Zn, Pb, Cd, Cu, Cr, Ni and total cyanide. This, combined with analytical data provided by RAL's investigation, should provide sufficient evidence to show the air emission systems inherited by ILCO are inadequate and that zinc dust accumulating on the roof is a potential on-going source of soil contamination.

2.3 Evaluation of Air Emissions and Ventilation System

Steward-Warner and RAL have already demonstrated that the existing air emissions systems are more than inadequate. Extremely high concentrations of Copper, Nickel, zinc, lead and chromium were measured in various vent stacks. The accumulation of zinc dust on the roof also testifies to the inadequacy of the systems. This data will be incorporated into GTI's final report.

2.4 Development of a Quality Control/Quality Assurance Plan

One of the most important parts of an investigation such as this, is the QA/QC plan. Particularly in situations where third party scrutiny is possible. In order to be effective, the QA/QC plan should be investigation specific, and must be prepared prior to implementing the investigation.

The QA/QC plan will provide detailed guidance procedures for implementing the field investigation. Procedural and documentation requirements for soil sampling, well installation, water sampling, etc. will be outlined in the plan.

The QA/QC plan will also act as a guidance document for laboratory analyses. GTEL Environmental Laboratories offers a range of quality assurance documentation packages for three levels of service which are discussed below:

(1) The standard level of QA/QC is described in the various methods and usually takes the form of a prescribed number and order of specific quality control analyses. Examples of these are calibration standards, reagent blanks, method blanks, surrogate recoveries, replicates, sample duplicates, matrix spikes, and matrix spikes duplicates. The frequency of these analyses is determined as a percentage of the total number of analyses being performed. The project file, retained by the laboratory, contains the results of all QC work related to the project. The Report of Analyses contains a statement stipulating that the required procedures were followed. This serves as the basis for our standard analytical fees presented in this proposal.

(2) The GTEL "Blue Level" package reports the results of a method blank, surrogate recoveries, matrix spike recoveries, precision data, and a QA conformance summary comparing the QC results with industry or regulatory standards. <u>The "Blue Level" package requires the analysis of two QC samples for each group</u>

of ten or fewer samples and the costs are paid by the client. These samples qualify for inclusion in the volume discount sample price. The quality assurance documentation package fee is an additional 5% of the cost of all analysis.

(3) The GTEL labs provides a "CLP Level" QA package which meets or exceeds the USEPA Contract Laboratory Program level requirements. The program specific detection limits, instrument performance standards, quality control/quality assurance standards, and the data reporting forms stipulated by the program are used in the performance of the work. The "CLP Level" package requires the analysis of three QC samples for each group of ten or fewer samples and the costs are paid by the client. These samples qualify for inclusion in the volume discount samples price. The quality assurance documentation package fee is an additional 25% of the cost of all analysis.

2.5 Health and Safety Plan

All GTI personnel participating in the field work related to this proposal have completed the OSHA 40 hour Health and Safety Training Course.

Site safety plans are required for all sites where contact or potential contact, with hazardous materials may occur. This is mandated as a requirement of 29 CFR 1910.120 Paragraph I. GTI's Health and Safety Officer will taylor existing health and safety plans for this site prior to the initiation of field work. The field geologist will be appointed as site safety officer and will maintain (on-site) a copy of the safety plan.

3.0 REPORTING

ILCO will be kept informed on the progress of the investigation by means of telephone conversations and letter style updates. Upon completion of field work and analytical work, a report will be prepared to include the following:

(1) Description of Field Methods and Procedures
(2) Drilling and Well Construction Logs
(3) Clear identification of sampling locations on base map
(4) Geology
(5) Hydrogeology (water table gradient map)
(6) Analytical Results
(7) Extent of Contamination (also expressed graphically if appropriate)
(8) Conclusions and Evaluations
(9) Recommendations

4.0 PROJECT MANAGEMENT

4.1 Project Team

Key project members and responsibilities are given below:

Senior Technical Advisor ----------Frank Jasiulewicz
Project Director ----------Jim Garrett
Field Manager ----------Jim Boomgarden
Laboratory Director ----------Mike Webb
Health and Safety Officer ----------Ken DiLuigi
Air Emissions Specialist ----------Greg Gasparez
Support Staff ----------To be Named

Resumes will be furnished upon request.

4.2 Project Time-Line

GTI can begin work within 2 weeks of notice to proceed. It is anticipated that field work, analytical work and report preparation can be completed within 45 days of notice to proceed.

5.0 COST ESTIMATE

The estimated costs required for GTI to complete the work program outlined in Sections 2.0 and 3.0 are presented below:

Professional Services ----------$13,065.00

(Includes project management, field personnel, report preparation, field work supervision, drafting, data analyses, etc.)

Drilling Services ----------$ 8,798.00

(Includes manpower, equipment and materials to collect soil samples, decontaminate equipment, install three wells to 45 feet, mobe and demobe)

Laboratory Services ----------$19,046.00

62 TCLP Metals Analyses (Cu, Cd, Cr, Ni, Pb, Zn (soil)
62 Total Cyanide Analyses (soil)
5 Volatile Organic Analyses (soil)
3 Analyses Cu, Cd, Cr, Ni, Pb, Zn (groundwater)
3 Cyanide Analyses (groundwater)
3 Volatile Organic Analyses (groundwater)
Standard QA/QC

Expenses ----------$ 2,998.00

(Includes travel, subsistence, rental of specialized equipment, sampling supplies, truck rental, etc.)

TOTAL COST ESTIMATE ----------$43,907.00

NOTE: These estimates of cost are based on GTI's present understanding of site conditions. As such, they reflect the estimated amount of manpower, equipment, vendor's costs and expenses to implement the work steps. This estimate of cost is considered by GTI as a not to exceed ceiling cost without ILCO-UNICAN Corporation's approval. Actual billing will be on a time and materials basis according to the terms and conditions of Attachment I.

Groundwater Technology, Inc.

Hourly Rate Schedule – Effective February 25, 1990

SUPPORT PERSONNEL

ADMINISTRATIVE SERVICES 36
- Admin I
- Admin II
- Admin III

TECHNICAL SERVICES 39
- Lab Technician
- Geotechnician
- Draftsperson
- Technician

MASTER TECHNICIAN 48
- Master Technician I
- Master Technician II
- Equipment Operator

FIELD SCIENTIST 51
- Environmental Scientist I
- Microbiologist
- Geologist I

PROFESSIONAL PERSONNEL

DESIGN/CARTOGRAPHER 52
- Graphics Manager
- Cartographer

STAFF SCIENTIST/ENGINEER 66
- Environmental Scientist II
- Geologist II
- Chemist I
- Engineer I

PROJECT SCIENTIST/ENG/MGR 73
- Microbiologist II
- Field Supervisor
- Geologist III
- Hydrogeologist I
- Engineer II

SENIOR SCIENTIST/ENGINEER 85
- Engineer III
- Environmental Scientist III
- Hydrogeologist II

PROJECT DIRECTOR 104
- New Category

REGISTERED PROFESSIONALS 112
- Senior Microbiologist
- Industrial Hygienist
- Professional Engineer
- Professional Hydrogeologist

PRINCIPALS 125
- Registered Principal Hydrogeologist
- Principal Scientist
- Director Biorec Services
- Principal Engineer

TERMS:

Due upon receipt. A finance charge of 1.5% per month will be assessed for amounts 30 days past due.

Subcontractor's services and expenses will be billed at cost plus 20%.

Hardware, repair parts and other items will be billed to specific projects according to the local Groundwater Technology, Inc. Standard Materials Price List which is available on request. Market availability and supplier price fluctuations may cause prices to change without prior written notice. Items not identified on the materials price list will be billed at cost plus a 20% handling charge.

GTEL Environmental Laboratory Services and ORS Environmental Equipment will be billed at current rates and list prices which will be available on request.

Mileage is charged at the prevailing applicable IRS rate for automobiles and $.50/mile for company trucks. An additional $40/day will be charged for any vehicle used over eight hours in a day for a project. For usage less than eight hours but greater than four hours, the rate will be $25/day.

Out-of-town travel (meals, lodging, car rental and air fare) and other direct expenses will be billed at cost with a 10% handling charge.

- Delivery of depositions, responses to subpoenas or expert testimony will be billed at 1.5 times Fee Schedule Rates.
- All overtime for support personnel (over 8 hours/day) will be billed at 1.5 times Fee Schedule Rates.
- All weekend and emergency response for both professional and support personnel will be billed at 2.0 times Fee Schedule Rates.

February 25, 1990 JKH/l

REFERENCE 30

Chemical Name: Lead, inorganic dusts

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X ___ _____

Toxic by-products _____ _____

_____ _____

B. Flammability LEL N/A UEL _____ _____

C. Reactivity Hazard None _____

D. Corrosivity Hazard yes/no pH: _____ _____

Neutralizing agent: _____ _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

(1) The Merck Index, 11th Edition, 1989

(2) Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH.

(3) 29 CFR 1910.1025

(4) Pocket Guide to Chemical Hazards, NIOSH, 1987.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Lead, inorganic dusts

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula Pb	1
Natural Physical State at 25°C solid	1
Vapor Pressure N/A mm Hg at 20°C	1
Melting Point 327.4 °F/°C Boiling Point 1,740 °F/°C	1
Flash Point (open or closed cup) N/A °C/°F	
Solubility - H_2O N/A	
Other N/A	

Physical Features: (odor, color, etc.) appearance and odor vary depending upon specific compound.

II. TOXICOLOGICAL DATA

suspected or confermed human carcinogen

Standards: .15 mg/m^3 (2) TLV 0.05 mg/m^3 (3) PEL N/A (4) IDLH

Routes of Exposure: inhalation, ingestion, eye contact, skin contact(3)

Acute/Chronic Symptoms: Acute: lassitude, pallor, constipation, abdominal pain, gingival gum line, tremors. Target organs: GI tract, CNS, kidneys, blood.(3)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Zinc

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes X No ____ — 1

Toxic by-products _____

B. Flammability LEL _____ UEL _____

C. Reactivity Hazard reacts slowly with ammonia water and aretic acid, rapidly with ammonia — 2

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____
Alpha particles	yes/no	_____
Beta particles	yes/no	_____
Gamma radiation	yes/no	_____

IV. REFERENCES

(1) The Condensed Chemical Dictionary, 10th Edition

(2) The Merck Index, 11th Edition, 1989

(3) Threshold Limit Values and Biological Exposure Indices for 1991-92, ACGIH

(4) 29 CFR 1910.1000.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Zinc

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula Zn	1
Natural Physical State at 25°C solid	1
Vapor Pressure _____ mm Hg at 20°C	
Melting Point 419.5 °F/°C Boiling Point 908 °F/°C	2
Flash Point (open or closed cup) _____ °C/°F	
Solubility - H_2O insoluble	1
Other soluble in acids and alkalis	1

Physical Features: (odor, color, etc.) shining white metal with bluish gray luster (1)

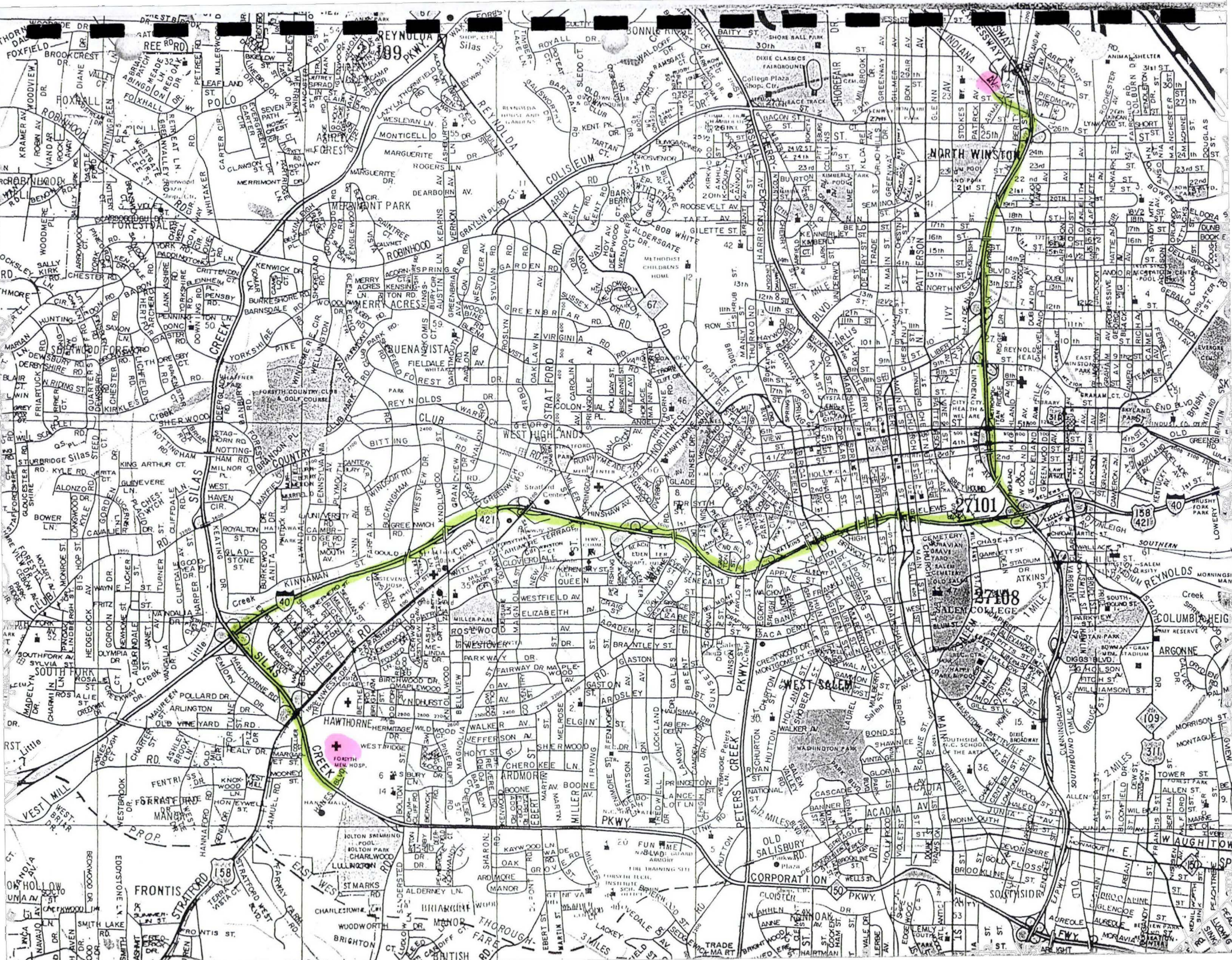
II. TOXICOLOGICAL DATA

	Zinc oxide dust		total dust			
Standards:	10 mg/m^3(3)	TLV	10 mg/m^3(4)	PEL	_____	IDLH _____

Routes of Exposure: Inhalation, Ingestion, Eye contact, skin contact

Acute/Chronic Symptoms: Inhalation of fumes can result in sweet taste, throat dryness, cough, weakness, generalized aching, chills, fever, nausea, vomiting. Ingestion of soluble salts may cause nausea, vomiting, purging (2).

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately


NORTH WINSTON
WEST SALEM
SALEM COLLEGE
27101
27108
REYNOLDA
PKWY.
COLISEUM
BUENA VISTA
MERRY ACRES
MERMONT PARK
STRATFORD
WEST HIGHLANDS
SILAS CREEK
FRONTIS
ARDMORE
CORPORATION
SOUTHSIDE
ACADIA
OLD SALISBURY
COLUMBIA HEIG
ARGONNE
SOUTH FORK
FORSYTH MEM. HOSP.
FORSYTH COUNTRY CLUB & GOLF COURSE
DIXIE CLASSICS FAIRGROUNDS
College Plaza Shop. Ctr.
SHORE BALL PARK
METHODIST CHILDRENS HOME
BOLTON SWIMMING POOL
BOLTON PARK
FUN TIME
N.C. NATIONAL GUARD ARMORY
FIRE TRAINING SITE
SALEM CEMETERY
OLD SALEM
WASHINGTON PARK
DIXIE BROADWAY
SOUTHBOUND TRAFFIC
SOUTHBOUND
2 MILES
3 MILES
1 MILE
421
40
158
109
311
150
FWY.

ID # NCD 024 895 864

Location of Nearest Phone: on-site: this is an operational facility

Hospital (Address and Phone Number)

Forsyth Memorial Hospital, 3333 Silas Creek Parkway, Winston -Salem, NC

(919) 760-5000 - can handle chemically contaminated patients

Emergency Transportation Systems (Phone Numbers)

Fire 911

Ambulance 911

Rescue Squad 911

Emergency Route to Hospital Turn left onto Indiana Ave. and follow it to Route 8/52 and turn right. From 8/52, get on 40 West and stay on 40 West to the Silas Creek Parkway exit and turn left. The hospital is about 6 miles from the site.

PREVAILING WEATHER CONDITIONS AND FORECAST Partly cloudy with a chance of showers, highs in the mid 80s.

EQUIPMENT CHECKLIST

	Air purifying respirator	X	First Aid Kit
	Cartridges for respirator	X	3 gal. Deionized H20
X	Eye Wash Unit	X	Rainsuit
	HNU	X	Gloves (PE/PVC/nitrile/cloth)
	OVA	X	Boots/Boot Covers
	Explosimeter		Coveralls (tyvek/saranex)
	Radiation Monitor		Eye Protection (goggles/shield)
X	Decontamination Materials	X	Hard Hat

Poison Control Center - State Coordinator
Duke University Medical Center
Telephone: 1-800-672-1697
Box 3024
Durham, NC 27710

ASHEVILLE 704-255-4490	Western NC Poison Control Center Memorial Mission Hosp. 509 Biltmore Ave. 28801	HENDERSONVILLE 704-693-6522 Ext. 555,556	Margaret R. Pardee Memorial Hospital Fleming St., 28739
CHARLOTTE 704-379-5827	Mercy Hospital 2001 Vail Ave, 28207	HICKORY 704-322-6649	Catawba Mem. Hosp. Fairgrove Chur. Rd 28601
DURHAM 1-800-672-1697	Duke Univ. Med. Center Box 3007, 27710	JACKSONVILLE 919-577-2555	Onslow Mem. Hospital Western Blvd. 28540
GREENSBORO 919-379-4105	Moses Cone Hospital 1200 N. Elm St. 27420	WILMINGTON 919-343-7046	New Hanover Mem. Hospital 2131 S. 17th St. 28401

safeform.211a

ID # NCD 024 895 864

Surveillance Equipment:

_____ HNU	_____ Detector Tubes and Pumps
_____ OVA	_____ 02 Meter
_____ Explosimeter	_____ Radiation Monitor

Decontamination Procedures

_____Level C Respirator wash, respirator removal, suit wash (if needed), suit removal, boot wash, boot removal and glove removal.

__X__Level D Boot wash and rinse and boot removal, suit removal, glove and goggle removal.

Modifications Dispose of trash properly, on-site if possible.

Work Schedule/Visit Objectives The purpose of this visit is to determine if the site poses a threat to the public health or environment because of releases of contaminants to soil, surface water, groundwater, or air. Sampling may consist of off-site surface soil sampling.

EMERGENCY PRECAUTIONS

Route of Exposure	First Aid
Eyes	irrigate immediately
Skin	soap and water wash
Inhalation	fresh air and artificial respiration
Ingestion	get medical attention immediately

ID # NCD 024 895 864

Facility Description: Size 9.8 acres Buildings yes

Disposal Methods Being Investigated Spills

Unusual Features on Site (dike integrity, power lines, terrain, etc.):
There is a 4,500 gallon above-ground cyanide storage tank on-site.

History of the Site: Manufacturing processes on-site include foundry work, vibratory finishing, electroplating, oxidizing, buffing, lacquering, painting, and degreasing. The electroplating sludge and waste from the wastewater treatment plant is sent to World Resource, Inc. for recycling.

C. HAZARD EVALUATION

The area around the site can be toured and sampled in level D protection. Steel toed work boots will be worn while conducting tour and sampling. PVC or PE gloves will be worn while collecting surface soil samples.

D. WORK PLAN INSTRUCTION

Map or Sketch Attached? yes

Perimeter Identified? no

Command Post Identified? no

Zones of Contamination Identified? no

Personal Protective Equipment/Level of Protection: ____ C ___X___ D

Modifications _____

B. SITE/WASTE CHARACTERISTICS

Waste Type(s) X Liquid X Solid ____ Sludge ____ Gas ____ Vapor

Characteristics X Corrosive X Ignitable ____ Radioactive

X Volatile X Toxic ____ Reactive ____ Other

List Known or Suspected Hazards (physical, chemical biological or radioactive) on Site and their toxicological effects. Also, if known, list chemical amounts

HAZARD	WARNING PROPERTIES	EXPOSURE LIMIT
Zinc	Odor Threshold (OT) = no data	10 mg/m^3
Lead	OT = no data	0.05 mg/m^3
Cyanide	OT = no data	5 mg/m^3
Nitric acid	OT = 0.3 - 1 ppm	2 ppm
Tetrachloroethene	OT = 4.68 - 50 ppm	25 ppm
Chromium	OT = no data	0.05 mg/m^3
Xylene	OT = 0.05 - 200 ppm	100 ppm
Toluene	OT = 0.17 - 40 ppm	100 ppm
Methanol	OT = 1.5 ppm	200 ppm
n-butyl alcohol	OT = 0.119 - 15 ppm	50 ppm
Methyl Ethyl Ketone	OT = 0.25 - 50 ppm	200 ppm
Acetone	OT = 100 ppm	750 ppm

SITE HEALTH AND SAFETY PLAN

A. General Information

Site Name Stewart-Warner Bassick-Sack ID # NCD 024 895 864

Location 0.5 mile NW of the intersection of Indiana Ave. and the Memorial Expressway, Winston-Salem, Forsyth County, NC

Proposed Date of Investigation August 17, 1993

Date of Briefing August 17, 1993

Date of Debriefing August 18, 1993

Nature of Visit (check one): Reconnaissance _____

Sampling X

Health Department Official Contacted Fred Overstreet's voice mail

Date of Contact August 13, 1993

Site Investigation Team: All site personnel have read the Site Health and Safety Plan and are familiar with its provisions.

	Personnel	Responsibilities	Signature
Team 1	Grover Nicholson	team leader, sampling	Grover C Nicholson
Team 1	Harry Zinn	sampling	Harry Zinn

Plan Preparation:

Prepared By: David Lilley, Industrial Hygienist David B. Lilley

Reviewed By: Jack Butler, Environmental Engineer Jack Butler

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	932502	932503	932504	932505		
	FIELD #	15558	15559	15560	15561		
COMPOUND	TYPE	(3)	(3)	(3)	(3)	( )	( )
	UNITS	ug/l (ug/kg)	ug/l (ug/kg)	ug/l (ug/kg)	ug/l (ug/kg)	ug/l ug/kg	ug/l ug/kg
chloromethane	10 ppb	u	u	u	u		
bromomethane	↓	↓	↓	↓	↓		
chlorodifluoromethane							
vinyl chloride	↓						
chloroethane	5 ppb						
methylene chloride	↓						
trichlorofluoromethane							
ethene, 1,1-dichloro							
ethane, 1,1-dichloro-							
1,2-trans-dichloroethene							
chloroform							
ethane, 1,2-dichloro-				↓			
ethane, 1,1,1-trichloro-				trace			
carbontetrachloride	↓			u			
bromodichloromethane	10 ppb			↓			
propane, 1,2-dichloro-	5 ppb						
1,3-trans-dichloropropene	10 ppb						
trichloroethylene	5 ppb						
chlorodibromomethane	↓						
benzene							
ethane, 1,1,2-trichloro-	↓						
1,3-cis-dichloropropene	10 ppb						
chloroethyl vinyl ether	↓						
bromoform	↓						
ethane, 1,1,2,2-tetrachloro-	5 ppb						
ethene, tetrachloro-	↓						
toluene							
chlorobenzene							
ethylbenzene	↓	↓	↓	↓	↓		
acetone	10 ppb	u	u	u	u		
2-butanone	↓	↓	↓	↓	↓		
carbondisulfide	5 ppb						
hexanone	↓						
4-methyl-2-pentanone	↓						
styrene	↓						
vinyl acetate	10 ppb						
xylenes (total)	↓	↓	↓	↓	↓		

E - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
[illegible] - Not analyzed.
T - Tentative identification.
Z/ - On NRDC List of Priority Pollutants.

N.C. Division of Health Services
DHS 3068-O (4/86 Laboratory)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES	LAB NO	932502	932503	932504	932505		
	FIELD #	15558	15559	15560	15561		
COMPOUND	TYPE	(3)	(3)	(3)	(3)	( )	( )
	UNITS	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	µg/l µg/kg	µg/l µg/kg
pyrene	10/330	U	U	U	U		
benzidine	50/1650						
butyl benzyl phthalate	10/330						
benz(a)anthracene							
chrysene							
3,3-dichlorobenzidine	50/1650						
bis(2-ethylhexyl)phthalate	10/330						
di-n-octyl phthalate	10/330						
benzo(b)fluoranthene	50/1650						
benzo(k)fluoranthene							
benzo(a)pyrene							
indeno(1,2,3-cd)pyrene							
dibenzo(a,h)anthracene							
benzo(g,h,i)perylene							
aniline	50/1650	U	U	U	U		
benzoic acid							
benzyl alcohol							
4-chloroaniline							
dibenzofuran	10/330						
2-methylnaphthalene							
2-methylphenol							
4-methylphenol							
2-nitroaniline	50/1650						
3-nitroaniline							
4-nitroaniline							
2,4,5-trichlorophenol							

MDL
H_2O/501L

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit. MDL
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

N.C. Division of Health Services
DHS 3068-0 (4/86 Laboratory)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES COMPOUND	LAB NO	932502	932503	932504	932505		
	FIELD #	15558	15559	15560	15561		
	TYPE	(3)	(3)	(3)	(3)	( )	( )
	UNITS	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	µg/l µg/kg	µg/l µg/kg
N-nitrosodimethylamine	10/330	U	U	U	U		
s(2-chloroethyl)ether	↓	↓	↓	↓	↓		
-chlorophenol	↓	↓	↓	↓	↓		
phenol	↓	↓	↓	↓	↓		
3-dichlorobenzene	↓	↓	↓	↓	↓		
4-dichlorobenzene	↓	↓	↓	↓	↓		
1,2-dichlorobenzene	↓	↓	↓	↓	↓		
is(2-chloroisopropyl)ether	↓	↓	↓	↓	↓		
exachloroethane	↓	↓	↓	↓	↓		
N-nitroso-di-n-propylamine	↓	↓	↓	↓	↓		
nitrobenzene	↓	↓	↓	↓	↓		
sophorone	↓	↓	↓	↓	↓		
-nitrophenol	↓	↓	↓	↓	↓		
2,4-dimethylphenol	↓	↓	↓	↓	↓		
s(2-chloroethoxy)methane	↓	↓	↓	↓	↓		
4-dichlorophenol	↓	↓	↓	↓	↓		
1,2,4-trichlorobenzene	↓	↓	↓	↓	↓		
aphthalene	↓	↓	↓	↓	↓		
exachlorobutadiene	↓	↓	↓	↓	↓		
4-chloro-m-cresol	↓	↓	↓	↓	↓		
hexachlorocyclopentadiene	↓	↓	↓	↓	↓		
4,6-trichlorophenol	↓	↓	↓	↓	↓		
-chloronaphthalene	↓	↓	↓	↓	↓		
acenaphthylene	↓	↓	↓	↓	↓		
imethyl phthalate	↓	↓	↓	↓	↓		
6-dinitrotoluene	↓	↓	↓	↓	↓		
acenaphthene	↓	↓	↓	↓	↓		
2,4-dinitrophenol	50/1650	↓	↓	↓	↓		
4-dinitrotoluene	10/330	↓	↓	↓	↓		
-nitrophenol	50/1650	↓	↓	↓	↓		
fluorene	10/330	↓	↓	↓	↓		
-chlorophenylphenylether	↓	↓	↓	↓	↓		
iethyl phthalate	↓	↓	↓	↓	↓		
4,6-dinitro-o-cresol	50/1650	↓	↓	↓	↓		
iphenylamine	10/330	↓	↓	↓	↓		
zobenzene	↓	↓	↓	↓	↓		
4-bromophenylphenylether	↓	↓	↓	↓	↓		
hexachlorobenzene	↓	↓	↓	↓	↓		
entachlorophenol	50/1650	↓	↓	↓	↓		
phenanthrene	10/330	↓	↓	↓	↓		
anthracene	↓	↓	↓	↓	↓		
ibutyl phthalate	↓	↓	↓	↓	↓		
luoranthene	↓	↓	↓	↓	↓		

MDL
H_2O/SOIL

- Estimated value.
- Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- U - Material was analyzed for but not detected. The number is the Minimum Detection Limit. MDL
- A - Not analyzed.
- / - Tentative identification.
- 2/ - On NRDC List of Priority Pollutants.

.C. Division of Health Services
HS 3068-0 (4/86 Laboratory)

Purpose: Enforcement and compliance with the N.C. Solid and Hazardous Waste Management Rules.

Preparation: A sample analyses request form must be completed for each type of evaluation requested (e.g., inorganic, organic, microbiology, radiochemistry). For sampling conditions which require more than one (1) container (i.e., ground or surface water) a sample label must be affixed to one of the containers. The collector must then write the site and sample number on the duplicate container.

Do not submit an analysis request form without any parameters indicated.

Equivalent measurements: ppm = μg/ml = mg/l = μg/g = mg/kg
ppb = μg/l = μg/1000g = μg/kg

DEFINITIONS/INSTRUCTIONS

Site Number - A unique twelve-digit site/location identifier (i.e., the EPA identification number).

Field Sample Number - A unique six-digit sample identifier which is pre-printed on the sample label.

Name of Site - Name of facility, landfill, etc.

Site Location - City and county.

Collected By - Name and staff identification number of collector.

Date and Time Collected - Self-explanatory.

Environmental - A sample of a naturally occurring substance such as ground water, surface water, or soils which may be contaminated.

Concentrate - A sample of a waste, including but not limited to, sludges, resins, treatment effluents, or drummed wastes.

Comments - Lists details regarding sample or sample point (e.g., sample location, well number, phase separation, and/or odors.

Inorganic Chemistry - Check (✓) the desired parameters to be analyzed. If not listed, enter the element/compound in the space provided.

Organic Chemistry - Check (✓) the desired parameters to be analyzed. If not listed, enter the element/compound in the space provided.

TCLP Compounds - Check (✓) the desired parameters to be analyzed. If not listed, enter the element/compound in the space provided. TCLP can only be performed on solid or semi-solid samples. For totals of the inorganic parameters, check (✓) the corresponding parameter under **Inorganic Chemistry**.

Microbiology and Radiochemistry - Contact the Raleigh office prior to sampling either of these.

Distribution:
1. Send or deliver the original to the State Laboratory of Public Health.
2. The Lab then sends a copy (with results) to the Solid Waste Management Division.
3. The Solid Waste Management Division sends a copy to the field person or collector.

Disposition: This form may be destroyed in accordance with the Environmental Health, Solid and Hazardous Waste Section of the Records Disposition Schedule as published by the North Carolina Division of Archives and History

Additional forms may be ordered from: Solid Waste Management Division
Hazardous Waste Section
P.O. Box 27687
Raleigh, NC 27611

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 15561

Name of Site STEWART-WARNER BASSICK-SALK Site Location WINSTON-SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1220

Agency: ___ Hazardous Waste ___ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-04
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
X P&T:GC/MS	
X Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chloride	
___ Chromium	
___ Copper	
___ Fluoride	
___ Iron	
___ Lead	
___ Manganese	
___ Mercury	
___ Nitrate	
___ Selenium	
___ Silver	
___ Sulfates	
___ Zinc	
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received 8-18-93 Reported by

Date Extracted 8-23-93 SA, WG (BWA, PT) Date Reported

Date Analyzed 8-24-93 (BQ) 8-26-93 (MW) Lab Number 932505

C:PD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 15560

Name of Site STEWART-WARNER BASSICK-SACK Site Location WINSTON - SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1210

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-03
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
X P&T:GC/MS	
X Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chloride	
___ Chromium	
___ Copper	
___ Fluoride	
___ Iron	
___ Lead	
___ Manganese	
___ Mercury	
___ Nitrate	
___ Selenium	
___ Silver	
___ Sulfates	
___ Zinc	
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received 8-18-93 J Reported by

Date Extracted 8-23-93 SA,WG Date Reported

Date Analyzed 8-24-93 BWA 8-26-93 PT Lab Number 932504
BD MW

CPD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 15559

Name of Site STEWART-WARNER BASSICK-SACK Site Location WINSTON - SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1200

Agency: ___ Hazardous Waste ___ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-02
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Chemistry

Parameter	Results(mg/l)
X P&T:GC/MS	
X Acid:B/N Ext.	
___ MTBE	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chloride	
___ Chromium	
___ Copper	
___ Fluoride	
___ Iron	
___ Lead	
___ Manganese	
___ Mercury	
___ Nitrate	
___ Selenium	
___ Silver	
___ Sulfates	
___ Zinc	
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Date Received 8-18-93 Reported by ___

Date Extracted 8-23-93 SA, WG (BWA) Date Reported ___ (PT)

Date Analyzed 8-24-93 (BD) 8-25-93 (MW) Lab Number 932503

CPD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

RECEIVED
SEP 03 1993
SUPERFUND SECTION

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 15558

Name of Site STEWART-WARNER BASSICK-SALK Site Location WINSTON - SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1145

Agency: ___ Hazardous Waste ___ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-01
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
X P&T:GC/MS	
X Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chloride	
___ Chromium	
___ Copper	
___ Fluoride	
___ Iron	
___ Lead	
___ Manganese	
___ Mercury	
___ Nitrate	
___ Selenium	
___ Silver	
___ Sulfates	
___ Zinc	
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received 8-18-93 Reported by John L. Neal

Date Extracted 8-23-93 SA, WG BWA PT Date Reported 8-30-93

Date Analyzed 8-24-93 8-25-93 BD NW Lab Number 932502

CPD89E

932502 - 932505

NC-DEHNR
Division of Solid Waste Management
☒ Superfund Section
☐ Hazardous Waste Section
☐ Solid Waste Section

Organics Lab: X
Inorganics Lab: _____

CHAIN OF CUSTODY RECORD

Project Name: STEWART-WARNER BASSICK-SACK
Site ID # (NCD#) NCD 024 895 864
Location: Winston-Salem NC 27105
Address: 2941 Indiana Ave.

Sampled by: GROVER NICHOLSON
Sampler ID 37
Telephone: (919) 733-2801
Date Sampled: 17 AUG 93
Time Sampled: 1145 to 1220

Sample Types: Soil X Water _____ Waste _____ Other _____

Remarks: Samples from playing fields of Hanes-Lowrance Middle School, 2900 Indiana Ave, Winston-Salem, NC 27105.

Field Sample Numbers: 15558 15559 15560 15561

Relinquished by: [signature] (Signature) Date: 18 Aug 93 Time: 1335

Received by: John L. Neal (Signature) Date: 8-18-93 Time: 1335

Relinquished by: _____ (Signature) Date: _____ Time: _____

Received by: _____ (Signature) Date: _____ Time: _____

Relinquished by: _____ (Signature) Date: _____ Time: _____

Received by: _____ (Signature) Date: _____ Time: _____

Results Reported: John L. Neal (Signature) #93 2502 - 93 2505 Date: 8-30-93 Time: _____

(A:\COCR.FRM)

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 16 608

Name of Site STEWART-WARNER BASSICK-SALK Site Location WINSTON-SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1220

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-04
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(~~mg/l~~)(mg/kg)
X Arsenic	4.9
X Barium	39
X Cadmium	<16
___ Chloride	
X Chromium	27
X Copper	25
___ Fluoride	
___ Iron	
X Lead	<20
___ Manganese	
X Mercury	<0.1 gw
___ Nitrate	
X Selenium	1.6
X Silver	<20
___ Sulfates	
X Zinc	(a)
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received ____ Reported by ____

Date Extracted ____ Date Reported ____

Date Analyzed ____ Lab Number 33 1843

GPD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 16607

Name of Site STEWART-WARNER BASSICK-SACK Site Location WINSTON-SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1210

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-03
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(~~mg/l~~)(mg/kg)
X Arsenic	7.8
X Barium	39
X Cadmium	<16
___ Chloride	
X Chromium	<20
X Copper	37
___ Fluoride	
___ Iron	
X Lead	53
___ Manganese	
X Mercury	<0.09
___ Nitrate	
X Selenium	2.4
X Silver	<20
___ Sulfates	
X Zinc	76
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received ____ Reported by ____

Date Extracted ____ Date Reported ____

Date Analyzed ____ Lab Number ____

CPD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 16606

Name of Site STEWART-WARNER BASSICK-SACK Site Location WINSTON-SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1200

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-02
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(~~mg/l~~)(mg/kg)
X Arsenic	67
X Barium	41
X Cadmium	<16
___ Chloride	
X Chromium	<20
X Copper	35
___ Fluoride	
___ Iron	
X Lead	51
___ Manganese	
X Mercury	<0.09
___ Nitrate	
X Selenium	2.2
X Silver	<20
___ Sulfates	
X Zinc	120
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received ____ Reported by ____

Date Extracted ____ Date Reported ____

Date Analyzed ____ Lab Number ____

CPD89E

N.C. Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NCD 024 895 864 Field Sample Number 16605

Name of Site STEWART-WARNER BASSICK-SACK Site Location WINSTON-SALEM

Collected By G. NICHOLSON ID# 37 Date Collected 17 AUG 93 Time 1145

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground water (1)	___ Solid (5)	SL-01
___ Surface water (2)	___ Liquid (6)	SAMPLE FROM
X Soil (3)	___ Sludge (7)	PLAYING FIELD AREA
___ Other (4)	___ Other (8)	OF HANES-LOWRANCE MIDDLE SCHOOL

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ MTBE	

Radiochemistry

Parameter	Results (PCi/l)
___ Gross Alpha	
___ Gross Beta	

Microbiology

Parameter	Results (Col/100ml)

Inorganic Chemistry

Parameter	Results(~~mg/l~~)(mg/kg)
X Arsenic	8.8
X Barium	45
X Cadmium	<16
___ Chloride	
X Chromium	<20
X Copper	43
___ Fluoride	
___ Iron	
X Lead	82
___ Manganese	
X Mercury	<0.09
___ Nitrate	
X Selenium	2.5
X Silver	<20
___ Sulfates	
X Zinc	110
___ pH	
___ Conductivity	
___ TDS	
___ TOC	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

Date Received ____ Reported by ____

Date Extracted ____ Date Reported 30 1993

Date Analyzed ____ Lab Number ____

CPD89E

NC-DEHNR
Division of Solid Waste Management
[X] Superfund Section
[ ] Hazardous Waste Section
[ ] Solid Waste Section

Organics Lab: ____
Inorganics Lab: X

RECEIVED
OCT 14 1993
SUPERFUND SECTION

CHAIN OF CUSTODY RECORD

Project Name: Stewart-Warner Bassick-Sack
Site ID # (NCD#) NCD 024 895 864
Location: Winston-Salem NC 27105
Address: 2941 Indiana Ave
SAMPLES FROM: Hanes-Lowrance School Yard

Sampled by: George Nicholson
Sampler ID 37
Telephone: (919) 733-2801
Date Sampled: 17 AUG 93
Time Sampled: 1145 TO 1220

Sample Types: Soil X Water ____ Waste ____ Other ____

Remarks: Samples from playing fields of Hanes-Lowrance Middle School, 2900 Indiana Ave, Winston-Salem, NC 27105.

Field Sample Numbers 16605 16606 16607 16608

Relinquished by: George C Nicholson (Signature) Date: 18 Aug 93 Time: 1344

Received by: Joyce Daum (Signature) Date: 18 Aug 93 Time: 1:46

Relinquished by: ____ (Signature) Date: ____ Time: ____

Received by: ____ (Signature) Date: ____ Time: ____

Relinquished by: ____ (Signature) Date: ____ Time: ____

Received by: ____ (Signature) Date: ____ Time: ____

Results Reported: [signature] (Signature) Date: 13 Oct 93 Time: ____

A:\COCR.FRM)

SOLID WASTE MANAGEMENT DIVISION

Receipt for Samples

FOR. STEWART WARNER BASSICK-SACK
AKA ILCO UNICAN.

HANES-LOWRANCE MIDDLE SCHOOL — 2900 INDIANA AVE WINSTO-SALEM NC 27105

Name of Firm — Firm Address

PATRICIA BROOKS, SCHOOL REP.

Firm Owner, Operator, or Agent Title

SAMPLE NUMBER	COLLECTED DATE	TIME	SAMPLE TYPE WATER	SOIL	OTHER	DUPLICATE SAMPLE OFRD	ACPT	RJCTD	SAMPLE LOCATION ONSITE	OFFSITE
SL-01	8-17-93	1145		X		X		X		X
SL-02	8-17-93	1200		X		X		X		X
SL-03	8-17-93	1210		X		X		X		X
SL-04	8-17-93	1220		X		X		X		X

Receipt for the sample(s) described above is hereby acknowledged:

Signature of Inspector

Environ. Eng.

Title

Receipt/rejection of duplicate or split samples is hereby acknowledged:

Patricia Brooks

Signature of Firm Owner, Operator, or Agent

SCHOOL REP.

Title

Comments:

A:\COCR.FRM)

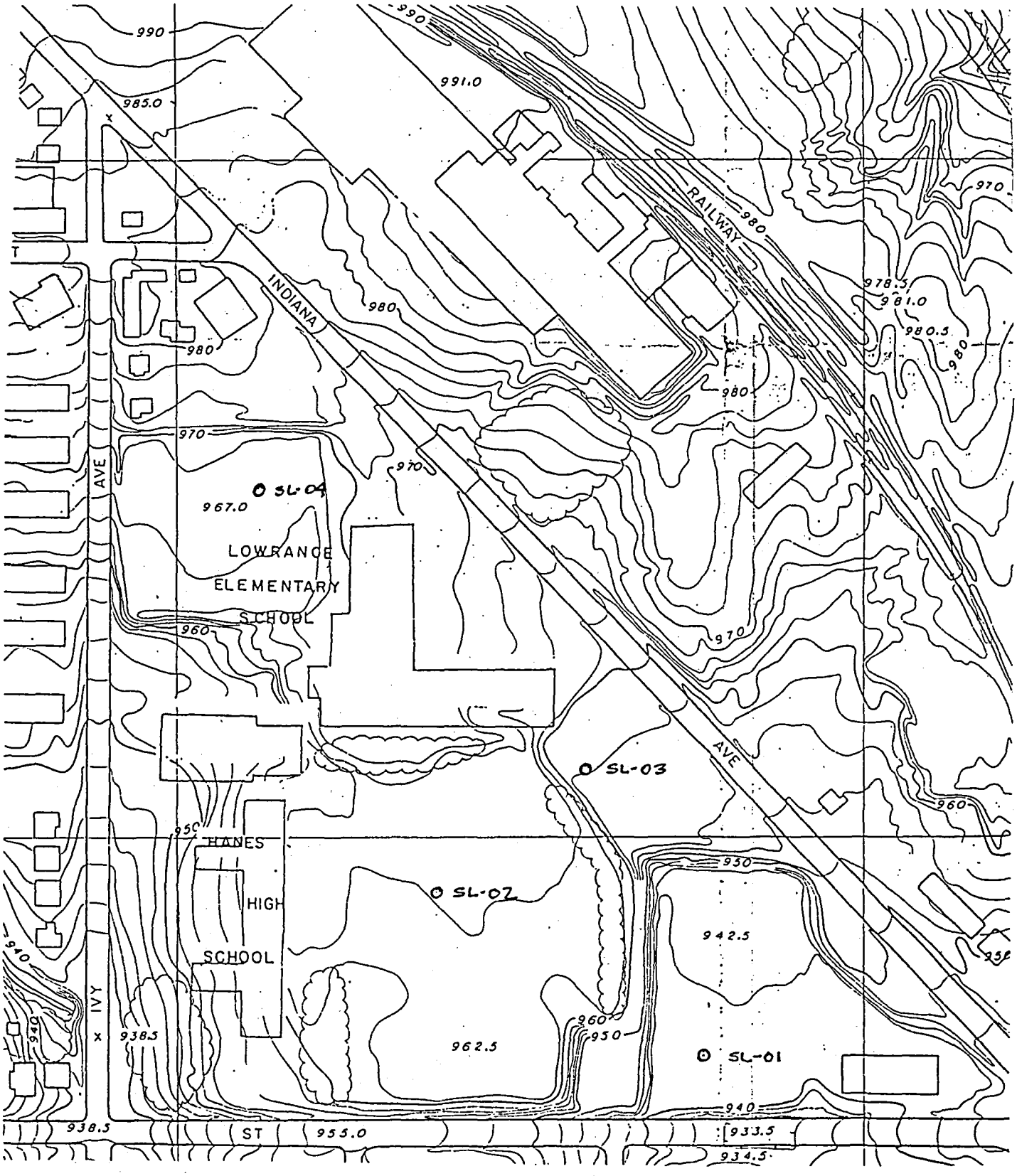
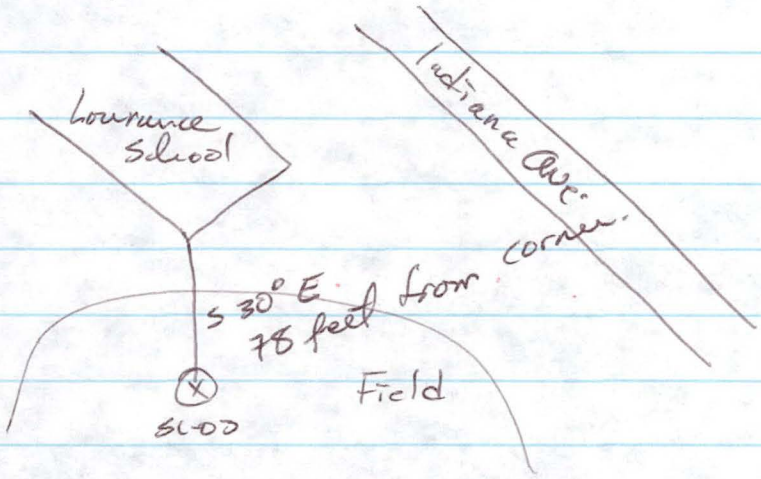
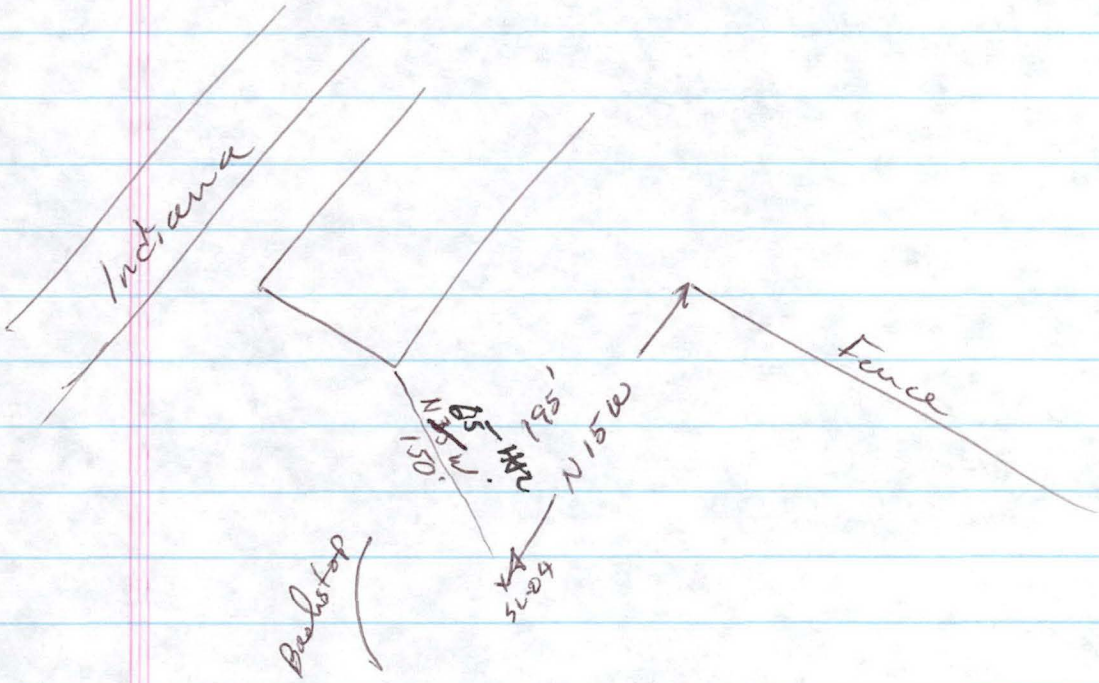


Fig. No:	Title: SAMPLING LOCATIONS. SOIL SAMPLES FROM HANES-LOWRANCE MIDDLE SCHOOL PLAYGROUNDS		
North Carolina Division of Solid Waste Management	Scale: 1" = 200'	Date: 18 AUGUST 93	Drawn By:
Superfund Section	Site Name: STEWART-WARNER BASSICK-SACK		NCD 024 895 864

SL-03 Playground Soil 0-2" 1210



SL-04 Ballfield Soil 0-2" 1220



Tuesday 8-17-93 Sunny + Warm

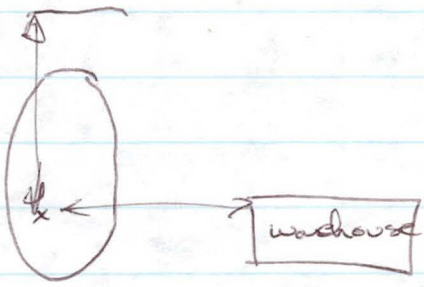
201' to Bldg
255' To Backstop

SAMPLE NO. 1. SW SL-01

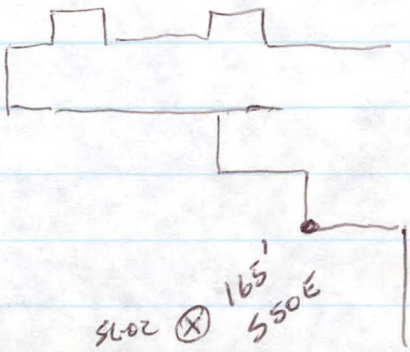
BACKGROUND SOIL 1145 17 AUG 93

LOCATION: IN FIELD OF SCHOOL TRACK
- 270° 201 feet from NW corner of school warehouse.
- S10°W 255 feet from backstop at north end of track.

- 0 to 3" deep.



SL-02 Playground Soil 0-3" 1200 17 Aug 93



Sample SL-03: Playing field soil, 0-2", 1210

Taken in playing field 78 feet from the south corner of the Lowrance school portion of Hanes-Lowrance Middle School along an azimuth of S 30° E.

Sample SL-04: Ballfield soil, 0-2", 1220.

Taken from "pitcher's mound" area of ballfield at north end of Lowrance portion of Hanes-Lowrance Middle School. Location is 150 feet from NW corner of building wing along an azimuth of N65° W, and 195 feet from end of fence along an azimuth of N 15° W.

Sampling Trip - Stewart-Warner Bassich-Sach
NCD 024 895 864

Grover Nicholson, Environ. Engr., Team Leader
Harry Zinn, Environ. Engr.

Sampling of soil in school yard of Hanes-Lowrance Middle School.

Arrived on school site at 8/17/93 1100. Informed school office of our arrival. Weather was sunny and warm.

Sample SL-01: Background Soil, 0-3" deep, 1145.

Taken in field of school track. Location is 200 feet from NW corner of school warehouse on azimuth of 270° and 255 feet from field backstop at north end of track on an azimuth of S 10° W.

Sample SL-02: Playground Soil, 0-3", 1200.

Taken in playground in front of Hanes school portion of Hanes-Lowrance Middle School. Location is 165 feet from corner of school on azimuth of S 50° E.

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street • Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor | Division of Solid Waste Management (919) 733-2801 | Jonathan B. Howes, Secretary

13 August 1993

To: File

From: Grover Nicholson, Environ. Engr.
NC Superfund Section

Re: Stewart-Warner Bassick-Sack
NCD 024 895 864
AKA Ilco-Unican

I called the Winston-Salem/Forsyth County School System and spoke with Betty Tuttle of the Office of Auxiliary Services, 919 727-2527. She gave me permission to take soil samples from the school grounds at Hanes/Lowrance Middle School in Winston-Salem. I told her that we would be there on 17 August 1993.

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4984 Fax # 919-733-0513

An Equal Opportunity Affirmative Action Employer

18 November 1993

To: File

From: Grover Nicholson

Subject: Stewart-Warner, Bassick-Sack Division
NCD 024 895 864
Soil sampling on the grounds of the Hanes-Lowrance Middle School

On 17 August 1993, Harry Zinn and I took four surface soil samples from the schoolyards of the Hanes-Lowrance Middle School. On 14 October 1993, I received the laboratory analyses of the samples. The entire sampling and analyses package is attached to this memo.

Chemical Name: Acetone

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes X No ____ — 2

Toxic by-products _____ — _____

_____ — _____

B. Flammability LEL 2.5% UEL 13% — 2

C. Reactivity Hazard oxidizing material and acids — _____

D. Corrosivity Hazard yes/no pH: _____ — _____

Neutralizing agent: _____ — _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

1. Chemical Safety Data Guide, BNA - 1985.
2. Pocket Guide to Chemical Hazards, NIOSH - 1990.
3. Threshold Limit Values and Biological Exposure Indices for 1991-1992
4. 29 CFR 1910.1000

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Acetone

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula CH3COCH3	1,2
Natural Physical State at 25°C liquid	1,2
Vapor Pressure 180 mm Hg at 20°C	2
Melting Point -140 °F/°C Boiling Point 133 °F/°C	2
Flash Point (open or closed cup) 0 °C/°F	2
Solubility - H_2O miscibe	2
Other	

Physical Features: (odor, color, etc.) colorless liquid with a fragrant, mint-like odor. IP=9.69 eV (2) HNU Relative Response = 6.3 with the 10.2 eV probe. OVA Relative Response = 60%.

II. TOXICOLOGICAL DATA

Standards: 750 ppm (3) TLV 750 ppm (4) PEL 20,000 ppm (2) IDLH

Routes of Exposure: Inhalation, contact with skin will cause dryness.

Acute/Chronic Symptoms: Irritation of eyes, nose and throat. Headaches, dizziness, and dermatitis. (2)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Methyl Ethyl Ketone

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes x No ____ — 2

Toxic by-products _____ — _____

_____ — _____

B. Flammability LEL 12% UEL 30% — 2

C. Reactivity Hazard very strong oxidizers — 3

D. Corrosivity Hazard yes/no pH: _____ — _____

Neutralizing agent: _____ — _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

(1) The Merck Index, 11th Edition, 1989.

(2) Documentation of the TLV's, 1980.

(3) NIOSH Pocket Guide to Chemical Hazards, 1990.

(4) Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH

(5) 29 CFR 1910.1000

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Methyl Ethyl Ketone (2 Butanone)

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula C4 H8 O	1,2,3
Natural Physical State at 25°C liquid	1,2,3
Vapor Pressure 70.6 mm Hg at 20°C	2,3
Melting Point -123 °F/°C Boiling Point 175 °F/°C	2
Flash Point (open or closed cup) 35 °C/°F	1,2
Solubility - H_2O 27%	1,3
Other common organic solvents	2

Physical Features: (odor, color, etc.) clear, colorless liquid with acetone-like odor, odor detection 10 ppm IP - 9.48 eV Hnu sensitivity with 10.2 eV probe = 5.7

II. TOXICOLOGICAL DATA

Standards: 200 ppm (4) TLV 200 ppm (5) PEL 3000 ppm IDLH 3

Routes of Exposure: Inhalation, Ingestion, Skin Contact, Eye Contact

Acute/Chronic Symptoms: irritation of eyes and nose, headache, dizziness, vomiting (3).

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: n-Butly alcohol

III. HAZARDOUS CHARACTERISTICS Re

A. Combustibility Yes X No ____ 3

Toxic by-products not pertinant

B. Flammability LEL 1.4% UEL 11.2% 3

C. Reactivity Hazard Incompatible with strong oxidizers

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard Exposure Rate

Background	yes/no	
Alpha particles	yes/no	
Beta particles	yes/no	
Gamma radiation	yes/no	

IV. REFERENCES

1. The Merck Index, 11th Edition, 1989.
2. The Condensed Chemical Dictionary, Hawley, 11th, Edition, 1987.
3. NIOSH Pocket Guide to Chemical Hazards, 1990
4. Chemical Hazard Response Information System, US Coast Guard, 1985.
5. Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH
6. 29 CFR 1910.1000

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: n-Butyl Alcohol

I. PHYSICAL/CHEMICAL PROPERTIES

	Refer
Chemical Formula $C_4H_{10}O$	1
Natural Physical State at 25°C liquid	2
Vapor Pressure 6 mm Hg at 20°C	3
Melting Point -129 °F/°C Boiling Point 243 °F/°C	3
Flash Point (open or closed cup) 99 °C/°F	3,4
Solubility - H_2O 9%	3
Other alcohol, ether, many organic solvents	1

Physical Features: (odor, color, etc.) Colorless liquid with a stro characteristic, mildly alcoholic odor (3) IP = 10.04 eV, OVA Relative Response = 50%

II. TOXICOLOGICAL DATA

Standards:	ceiling= 50ppm (5) TLV skin	ceiling= 50ppm(6) PEL skin	8,000ppm (3) IDLH

Routes of Exposure: Inhalation, Ingestion, Skin and/or Eye contact

Acute/Chronic Symptoms: Irritation of the eyes, nose, and throat; headac drowsiness; eye problems and blurred vision; tearing of the eyes; dry, c skin; visual intolerance of light (3)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Methanol

III. HAZARDOUS CHARACTERISTICS | Reference

A. Combustibility Yes X No ____ | 4

Toxic by-products None pertinent | 4

B. Flammability LEL 6.7% UEL 36% | 4

C. Reactivity Hazard Incompatible with strong oxidizers | 1

D. Corrosivity Hazard yes/nc pH: _____ | _____

Neutralizing agent: _____ | _____

E. Radioactive Hazard | Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

(1) NIOSH Pocket Guide to Chemical Hazards, 1990.

(2) Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH.

(3) 29 CFR 1910.1000.

(4) Chemical Hazard Respones Information System, US Coast Guard, 1985

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Methanol

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula CH3 OH	1
Natural Physical State at 25°C liquid	1
Vapor Pressure 92 mm Hg at 20°C	1
Melting Point -144 °F/°C Boiling Point 147 °F/°C	1
Flash Point (open or closed cup) 52 °C/°F	1
Solubility - H_2O miscible	1
Other	

Physical Features: (odor, color, etc.) colorless liquid with a pungent odor. I.P. = 10.84 eV. (1) Relative response on the HNU = 1

II. TOXICOLOGICAL DATA

	skin		skin		
Standards:	200 ppm (2)	TLV	200 ppm (3)	PEL	25,000 ppm (1) IDLH

Routes of Exposure: Inhalation, absorption, eye contact, ingestion

Acute/Chronic Symptoms: Eye irritation, headache, drowsy, vomit, visual disturbances, light headaches, digestive disturbances, failure of vision. (1)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Toluene

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes X No ____ — 4

Toxic by-products _____

B. Flammability LEL 1.0% UEL 7.0% — 4

C. Reactivity Hazard strong oxidizers — 3

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	
Alpha particles	yes/no	
Beta particles	yes/no	
Gamma radiation	yes/no	

IV. REFERENCES

(1) The Merck Index, 11th Edition, 1989

(2) Documentation of the TLV, 4th Edition, 1980

(3) NIOSH Pocket Guide for Chemical Hazards, 1990

(4) NEPA, Protection Guide on Hazardous Materials, 8th Edition, 1984

(5) Threshold Limit Values and Biological Exposure Indices for 1991-1992.

(6) 1910.1000, 1989.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Toluene (Methyl benzene, toluol)

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula C7H8	1,2,3,4
Natural Physical State at 25°C liquid	1,2,3,4
Vapor Pressure 20 mm Hg at 20°C	3
Melting Point -95 °F/°C Boiling Point 110.6 °F/°C	1,3,4
Flash Point (open or closed cup) 40 °C/°F	1,2,3,4
Solubility - H_2O slightly soluble	1,3,4
Other miscible with alcohol, chloroform, ether, acetone, glacial acetic acid, carbon disulfide	1,3,4

Physical Features: (odor, color, etc.) colorless liquid with an aromatic odor, IP 8.82 eV, (3) derived from coal tar oil or petroleum Relative response on HNU = 10

II. TOXICOLOGICAL DATA

Standards: 100 ppm (5) TLV 100 ppm (6) PEL 2000 ppm IDLH 4

Routes of Exposure: inhalation; ingestion, skin contact, eye contact

Acute/Chronic Symptoms: Narcotic in high concentrations, headache, lassitude, and nausea. Chronic: anemia and dermatitis. (2)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Xylene, O, M, & P

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes X No ____ — 1,2,3,4

Toxic by-products _____

B. Flammability LEL 1.4% UEL 6.7% — 2

C. Reactivity Hazard strong oxidizers — 4

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	
Alpha particles	yes/no	
Beta particles	yes/no	
Gamma radiation	yes/no	

IV. REFERENCES

(1) The Merck Index, 11th Edition, 1989.

(2) Threshold Limit Values and Biological Exposure Indices for 1991-1992.

(3) 29 CFR 1910.1000

(4) NIOSH Pocket Guide to Chemical Hazards, 1990.

(5) NFPA, Fire Protection Guide on Hazardous Materials, 8th Edition, 1984.

(6) Documentation of the TLV, 4th Edition, 1980

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Xylene, O, M, & P (Dimethyl benzene)

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula C8 H10	1
Natural Physical State at 25°C liquid	1
Vapor Pressure 7-9 mm Hg at 20°C	1
Melting Point 13-14 °F/°C Boiling Point 137-140 °F/°C	1
Flash Point (open or closed cup) 90/84/81 °C/°F	1
Solubility - H_2O insoluble	1
Other soluble in alcohol, ether and most other organic solvents.	1

Physical Features: (odor, color, etc.) colorless liquid with aromatic/benzene odor. Common solvent for paints and coatings. IP = 8.5 eV. HNU relative response with 10.2 eV probe = 11.3, OVA relative response = 111 - 116%

II. TOXICOLOGICAL DATA

Standards: 100 ppm (2) TLV 100 ppm (3) PEL 1,000 ppm (4) IDLH

Routes of Exposure: Inhalation, Ingestion, Skin and/or Eye contact

Acute/Chronic Symptoms: headache, fatigue, dizziness, lassitude, narcotic effects in high concentrations (5,6). Chronic effects not well defined (1).

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Chromium (VI), insoluble salts

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X ___ _____

Toxic by-products _____ _____

_____ _____

B. Flammability LEL N/A UEL _____ _____

C. Reactivity Hazard strong oxidizers 3

D. Corrosivity Hazard yes/no pH: _____ _____

Neutralizing agent: _____ _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

1. The Merck Index, 11th Edition, 1989.
2. Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH
3. Pocket Giude to Chemical Hazards, NIOSH, 1987
4. 29 CFR 1910.1000

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Chromium (VI), insoluble salts

I. PHYSICAL/CHEMICAL PROPERTIES

		Reference
Chemical Formula	varies with compound	1
Natural Physical State at 25°C	solid	1
Vapor Pressure	N/A mm Hg at 20°C	
Melting Point	°F/°C Boiling Point °F/°C	
Flash Point (open or closed cup)	N/A °C/°F	
Solubility - H_2O	not soluble in water	1
Other		

Physical Features: (odor, color, etc.) Properties vary depending upon specific compound. Compounds include: zinc chromate, lead chromate, calcium chromate, etc.

II. TOXICOLOGICAL DATA

Standards: 0.05 mg/m^3(2) TLV 0.5mg/m^3(4) PEL 500 mg/m^3 IDLH 3

Routes of Exposure: Inhalation and ingestion

Acute/Chronic Symptoms: Chronic: fibrosis of the lung and epidemiological studies have shown increased incidence of lung cancer among workers in the manufacture of chrome pigments

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Perchloroethylene

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — 2

Toxic by-products _____

B. Flammability LEL none UEL none — 2

C. Reactivity Hazard Incompatible with strong oxidizers, chemically active metals, such as barium, lithium, and beryllium & barium; caustic soda; sodium hydroxide, potash — 2

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no		
Alpha particles	yes/no		
Beta particles	yes/no		
Gamma radiation	yes/no		

IV. REFERENCES

1. The Merck Index, 11th Edition, 1989
2. NIOSH Pocket Guide to Chemical Hazards, 1990
3. Threshold Limit Values and Biological Exposure Indices for 1991-92, ACGIH.
4. CFR 1910.1000.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Perchloroethylene

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula C_2Cl_4	1
Natural Physical State at 25°C liquid	2
Vapor Pressure 14 mm Hg at 20°C	2
Melting Point -2 °F/°C Boiling Point 250 °F/°C	2
Flash Point (open or closed cup) N/A °C/°F	2
Solubility - H_2O 0.015%	2
Other misc with alcohol, ether, chloroform, benzene	1

Physical Features: (odor, color, etc.) colorless liquid with an odor like ether or chloroform IP=9.32 eV (2) OVA Relative Response = 70%

II. TOXICOLOGICAL DATA

Standards: 50 ppm(3) TLV 25 ppm (4) PEL suspect human carcinogen IDLH 2

Routes of Exposure: Inhalation, Ingestion, Skin and/or Eye Contact (2)

Acute/Chronic Symptoms: Irritation of eyes, nose, and throat, nausea, flushed face and neck, vertigo, dizziness, incoordination, headache, carcinogen (2)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Nitric Acid

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ____ No x ____ — 3

Toxic by-products _____

B. Flammability LEL _____ UEL _____

C. Reactivity Hazard combustible organics, oxidizable matter, wood, metals, strong bases. — 1,3

D. Corrosivity Hazard yes/no pH: _____ — 3

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no		
Alpha particles	yes/no		
Beta particles	yes/no		
Gamma radiation	yes/no		

IV. REFERENCES

1. The Merck Index, 11th Edition, 1989
2. Documentation of the TLVs, 4th Ed., 1980
3. Pocket Guide to Chemical Hazards, NIOSH, 1990
4. Threshold Limit Values and Biological Exposure Indices for 1991-1992, ACGIH
5. CFR 1910.1000

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Nitric Acid

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula H·N 03	1,2,3
Natural Physical State at 25°C liquid	3
Vapor Pressure 2.6 - 103 mm Hg at 20°C	3
Melting Point -41.49 °F/°C Boiling Point 122 °F/°C	1,2
Flash Point (open or closed cup) not combustibel °C/°F	3
Solubility - H_2O miscible	
Other	

Physical Features: (odor, color, etc.) fuming colorless to yellow liquid characteristic choking odor. (1,3) IP = 11.95 eV

II. TOXICOLOGICAL DATA

Standards: 2 ppm (4) TLV 2 ppm (5) PEL 100 ppm (3) IDLH

Routes of Exposure: Inhalation, Ingestion, Skin and/or Eye contact

Acute/Chronic Symptoms: Acute: skin: corrosion of skin, irritation of eyes and mucous membranes, delayed pulmonary edema, Chronic: chemical bronchitis and pneutmonitis, can erode teeth. (3)

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

Chemical Name: Cyanides (as CN)

1) Potassium cyanide

2) Sodium cyanide

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X ___ — 1

Toxic by-products _____

B. Flammability LEL _____ UEL _____

C. Reactivity Hazard Incompatible with strong oxidizers such as nitrates, chlorates, acids, acid salts — 1

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	
Alpha particles	yes/no	
Beta particles	yes/no	
Gamma radiation	yes/no	

IV. REFERENCES

1) Pocket Guide to Chemical Hazards, NIOSH, 1987

2) Threshold Limit Value and Biological Exposure Indices for 1991-92, ACGIH

3) 29 CFR 1910.1000.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Cyanides (as CN) 1) Potassium Cyanide 2) Sodium Cyanide

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula KCN/NaCN	1
Natural Physical State at 25°C solid	1
Vapor Pressure ~0 mm Hg at 20°C	1
Melting Point 1175/1040°F/°C Boiling Point ?/2732 °F/°C	1
Flash Point (open or closed cup) not combustible °C/°F	1
Solubility - H_2O 72%/58%	1
Other	

Physical Features: (odor, color, etc.) white solids with a faint almond odor (1)

II. TOXICOLOGICAL DATA as CN

Standards: 5 mg/m^3 (2) skin TLV 5 mg/m^3 (3) PEL 50 mg/m^3 IDLH 1

Routes of Exposure: Inhalation, skin absorption, eye contact, ingestion (1)

Acute/Chronic Symptoms: Asphyxia and death can occur, weakness, headache, confusion, nausea, vomiting, incoordination of respiratory rate, slow gasping respiration, eye and skin irritation(1).

First Aid: Inhalation: artificial respiration; Ingestion: get medical attention immediately; Eye contact: irrigate immediately; Skin contact: soap and water wash immediately

REFERENCE 31

Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States

By HANSFORD T. SHACKLETTE *and* JOSEPHINE G. BOERNGEN

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1270

An account of the concentrations of 50 chemical elements in samples of soils and other regoliths

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1984

1, unlike the geometric means shown in table 2, are estimates of geochemical abundance (Miesch, 1967). Arithmetic means are always larger than corresponding geometric means (Miesch, 1967, p. B1) and are estimates of the fractional part of a single specimen that consists of the element of concern rather than of the typical concentration of the element in a suite of samples.

Concentrations of 46 elements in samples of this study are presented in table 2, which gives the determination ratios, geometric-mean concentrations and deviations, and observed ranges in concentrations. The analytical data for most elements as received from the laboratories were transformed into logarithms because of the tendency for elements in natural materials, particularly the trace elements, to have positively skewed

TABLE 2.—*Mean concentrations, deviations, and ranges of elements in samples of soils and other surficial materials in the conterminous United States*

[Means and ranges are reported in parts per million (µg/g), and means and deviations are geometric except as indicated. Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. <, less than; >, greater than]

Element	Conterminous United States			Western United States (west of 96th meridian)					Eastern United States (east of 96th meridian)				
	Mean	Deviation	Estimated arithmetic mean	Ratio	Mean	Deviation	Observed range	Estimated arithmetic mean	Ratio	Mean	Deviation	Observed range	Estimated arithmetic mean
Al, percent	4.7	2.48	7.2	661:770	5.8	2.00	0.5 - >10	7.4	450:477	3.3	2.87	0.7 - >10	5.7
As	5.2	2.23	7.2	728:730	5.5	1.98	<0.10 - 97	7.0	521:527	4.8	2.56	<0.1 - 73	7.4
B	26	1.97	33	506:778	23	1.99	<20 - 300	29	425:541	31	1.88	<20 - 150	38
Ba	440	2.14	580	778:778	580	1.72	70 - 5,000	670	541:541	290	2.35	10 - 1,500	420
Be	.63	2.38	.92	310:778	.68	2.30	<1 - 15	.97	169:525	.55	2.53	<1 - 7	.85
Br	.36	2.50	.85	113:220	.52	2.74	<0.5 - 11	.86	78:128	.62	2.18	<0.5 - 5.3	.85
C, percent	1.6	2.57	2.5	250:250	1.7	2.37	0.16 - 10	2.5	162:162	1.5	2.88	0.06 - 37	2.6
Ca, percent	.92	4.00	2.4	777:777	1.8	3.05	0.06 - 32	3.3	514:514	.34	3.08	0.01 - 28	.63
Ce	63	1.78	75	81:683	65	1.71	<150 - 300	75	70:489	63	1.85	<150 - 300	76
Co	6.7	2.19	9.1	698:778	7.1	1.97	<3 - 50	9.0	403:533	5.9	2.57	<0.3 - 70	9.2
Cr	37	2.37	54	778:778	41	2.19	3 - 2,000	56	541:541	33	2.60	1 - 1,000	52
Cu	17	2.44	25	778:778	21	2.07	2 - 300	27	523:533	13	2.80	<1 - 700	22
F	210	3.34	430	598:610	280	2.52	<10 - 1,900	440	390:435	130	4.19	<10 - 3,700	360
Fe, percent	1.8	2.38	2.6	776:777	2.1	1.95	0.1 - >10	2.6	539:540	1.4	2.87	0.01 - >10	2.5
Ga	13	2.03	17	767:776	16	1.68	<5 - 70	19	431:540	9.3	2.38	<5 - 70	14
Ge	1.2	1.37	1.2	224:224	1.2	1.32	0.58 - 2.5	1.2	130:131	1.1	1.45	<0.1 - 2.0	1.2
Hg	.058	2.52	.089	729:733	.046	2.33	<0.01 - 4.6	.065	534:534	.081	2.52	0.01 - 3.4	.12
I	.75	2.63	1.2	169:246	.79	2.55	<0.5 - 9.6	1.2	90:153	.68	2.81	<0.5 - 7.0	1.2
K, percent[1]	1.5	.79	None	777:777	1.8	.71	0.19 - 6.3	None	537:537	1.2	.75	0.005 - 3.7	--
La	30	1.92	37	462:777	30	1.89	<30 - 200	37	294:516	29	1.98	<30 - 200	37
Li	20	1.85	24	731:731	22	1.58	5 - 130	25	479:527	17	2.16	<5 - 140	22
Mg, percent	.44	3.28	.90	777:778	.74	2.21	0.03 - >10	1.0	528:528	.21	3.55	0.005 - 5	.66
Mn	330	2.77	550	777:777	380	1.98	30 - 5,000	480	537:540	260	3.82	<2 - 7,000	640
Mo	.59	2.72	.97	57:774	.85	2.17	<3 - 7	1.1	32:524	.32	3.93	<3 - 15	.79
Na, percent	.59	3.27	1.2	744:744	.97	1.95	0.05 - 10	1.2	363:449	.25	4.55	<0.05 - 5	.78
Nb	9.3	1.75	11	418:771	8.7	1.82	<10 - 100	10	322:498	10	1.65	<10 - 50	12
Nd	40	1.68	46	120:538	36	1.76	<70 - 300	43	109:332	46	1.58	<70 - 300	51
Ni	13	2.31	19	747:778	15	2.10	<5 - 700	19	443:540	11	2.64	<5 - 700	18
P	260	2.67	430	524:524	320	2.33	40 - 4,500	460	380:382	200	2.95	<20 - 6,800	360
Pb	16	1.86	19	712:778	17	1.80	<10 - 700	20	422:541	14	1.95	<10 - 300	17
Rb	58	1.72	67	221:224	69	1.50	<20 - 210	74	107:131	43	1.94	<20 - 160	53
S, percent	.12	2.04	.16	34:224	.13	2.37	<0.08 - 4.8	.19	20:131	.10	1.34	<0.08 - 0.31	.11
Sb	.48	2.27	.67	35:223	.47	2.15	<1 - 2.6	.62	31:131	.52	2.38	<1 - 8.8	.76
Sc	7.5	1.82	8.9	685:778	8.2	1.74	<5 - 50	9.6	389:526	6.5	1.90	<5 - 30	8.0
Se	.26	2.46	.39	590:733	.23	2.43	<0.1 - 4.3	.34	449:534	.30	2.44	<0.1 - 3.9	.45
Si, percent[1]	31	6.48	None	250:250	30	5.70	15 - 44	None	156:156	34	6.64	1.7 - 45	--
Sn	.89	2.36	1.3	218:224	.90	2.11	<0.1 - 7.4	1.2	123:131	.86	2.81	<0.1 - 10	1.5
Sr	120	3.30	240	778:778	200	2.16	10 - 3,000	270	501:540	53	3.61	<5 - 700	120
Ti, percent	.24	1.89	.29	777:777	.22	1.78	0.05 - 2.0	.26	540:540	.28	2.00	0.007 - 1.5	.3[illegible]
Th	8.6	1.53	9.4	195:195	9.1	1.49	2.4 - 31	9.8	102:102	7.7	1.58	2.2 - 23	8.6
U	2.3	1.73	2.7	224:224	2.5	1.45	0.68 - 7.9	2.7	130:130	2.1	2.12	0.29 - 11	2.7
V	58	2.25	80	778:778	70	1.95	7 - 500	88	516:541	43	2.51	<7 - 300	66
Y	21	1.78	25	759:778	22	1.66	<10 - 150	25	477:541	20	1.97	<10 - 200	25
Yb	2.6	1.79	3.1	754:764	2.6	1.63	<1 - 20	3.0	452:486	2.6	2.06	<1 - 50	3.3
Zn	48	1.95	60	766:766	55	1.79	10 - 2,100	65	473:482	40	2.11	<5 - 2,900	52
Zr	180	1.91	230	777:778	160	1.77	<20 - 1,500	190	539:541	220	2.01	<20 - 2,000	290

[1]Means are arithmetic, deviations are standard.

ELEMENT	COMMON LEVELS (MEANS-mg/kg)		TRIGGER LEVELS	
	SOILS	NON-MINERALSED ROCKS (*)	ROCKS/SOILS (mg/kg)	SOIL SOLUTION (mg/l)
Silver (Ag)	0.05	0.07	-	-
Arsenic (As)	5	1.5-7.7	20	0.02-7.1
Boron (B)	15	10-100	100	-
Barium (Ba)	500	500	500	500
Bismuth (Bi)	0.2	0.05-0.4	0.5	25-30
Cadmium (Cd)	0.35	0.1-0.2	1	0.2-9
Cobalt (Co)	8	20-24	40	0.1-3
Chromium (Cr)	100	75-200	100	0.5(VI)
Copper (Cu)	30	30-70	100	0.5-8
Mercury (Hg)	0.05	0.1-0.2	0.2	-
Manganese (Mn)	600	750-950	1000	1-100
Molybdenum (Mo)	2	1.5-2.5	5	0.5-2
Nickel (Ni)	50	50-100	500	0.5-2
Lead (Pb)	10	15-20	30	3-20
Sulphur (S)	700	250-2500	-	-
Antimony (Sb)	1	0.2-1.2	20	-
Selenium (Se)	0.3	0.05-0.42	2	1-2(IV)
Zinc (Zn)	50	75-95	100	60-400

Sources: Bowen (1979), Lindsay (1979), Wilson & Stevens (1981), Bresler et al. (1982) and Miller (1985).
(*): Range of means for non-mineralised rocks of various origins (i.e. igneous, sedimentary).

Golder Cross Jotty GCNZ 1987